



**SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT FOR THE
PROPOSED WILDEALSKLOOF MIXED USE DEVELOPMENT IN
BLOEMFONTEIN, FREE STATE PROVINCE**

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT-
EIA Report and Appendices A, B C E & F (Volume 1)
Appendix D: Specialist Report (Volume 2)**

**DESTEA Ref. No: EMS/9(i)(ii), 13,14,19,23,28(i),15,25,12(b)(ii)(iv)/18/19
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PROJECT DETAILS

DESTEA Reference No.	:	DESTEA Ref. No:EMS/9(i)(ii), 13,14,19,23,28(i),15,25,12(b)(ii)(iv)/18/19 NEAS Ref. No: FSP/EIA/000214/2018
Title	:	The Proposed Wildealskloof Mixed Use Development in Bloemfontein, Free State Province
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Client	:	Ideal Consulting
Report Status	:	Draft Environmental Impact Assessment Report for Authority and Public Review.
Review Period		31 August 2018- 04 October 2018
Reviewed & Approved by:		Gesan Govender

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Envirolution Consulting (Pty) Ltd was contracted by Ideal Consulting as the independent environmental consultants to undertake the Scoping & Environmental Impact Assessment for the proposed project. Envirolution is not a subsidiary or affiliated with Ideal Consulting. Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project. Envirolution Consulting is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance with environmental legislation and evaluate the risk of development; and the development and implementation of environmental management tools. Envirolution Consulting benefits from the pooled resources, diverse skills and experience in environmental field held by its team. We offer solutions to environmental issues that are key during our clients' planning and decision-making processes. The Envirolution Consulting team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects in South Africa, including those associated with linear developments.

As required by NEMA, the qualifications and experience of the key independent Environmental Assessment Practitioners (EAPs) undertaking the EIA are detailed below and Curriculum Vitae provided in **Appendix F**.

Project manager :Jubilee Bubala holds a Master's of Science degree from the Witwatersrand University. She has 10 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; environmental auditing and compliance reporting; the identification of environmental management solution and mitigation/risk minimising measures; environmental auditing, monitoring and reporting compliance; and developing and implementing ISO 14001:2004. Jubilee has been a project scientist for various EIA's in South Africa and Southern Africa. Jubilee is currently a Project Manager and Environmental Consultant at Envirolution Consulting Pty Ltd.

Project Director and Reviewer: Gesan Govender is a registered Professional Natural Scientist No: 400049/12) and holds an Honours degree in Botany. He has over 15 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and

guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

The curriculum Vitae and a sworn affidavit by the EAP confirming that the information provided to the Department was at no stage influenced by the applicant and that the EAP has explained the potential consequences of submitting this application are attached within **Appendix F** of this report.

EXECUTIVE SUMMARY

I. BACKGROUND

Ideal Consulting proposes the establishment of a mixed use development as well as associated infrastructure in Bloemfontein, Free State Province. The total study area proposed for development is approximately 587 hectares located within the boundary of Mangaung Metropolitan Municipality.

The Wildealskloof Mixed Use Development entails the construction of the following land uses: Single Residential Units, Apartments and "flat" Units, Retirement facility, School Housing (Boarding Houses), Offices, a Regional Shopping Centre, Industrial Land Uses, Memorial Park (Cemetery), Parks, Conservation areas, Municipal land uses, Hotel and Spa, Churches, Schools, Creches roads and bulk services infrastructure

Based on a pre-feasibility analysis, site identification and environmental screening process undertaken by Ideal Consulting, a favourable site has been identified for consideration and evaluation through an Environmental Impact Assessment (EIA) process.

The Wildealskloof Mixed Use Development is proposed to be developed on the remaining extent of the Farm Olrig No. 1710 & Portion 4 of the Farm Wildealskloof No. 1205, Bloemfontein, Free State Province. The site is adjacent to the Provincial Road R700 and the National Road N1 and is approximately 10 km North of Bloemfontein CBD. The site

geographical coordinates are: 29°01'26.76"S: 26°13'48.64"E: The site falls within the jurisdiction of Mangaung Metropolitan Municipality.

In terms of sections 24(2) and 24D of the National Environmental Management Act (Act No. 107 of 1998), as read with the Environmental Impact Assessment (EIA) Regulations of GN R982, as amended by GN R326) the proposed development triggers a listed activity for which a Scoping and Environmental Impact Assessment Process is required in order for Ideal Consulting to obtain environmental authorisation for the construction and operation of the proposed development.

II. REQUIREMENT FOR AN ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The construction and operation of the proposed Wildealskloof Mixed Use Development is subject to the requirements of the Environmental Impact Assessment Regulations (2014 EIA Regulations) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is the National legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker)

charged by NEMA with granting of the relevant environmental authorisation.

In terms of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998, **Ideal Consulting** requires authorisation from Department of Economic Development, Small Business Development, Tourism and Environmental Affairs (DESTEA) for the construction and operation of the proposed Wildealskloof mixed-use development.

Envirovolution Consulting Pty Ltd has been appointed by Ideal Consulting to undertake the Scoping and Environmental Impact Reporting (S&EIR, also referred to as EIA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA). The EIA process is being undertaken in accordance with Section 21 of the EIA Regulations, 2014 (GN R982, as amended by GN R326).

In order to obtain an environmental authorisation, comprehensive, independent environmental studies must be undertaken in accordance with the EIA Regulations.

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts (and indicates whether potential environmental impacts can be avoided, minimised or mitigated to acceptable levels). It provides the

opportunity for the developer to be forewarned of potential environmental issues, allows for resolution of the issues reported on in the Scoping and EIA Reports as well as facilitating dialogue with interested and affected parties (I&APs).

Comprehensive, independent environmental studies are required in accordance with the EIA Regulation to provide the competent authority with sufficient information in order to make an informed decision. Ideal Consulting has appointed Envirovolution Consulting (Pty) Ltd, as independent environmental consultants, to undertake the required Scoping phase and EIA process and compile the BA Report and Environmental Management Programme (EMPr).

III. WATER USE LICENCE

In terms of the National Water Act No. 36 of 1998(NWA), an Integrated Water Use Licence is required for the development for the triggered water uses under section 21 of the Act. This is a legislative process governed by Department of Water and Sanitation (DWS) for the authorisation of all water used defined in Section 21.

IV. NEED AND DESIRABILITY OF THE PROPOSED PROJECT

The idea of the Wildealskloof development was born from the need of an all-inclusive socio-economic mixed-use development to the north of the Bloemfontein CBD. TAs the CBD of Bloemfontein is under great pressure for

development, the idea of creating a new economic hub to the north of Bloemfontein is an exciting new possibility.

Tenure options will range from fully subsidised, to higher income residential units. The reality of a mixed land use development will bring the "new urbanism" idea of life to Bloemfontein. Giving life to a development that will change the face of Bloemfontein for the future and relieving pressure from the Bloemfontein CBD. Development around cities and towns are necessary to accommodate an ever growing population. This development is imperative to Mangaung Metropolitan Municipality as it addresses the need of basic services, housing, economic growth, job opportunities and in turn reduces poverty levels within the metropolitan. This activity is in line with the 2017 Integrated Development Plan of Mangaung Metro as the area and its vicinity is earmarked for future residential development.

V. IDENTIFICATION OF POTENTIAL IMPACTS AND CONCLUSION OF SPECIALIST STUDIES

In summary, the following conclusions have been drawn from the specialist studies undertaken and is concluded as follows:

Impact on Paleontological Resources

The study area was assessed in terms of the archaeological component of Section 35 of the NHRA during a field survey of the development footprint, no fossiliferous outcrops were found. For this reason, a low

paleontological sensitivity is allocated to the development footprint. Irrespective of the uncommon occurrence of fossils a solitary fossil may be of scientific value as many fossil taxa are known from a single fossil. The recording of fossils will expand our knowledge of the Paleontological Heritage of the development area. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the Wildealskloof mixed used development and associated infrastructure will be of a low significance in paleontological terms. It is therefore considered that the construction and operation of the Wildealskloof development is deemed appropriate and feasible and will not lead to detrimental impacts on the paleontological resources of the area. From a paleontological perspective, the construction and operation of the development may be authorised as the whole extent as the development footprint is not considered sensitive in terms of paleontological resources.

Impact on Heritage Resources

In terms of the built environment of the area (Section 34), the following heritage resources were discovered during the survey

- An existing informal burial place containing approximately 10 graves marked by stone cairns. (Farm: Orlig 1710; Coordinates: S 29, 02969, E 26, 22727).
- A low density scatter (1/5m²) of MSA stone tools (blades and scrapers) and flakes was identified at the eastern foot of the hill located in the south-western

corner of the study area. (Farm: Orlig 1710; Coordinates: S 29, 03001, E 26, 22709).

- At least twenty structures identified as sangars occur on the western side of the hill, with a few located on the eastern side. (Farm: Orlig 1710; Coordinates: S 29, 02997, 26, 22577).

Based on the results of the field survey of the proposed Wildealskloof Mixed Use Development there are no significant heritage risks associated with the development and from an archaeological point of view there is no reason why the development should not proceed if the recommendations as made in the report area adhered by and based on approval from SAHRA. Nonetheless of the two provided layouts, Layout Alternative 1 is more preferred as it has excluded the heritage sites from being developed and instead included the heritage site as part of the public open space

Impacts on Soil, Agriculture and Land use

Soils of the study site are predominantly fairly shallow, dark coloured, clay-rich soils on underlying rock, of the Arcadia, Milkwood and Bonheim soil forms, with some rock outcrops. The soil limitations for rain fed crop production are high clay content, with shrink-swell characteristics, limited depth and occurrence of rock outcrops. The very high clay content soils are limited in terms of their plant available moisture reservoir. The limited moisture reservoirs, in combination with fairly low rainfall, make the study area unsuitable for

rain fed crop production. Insufficient water availability limits the potential for irrigation.

There is only one impact of the development on agriculture, and that is the loss to agriculture of the 580 hectares of agriculturally zoned land used for grazing due to rezoning and occupation of the site by the development. Because the land is unsuitable for cultivation, its loss as agricultural land is assessed as being of only medium significance.

Because the proposed development site is only suitable as grazing land, it is agriculturally strategic, from a regional and national food security point of view, to target such non-arable and less scarce land for satisfying inevitable urban development requirements, rather than higher potential arable land in the area. For this reason, from an agricultural impact point of view, the development should be authorised. There are no conditions resulting from this assessment that need to be included in the Environmental Authorisation.

Impacts on Vegetation

The proposed Wildealskloof Mixed Use development will impact largely on the transformed open grassland that was found to be of intermediate flora ecological sensitivity. However, low rocky hill and Rocky grassland vegetation and wetland and riparian vegetation unit were also recorded on site and were classified as high sensitivity to the proposed development. In addition, a number of Provincial species of conservation concern were also identified on site namely

Haemanthus humilis subsp. *Humilis*, *Boophone disticha*; *Brunsvigia radulosa*, *Hypoxis hemerocallidea*, *Ammorcharis coranica*; *Nerine laticoma*, *Raphionacme dyeri*,

This assessment noted that the proposed development mainly makes use of areas where historical impacts took place (transformed open grassland of low ecological sensitivity). The majority of the high floral sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both layout alternatives. The high floral sensitivity Low Rocky Hill and Rocky Grassland vegetation units are also included within a designated Open Space in layout Alternative 1.

From the results of the impact assessment, it was found that the majority of the potential impacts may be reduced to medium or low significance impact levels. Based on the information gathered during the background and field assessments with regards to the ecological condition of the vegetation within the study area, it is the opinion of the vegetation specialist that the proposed project be considered favourably from a floral resource perspective, taking integrated environmental management into consideration and provided that the mitigation measures as set out in this report are implemented.

Such mitigation includes the conservation of the wetland areas and appropriate buffer areas identified, the conservation of the Low Rocky Hill and surrounding Rocky Grassland vegetation units as identified during the assessment, as well as considering conserving

selected intact portions of open grassland within the study area as part of the open space areas of the development. In addition, the rehabilitation of any areas impacted as a result of the proposed project, the eradication and control of alien vegetation within the study area (with emphasis on the eradication of National Environmental Management Biodiversity Act (NEMBA) listed Category 1b species), as well as the on-going control and prevention of spread of alien species that may proliferate during operational of the project should take place.

In summary, from a vegetation perspective, no objection can be raised should development of the Wildealskloof proceed. Two layout alternatives are considered for the project (refer to Appendix A). When considering these layout alternatives from a floral perspective, the majority of the high floral sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both alternatives. The high floral sensitivity Low Rocky Hill and Rocky Grassland vegetation units are also included within a designated Open Space area, while developments of these vegetation units are proposed in the alternative layout. Of the two layout alternatives considered, the layout Alternative 1 is the preferred alternative from a floral perspective.

Impact on Fauna

Overall, the remaining natural terrestrial habitats are considered as of only Medium-Low sensitivity, except for the non-perennial river, the two non-perennial streams and the

small depressional pan wetland, as well as their buffer zones, should be considered as Medium-High ecologically sensitive. The hill or kopje is also sensitive and must be excluded from any development due to unique habitats and the presence of many species, including the mountain reedbuck. The Endangered Species treat the site as part of their home ranges / territories. There is a possibility that about 9 species of mammals with a Red Data status may occur on the study site. Most of these species include bats, which move over huge distances. It is very difficult to confirm whether any of the bat species are present on any study site, but there is a possibility that some red data bats species does occur on this particular study site.

In optimum conditions the possibility exists that the Southern African hedgehog may occur on the study site. There is a very small chance that the small spotted-cat, brown hyena and African striped weasel could occur on this particular study site. The possibility exists that at least some individuals of giant bullfrog and striped harlequin snake occur on the study site. The development is expected to destruct mammal and herpetofauna habitats and also displace individual animals and vertebrates rather than populations, hence it is concluded that irreplaceable loss of species will not occur within the general area nor will any Red Data species be significantly affected.

From a mammal and Hepertofauna perspective, no objection can be raised should

development of the Wildealskloof Mixed Use Development proceed.

Visual Impacts

The significance of the visual impact is determined through separate assessments of impacts on the landscape character and impacts on observers in the study area. This has been done for the construction and operational phases as each phase presents different impacts. The landscape character and the observers are receptors in the study area and have different sensitivities when confronted with an alteration to the status quo scenario. It is expected that each receptor will respond differently to the visual impacts.

The sources of impact originate from the construction activities during the lengthy construction phase and the major land use change and associated transformation of the baseline conditions in the study area.

The scale of the assessment includes the regional area up to 10 km but with a maximum impact zone reduced to a 3 km radius. The study area is considered to have a moderate VAC due to the varied topography to the south and south east as well as the major influence of vegetation on localised screening capacity. The baseline character is defined by a predominantly rural landscape with a land cover of grassland, agricultural fields and natural vegetation along tributaries and on hills and ridges.

Three observer groups are identified in the study area namely; residents, tourists and

motorists. Residents and tourists are considered the most sensitive receptors. Residents from Mimosa Park S.H. and Ribblesdale are expected to experience the highest levels of visual exposure. Viewer incidence is however low due to the low population density. Affected tourists are identified as those visiting the nearby Sangiro Game Lodge and attractions at Tredenham Hill and Somerton Estate. A high viewer incidence is expected for motorists due to the high traffic volumes on the N1. Motorists exposure to the visual impacts will however be brief and therefore their sensitivity is considered low.

The landscape character is considered to have a medium sensitivity. The site and its surroundings are not particularly unique, and its identity is typical of the rural Free State landscape. The grassy plains and small tributary are visually pleasing elements, but lack dramatic diversity to place it in a unique category. The site contributes to a regional sense of place that portrays a rural and sparsely developed sense of place with elements of natural features such as the undisturbed hills and tributary. A peaceful character prevails as farming activities cultivate land parcels while grasslands are grazed by cattle.

The essence of determining the significance of a visual impact centres on the severity of the potential impacts, and the sensitivity of the affected receptors. During the construction phase, moderate to moderate/minor impacts are expected on the receptors with the highest rating being on the residents, tourists and landscape character. A major significant

impact will occur during the operational phase on the residents and tourists, mainly due to the substantial visual change from a rural land use to a mixed-use development.

Mitigation measures are however paramount to alleviate the anticipated impacts. Screen planting will yield the greatest result and should be planted along the perimeter of the development in the early stages to gain maturity as soon as possible. The development should also consider roof gardens as well as adopt a vision of “greening” to compensate for the loss of vegetation. These measures should form part of a master plan development during the design and implementation phases.

No fatally flawed issues are identified on the bases of visual impacts, but serious consideration should be given to the IDP of Mangaung Metropolitan Municipality in order to adhere to town planning schemes etc.

Impact on Wetland

Four watercourses were recorded on the study site. The watercourses can be classified as one non-perennial ephemeral river, two non-perennial episodic streams (drainage lines) and one very small depression pan wetland.

The episodic streams are very small and no clear channel could be discerned. The episodic streams also lacked woody species and were dominated by grasses similar to the adjacent terrestrial grasses with some additional species such as *Brachiaria eruciformis*, *Panicum coloratum* and *Pennisetum sphecelatum*. The site visit was conducted after heavy rains and

no water flow was seen in these streams. Thus these small episodic streams are not likely to contribute greatly to stream flow regulation or conveyance of water.

The ephemeral stream located in the north eastern corner runs through to the south east and western corner of the study site. It is dominated by dense woody riparian vegetation. The stream flows from south to north where it flows into the Stinkhoutspruit River approximately 2 km north of the study site. During the site visit the main channel was recorded as flowing

The current assessment finds that a minimum buffer of (15-31) m from the edge of the wetland boundaries during the construction phase and (15-22) m from the edge of the wetland boundaries during the operation phase should be respected. Should development occur within the watercourse it is important that appropriate mitigation measures are put into place and carefully monitored to ensure minimal impact to regional hydrology. The majority of the Wetland sensitive area is included as part of a Public Open Space area within both layout alternatives. This assessment has demonstrated that the development is feasible and that there are no fatal flaws from a wetland perspective.

Social Impacts

The proposed Wildealskloof Mixed Use Development could result in different negative social impacts with varying rates of intensity and significance. The construction phase will span approximately 10 years or longer. The main positive socio-economic impact during

this phase refer to the 3 000 opportunities that would be provided over this period of time. The presence of these construction workers in the area would have a temporary impact on the population profile for the duration of the construction phase. Intrusion impacts would thus mainly be felt by the residents of the smallholdings in close proximity to the proposed development. The negative social impacts associated with an inflow of a workforce and jobseekers (mainly temporary) could be minimised should local residents be employed.

Other intrusion impacts related to noise, vibration, dust, odour or air pollution, to nearby residents due to the on-going construction activities that would last approximately 10 years. These impacts and activities would already change the amenity or aesthetic appeal of the semi-rural area. The sense of place would thus be permanently altered.

The proposed development would require different infrastructure and services. Although new infrastructure would be created by the proposed development itself, and services would be provided, some inputs in this regard would be required from the MMM. The provision of water, as well as the availability of water remains a concern. From a social point of view, it is important to note that any decrease in the property values of properties surrounding the site would have severe negative financial implications for the affected landowners. It is thus imperative that uncontrolled urban sprawl is contained and that

the development is implemented based on best practice. The water quality and quantity of these residents must further not be negatively affected by activities associated with the proposed development.

The proposed site is not occupied at the moment and therefore one of the main concerns for the neighbouring residents would be the increased risk in community safety and criminal activities, as a result of the increase in people movement and increase in the population profile (construction workers and occupiers of the residential units). Concerns from the existing residents with regards to safety risks should not be dismissed as irrational and therefore unimportant.

The proposed Wildealskloof development is anticipated to have a marked population change with severe impacts in terms of its size and density. A rapid change in the local population could thus start during the construction phase and continue in the long term. The population increase also refers to the inflow of workers and possible jobseekers. This population increase would therefore result in various socio-economic impacts and would put additional pressure on the already challenged local infrastructure and services. The key mitigation measure in this regard would be the employment of locals as far as possible.

As the proposed site is situated in a low density area, the sudden increase in the population figures could be overwhelming to the residents currently living on the smallholdings and who chose to live in a semi-

rural area. The land use changes and possible impact on the existing residents' sense of place cannot be reversed and would start to materialise during the construction phase and continue until the development has been completed. The rural area would change to a high density urban area. The impact on the sense of place and intrusion impacts would affect them negatively and their quality of life could be compromised.

A well-managed housing development would however assist in addressing the local housing needs. Strict procedures and enforcement of environmental regulations are thus vital to the well-being of all the residents.

The proposed project would have the following anticipated positive social impacts:

- Even though the majority of the job opportunities would only be of a temporary nature, it could still result in positive spin-offs especially in the area characterised by relative low employment levels. The development is not anticipated to significantly reduce the unemployment rate of the area, but it would still contribute to relieving poverty in the area.
- Educational and health care facilities are further planned as part of the development. To maximize the benefits, it must be ensured that the planned facilities accommodate the long term needs of the number of learners and residents.

- The MMM's tax base would be extended resulting in improved income due to the proposed development.
- New business developments could materialise to meet the needs of the increased population profile.
- The proposed development would provide a choice in housing types which would attend to the different economic needs within one township.
- The benefits that would accrue through the provision of housing infrastructure as such would be enhanced if the local community members would be the occupiers of the houses.
- Further enhancement of benefits would refer to the local procurement and use of local labour, especially during the construction phase
- At this stage, it is believed that the majority of the negative social impacts associated with the construction and operation of the proposed development could respond to mitigation and would depend on the adherence to the environmental guidelines.

It should be noted that the social integration of the residents could remain a challenge for the foreseeable future. The principle of densification and different integrated social classes would however have to be accepted as affordability for such housing projects remains a critical issue.

Concluding Remarks

The proposed Wildealskloof Mixed Use Development aims to ensure integrated

development by addressing the housing needs of a wide range of community members with different income levels. The different type of housing on offer will thus accommodate a wide range of families. Educational and health care facilities, office parks, an industrial area and so forth will further assist in ensuring a sustainable development.

Possible negative impacts associated with the increase in the population profile can be addressed during the construction period and during the operational phase due to the phased approach in occupying the residential sections. The development, on the other hand, would assist to accommodate the ever growing population. Safety and security issues would remain a concern and the mitigation measures to avoid any increase in criminal activities should be strictly implemented.

The majority of the negative social impacts associated with the construction and operation of the proposed development could respond to mitigation and would depend on the adherence to the environmental guidelines.

This development could further ensure economic growth, assist to reduce poverty by creating new employment opportunities, boost growth for different businesses, help improve livelihoods and the economic growth of a specific location. This would raise the living standards of those residing in the development.

An integrated planning process with the MMM is required to ensure sustainable development and that the needs for infrastructure and services are timeously met. On-going and constructive communication between the

developer, the local landowners and the MMM would thus be the main platform for ensuring the success of the proposed project.

Based on the findings of the SIA, it is thus recommended that the proposed development be considered by the authorities

Socio Economic Impacts

The proposed Wildealskloof mixed use development could have a large positive effect on the local economy of MMM during the construction phase and could continue to contribute positively to the local economy during the operations phase provided that attention is given to attracting new Greenfield investments to the development.

A potential economic concern related to the development is the remote location in relation to the Bloemfontein CBD, its location in a low density area and its lack of alignment to the spatial policy of urban densification and the development of the N8 corridor to the east. Its positive contribution to the spatial economy is that it is a mixed used development that could reduce the traveling time of low income residents who are working in planned commercial activities within development. However it is still foreseen that a large portion of low income residents will still have to make use of public transport working on the outside.

Despite the shortcomings, the development is in line with current market-driven spatial trends developments in the Bloemfontein area and is expected to have a net positive economic impact on the economy of MMM. It also supports the spatial strategies in

contributing to the de-racialization of the built environment by promoting the development of affordable or governments-sponsored properties in high value areas. Based on the economic assessment specialist, it is recommended that the project should be granted its environmental authorisation to proceed.

The other identified construction impacts such as the noise, pollution due to inappropriate handling of waste on site and air pollution are all those that are common to a built environment and can all be mitigated to have a very low significance

Cumulative Impacts

The study area is situated approximately 10km from the Bloemfontein central business District. The closest town is Bloemfontein. The site and the immediate surrounding areas are mostly agricultural farmland with cultivated or grazing fields dominating the study area. On a regional basis the N1 provide access to the study area. Prominent features in or near the study area include:

The Bloemfontein Botanical Gardens are situated 2.2 km south of the site, but a couple of small hills visually separate the two locations from each other.

- The Bainsvlei / Ribblesdale Road (S1066) runs to the north and east of the site, with the Mimosa Park Smallholdings situated to the north of the farms and north of the Bainsvlei / Ribblesdale Road.

- The Summerwood Country Estate and Guesthouse which hosts conferences and functions (e.g. weddings) is located within the Mimosa Park Smallholdings. The majority of the smallholdings adjacent the site is used for residential purposes with some limited agricultural activities such as the grazing of livestock.
- The Gwen Bali waterpark is also situated on one of these smallholdings just to the north of the site.
- Approximately 3-5 km to the west of the proposed site is the existing Woodland Hills Wildlife Estate. The construction of the next phase of the Woodland Hills Wildlife Estate has started to the east of the existing development. The land opposite the proposed site, located to the west of the R700, belongs to Our Father's Home Church (Mountain View 1707: RE/1707). A school has been built within the northern section of this property, but has not yet been occupied by learners.
- The Waveren Game Farm (Waveren 1103) is situated to the north west of the proposed site.
- The area to the south of the N1 (approximately 2 km south of the proposed site) is characterised by various new residential estates, such as the Oubos Landgoed Estate, Somerton, Penrose, Fredenham Valley, Strathearn Estate, Wild Olive Estate and the Tredenham Boutique Hotel.
- The Sangiro Game Lodge that offers accommodation on a small game reserve is also situated to the south of the site, opposite the Shell Ultra City. The implementation of bulk services for further residential developments on the property of Sangiro Game Lodge has also started.
- The land to the east of the proposed site and south of the N1 is also still being used for agricultural purposes, with the Ribblesdale small holding area to the south east of the site. Some sections of these smallholdings are occupied by and used for industrial related activities. Wildealskloof 1205 Portion 2 and 3 which are situated directly to the east of the proposed development accommodates infrastructure for poultry production but are currently not in use.
- There are a number of planned township developments within the study area.

Considering the nature of the proposed development project, as well as the existing and planned developments in the area, there is potential for cumulative impacts to occur. Based on the findings of the specialist reports undertaken for the project the cumulative impacts for the proposed Wildealskloof Mixed Use Development are expected to be low to Moderate

VI. PUBLIC PARTICIPATION PROCESS

Interested and Affected Parties, including surrounding and affected landowners, Provincial, National and Local Governments Departments were involved during the Public Participation Process (PPP).

The Draft EIA Report will be available to the stakeholders, the public and all registered I&APs for a review period of 30 days. Dates and venues of the availability of the report were communicated to registered IAPs.

VII. ALTERNATIVES/DEVIATIONS CONSIDERED

Specialist studies and the interaction with land owners during the Public Participation Process (PPP) have guided the design of the layout alternatives considered in this scoping and EIA process. The proposed alternatives will be assessed by the Scoping and Environmental Impact Assessment Reports and recommendations from the investigations are likely to inform a decision on the preferred design layout. When the project was initiated, Design layout Alternative 2 (Figure 1b below) was proposed but it was found that the south western section of the study site would have impacted negatively on the heritage resources and also areas of high ecological sensitivity such as the rocky grassland and the hill. To avoid the impact, Design Layout 1 (indicated in Figure 1a) was designed which will now be investigated as part of this EIA.



Figure 1a: Overview of the Design Layout Alternative 1.



Figure 1b: Overview of the Design Layout Alternative 2

The No Go Option: A No Go Option implies the consequences of not constructing the proposed Wildealskloof Mixed Use Development and the subsequent implications on sustainable development. No footprint would result from this option and the status quo of the area will be retained. While this cancels out negative impacts that would have occurred should the project proceed, it also means that the positive impacts of the new infrastructure would not realise

VIII. OVERALL CONCLUSION (IMPACT STATEMENT)

Layout Alternative 1 (Figure 1a) avoids some of the high sensitivities identified on the site,

and is nominated as the preferred alternatives following the full assessment through this EIA process for the following reasons:

- In terms of impacts arising from destruction/alteration of Heritage artefacts or features a result of construction activities, the impacts would be the similar for Layout Alternative 1 and Layout Alternative 2 for most of the site orientation, apart from the fact that Layout Alternative 2 would impact on the graves and also other heritage resources such as a low density scatter of MSA stone tools and flakes identified at the eastern foot of the hill located in the south-western corner of the study site are; and approximately twenty structures identified as sangars also occurring on the western side of the hill, with a few located on the eastern side.
- From a flora, avifauna and fauna perspective, there is no significant difference in the potential impacts of the two design layout alternatives for the majority of the alignments. A difference emanate with the identified high sensitive rocky grassland, hill or kopje also located on the south-western corner of the study site. , Design Layout alternative 2 (Figure 1b) would impact on the rocky grassland and hill which has been identified in this EIA as an area of high sensitivity from an ecological perspectives. This land use conflict results in the Design Alternative 2 being less desirable from an ecological (flora fauna, and avifauna) perspective.

However, it must be noted that they are certain sensitivities on site that are unavoidable by either of the alternatives. In order to protect biodiversity and conserve sensitive environments during development, steps that

should be followed are to firstly avoid, then minimize, then repair or restore, and finally compensate for, or offset the negative effects of any development on biodiversity (Macfarlane *et al*, 2014). Thus where the impact is unavoidable, the impacts must be minimised and the unavoidable and unforeseen impacts restored or rehabilitated. The section below summarises how this mitigation hierarchy has been applied to mitigate impacts that are likely to occur on site.

- **Impacts on wetland and riparian vegetation grassland:** Vegetation associated with the wetland and riparian vegetation unit was classified as being of high sensitivity, it is recommended that the storm water outlets, attenuation facilities and the two road bridges proposed in some sections of the wetland should be constructed with minimal impacts. Due to the nature of the development, neither of the proposed alternative can avoid this area, though the use of wetland rehabilitation and monitoring plan (Appendix F) as well as the findings of the flood line determination report (Appendix F), this impact can be minimised and managed.
- **Impacts on open grassland:** The open grassland covers an area covers an area of approximately 80% of the study site. The grassland has an intermediate flora ecological sensitivity. Due to the nature of the development it is inevitable that the development will not impact on this grassland. Although Development within this vegetation unit will not lead to a significant loss of floral biodiversity and habitat within the larger region, however it is recommended that partial conservation of selected intact grassland portions be incorporated into the open space areas

planned as part of the mixed-use development. Edge effects within these areas must be strictly managed to avoid disturbance within adjacent natural habitat. Where provincially protected floral Species of Conservation Concern (SCC) fall within the developments, e.g. *Ammorcharis coranica*, *Nerine laticoma*, *Raphionacme dyeri* permits have to be obtained from the Free State **Province Department of Economic Development, Tourism and Environmental Affairs** (DESTEA) for relocation of such species to similar suitable habitat within the boundaries of the study area

- **Impact on wetlands:** Although both, the majority of the high sensitivity Wetland and Riparian area is included as part of a Public Open Space area within both design layout alternatives. It is recommended that a minimum buffer of 30 m from the edge of the wetland boundaries should be respected. However, technically based on the nature of the development, this impact cannot be totally avoided totally, but through the use of wetland rehabilitation and monitoring plan (Appendix E). The wetland rehabilitation and monitoring plan is specific to the construction of some of the land uses of the proposed development that will fall within the delineated wetlands or within the protective buffer thereof, including construction of storm water outlets and attenuation facilities that could impact on the wetlands. In addition, the rehabilitation plan also applies to disturbances in wetlands where absolutely necessary in order to construct the aforementioned land uses. The overall objective of this plan is to return the environment in and around footprint of the road to a state as

close to the state prior to construction and to limit or negate any construction and operational associated impacts.

In addition, a flood line determination report (Appendix F) has been undertaken in the EIA investigations as part of the formulation of mitigation for the impact of storm water structures on the receiving environment i.e. the floodplain and streams. These recommendations are aimed to reduce the impact the storm water outlets, attenuation facilities and the two road bridges construction will have on water resources within the study area. The wetland report has recommended that the designs for outlet should include vegetated, rock lined bio-retention ponds to ensure slow release of water into the watercourse. The two road bridges that will span over the watercourse must be constructed with less impact on the wetland.

The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no insurmountable environmental or social constraints that prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented. The project has considered constraints, and is considered to meet the requirements of sustainable development. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Programme (EMPr) for the proposed Wildealskloof Mixed Use Development and are included within **Appendix E**. With reference to the information available at this planning approval

stage in the project cycle, the confidence in the environmental assessment undertaken is regarded as acceptable provided all measures are taken to protect and preserve surrounding environment.

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- Appendix A.1: Locality Maps
- Appendix A.2: Sensitivity Maps
- Appendix A.3: Preliminary Design
- APPENDIX B: DESTEA CORRESPONDENCE
- APPENDIX C: PUBLIC PARTICIPATION REPORT
- Appendix C.1: Proof of Site Notices
- Appendix C.2: Background Information Document & Correspondence to & from IAPs
- Appendix C.3: Knock & Drop Register
- Appendix C.4: Newspaper Advertisement
- Appendix C.5: Project Database
- Appendix C.6: Correspondence with Organs of State
- Appendix C.7: Minutes of the Information Sharing Meeting & Attendance Register
- Appendix C.8: Proof of Draft Scoping Report Circulation to Organs of State & the Public
- Appendix C.9: Comments Received on the Draft Scoping Report
- Appendix C.10: Public Meeting & Attendance Register (N/A-to be held during the review period of the DEIR)

APPENDIX D: SPECIALIST REPORTS VOLUME 2

- Appendix D.1: Agriculture Assessment Report
- Appendix D-2: Avifauna Assessment Report
- Appendix D-3: Mammal & Hepertofauna Impact Assessment Report

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- Appendix D.5: Paleontological Impact Assessment Report
- Appendix D.6: Social Impact Assessment Report
- Appendix D.7: Socio-Economic Impact Assessment Report
- Appendix D.8: Visual Assessment Report
- Appendix: D-9 Vegetation Assessment Report
- Appendix D-10: Wetland impact Assessment Report
- Appendix D-11: geotechnical Assessment Report
- Appendix: D-12 Traffic Impact Assessment Report

- APPENDIX E: SITE MANAGEMENT PLANS
- Appendix E-1: Draft Environmental Management Plan
- Appendix E-2: Alien Management and Monitoring Plan
- Appendix E-3 Wetland Rehabilitation and Monitoring Plan
- Appendix E-3: Phase 1 traffic management plan

APPENDIX F-OTHER INFORMATION

- Appendix F-1: Bulk Services Report
- Appendix F-2: Floodline Determination Report
- Appendix F.3: EAP Declaration and Affirmation
- Appendix F-4: Specialist Declarations

GLOSSARY OF ABBREVIATIONS

DESTEA: Department of Economic Small Business Development Tourism and Environment
Affairs

EIA: Environmental Impact Assessment

EMP: Environmental Management Programme

IDP: Integrated Development Plan

I&AP: Interested and Affected Party

MMM: Mangaung Metropolitan Municipality

SIA: Social Impact Assessment

SDF: Strategic Development Framework

StatsSA: Statistics South Africa

1. Introduction

1.1 Background and Introduction

Ideal Consulting proposes the establishment of a mixed use development as well as associated infrastructure in Bloemfontein, Free State Province. The total study area proposed for development is approximately 587 hectares located within the boundary of Mangaung Metropolitan Municipality.

The Wildealskloof Mixed Use Development entails the construction of the following land uses: Single Residential Units, Apartments and "flat" Units, Retirement facility, School Housing (Boarding Houses), Offices, a Regional Shopping Centre, Industrial Land Uses, Memorial Park (Cemetery), Parks, Conservation areas, Municipal land uses, Hotel and Spa, Churches, Schools and Creches. The proposed township will be developed in twenty one (21) phases (Refer to Appendix A3-for the Phase out plan).

Based on a pre-feasibility analysis, site identification and environmental screening process undertaken by Ideal Consulting, a favourable site has been identified for consideration and evaluation through an Environmental Impact Assessment (EIA) process.

Consequently, and in terms of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998, Ideal Consulting requires authorisation from Department of Economic Development, Tourism and Environmental Affairs (DETEA) for the construction and operation of the proposed Wildealskloof mixed-use development

In terms of the National Water Act No. 36 of 1998, an Intergrated Water Use Licence is required for the development for the triggered water uses under section 21 of the Act.

This is a legislative process governed by Department of Water and Sanitation (DWS) for the authorisation of all water used defined in Section 21.

Ideal Consulting has appointed Envirolution Consulting (Pty) Ltd, an independent environmental consultant, to conduct the Environmental Impact Assessment, including the public participation process for the proposed development.

The first phase of the EIA, the scoping study, has been completed and included a Public Participation Process (PPP), aimed at identifying issues and concerns of Interested and Affected Parties (IAPs). The objective of the Scoping Study was to identify those issues and concerns that must be investigated in more detail, and included a Plan of Study for the EIA. The Final Scoping Report and Plan of Study was approved by DESTEA on 07 August 2018 (see Appendix B).

The second phase of the EIA commences with the Draft Environmental Impact Report (this report). The aim of this report is to present the results of investigations of the issues and concerns identified in the Scoping Study, identify and assess the potential impacts of the development and provide recommendations with the objective of minimising negative environmental impacts and maximising benefits.

1.2 Purpose of the Report

In terms of relevant legislation, the development of the Wildealskloof mixed use development may not commence prior to obtaining a suite of authorisations (see Section 2). This report has been compiled in support of these applications. The EIA Report documents the steps undertaken during the Impact

Assessment Phase to assess the significance of potential impacts and determine measures to mitigate the negative impacts and enhance the benefits (or positive impacts) of the proposed Project.

The report presents the findings of the Impact Assessment Phase and the public participation that forms part of the process.

The EIA Report is accompanied by an Environmental Management Programme (EMP), which documents the management and monitoring measures that need to be implemented during the Design, Construction and Operations phases of the Project to ensure that impacts are appropriately avoided or mitigated and benefits enhanced. More specifically, the objectives of this EIA Report are to:

Inform the stakeholders about the proposed Project and the S&EIR (also referred to as EIA)

process followed;

- Obtain contributions from stakeholders (including the applicant, consultants, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented and addressed;
- Assess in detail the potential environmental and socio-economic impacts of the Project;
- Identify environmental and social mitigation measures to address the impacts assessed; and
- Produce an EIA Report that will assist the DESTEA to decide whether (and under what conditions) to authorise the proposed development. This report will be submitted to DESTEA for their acceptance following public review.

1.3 Structure of this Report

This report discusses relevant environmental legislation and its application to this Project, outlines the S&EIR process, presents a detailed project description and environmental baseline, details the stakeholder engagement process followed and assesses the potential impacts of the Project before concluding the report with a set of pertinent findings and key recommendations. The report consists of the following sections:

Section 1: Introduction

Provides an introduction and background to the proposed project and outlines the purpose of this document and the assumptions and limitation applicable to the study.

Section 2: Governance Framework and Environmental Process

Provides a brief summary and interpretation of the relevant legislation as well as pertinent strategic planning documents, and outlines the approach to the environmental process.

Section 3: Project Description

Describes the location and current status of the site and provides a brief summary of the surrounding land uses as well as background to and a motivation for the proposed project.

Section 4: Description of the Affected Environment

Provides an overview of the affected biophysical and social economic environment in the Bloemfontein area as relevant to the Farm Olrig No. 1710 & Portion 4 of the Farm Wildealskloof No. 1205, Bloemfontein, Free State Province

Section 5: Stakeholder Engagement

Describes the Public Participation Process (PPP) followed and the issues of concerns that have been raised by Interested and affected parties

Section 6: Assessment of Environmental and Social Impacts

Describes the potential positive and negative environmental and social impacts of the proposed mixed use development utilizing Envirolution`s proven impact methodology

Section 8: Conclusions and Recommendations

Provides an Environmental Impact Statement, summarizes the key findings and recommendations in the EIA Report and outlines further opportunities for stakeholder engagement.

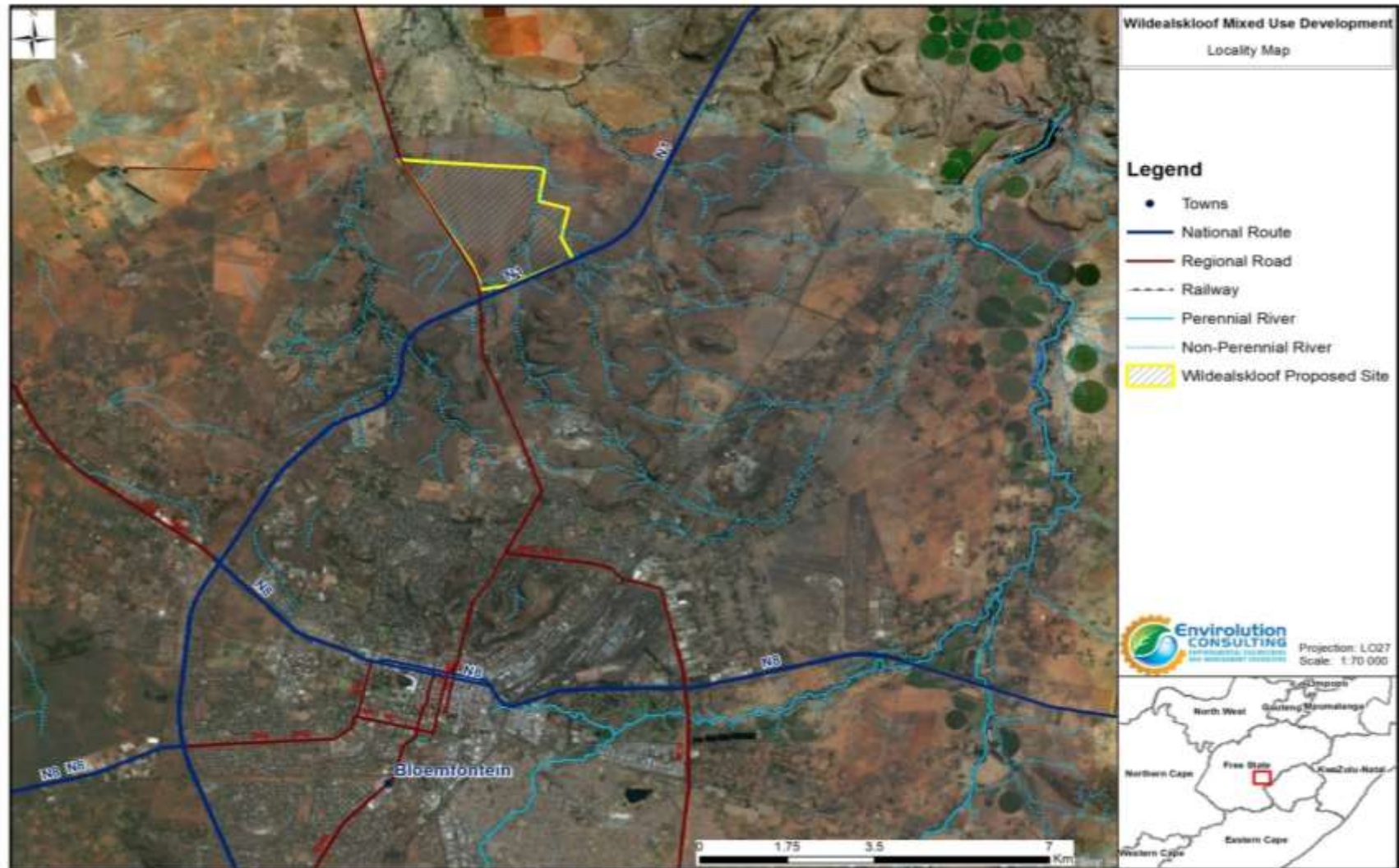


Figure 1-1 Locality Plan

1.4 Content of Report

The EIA Regulations, 2014 (Government Notice (GN) 982 which came into effect on 8 December 2014, as amended by GN R326 of 2017, Appendix 3), prescribe the required content in an Environmental Impact Report. These requirements and the sections of this EIA Report in which they have been addressed, are summarized in Table 1-1 and will guide the reader to the relevant pages of the report.

Table 1-1: Content of Scoping Report as per EIA Regulations, 2014

GN 982, App 3 Ref.:	Requirement	Reference section within document
(3) (a)	Details of:	
(3) (a) (i)	The EAP who prepared the report	Page iii
(3) (a) (ii)	The expertise of the EAP, including a Curriculum Vitae	Page iii & Appendix F
(3) (b)	Location of the activity, including:	
(3) (b) (i)	21 digit Surveyor General code of the property	3
(3) (b) (ii)	Physical address and farm name (where available)	3
(3) (b) (iii)	The coordinates of the boundary of the property (where (2) (b) (i) and (2) (b) (ii) are not available)	3
(3) (c)	A plan indicating the location of the proposed activities and associated infrastructure, or:	1.3
(3) (c) (i)	For linear activities: a description and coordinates of the corridor in which the proposed activity is to be undertaken	
(3) (c) (ii)	On land where the property has not been defined, the coordinates within which the activity is to be undertaken	
(3) (d)	A description of the scope of the proposed activity, including	
(3) (d) (i)	All listed and specified activities triggered	2.1.3
(3) (d) (ii)	A description of activities to be undertaken, including associated infrastructure	3
3 (e)	A description of the policy and legislative context	2
(3) (f)	Motivation for need and desirability for the proposed development	3.3, 3.3.1

(3) (g)	Motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report.	3.3, 3.3.1
(3) (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including	
(3) (h) (i)	Details of all alternatives considered	3.4
(3) (h) (ii)	Details of public participation process undertaken, including copies of the supporting documents and inputs	Section 5 & Appendix C
(3) (h) (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	5.3
(3) (h) (iv)	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	4
(3) (h) (v)	The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources, and can be avoided, managed or mitigated	<i>Section 6</i>
(3) (h) (vi)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks	6.1
(3) (h) (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 geographical, physical, biological, social, economic, heritage and cultural aspects	<i>Section 6</i>
(3) (h) (viii)	Possible mitigation measures that could be applied and level of residual risk	<i>Section 6</i>
(3) (h) (ix)	If no alternative development locations for the activity were investigated, the motivation for not considering such and	3.4
(3) (h) (x)	A concluding statement indicating the preferred alternative development location within the approved site	<i>Section 6</i>
(3) (i)	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— (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 6

3(i)	(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;	
(3) (j)	an assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Section 6
(3) (k)	where applicable, a summary of the findings and impact management measures identified in 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 report;	Section 7.1
(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;	i. Section 7.1 ii. Section 7.1 (Figure 7.1 and 7.2) and Appendix A iii. Section 7.2
(3) (m)	(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;	Appendix E
(3) (n)	the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Section 7.4
(3) (o)	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;	Section 7.5

(3) (p)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.5
(3) (q)	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;	Section 7.3, 7.4 & Specialist reports attached within Appendix D, Volume 2
(3) (r)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	N/A
(3) (s)	an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (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; and	Page iii & Appendix F
(3) (t)	where applicable, details of any financial provisions for the rehabilitation, closure, and on-going post decommissioning management of negative environmental impacts;	N/A
(3) (u)	an indication of any deviation from the approved scoping report, including the plan of study, including— (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and a (ii) motivation for the deviation;	N/A
(3) (v)	any specific information that may be required by the competent authority; and any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A
(3) (w)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A

1.5 Assumptions and Limitations

As noted in the Final Scoping Report, this report is based on currently available information and, as a result, the following limitations and assumptions are implicit in it:

1.5.1 General

- All information provided by Ideal Consulting and I&APs to the Environmental Team was correct and valid at the time it was provided;
- That sufficient capacity for the provision of bulk services (e.g. waste management, sewage treatment, water supply, electricity supply) exists, or alternatively, if such services need to be upgraded, it is assumed that this is outside of the scope of this environmental assessment. This EIA process is therefore limited to the assessment (where relevant) of existing and proposed bulk services and infrastructure on site all external proposed bulk services are outside the scope of this EIA.
- That, due to the cost of preparing detailed designs and plans, such detailed design/ planning information would only be developed in the event of environmental authorization being granted. As such, it is anticipated that, as is typically the case in an EIA process, the EIA will assess broad land uses;
- That the comments received in response to the public participation programme so far, are representative of comments from the broader community;
- Additional permitting or licensing requirements that may be required (including but not limited to Water Use Licenses, vegetation destruction permits, township establishment permit) are outside the scope of this EIA process. It is assumed that the legal requirements in this regard will be followed and that the relevant permissions will be in place prior to commencement of construction;
- It is assumed that the current policies and legislation referred to in this EIA will be relevant until the time that the development is completed;
- Every effort was made by the Public Participation Officer to contact stakeholders and landowners through organizations with which they may be registered. The assumption has been made that the issues and concerns raised by these organisations are representative of a

fair understanding of the study area. The assumption has also been made that information presented by all I&APs has been accurate and has been presented timeously in the study.

- It is assumed that the development site identified by the developer represents a technically suitable site for the establishment of the proposed Wildealskloof mixed use development;
- Studies assume that any potential impacts on the environment associated with the proposed development will be avoided, mitigated, or offset.
- This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other site alternatives.

Refer to the specialist studies in Appendix D-Volume 2 of the report for specialist study specific limitations.

Notwithstanding the above, Envirolution Consulting is confident that these assumptions and limitations do not compromise the overall findings of this report.

2. Governance Framework and Environmental Process

2.1 South African Legislation

Appendix 2 of the 2014 Environmental Impact Assessment Regulations states that one of the purposes of the scoping report is to identify the relevant policies and legislation relevant to the activity. The scoping report must include a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process. It has been determined that a Scoping & Environmental Impact Assessment Report (S&EIR) process must be completed in respect of activities listed in a notice issued by the Minister in terms of section 24D of the NEMA. The scope and content of this draft scoping report has been guided by the following additional legislation and guidelines.

A synopsis of Envirolutions's understanding of the relevant Acts and Regulations that are applicable to this study is provided below. Note that other legislative requirements may also pertain to the project. As such, the summary provided below is not intended to be definitive or exhaustive, and serves only to highlight key environmental legislation and obligations.

2.1.1 The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)

The Constitution of the Republic of South Africa, 1996 has major implications for environmental management. The main effects are the protection of environmental and property rights, the drastic change brought about by the sections dealing with administrative law such as access to information, just administrative action and broadening of the locus standi of litigants. These aspects provide general and overarching support and are of major significance in the effective implementation of the environmental management principles and structures of the Environment Conservation Act and NEMA. Section 24 in the Bill of Rights of the Constitution specifically states:

"Everyone has the right –

- *To an environment that is not harmful to their health or well-being; and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -*
 - *Prevent pollution and ecological degradation;*
 - *Promote conservation; and*

-
- *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."*

Legal requirements for this project:

The developer will be required to protect Constitutional Rights when undertaking this project for the construction of the Wildealskloof mixed use development.

2.1.2 National Environmental Management Act (Act No. 107 of 1998)

NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-coordinating environmental functions exercised by organs of the State, as well as to provide for matters connected therewith. Section 2 of NEMA establishes a set of principles that apply to the activities of all organs of state that may significantly affect the environment. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and
- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its life cycle.

Section 28(1) states that:

“Every person who causes has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring.”

If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remedying the effects of the pollution.

Legal requirements for this project:

The developer has a responsibility to ensure that the proposed housing development construction activities and the EIA process conform to the principles of NEMA. The proponent is obliged to take action to prevent pollution or degradation of the environment in terms of Section 28 of NEMA.

2.1.3 2014 EIA regulations, as amended (2017)

The 2014 revision of the EIA regulations came into effect on 8 December 2014, with subsequent amendments in April 2017. Although the project's application for environmental authorization was made under the 2010 EIA regulations and therefore remains subject to the procedural requirements thereof, the assessment is also required to take into account all relevant equivalent or additional listed activities in terms of the 2014 EIA regulations.

The following listed activity in terms of the 2014 EIA regulations (as amended) is triggered by the proposed development.

Table 1-1: NEMA activities triggered and being applied for the proposed project

The number and date of the relevant notice: e.g. Listing Notice 1 (R983, 08 December 2014) as Amended Listing Notice 1 (327) of 7 April 2017	Activity No (s) (in terms of the relevant notice) : e. g 1(a)	Description of each listed activity as per project description
<i>Listing Notice 1 (requiring BA)</i>		
Listing Notice 1 (R983, 08 December 2014) as Amended Listing Notice 1 (327) of 7 April 2017	9 (i) & (ii)	The proposed project entails the construction of a potable water pipeline that will exceed 1000 metres in length with an internal diameter of up to 1,4m that will be constructed outside the urban area
Listing Notice 1 (R983, 08 December 2014) as Amended Listing Notice 1 (327) of 7 April 2017	13	A Water reservoir with a combined capacity 50000 cubic metres will be constructed on site.
Listing Notice 1 (R983, 08 December 2014) as	14	i. During construction cement and hydrocarbons may be stored in the

<p>Amended Listing Notice 1 (327) of 7 April 2017</p>		<p>construction camps, but it has been established that the combined capacity will not exceed 500 cubic meters.</p> <p>ii. At the Water Treatment Works (WTW) chloride and other chemicals will be used. Once again, the storage containers will not have a combined capacity exceeding 500 cubic metres</p> <p>iii. Two filling stations are proposed on site. The combined capacity of the two stations will not exceed 500 cubic metres.</p> <p>The overall combined capacity of the dangerous goods on site will not exceed 500 cubic metres.</p>
<p>Listing Notice 1:GN 983, 08 Dec 2014 as Amended Listing Notice 1 (327) of 7 April 2017</p>	<p>19</p>	<p>i. Road bridges will be constructed to span a watercourse on site.</p> <p>ii. Sewer pipelines will also span the watercourse on site</p> <p>iii. The wetland on site will be rehabilitated to make it more aesthetically appealing.</p> <p>Approximately 10 cubic metres or more of soil, sand, pebbles or rock will be excavated and removed from the watercourse during the works. In addition there will also be infilling and depositing of approximately 10 cubic metres or more of construction material into the watercourse.</p>
<p>Listing Notice 1: GN 983, 08 Dec 2014 as Amended Listing Notice 1 (327) of 7 April 2017</p>	<p>23</p>	<p>A memorial park/cemetery of approximately ±16 Hectares (160,000 square metres) is proposed on site.</p>
<p>Listing Notice 1: GN</p>	<p>28</p>	<p>The Wildealskloof mixed use development will</p>

983, 08 Dec 2014 as Amended Listing Notice 1 (327) of 7 April 2017		comprise of residential, mixed, retail, commercial, industrial or institutional development on land previously used for agriculture. The development will occur inside an urban urge and the total area to be developed is approximately 587 hectares.
<i>Listing Notice 2 (requiring S&EIR)</i>		
Listing Notice 2: GN 984, 08 Dec 2014 as Amended Listing Notice 2 (325) of 7 April 2018	15	The site is approximately 587 hectares and the clearance of an area of 20 hectares or more of indigenous vegetation will occur prior to initiating construction.
Listing Notice 2: GN 984, 08 Dec 2014 as Amended Listing Notice 2 (325) of 7 April 2017	25	A Waste Water and Sewage Treatment Works (WWSTW) will be constructed as part of the development. The proposed package plant will treat waste water and sewage emanating from the development. The plant will have a daily throughput capacity of 15 000 cubic metres or more.

For Listing Notice 3 (R985, 08 December 2014)

Activity No (s)	No. of Geographical Area and Description as per project	Describe each listed activity as per project description
<i>Listing Notice 3 (requiring BA in the sensitive areas)</i>		
GN 985, 08 Dec 2014 as amended on 07 April 2017 as as Amended Listing Notice 3 (324) of 7 April	12 (b) (i), (ii) & (iv)	i. Although heavily overgrazed and consequently somewhat degraded the grassland portion on site constitutes a threatened vegetation type—more than 300 square meters or more of vegetation will be cleared prior to construction

2017		ii. There are two critical biodiversity areas (two wetland, one flows from south-east, and then meanders to flow north of the study site and the other is on the western periphery) within the proposed site — more than 300 square meters or more of vegetation will most probably be cleared prior to construction within the wetlands.
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Legal requirements for this project:

Consequently, the developer is obliged to apply for EA for the Project. Since activities listed under Listing Notice 2 apply to the Project, a Scoping & Environmental Impact Assessment process is required. The EIA authorizations need to be granted by the Department of Economic Development, Small Business Development, Tourism and Environmental Affairs (DESTEA for approval and setting of conditions prior to commencement of any construction activities.

2.1.4 The National Environmental Management: Water Act, 1998 (Act No. 36 of 1998)

Water use in South Africa is controlled by the NWA. The executive authority is the Department of Water and Sanitation (DWS). The NWA recognizes that water is a scarce and unevenly distributed national resource in South Africa. Its provisions are aimed at achieving sustainable and equitable use of water to the benefit of all users and to ensure protection of the aquatic ecosystems associated with South Africa’s water resources. The provisions of the Act are aimed at discouraging pollution and wastage of water resources. In terms of the Act, a land user, occupier or owner of land where an activity that causes or has the potential to cause pollution of a water resource has a duty to take measures to prevent pollution from occurring. If these measures are not taken, the responsible authority may do whatever is necessary to prevent the pollution or remedy its effects, and to recover all reasonable costs from the responsible party. Section 21 of the NWA specifies a number of water uses. These water uses require authorization in terms of Section 22 (1) of the Act, unless they are listed in Schedule 1 of the NWA, are an existing lawful use, fall under a General Authorization issued in terms of Section 39 or if the responsible authority waives the need for a licence.

Legal requirements for this project:

Section 21: There is a watercourse on site which will be impacted on by the development. In this regard the developer will trigger some listed activities under Section 21 of the act, in which case an integrated Water Use Licence Applications (WULAs) would need to be prepared and submitted to the Department of Water and Sanitation for authorisation prior to development

Section 19: Of specific importance to this application is Section 19 of the National Water Act, 1998 (Act No. 36 of 1998), which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby 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 and must therefore comply with any prescribed waste standard or management practices.

Legal requirements for this project:

In terms of Section 19, the developer must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring.

2.1.5 National Environmental Management: Biodiversity Act 2004 (Act 10 of 2004)

The National Environmental Management Biodiversity Act (NEMBA) (Act 10 of 2004); NEMBA Chapter 4 and 5 are important to this project, in terms of the following Regulations:

- National List Of Ecosystems that are threatened and in need of protection (Published under Government Notice 1002 in Government Gazette 34809 of 9 December 2012)
- Publication Of Lists Of Critically Endangered, Endangered, Vulnerable And Protected Species (Published under Government Notice R151 in Government Gazette 29657 of 23 February 2007)
- Threatened Or Protected Species Regulations (Published under Government Notice R152 in Government Gazette 29657 of 23 February 2007)
- Alien And Invasive Species Regulations (Published under Government Notice R598 in Government Gazette 37885 of 1 August 2014).
- Publication Of National List Of Invasive Species (Published under Government Notice R507 in Government Gazette 36683 of 19 July 2013).

Legal requirements for this project:

- *According to the National Biodiversity Assessment (NBA) database, the study area is not affected by formally or informally protected areas*
- *The developer will be required to eradicate and control alien vegetation within the study area as well as the ongoing control and prevention of spread of alien species that may proliferate during operational of the project should it takes place.*

2.1.6 National Forests Act (Act No 84 of 1998)

An updated list of protected tree species was published under section 12(1) (d) of the National Forests Act (Act No 84 of 1998) on 8 September 2017. In terms of section 15(1) of the National Forests Act, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated.

Forests: Prohibits the destruction of indigenous trees in any natural forest without a licence.

Legal Requirements

A vegetation survey has been undertaken as part of this EIA to confirm the boundaries of the forest areas on the proposed site as per the Department of Agriculture, Forestry and Fisheries (DAFF) request. The isolated hill is characterised by a well-developed tree and shrub layer, with dense woody vegetation present particularly along its eastern slopes.

2.1.7 Notice of the List of Protected Tree Species under the National Forests Act, 1998 (GN R 716, 7 September 2012)

Government Notice 716 provides a schedule listing all protected tree species in South Africa. In terms of section 15 (1) of the National Forests Act, 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. The published list includes Wild olive *Olea europaea subsp. africana* trees, a provincially protected species, which is found in high abundance on the site on the isolated hill located in the south western corner of the development site

Legal requirements

Wild olive and any other protected species as listed in GN R 716 will require permits from DAFF before removal, damage or destruction.

2.1.8 Free State Province Nature Conservation Ordinance 8 of 1969

The Free State Nature Conservation Ordinance (FSNCO) provides for the listing of certain Protected plant species, as per Schedule 6, whereby a permit to pick, donate, sell, import, export or remove such species, as well as other indigenous plants, is required, except under certain conditions..

Legal requirements

An ecological study was undertaken and several protected species were found to be present which will require a permit from DESTEA for removal

2.1.9 National Environment Management Protected Areas Act, 2003 (Act No. 57 of 2003).

Wetlands and other critical Biodiversity areas are regulated under the NEM: BA. Activities that fall within the parameters of these areas require specialist assessment to determine the impacts and the residual effects of mitigation measures.

Legal Requirements

An ecological study was undertaken and several wetlands were found to be present recommendations on the project. The developer will be required to adhere to the mitigation measures included in the requirements of the EMPr.

2.1.10 National Heritage Resources Act (Act No 25 of 1999)

South Africa's unique and non-renewable archaeological and paleontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, Section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. The National Heritage Resources Act (Act No. 25 of 1999, Section 38) provides guidelines for Cultural Resources Management and prospective developments:

“38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as :)

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

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

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

(i) exceeding 5 000 m² in extent; or (ii) involving three or more existing erven or subdivisions thereof;

or (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

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

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

And:

“38 (3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2) (a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

- (b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
- (c) an assessment of the impact of the development on such heritage resources;
- (d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- (e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- (f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- (g) plans for mitigation of any adverse effects during and after the completion of the proposed development.”

Legal requirements for this project:

The proposed development triggers the requirement for an HIA in terms of the NHRA, and paleontological and archaeological studies have therefore been completed as part of the EIA. The HIA field survey has confirmed Archaeological sites as follows:

- An informal burial place containing approximately 10 graves marked by stone cairns.
- A low density scatter of MSA stone tools and flakes was identified at the eastern foot of the hill located in the south-western corner of the study area.
- At least twenty structures identified as sangars occur on the western side of the hill, with a few located on the eastern side

Should graves be required to be relocated or any of the identified heritage material to be disturbed, a permit from PHRA/SAHRA as well as other institutions will be required-However this is outside the scope of this EIA. The developer will ensure compliance with the NHRA requirements

SAHRA has been notified of the proposed project as per the requirement of the National Resources Heritage Act.

2.1.11 The National Environmental Management Waste Act 2008 (Act 59 of 2008)

The National Environmental Management Waste Act (NEMWA) reforms the law regulating waste management in order to protect health and the environment providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

Legal requirements for this project:

In terms of GNR921, no waste license is required for the project. No waste license activities are applicable to this project. The developer will however be required to store and manage waste in accordance with the requirements of this Act and associated Standards during construction and operational phases.

2.1.12 Hazardous Substances Act (Act No. 15 of 1973)

This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitizing, or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.

- Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance;
- Group IV: any electronic product;
- Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.

Legal requirements for this project:

The developer will be required to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled.

2.1.13 The Occupational Health and Safety Act 1993 (No 85 of 1993)

The Occupational Health and Safety Act make provision in regulation Section 8 for the general duties of employers to their employees. Section 9 of the Regulations makes provision for general duties of employers and self-employed persons to persons other than their employees.

Legal requirements for this project:

While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. Health and safety precautions measures must be put in place for the construction crew and the public

2.1.14 The National Environmental Management: Air Quality Act 2004 (No 39 of 2004)

National Environmental Management: Air Quality Act (NEM: AQA) which provides for the control of dust, noise and offensive odors.

- S18, S19 and S20 of the Act allow certain areas to be declared and managed as “priority areas”.
- Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.
- The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.

Legal requirements for this project:

While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan during the construction phase of the project for dust management.

2.1.15 Environment Conservation Act (Act No. 73 of 1989)

National Noise Control Regulations (GN R154 dated 10 January 1992)

Legal requirements for this project

There is no requirement for a noise permit in terms of the legislation. However the act finds applicability in ensuring construction noise is below the legislated 85 decibels

2.1.16 Conservation of Agricultural Resources Act (Act No 43 of 1983)

Prohibition of the spreading of weeds (S5)

Classification of categories of weeds & invader plants & restrictions in terms of where these species may occur - Regulation 15 of GN R1048 and Regulation 598 GN 37885 of NEM: BA (Act No. 10 of 2004)

This Act will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented.

2.1.17 Promotion of Access to Information Act, 2000 (Act No 2 of 2000)

Legislation that allows the public access to information about activities that influence their well-being and to make contributions to decision making.

Legal requirements for this project:

No permitting is required the act finds applicability during the public participation process phase of the scoping and environmental impact assessment

2.1.18 National Development Plan 2030

The National Development Plan (NDP) offers a long-term perspective for development in the country. The NDP aims to eliminate poverty and reduce inequality by 2030. According to the plan, South Africa can realize these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society.

- The planning is that the NDP and its proposals are to be implemented in the right order over the next 17 years. Three phases have been identified.
- Government has already started a process to align the long term plans of departments with the NDP and to identify areas where policy change is required to ensure consistency and coherence.
- The NDP is a plan for the whole country. Government will engage with all sectors to understand how they are contributing to implementation, and particularly to identify any obstacles to them fulfilling their role effectively.
- The Plan will shape budget allocation over the next 17 years.
- The Plan identifies the task of improving the quality of public services as critical to achieving transformation. This will require provinces to focus on identifying and overcoming the obstacles to achieving improved outcomes, including the need to strengthen the ability of local government to fulfil its developmental role.

Legal requirements

Provisions of housing infrastructure and job opportunities (such as the Wildealkloof project) are in support of the NDP.

2.1.19 Municipal Systems Act, No 32 of 2000

Legislation requires each municipality to develop a plan for the development of its area of jurisdiction. Such a plan, in terms of the law, should be holistic and integrated in its approach and content. According to the Municipal Systems Act, No 32 of 2000, the IDP is the principal strategic planning instrument which guides and informs all planning, budgeting, investment, development, management and implementation processes in the municipality. In terms of Chapter 5 of Municipal System Act, 2000 (Act 32 of 2000), a municipal council is expected to annually review their IDP in accordance with an assessment of its performance measures and to the extent that changing circumstances so demands, the municipality may also amend its IDP in accordance with a prescribed process. This plan identifies 'broad spatial planning categories' for all land in the Mangaung Metropolitan Municipality, as well as various structuring elements that are critical to the future development and restructuring of the Mangaung Metropolitan Municipality. In accordance to the Council Resolution CNL 57A.13-28/04/2015 the IDP has been reviewed and adopted by council. This includes the review and adoption of the SDF as chapter 5 of the IDP. In terms of the Integrated Development Plan, the land on which the Wildealskloof Mixed Use development is proposed is now included in the urban edge earmarked for neighborhood development subject to the developer conducting the necessary investigations regarding the availability of all required municipal services, including a comprehensive traffic impact study, investigating the traffic capacity.

Legal requirements for this project:

The developer will be required to submit a township establishment application to the requirements of the Municipality.

2.1.20 MMM Spatial Development Framework (SDF) (2016)

The Spatial Development Framework (SDF) of Mangaung Metropolitan Municipality (2016) has included the site within its planned urban edge. This is different to the previous SDF (2013) that excluded the site which indicates a planned expansion to the northern regions of Bloemfontein. It can be argued that the development is in accordance with the macro framework policy of the Mangaung Metropolitan Municipality (**Figure 2-1 & Figure 2-2**).

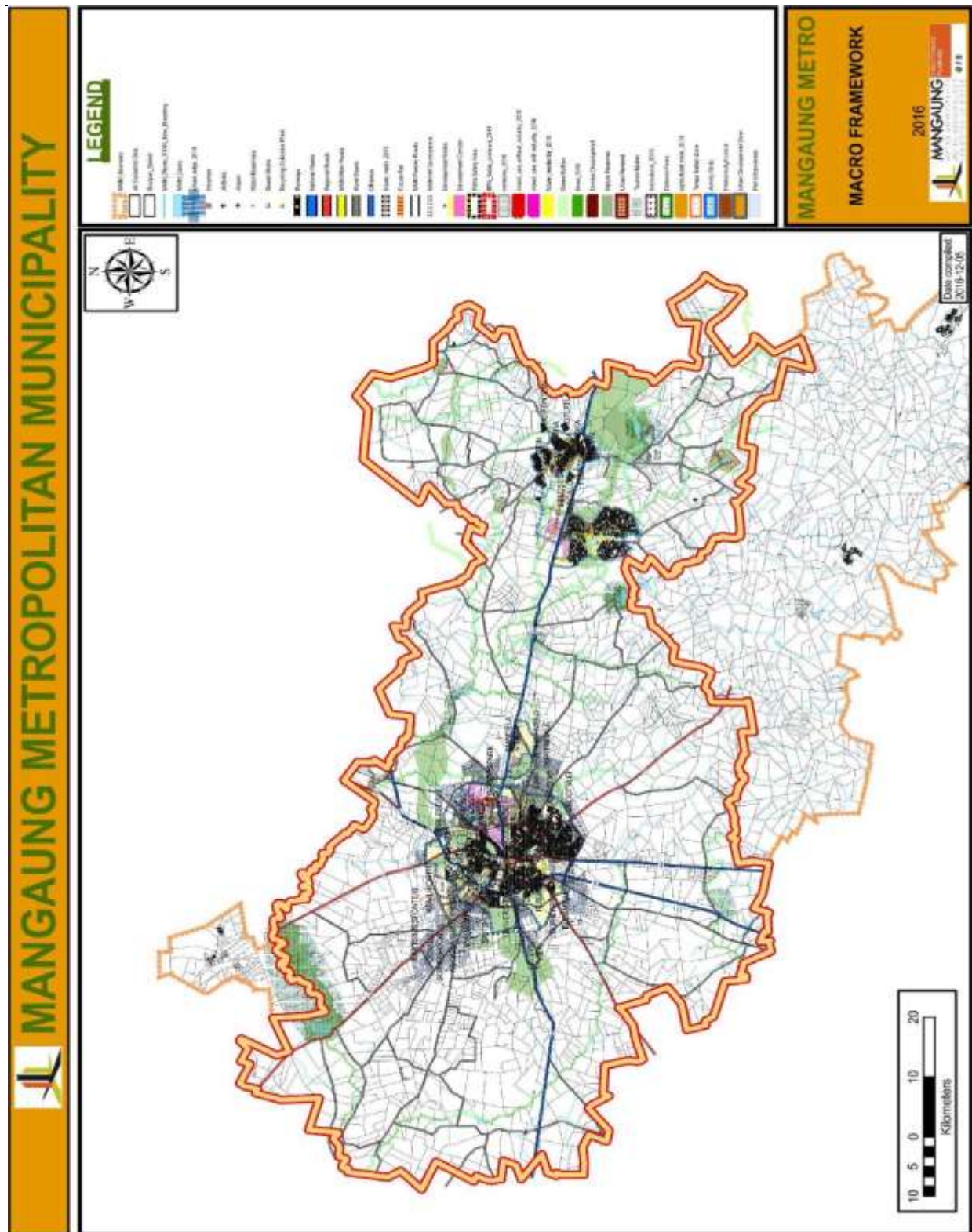


Figure 2-1: Mangaung Metropolitan Municipality SDF (2016)

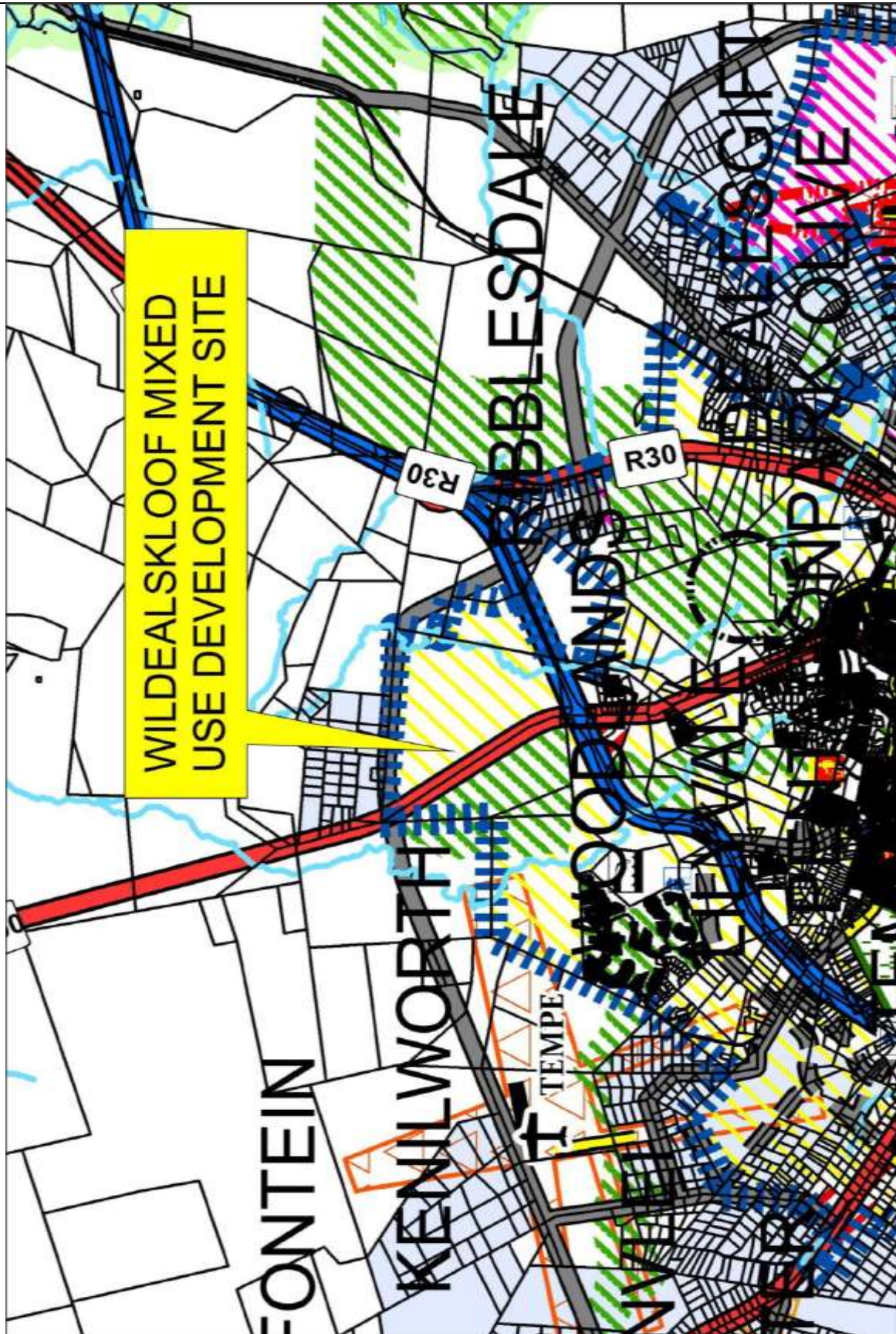


Figure 2-2: Extract from MMM SDF

2.1.21 Additional notable legislation

Other applicable legislation includes:

- National Road Traffic Act (Act No. 93 of 1996); and
- Subdivision of Agricultural Land Act (Act 70 of 1970)

2.1.22 Policy Guidelines

The following Guideline documents have been considered in the preparation of this report:

- Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series 7, Public Participation in the EIA Process as published in Government Gazette No. 33308, 18 June 2010;
- Implementation Guidelines (published for comment) in Government Notice 603 of 2010
- Integrated Environmental Management Information Series (Booklets 0 to 23) (DEAT, 2002 – 2005);
- DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7.

2.2 Environmental Impact Assessment Process

2.3.1 Principles

The general approach to this study is guided by the principles contained in Section 2 of NEMA and those of Integrated Environmental Management (IEM). NEMA lists a number of principles that apply to the actions of organs of state and also serve as reference for the interpretation of environmental legislation and administration of environmental processes. The principles most relevant to environmental assessment processes and projects for which authorisation is required are summarized below.

Principles Relevant to the EIA Process

- Adopt a risk-averse and cautions approach
- Anticipate and prevent or minimise negative impacts
- Pursue integrated environmental management
- Involve stakeholders in the process; and
- Consider the social, economic and environmental impacts of activities

Principles Relevant to the EIA Process

- Place people and their needs at the forefront of concern and serve their needs equitably

- Ensure development is sustainable, minimise disturbance of ecosystems and landscapes, pollution and waste, and achieves responsible use of non-renewable resources and exploitation of renewable resources.
- Assume responsibility for project impacts throughout its life cycle; and
- Polluter bears remediation cost

The underpinning principles of IEM require:

- Informed decision making
- Accountability for information on which decisions are made
- A broad interpretation of the term “environment”;
- An open participatory approach in the planning of proposals;
- Consultation with Interested and Affected Parties
- Due to consideration of alternatives
- An attempt to mitigate negative impacts and enhance positive impacts of proposals
- An attempts to ensure that social costs of development proposals are outweighed by the social benefits
- Democratic regard for individual rights and obligations
- Compliance with these principles during all stages of the planning, implementation and decommissioning of proposals and
- The opportunity for the public and specialist input in the decision making process

2.3.2 Submission of Applications

Various environmental authorisations, permits or licences may be required before the Wildealskloof Mixed Use Development can commence with construction and operation. Certain application forms must be submitted at the outset of the S&EIR process (e.g. in terms of the EIA Regulations, 2014); while a licence in terms of the NWA would only be issued after EA.

Application	Authority	Status
EA	DEA	The application was submitted to DESTEA in compliance with Section 16 of the EIA Regulations, 2014 on 17 th May 2018. The application was given the following project reference number: DESTEA: Ref.No:EMS/9(i)(ii), 13,14,19,23,28(i),15,25,12(b)(ii)(iv)/18/19 NEAS Ref. No: FSP/EIA/000214/2018
WUL	DWS	The application for the integrated water use licence is underway

2.3.3 EIA Process and Phasing

The EIA Process consists of three phases, namely the Pre-application Phase, Scoping Phase and an Impact Assessment Phase (current phase) (see **Figure 3**).

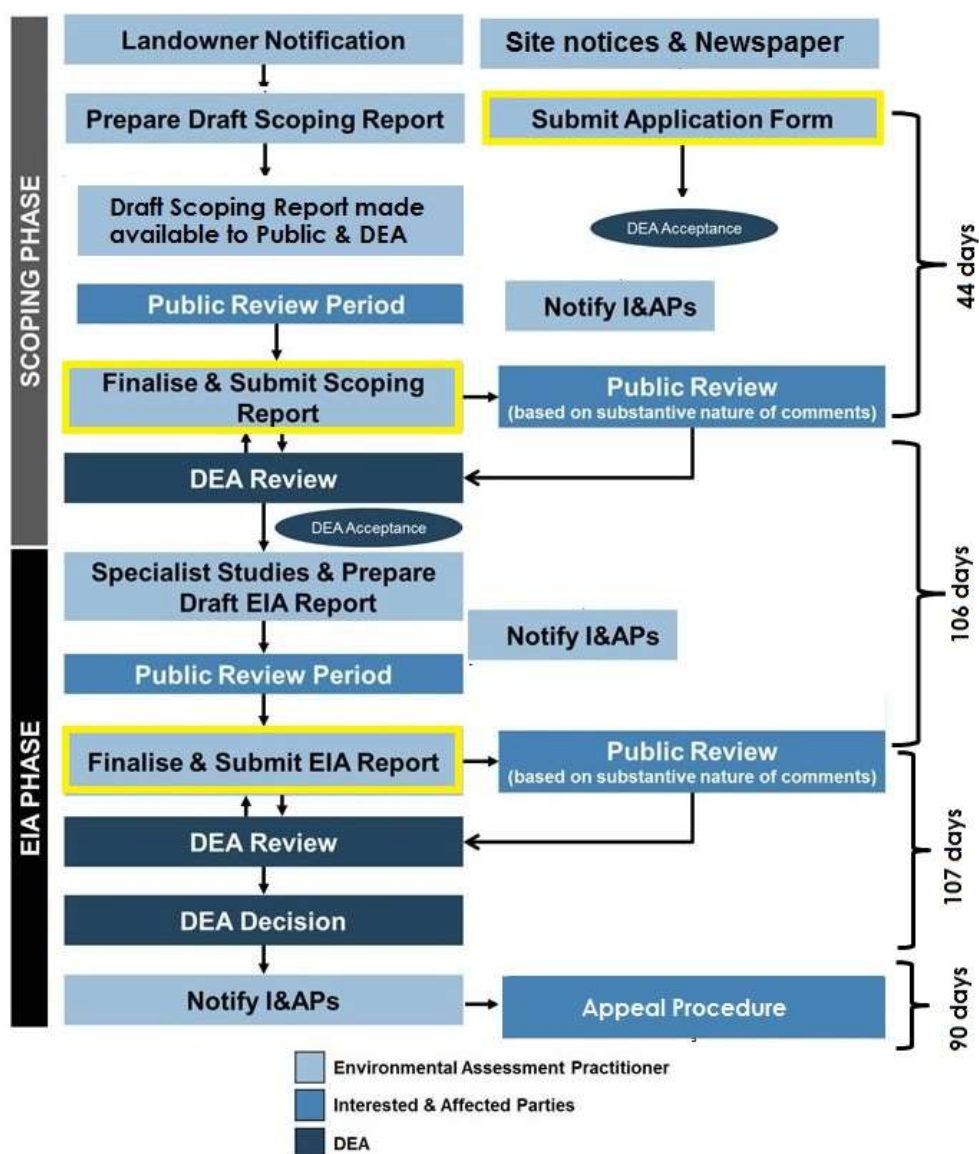


Figure 2-3: Overview of the Overview of EIA Process

The objectives of the Pre- Application Phase are to:

- Identify stakeholders, including neighbouring landowners, residents and authorities
- Compile a draft Scoping Report describing the affected environment and present an analysis of the potential environmental issues and benefits arising from the proposed project that require further investigation in the Impact Assessment Phase
- Develop Terms of Reference (ToR) for specialist studies to be undertaken in the Impact Assessment Phase:

The Objectives of the Scoping Phase are to:

- Inform stakeholders of the proposed activity, feasible alternatives and the S&EIR process;
- Provide stakeholders with the opportunity to participate effectively in the process and identify any issues and concerns associated with the proposed activity, review specialist study ToR and the Plan of Study for RAI; and
- Submit a Scoping Report to the relevant authority (in this case DESTEA).

The aims of the Impact Assessment Phase (current phase) are to:

- Inform and obtain contributions from stakeholders, including relevant authorities, the public and local communities and address their relevant issues and concerns
- Build capacity amongst stakeholders during the S&EIR process so that they may actively and meaningfully participate;
- Document and contextualise the biophysical baseline conditions of the study area and the Socio-economic conditions of affected communities;
- Assess in detail the potential environmental and social-economic impacts of the project
- Identify environmental and social mitigation measures to avoid and/or address the impacts assessed; and
- Develop an environmental and other management plans e.g. EMPr based on the mitigation measures developed in the EIA Report;
- The release of a draft EIA Report for a 30 day period will provide stakeholders with an opportunity to verify that issues that they raised through the EIA Process have been captured and adequately considered.
- Produce a Final Environmental Impact Report (EIR), that will provide all the necessary information for the competent authority (DESTEA) to decide whether (and under what conditions) to authorise the proposed development

3. Project Description

3.1 Background of the Project

The developer, Ideal Consulting, proposes to develop an all-inclusive socio economic mixed use development to the North of the Bloemfontein CBD. Tenure options will range from fully subsidised, to higher income residential units. Approximately 8 769 residential units are planned. The proposed development will be known as the Wildealskloof.

The Wildealskloof Mixed Use Development entails the construction of the following land uses:

- Single residential units;
- A lifestyle estate with stands between 900m² and 1000m²;
- Multi storey / RDP / FLIPS / Social units (total of approximately 8 769 units);
- A community centre / public library;
- Educational facilities (e.g. crèche, primary and secondary school) including boarding facilities;
- Retail and related small businesses e.g. fuelling station;
- Regional Shopping Centre;
- Medical facilities including a hospital/clinic;
- Hotel and Spa;
- Industrial and office facilities;
- Religious facilities e.g. churches;
- Retirement Village;
- Parks;
- Memorial Parks (cemetery) of approximately 16 ha; and
- Open Space Conservation areas.

The project planning is currently at Preliminary Sub divisional Plan stage, which has as far as possible accommodated ecological sensitivities, wetland sensitivities and heritage sensitivities identified on the site. Two provisional layout alternatives were presented in the Scoping Stage of the EIA and they are being considered in this environmental impact assessment for investigation. These included layout Alternative 1 and layout Alternative 2. The two layouts are described in detail in section 3.4.2. Refer to Appendix B for the A3 Conceptual layout Designs. The proposed township will be developed in twenty one (21) phases refer to Appendix A for the overview of the 21 phased development. In addition to the abovementioned land uses the following associated infrastructure is required.

3.3.1 Infrastructure required

No internal bulk infrastructure is currently in place on site. A preliminary design report was compiled by Civil Consult Consulting engineers addressing the bulk services for the development and submitted to MMM. The engineering Bulk Services Report is included under Appendix F1.

Access Roads

The concept of integrated planning requires the development of settlements that are physically and functionally integrated with the immediate area as well as broader linkages to facilities, where mobility is promoted. The layouts aim to address this need as far as possible. Access to the study area will be provided from Road S1066 and Road R700.

Internal Access Roads

The proposed township will be served by a network of surfaced Class U4 and Class U5 roads. These roads will all comprise of one lane per direction. The road reserve widths for the roads varies between 13.0m, 16.0m, 20m and wider, as illustrated in the township layout appended in **Annexure A**.

Storm water drainage

No formal municipal storm water services are available in the vicinity of the proposed development. The proposed development has two major drainage patterns with the majority of the proposed development drainage from South to North and the Eastern part of the proposed drainage from South East to North West towards the existing watercourse intersecting the proposed development. The proposed will increase the area of impervious surfaces within the storm water catchment area, causing changes in the quantity of storm water run-off. This will increase the risk of erosion, localised flooding and watercourse turbidity and sedimentation. Storm water run-off generated by the proposed development will be handled by means of concrete channels, attenuation dams, storm water box culverts, storm water pipes and road surface drainage. Surface drainage will be accepted via kerb-grid inlets.

Storm water run-off generated by the proposed development will be discharged into one of the two watercourses intersecting the proposed development. In order to ensure that storm water runoff from the proposed development is properly managed, the following must be exercised.

- Avoid or minimise the risk of erosion caused by rainfall from new impervious surfaces
- Prevent sedimentation and turbidity of the watercourse
- Ensure that post development storm water infiltration and run off rates have no more of the off-site impact than pre-development rates
- Minimise the risk of localised flooding caused by increased storm water runoff from impervious surfaces

The storm water system will be designed for a 1:25 year flood return and a run off coefficient of 80% (C=0.8) will be allowed for the proposed development. Storm water will be attenuated where possible to minimise the increase in storm water run-off generated by the proposed development. The storm water outlet structures will be equipped with energy dissipaters to minimise the possibility of erosion at the point of discharge.

Bulk Water Supply

The existing water reticulation pipeline located inside of portion 1/26360 approximately 700m south west of the south western corner of the proposed site is insufficient to service the proposed development. Nonetheless the proposed development has been included in the Water Master plan for the MMM, as the development will be constructed in 21 phases and so will the bulk water supply be provided in the phases of each development phase until the entire development is completed and in due course the entire development will be serviced; The proposed activity will not use groundwater during construction or during the operational phase of the activity. For more details please refer to Section 8 of the Bulk services report included within Appendix F1 of this report.

Bulk Sewer Infrastructure

External Sewer Infrastructure

There are three existing Waste Water Treatment Works (WWTW) in the area located within 12km from the edge of the development; however they are insufficient to service the proposed development. Following consultation with the MMM, a new Regional WWTW is envisaged to be constructed for the Proposed Development (the capacity of this new Regional WWTW will have to be confirmed by the Mangaung Metropolitan Municipality). This WWTW is proposed to be constructed north east of the Proposed Development, just outside the development boundary. The relevant way leave process (National, Provincial or Municipal) will have to be followed for work done within road reserves. The construction of a new regional WWTW is outside the scope of this EIA.

Internal Sewer Infrastructure

Complete water borne sewage reticulation (WWTW) will be installed for the Proposed Development. It is proposed to construct a new Sewage Pump Station in the north western corner of the Proposed Development. Sewage from each erf will drain to the proposed sewage reticulation from where it will gravitate to either the proposed Sewage Pump Station or the proposed Regional WWTW.

A grey water system is also proposed for the Proposed Development. This will be utilised for irrigation of the Proposed Development. For further details please refer to the bulk services report attached within Appendix F1

Bulk Electricity Supply

Centlec, a Municipal utility, is responsible for providing electricity in Mangaung. Centlec has undertaken a detailed network expansion plan for the ability to supply the growth in demand of the Northern suburbs. This development forms part of the development plan. A solar power is being

Considered as well on site to provide electricity for lighting of public open spaces and it is further envisaged that electricity to the majority of houses will be supplied by solar power. The base load will not form part of the solar initiatives but rather be a mechanism to reduce the peak loads.

Solid Waste Management

Approximately 3 707.48m³ of solid waste is estimated to be generated by the development on a weekly basis. Solid waste management services are to be provided by the MMM, in accordance with the national Domestic Waste Collection Standards. This will include regular weekly removal of domestic refuse. For details refer to the bulk services report.

3.2 Description of the Project Area

3.2.1 Regional Setting

Regionally the site for the proposed Wildealskloof Mixed Use Development is located within the Mangaung Metropolitan Municipality, which is part of Bloemfontein. The proposed site identified for the facility is located approximately 10 km North of Bloemfontein CBD.



Figure 3-1: Location of the Mangaung Metropolitan municipality within Bloemfontein

3.2.2 Project Locality

The total study area proposed for development is approximately 587 hectares situated within the boundaries of Mangaung Metropolitan Municipality in Bloemfontein, Free State Province. The proposed land development borders directly the Provincial Road R700 on its western periphery and the National Road N1 on its southern periphery. The study site is approximately 10 km North of Bloemfontein CBD. The proposed site is bordered by open land to the west and north, the N1 to the south and a tourist attraction to the east. The site falls within the jurisdiction of Mangaung Metropolitan Municipality. Refer to Figure 1.1 for the Locality Map and **Appendix A** for the A3 Maps.

Table 3-1 Property description/Physical address:

Farm Name/ERF Number	Farm Orlig No. 1710 & Portion 4 of the Farm Wildealskloof No. 1205
SD 21 Digit Code	F00300000000171000000
Physical Address	Adjacent to the Provincial Road R700 and the National Road N1
Coordinates	Northern central coordinates: 29°00'40.60"S; 26°13 '27.42"E Southern central coordinates: 29°02'01.28"S; 26°14 '09.61"E Easter coordinates: 29°01'14.58"S; 26°14 '36.55"E Western coordinates: 29°01'33.70"S; 26°13 '11.04"E Centre Coordinates: 29°01'26.54"S; 26°13 '46.35"E
Current Land use Zoning	The site was previously zoned as agriculture but the IDP has been reviewed and the portion of land is now included in the urban edge earmarked for development. The Spatial Development Framework (SDF) of Mangaung Metropolitan Municipality (2016) has thus included the proposed Wildealskloof Mixed Use site within its planned urban edge. The planned development is thus in accordance with the macro framework policy of the Mangaung Metropolitan Municipality and the applicant can submit a township establishment in line with the requirements of the Municipality.

3.2.3 Surrounding Land use

According to an analysis of the aerial imagery (Google Earth), no nature reserves, game parks or wildlife sanctuaries are identified in a 10 km radius from the proposed site. However, the Bloemfontein Botanical Gardens are situated 2.2 km south of the site, but a couple of small hills visually separate the two locations from each other. The Sangiro Game Lodge is a small lodge south of the site, opposite the N1 that offers overnight accommodation. Game is present on the property, but it is not classified as a formal reserve or park.

The Bainsvlei / Ribblesdale Road (S1066) runs to the north and east of the site, with the Mimosa Park Smallholdings situated to the north of the farms and north of the Bainsvlei / Ribblesdale Road. The Summerwood Country Estate and Guesthouse which hosts conferences and functions (e.g. weddings) is located within the Mimosa Park Smallholdings. The majority of the smallholdings adjacent the site is used for residential purposes with some limited agricultural activities such as the grazing of livestock. The Gwen Bali waterpark is also situated on one of these smallholdings just to the north of the site.

Approximately 3-5 km to the west of the proposed site is the existing Woodland Hills Wildlife Estate. The construction of the next phase of the Woodland Hills Wildlife Estate has started to the east of the existing development. The land opposite the proposed site, located to the west of the R700, belongs to Our Father's Home Church (Mountain View 1707: RE/1707). A school has been built within the northern section of this property, but has not yet been occupied by learners. The Waveren Game Farm (Waveren 1103) is situated to the north west of the proposed site.

The area to the south of the N1 (approximately 2 km south of the proposed site) is characterised by various new residential estates, such as the Oubos Landgoed Estate, Somerton, Penrose, Fredenham Valley, Strathearn Estate, Wild Olive Estate and the Tredenham Boutique Hotel. The Sangiro Game Lodge that offers accommodation on a small game reserve is also situated to the south of the site, opposite the Shell Ultra City. The implementation of bulk services for further residential developments on the property of Sangiro Game Lodge has also started.

The land to the east of the proposed site and south of the N1 is also still being used for agricultural purposes, with the Ribblesdale small holding area to the south east of the site. Some sections of these smallholdings are occupied by and used for industrial related activities. Wildealskloof 1205 Portion 2 and 3 which are situated directly to the east of the proposed development accommodates infrastructure for poultry production but are currently not in use.

The site and the immediate surrounding areas are mostly agricultural farmland with cultivated or grazing fields dominating the study area. The relatively even topography is ideal for such agricultural activities. The landscape becomes increasingly varied towards the south and south east with noticeable hills and ridges appearing. The hilly terrain appears to be in a pristine condition with no obvious disturbances and

features shrubby vegetation that is classified as the Winburg Grassy Shrubland vegetation type (Mucina & Rutherford, 2006). The rural character and farming patterns are widely represented in the Free State Province and is therefore a common land use.

3.3 Project Motivation

The Wildealskloof development was born out of the idea of developing a truly remarkable integrated housing development to the north of Bloemfontein. As historical precedents have shown that development tends to sprawl to the South of the Bloemfontein CBD, taking people further away from their workplace. The vision became a dream of the developer to establish a community that will reap the fruits of integration in every aspect of the South African Context, integrating different housing-, income-, social-, religious-, economic, and race groups in one sustainable mixed-use development

Tenure options will range from fully subsidised, to higher income residential units. The reality of a mixed land use development will bring the "new urbanism" idea of life to Bloemfontein. Giving life to a development that will change the face of Bloemfontein for the future and relieving pressure from the Bloemfontein CBD. Development around cities and towns are necessary to accommodate an ever growing population. Although a lower ratio than in other metros, Mangaung has 1.2 times as many households as it has properties. The balance of the demand is absorbed in informal settlements and backyard rentals. Mangaung's 2016 community survey revealed that its current housing backlog stands at approximately 31 100 housing units of which nearly 80% are located in the 29 informal settlements across the metro (CAHF, 2018). Meeting housing needs remains one of the MMM's biggest challenges.

The need for low-income housing opportunities to assist the poor out of poverty and cater for the informal settlements area is a critical issue. The issue thus revolve around the challenge of poverty and ensuring that vulnerability, inequality and social exclusion are addressed. Furthermore, the development aims to aid urban integration.

The proposed Wildealskloof Mixed Use Development aims to ensure integrated development by addressing the housing needs of a wide range of community members with different income levels. The different type of housing on offer will thus accommodate a wide range of families. Educational and health care facilities, office parks, an industrial area and so forth will further assist in ensuring a sustainable development.

This development is imperative to Mangaung Metropolitan Municipality as it addresses the need of basic services, housing, economic growth, job opportunities and in turn reduces poverty levels help improve livelihoods and the economic growth of a specific location within the metropolitan. This activity is in line with the 2017 Integrated Development Plan of Mangaung Metro as the area and its vicinity is earmarked for future residential development.

3.3.1 Description of the Need and Desirability

The table below a needs and desirability of the activity in the context of the preferred location

Table 3-1. Need and Desirability

NEED ('Timing'):
<p>Question 1: Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority? (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP).</p> <p>Answer: Yes</p> <p><i>The Planning documents of the MMM and Free State Province consider such a mixed use development as imperative as it addresses the need of basic services, housing, economic growth, job opportunities and in turn reduces poverty levels within the metropolitan. . This activity is in line with the 2017 Integrated Development Plan of Mangaung Metro as the area and its vicinity is earmarked for future residential development. The site is vacant and the current land use is vacant/unspecified.</i></p>
<p>Question 2: Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occurs here at this point in time?</p> <p>Answer: No.</p> <p><i>The town/area will not expand immediately, but Yes the activity may result in further expansion of the area due to urban expansion in terms of residential development and housing occurring predominantly in the northern parts of Bloemfontein. The constant growth in the city's population means that housing availability must continually increase to meet demands. Therefore, the proposed mixed use development will make a positive contribution towards housing availability and economic growth in Bloemfontein. Development around cities and towns are necessary to accommodate an ever growing population</i></p>
<p>Question 3: Does the community/area need the activity and the associated land use concerned (is it a societal priority)? This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate)</p> <p>Answer: Yes</p> <p><i>This development is imperative to Mangaung Metropolitan Municipality as it addresses the need of basic services, housing, economic growth, job opportunities and in turn reduces poverty levels within the metropolitan.</i></p>

Question 4: Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?

Answer: *Additional capacity will be required to be created to cater for the development in terms of bulk services. However it is worth noting that the development will be constructed in phases over a period of +/-10 years. With this in mind the MMM has planned additional bulk services to be constructed of which this phased out development will be able to be serviced fully. For details refer to the bulk service report attached within Appendix F1*

Question 5: Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?

Answer: Yes

The said portion of land is now included in the urban edge for earmarked for neighbouring development. The amendment of the SDF would enable the applicant to submit a township establishment to the requirements of the Municipality. The municipality will be able to approve development applications based on the capacity of available services.

Question 6: Is this project part of a national programme to address an issue of national concern or importance?

Answer: Yes

The National Spatial Development Perspective was initiated with the aim of not only providing a strategic assessment of the spatial distribution and socio-economic characteristics of the South African population, but also gaining an understanding of the distribution of economic activity and potential across the South African landscape. In order to overcome the spatial distortions of apartheid, infrastructure investment and development spending should primarily support localities that are growth nodes in South Africa.

DESIRABILITY ('placing'):

Question 7: Is the development the best practicable environmental option for this land/site?

Answer:

According to specialist studies conducted during the EIA phase no environmental fatal flaws exist that would prevent the development from being implemented. In addition the area is now part of urban edge earmarked for such developments.

Question 8: Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF as agreed to by the relevant authorities.

Answer: No

Question 9: Would the approval of this application compromise the integrity of the existing

environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?

Answer: No

Question 10: Do location factors favour this land use (associated with the activity applied for) at this place? (this relates to the contextualisation of the proposed land use on this site within its broader context).

Answer: Yes

The said portion of land is now included in the urban edge for earmarked for neighbouring development

Question 11: How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?

Answer: The impacts can be mitigated. This EIR process will determine the potential impact on the environment and if negative impacts are identified, mitigation measures will be proposed. To date, the specialist studies have shown that if these cannot be avoided, wetland may be an issue that would require well-planned mitigation and rehabilitation after construction. Nonetheless the majority of the high sensitive areas including the wetland areas included as part of a Public Open Space area within both layout alternatives considered in this application

Question 12: How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?

Answer: No negative impacts are anticipated regarding odours during the operational phase of the project. The identified noise, visual and sense of place are all those that are common to a built environment and can all be mitigated to have a very low significance.

Question 13: Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?

Answer: No known unacceptable opportunity costs were identified with the proposed development.

Question 14: Will the proposed land use result in unacceptable cumulative impacts?

Answer: No

The project is not expected to have an unacceptable cumulative impact. The project will result in positive impacts in terms of housing infrastructure and economic growth. The EIAR has determined the full extent of impacts and proposed mitigation measures to bring the impacts to acceptable levels.

3.4 Project Alternatives

Appendix 2 Section 2 (h) (i) of the EIA Regulations, 2014, requires that all S&EIR processes must identify and describe alternatives to the proposed activity that are feasible and reasonable'. Different types or categories of alternatives can be identified, e.g. location alternatives, type of activity, design or layout alternatives, technology alternatives and operational alternatives. The 'No Go' or 'No Project' alternative must also be considered. Not all categories of alternatives are applicable to all projects.

The following describes the potential alternatives identified as well as reasons why some were not assessed.

3.4.1 Site Alternatives

No site alternatives are proposed for this project as the proposed site has been identified by Ideal Consulting as being highly desirable for a mixed use development in terms of the following characteristics:

- **Site Extent:** The proposed development inclusive of associated infrastructure can be appropriately located on the identified site, which covers a total area of approximately 587 ha.
- **Land availability and Site access:** - The land is available for lease by the developer. The identified site is traversed by the R700 provincial Road and the N1 high way. Access to the site is facilitated via both roads. Access to the site is provided via gravel roads that can potentially be used and/or upgraded for the proposed development. The site is therefore appropriately located for easy access to the site and proximity to the nearest road infrastructure
- **Current Land Zoning:** The proposed site is on land that has been designated for future urban development. The land in the vicinity is also earmarked for future residential development.
- **Gradient:** The slope of the proposed site is considered to be acceptable from a development perspective, which reduces the need for extensive earthworks and associated levelling activities, thereby minimising environmental impacts.

3.4.2 Layout Design Alternatives

The proposed mixed use development is expected to have a development footprint of approximately 587 ha. Therefore, the development and its associated infrastructure (i.e. internal roads, etc.) can

conveniently be positioned within the broader site to avoid areas of sensitivity. Therefore, the extent of the site allows for the identification of layout design and site-specific alternatives.

A Scoping study was conducted in order to identify and describe potential impacts associated with the proposed development. The scoping report identified areas of potential environmental sensitivities to inform the design of the Wildealskloof mixed use development for further investigation during the EIA phase. These sensitivities areas include:

- Areas of wetlands and watercourses depicted as high ecological sensitivity and conservation value
- Areas of High ecological sensitivity e.g. the
- Areas of heritage sensitivity.

The findings of the Scoping study identified portions of the proposed study site as being of ‘‘high sensitivity’’, No fatal flows or no go areas were identified at this stage.

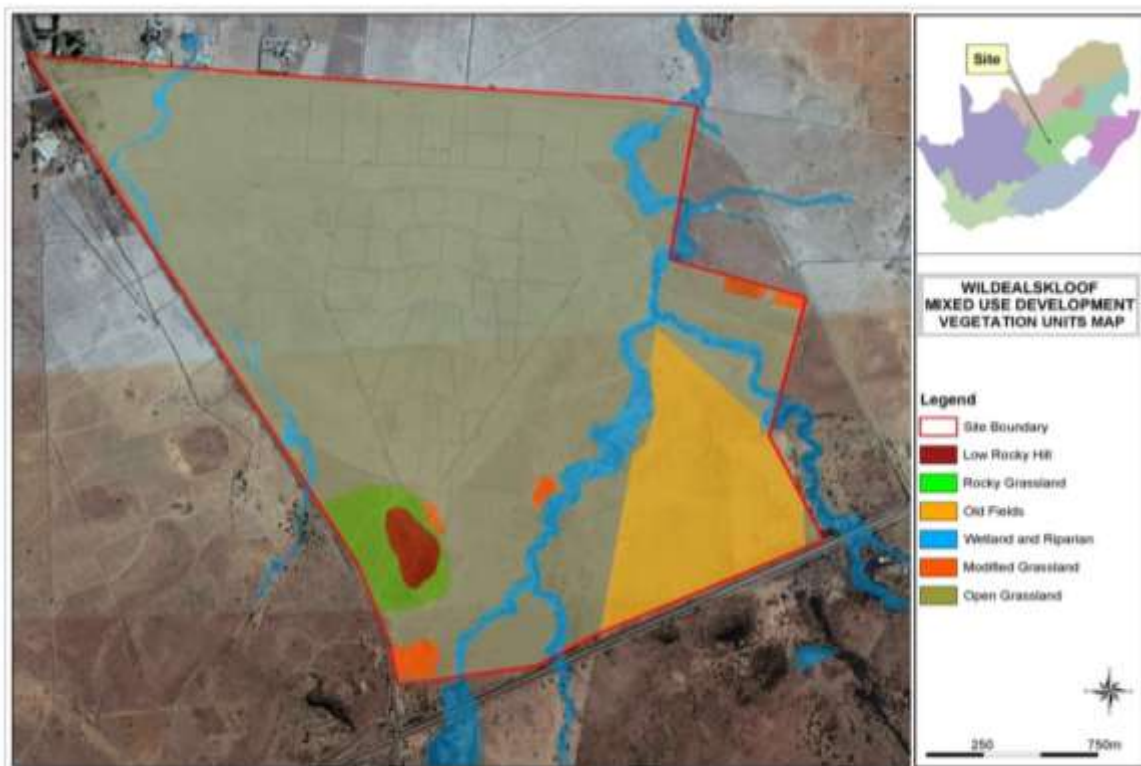


Figure 3-2: Sensitivity Map showing the rocky grassland, hill or kopje and wetland which must be excluded from any development due to unique habitats and the presence of many species, including the mountain reedbed.

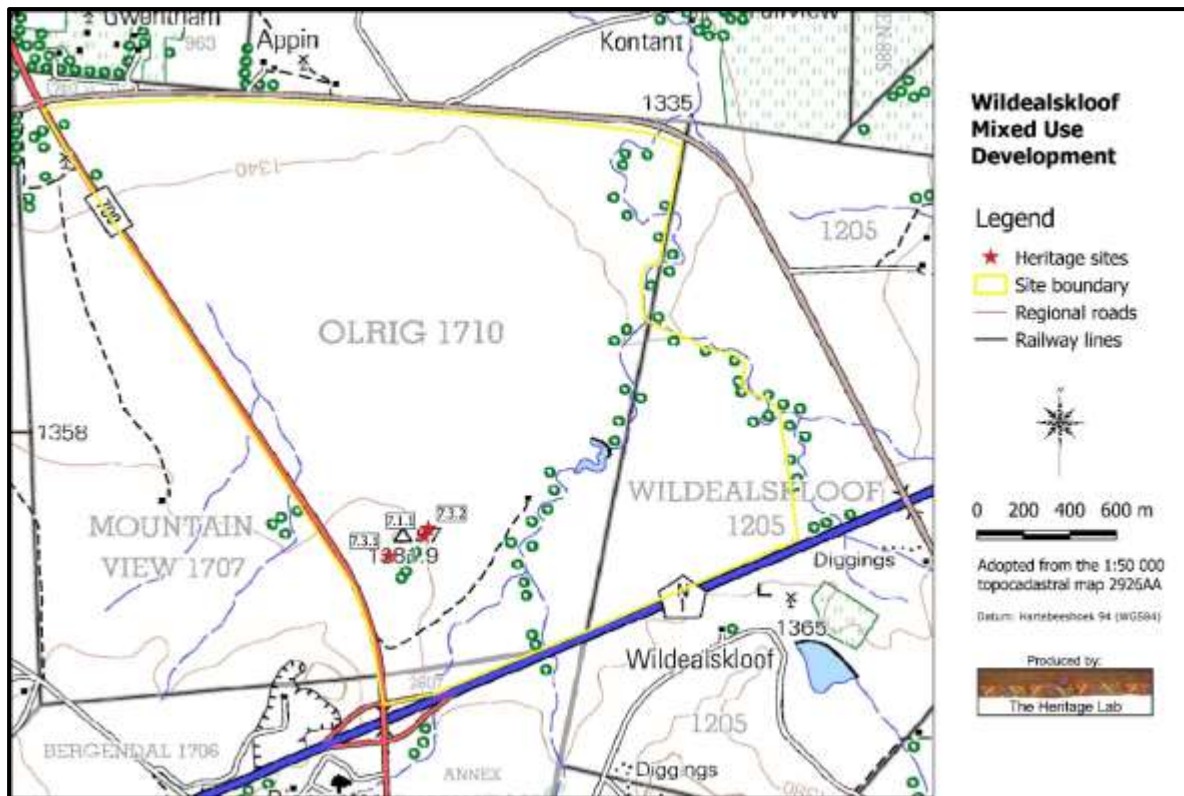


Figure 3-3: Location of heritage sites in the study area.

Based on the Scoping study the following two layout alternatives for the construction of the proposed Wildealskloof mixed use development were considered and are briefly described below and presented in Figure 3-3 and Figure 3-4. A3 versions of these conceptual layouts are provided in Appendix A.

3.4.2.1 Design Layout Alternative 1

Design Layout Alternative 1 is cognisant of the high areas of sensitivity on site. The layout has avoided development in the non-perennial river, the two non-perennial streams and the small depression pan wetland, as well as their buffer zones. The rocky grassland, hill or kopje another area of high sensitivity due to its unique habitats and the presence of many species, flora, fauna and avifauna was also reserved as a public open space. Various heritage features (sangars and burial site) were identified on and at the base of the hill in the south-western section of the study area. This design has avoided development also in areas of heritage sensitivity.



Figure 3-4: Overview of the Design Layout Alternative 1. Refer to Appendix xx for an A3 Conceptual Design.

Advantages and Disadvantages regarding **Design Layout Alternative 1** are tabulated as follows:

Advantages	Disadvantages
<p>Ecological Sensitivity: This layout has taken into consideration the areas of high sensitivity which is the hill and the rocky grassland which has high sensitivity of fauna, flora and avifauna. The area is left as public open space</p>	<p>None</p>
<p>Heritage Sensitivity: No permit will be required to relocate identified graves and destruction of the others heritage resources found on site on the western section of the hill as this area is left as a public open space in this layout</p>	<p>None</p>

<p>Wetland Sensitivity: This layout has minimised development in the non perennial ephemeral river and were development is unavoidable e.g. the construction of the bridges to span the watercourse, storm water outlet structures.</p>	<p>Impacts in the watercourse. A water use licence is required from the relevant authority (DWS)</p>
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As indicated above, Design Layout Alternative 1 has ensured that the areas of high sensitivity were excluded from the development and included as part of the developments open space it is therefore the preferred layout from an environmental perspective.

3.4.2.2 Design Layout Alternative 2

Design Layout Alternative 2 is very similar to Design Alternative 1; the only difference between this design and design Layout Alternative 1 is that Design Layout Alternative 2 did not take into consideration all areas of high sensitivity such as the rocky grassland, hill or kopje and the heritage features (sangars and burial site) identified on and at the base of the hill in the south-western section of the study area (the area highlighted in purple in Figure 3-5). Unlike Design Layout Alternative 1, which has left the areas of high sensitivity as public open space, Design Layout Alternative 2 is proposing a heavy industrial development in the aforementioned sensitivity areas.



Figure 3-5: Overview of the Design Layout Alternative 2 (Refer to Appendix A for an A3 Conceptual Designs.

Advantages and Disadvantages regarding **Design Layout Alternative 2** are tabulated as follows:

Advantages	Disadvantages
<p>Ecological Sensitivity: This layout proposes a heavy industrial land use in the areas of high sensitivity which is the hill and the rocky grassland.</p>	<p>Impacts on fauna, flora and avifauna</p>
<p>Heritage Sensitivity: No permit will be required to relocate identified graves and destruction of the others heritage resources found on site on the western section of the hill as this area is left as a public open space in this layout</p>	<p>Impact on heritage resources identified on site. A permit from SAHRA and Provincial Heritage will be required to relocate graves and destroy the built heritage sites. This may also result in social impacts for the families involved during grave relocations</p>
<p>Wetland Sensitivity: This layout has minimised development in the non perennial ephemeral river and were development is unavoidable e.g. the construction of the bridges to span the watercourse, storm water outlet structures, a water use licence will be sourced from the relevant authority</p>	<p>Impacts in the watercourse. A water use licence is required from the relevant authority (DWS)</p>

3.4.3 The No Go Alternative

The No Go alternative will be considered in the EIA in accordance with the requirements of the EIA Regulations, 2014. The No Go alternative is the option of not implementing the proposed project. This option is evaluated as the “no go alternative” in this Draft EIR.

4. Description of the Affected Environment

The following chapter presents provides a description of the biophysical and socio-economic environment that may be affected by the proposed Wildealskloof Mixed Use Development. The receiving environment has been described using a combination of on-site observations (by both specialists and Envirolution Consulting Pty Ltd),

4.1 Biophysical Characteristics of the Study Area and Surrounds

4.1.1 Topography

The topography of the region is classified as hills and lowlands .The topography of the site consists of a plains area which has a gradual slope from the south toward the north. This is also indicated by the flow direction of the seasonal stream. The elevation over the plains region on the site varies from 1377 m to 1340 m. This also includes the low hill on the site. The single low hill located in the south western corner of the site consists of dolerite with prominent woodland especially along the southern slopes.

4.1.2 Geology and Soil

Bloemfontein and the immediate surrounding area falls under the Ea land type followed by Dc and Fa: The study area is underlain by the Adelaide Subgroup, which can be characterised by dolerite intrusions embedded within sedimentary rocks (mudstones and sandstones) of the Beaufort Group and Karoo Super group (Mucina & Rutherford, 2006). According to (le Roux *et al.* 2013) the Bloemfontein area is characterised by Aeolian sands in the southern parts with soil forms mostly found in this land type being Bainsvlei and Bloemdal soil forms. The soils to the northern parts of Bloemfontein consist of higher clay volumes therefore, the soil forms associated with these soils is the Arcadia and Rensburg soil forms. The above-mentioned soil forms are mainly characterised by sandy top layers. These top layers are prone to wind and water erosion if not managed correctly. The geology of the study area is made up of mudstone, changing to shale in the northern portion. A dolerite outcrop occurs in the south-western section. No significant regional structures such as faults or dykes have been identified in the area. The study area lies in environment that has to some extent been transformed by farming activities, with an urban element encroaching from the south-west. In the proposed site the characteristic soil forms are the stony Mispah and gravel-rich Glenrosa derived from Jurassic dolerite (Mucina & Rutherford, 2006).

The study site is located on three geological areas, mainly on mudstone with shale in the north and a small section Dolerite in the eastern section of the study site (Figure 4-1). The soil of the study area is

classified as Ea39 - One or more of: vertic, melanic, red structured diagnostic horizons, undifferentiated Sandstone, shale and mudstone of the Beaufort Group, with dolerite intrusions. The soil class of the study site is S18 – which refers to an association of Classes 5, 6, 10, 11 and 12: Undifferentiated clays, High natural fertility, one or more of: high swell-shrink potential, plastic and sticky, restricted effective depth, wetness. No ground water was encountered during the geotechnical investigation.

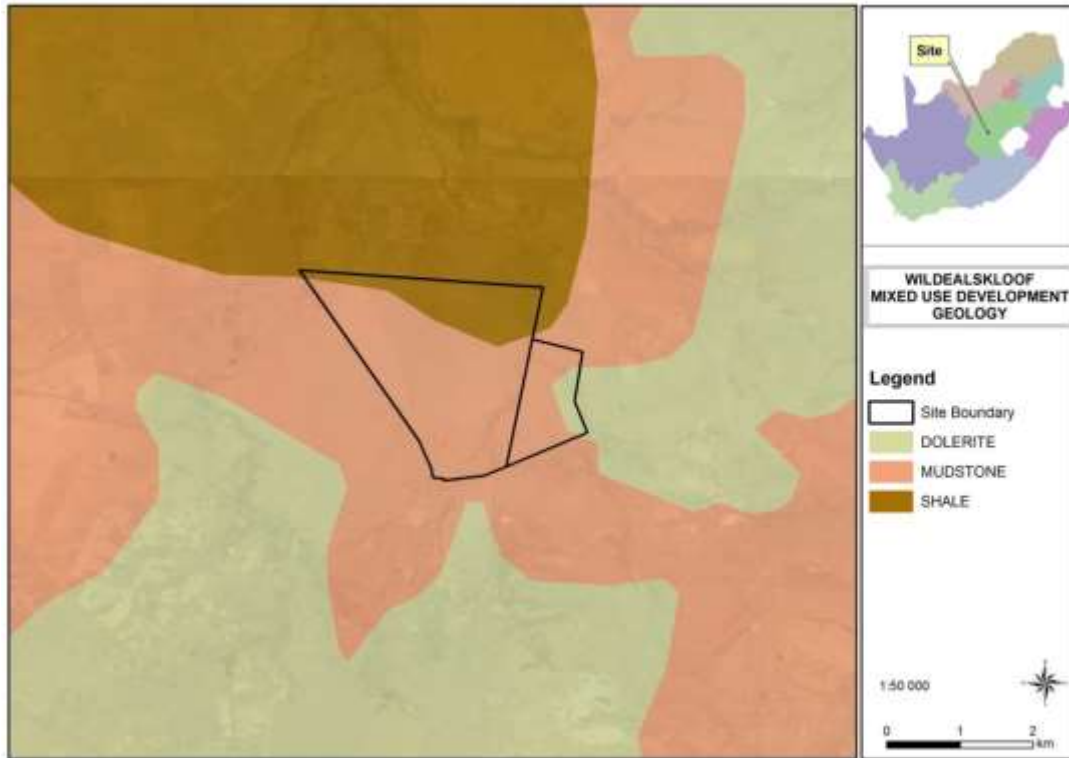


Figure 4-1: Geology of the proposed development

4.1.3 Climate

The city of Bloemfontein falls under the Semi-Arid Aridity zone and. The climate is largely characterised by a summer-rainfall area, with a mean annual rainfall of approximately 450 - 550 mm and a mean annual evaporation of approximately 2 200mm. Most of the rainfall is of 12 convectional origin and peaks in late summer. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Bloemfontein range from 16°C June to 29.2 in January. The region is coldest during July when the mercury drops to 0°C on average during the night (Mucina & Rutherford, 2006). It is not expected that the proposed establishment of the residential area will have any impact on the local climate in the area.

4.1.4 Land use

The study area is generally flat with one hill and several watercourses located on the study site. Historically, since 1941 only small sections of the study area were used for agriculture in the south east corner, still evident today. The main ephemeral watercourse located on the study site is similar today to the historical conditions, although more trees are visible today and the watercourse has been dammed up within the study area. Prior to 2017 the study area was generally open land with little impacts other than possible overgrazing. In 2017 the majority of the study site was cleared with large road sections. The hill located in the south western corner of the study site is predominantly vegetated by woody species on the southern slopes while the northern slopes have less woody cover.

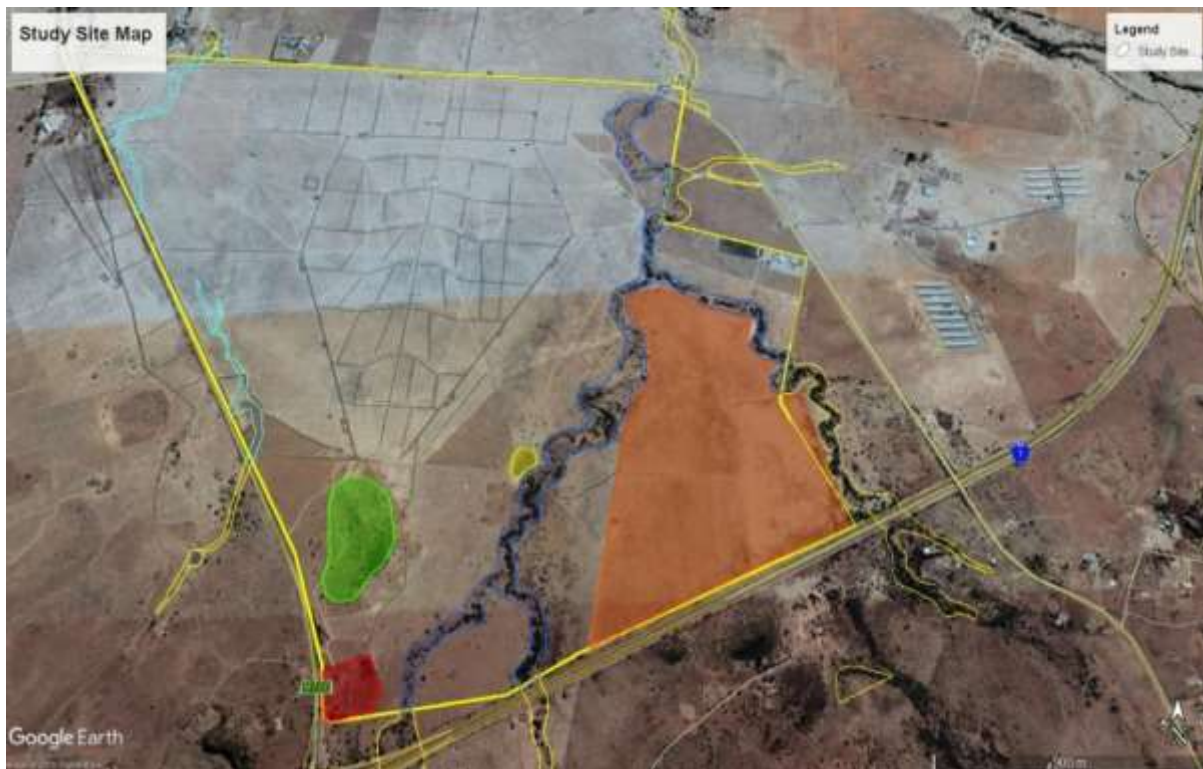


Figure 4-2: Map of the study site in relation to each specific area. Blue and light blue indicated non-perennial rivers, orange indicates previously ploughed lands, red indicates disturbed area, green indicates the hill, yellow indicates the animal pen. The remaining areas not classified are the grassland area.

4.1.5 Hydrology and Hydrogeology

The Bloemfontein area falls under a minor aquifer region which is a Mediumly-yielding aquifer system of variable water quality (DWA, 2012). Groundwater quality is characteristically expressed through Electrical Conductivity (mS_m). The groundwater quality in the Bloemfontein area ranges between 70 – 150 mS_m. The MMM is not currently utilizing groundwater as a primary water supply

resource for the supply of potable water to Bloemfontein. Groundwater is only used by individuals for irrigation of gardens and residential areas as well as small industries and micro irrigation for nurseries and garden centres. Groundwater is only used for agriculture towards the south-western areas (i.e. Bainsvlei & Kalkveld). The smaller towns around Mangaung like Wepener, Dewetsdorp, Reddersburg and Edenburg are completely dependent on groundwater for daily use (Aurecon, GHT Consulting Scientists, ILISO Consulting, 2012). The proposed activity will connect to the existing water supply line of the municipality and will not use groundwater. A geotechnical investigation undertaken for the site reported that no ground water was encountered during the geotechnical investigations. The activity will therefore not have any impact on groundwater.

4.1.6 Wetlands and Surface Water Bodies

A specialist study was done by Antoinette Bootsma (Pr.Sci.Nat. No. 400222-09 – Botanical and Ecological Science) of Limosella Consulting (A summary of the study findings is included below and a copy of the full report is included as Appendix D10 of Volume 2.).

The specialist assessed the potential impact of the project on wetlands and surface water bodies. During the site visits, four wetland areas were recorded on the study site. The watercourses can be classified as one non-perennial ephemeral river, two non-perennial episodic streams (drainage lines) and one very small depressional pan wetland.

The episodic streams are very small and no clear channel could be discerned. The episodic streams also lacked woody species and were dominated by grasses similar to the adjacent terrestrial grasses with some additional species such as *Brachiaria eruciformis*, *Panicum coloratum* and *Pennisetum sphacelatum*. The site visit was conducted after heavy rains and no water flow was seen in these streams. Thus these small episodic streams are not likely to contribute greatly to stream flow regulation or conveyance of water.

The ephemeral stream located in the north eastern corner runs through to the south east and western corner of the study site. It is dominated by dense woody riparian vegetation. The stream flows from south to north where it flows into the Stinkhoutspruit River approximately 2 km north of the study site. During the site visit the main channel was recorded as flowing. The ephemeral river remained mostly undisturbed since as early as 1941 with changes including a dam within the main channel and a road crossing within the study site. Off-site several other roads cross the ephemeral stream. The riparian vegetation is now denser compared to earlier years. The marginal zone of the stream is characterised by a grassy layer as well as some sedges and herbaceous species, many of which are terrestrial species and indicates the ephemeral nature of the stream. The non-marginal zone is dominated by woody vegetation as well as terrestrial grasses. The main woody species recorded within the riparian area include *Vachellia karroo*, *Ziziphus mucronata*, *Searsia lancea*, *Asparagus lariginus*, *Searsia pyroides*, *Scolopia zeyheri*,

Vachellia xanthophloea. Some obligate wetland species, such as *Cyperus congesta*, also occurred in the dammed areas of the stream. This indicates that these pools often retain water for long periods after rainfall events.

A very small depressional pan wetland (325 m²) was recorded in close proximity to the episodic stream near the western border of the study site. Clear animal tracks can be seen from the feeding pens leading straight to this wetland. More recently several dirt roads have been constructed and join together directly adjacent to the wetland. Plant species recorded here include *Persicaria lapathifolia*, *Leptochloa fusca* and *Cyperus congesta*.

The position and extent of the watercourses, together with their associated buffer zones is shown in Figure 4-3.

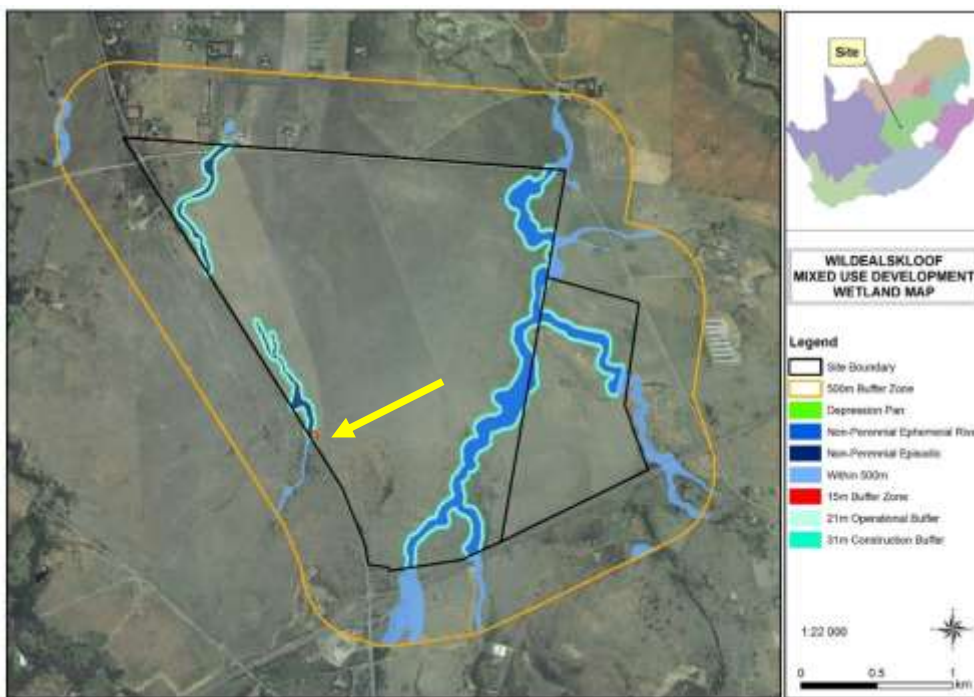


Figure 4-3: Map showing the location and extent of watercourses in relation to the study site and the associated scientific buffer. The yellow arrow points to the pan.



Figure 4-4: Vegetation composition of the non-perennial ephemeral stream.



Figure 4-5: Vegetation composition of the episodic stream (top photos) and the depressional pan wetland (bottom).

Present Ecological Status (PES): In summary the PES scores for The PES and EIS scores were calculated for the wetland likely to be impacted by the proposed project, thus the Depressional Pan wetland. This wetland scored a C - Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact. The Depressional pan is a very small wetland and impacts are limited to a small area surrounding the pan, in this case road works and vegetation clearing.

Ecological Importance and Sensitivity (EIS)

An EIS score for the pan of 1.4 falls into a category characterised by Moderate ecological importance and sensitivity. Wetlands in this category are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water in major rivers (DWA, 1999). For details refer to the Wetland specialist report in Appendix xxx of this EIR report

Wetlands situated within 500 m of proposed activities should be regarded as sensitive features potentially affected by the proposed development (Regulation 1199 of 2009 in terms of the National Water Act, 1998). Development activities close to wetlands are excluded from General Authorisation (GA) for Section 21 (c) and (i) water uses (published in Government Gazette No. 389). In this instance the Department of Water Affairs should be contacted regarding the application for a Water Use License.

4.1.7 Flora and Vegetation Ecology

The study area is located within the Grassland Biome (Rutherford & Westfall, 1994) and within the Bloemfontein Dry Grassland and Winburg Grassy Shrubland vegetation types (Mucina & Rutherford, 2006) (Figure 5). Other classifications describe Bloemfontein's vegetation as located within the Central Variation of Dry *Cymbopogon-Themeda* veld (Acocks 1988) and Dry Sandy Highveld Grassland (Bredenkamp & Van Rooyen 1996). The vegetation types are described in details below.

Bloemfontein Dry Grassland: The Bloemfontein Dry Grassland vegetation type occur of slightly undulating bottomland landscapes and comprises tall, dense grassland alternating with patches of karroid scrub occurring especially over calcrete. The Bloemfontein Dry Grassland vegetation is formally classified as an Endangered (EN) vegetation type with only a small portion thereof conserved within the Soetdoring Nature Reserve. At least 40% of this vegetation type has already undergone transformation, mostly by crop production as well as urban development. Grasslands on shallow soils are prone to karoo-bush encroachment when overgrazed, but erosion is moderate to low (Mucina & Rutherford, 2006).

Winburg Grassy Shrubland: The Winburg Shrubby Grassland vegetation type occurs on solitary hills, slopes and escarpments of mesas creating a mosaic of habitats ranging from open grassland to shrub land. The vegetation typically comprises evergreen shrub land of medium height dominated by a combination of *Olea europaea subsp. africana*, *Euclea crispa subsp. crispa*, *Diospyros lycioides*, *Searsia burchelli*, *S. ciliata*, *S. erosa*, *Clutia pulchella* and *Grewia occidentalis*. Trees such as *S. lancea*, *Celtis africana* and *Ziziphus mucronata* are found in more deeply incised drainage lines (Mucina & Rutherford, 2006).

The Winburg Shrubby Grassland vegetation type is formally classified as a Least Threatened vegetation type. More than 10% thereof has been transformed for cultivation and urban sprawl and only 2% is statutorily conserved. The conservation target for this vegetation type is 28%.

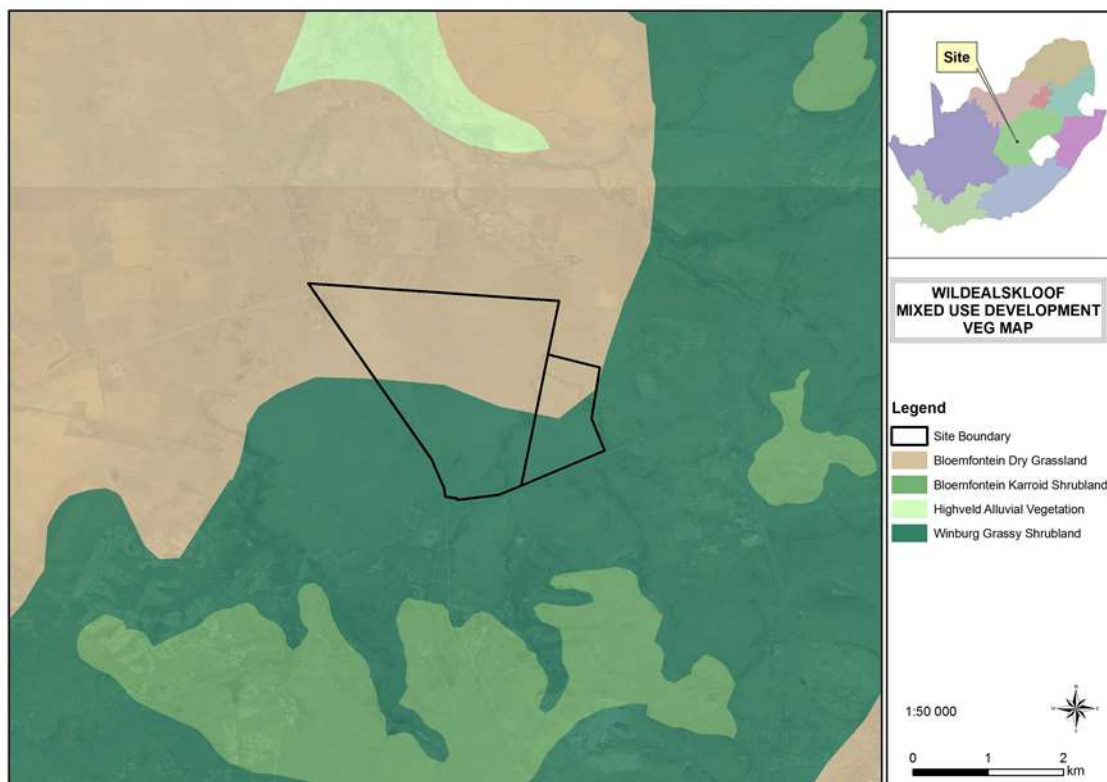


Figure 4-6: Map showing the vegetation type on Orlig No. 1710 & Portion 4 of the Farm Wildealskloof.

An ecological assessment was conducted by Michelle Pretoriust (Pr. Sci. Nat No 400003) of Dimela Eco Consulting. A summary of the study findings is included below, and a copy of the full report is included as Appendix D9 of Volume 2.

During the field assessment, six broad vegetation units were identified within the study area namely:

- Low Rocky Hill, located within the south western portion of the study area;
- Rocky Grassland, which includes the area immediately surrounding the foothills of the Low Rocky Hill, where exposed rock is present;

- Open Grassland, which cover the majority of the study area;
- Old Fields, located in the south eastern portion of the study area;
- Wetland and Riparian areas comprise four watercourses occurring in the eastern and southern portions of the study area, as well as along the western boundary; and
- Modified Grassland Areas, which mainly relates to existing mining and agricultural activities and ancillary infrastructure.

The location and extent of these vegetation units in relation to the study area are illustrated in Figure 4-7.

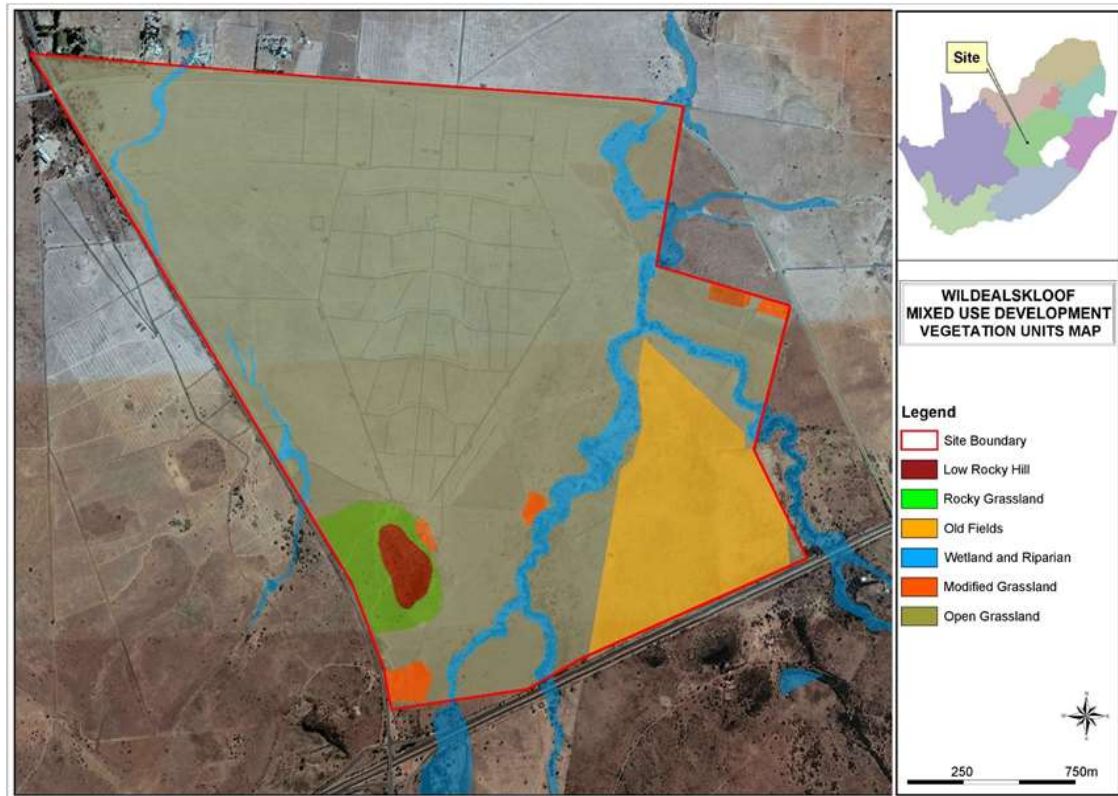


Figure 4-7: Vegetation units identified within the study area.

Rocky Hill: The isolated hill is the only such landscape feature within the study area and is located within the south western portion of the study area (Figure 4-7 & 4-8). This feature is characterised by dolerite substrate which, together with the surrounding rocky grassland area, provides varied topography, high levels of spatial heterogeneity, refuge and niche habitat for an increased diversity of faunal and floral species. The vegetation occurring within these areas are notably different from the surrounding areas and comprise vegetation typical of rocky areas within the region.

The isolated hill is characterised by a well-developed tree and shrub layer, with dense woody vegetation present particularly along its eastern slopes. Dominant trees species include a high abundance of large *Olea europaea* subsp. *africana* trees, a provincially protected species, as well as

Buddleja saligna, *Grewia occidentalis*, *Searsia burchellii*, *Gymnosporia polyanantha* and *Euclea crispa* subsp. *crispa*.

The forb layer is relatively diverse when compared to the grasslands within the study area and include species such as *Lantana rugosa*, *Pollichia campestris*, *Selago albida*, *Hypoxis hemerocallidea* (which is not protected within the Free State Province and although listed as being of Least Concern, is indicated by SANBI to be declining in abundance due to harvesting for the medicinal trade, habitat loss and degradation) and the fern species *Cheilanthes hirta*. Provincially protected forb species include *Aloe grandidentata*, *Haemanthus humilis* subsp. *humilis* and *Orbea lutea* subsp. *lutea*. Grass species present include *Themeda triandra*, which is abundant throughout the study area and larger region, as well as *Cymbopogon pospischilii*, *Eustachys paspaloides*, *Melinis nerviglumis* and various *Aristida* spp.

Although a number of ruderal alien species such as *Zinnia peruviana*, *Tagetes minuta* and *Bidens bipinnata* occur within the Low Rocky Hill vegetation unit, this area provides intact vegetation composition and structure, a high diversity of floral species and host an increased diversity and abundance of faunal species. The overall level of anthropogenic disturbance within this habitat unit is considered low.



Figure 4-8: Representative photographs of the Low Rocky Hill vegetation unit, illustrating the high abundance of *Olea europaea* subsp. *africana* trees along its eastern slopes and crest, as well as the characteristic rocky substrate.

Rocky Grassland: The Rocky Grassland vegetation unit is located within the south eastern portion of the study area in the vicinity of the isolated hill, and shares many of its floral characteristics with the Low Rocky Hill vegetation unit (Figure 4-9). The provincially protected tree species *Olea europaea* subsp. *africana*, as well as *Buddleja saligna*, *Searsia burchellii* and *S. ciliata* occur in this vegetation unit and various protected forb species such as *Boophone disticha*, *Aloe grandidentata*, *Haemanthus humilis* subsp. *humilis*, and *Brunsvigia radulosa*. Although not encountered within this vegetation unit during the field assessment, suitable habitat for *Hypoxis hemerocallidea* and *Orbea lutea* subsp. *lutea* is also available and these species are likely to occur in this area. The grass species composition is similar to that of the Low Rocky Hill vegetation unit, with a high abundance of *Themeda triandra*, *Tragus koelerioides*, *Aristida* spp. and *Elionurus muticus* present.

The Rocky Grassland vegetation unit is in a relatively good ecological condition, although some grazing by livestock was noted and bush encroachment by the woody species *Searsia ciliata* is taking place. Where disturbance has occurred, local dominance by *Chloris virgata* is evident. An overall low number of alien species were recorded, with *Opuntia engelmannii* being the most prominent.



Figure 4-9: Representative photographs of the Rocky Grassland vegetation unit with *Searsia burchellii* and *S. ciliata* being the dominant woody species.

Open Grassland: The Open Grassland vegetation unit is represented within the majority of the study area (Figure 4-10) and is relatively uniform across its extent in terms of species composition and structure. As a result of ongoing grazing activities within certain portions of the open grassland, some areas are somewhat degraded, while other portions are relatively intact. The Open Grassland vegetation unit is however discussed as a single unit in this report due to the expected resilience of the system and its ability to recover should the grassland be allowed to recover from grazing.

The extent of this area is utilised as grazing land for cattle and various game species on the farm, which has led to a degree of habitat degradation within portions of this vegetation unit as a result of trampling and localised overgrazing. Furthermore, the clearing of vegetation for the development of access roads has occurred centrally within the habitat unit as recently as 2017, as can be seen from Google Earth imagery. As a result of the aforementioned disturbances, the vegetation within this vegetation unit varies between being dominated by *Themeda triandra*, a climax grass species in less impacted areas, and *Chloris virgata*, a pioneer species, in overgrazed and trampled areas. Overall, however, the species composition and structure across this vegetation unit is largely homogeneous, and apart from variations in grass species dominance, the forb composition is very similar.

The Open Grassland vegetation unit is dominated by grass species typical of both the Winburg Shrubby Grassland and Bloemfontein Dry Grassland vegetation types (Figure 4-11). The grass component within areas where disturbances are managed is dominated by *Themeda triandra*, *Tragus berteronianus*, *Aristida congesta*, *E. obtusa* and also includes *Cynodon dactylon*, *Eragrostis lehmanniana*, *Digitaria eriantha* and *E. chloromelas*. Commonly encountered forb species include *Felicia muricata*, *Ipomoea oblongata*, *Ledebouria luteola*, *Geigeria ornativa* subsp. *ornativa*, *Pentzia incana*, *Berkheya onopordifolia* var. *onopordifolia*, *Eriospermum* sp. The fern species *Ophioglossum polyphyllum* as well as several abundant alien species such as *Portulaca oleracea*, *Hibiscus trionum* and *Sphaeralcea bonariensis*, with *Opuntia engelmannii* also occur through the vegetation unit. Several protected species occur scattered throughout the Open Grassland vegetation unit, within both the intact and more degraded portion of the grassland, namely *Nerine laticoma* and *Ammorcharis coranica*. In the 2016 Eko Environmental vegetation study, both *Raphionacma dyeri* and the provincially protected *Orbea lutea* subsp. *lutea* were also recorded throughout this vegetation unit. *R. dyeri* is considered a rare species and has a limited distribution range.

Within open grassland areas subjected to overgrazing and trampling, a similar species composition may be found, although of a lower diversity (Figure 4-10). Within these areas the dominant grass species is *Chloris virgata*, with *Aristida bipartita*, *A. congesta*, *Eragrostis superba* and *E. obtusa* also

occurring in high abundance. *Felicia muricata* remains one of the dominant forbs species within these areas together with *Geigeria ornativa* subsp. *ornativa* and *Berkheya onopordifolia* var. *onopordifolia*. In Open Grassland areas bordering the Wetlands and Riparian vegetation unit particularly within the southern portion of the study area, bush encroachment and densification of *Vachellia karroo* evident possibly also as a result of grazing activities, with this species also occurring in small, scattered clumps throughout this vegetation unit.

The majority of the Open Grassland vegetation unit is considered to be in a largely natural state, hosting a high proportion of climax grasses such as *Themeda triandra*. Historical and ongoing disturbances have however contributed towards an increased occurrence of alien species, as well as an alteration of local species composition within areas where overgrazing and trampling take place. Should disturbances cease, these overgrazed and trampled grassland could rehabilitate well overtime.



Figure 4-10: Representative photographs of the Open Grassland vegetation unit, occurring within the majority of the study area.



Figure 4-11: Representative photographs of the *Chloris virgata*-dominated portions of the Open Grassland vegetation unit, with overgrazed areas leading to bare soils and loss of vegetation structure also indicated.

Old Fields: An area within the south eastern portion of the study area has historically been cultivated, with this land currently lying fallow (Figure 4-12). The vegetation within this vegetation unit is dominated by weeds and pioneer species as well as *Chloris virgata*, with *Aristida bipartita*, *A. congesta*, *Fingerhuthia africana* and *Cynodon dactylon* also occurring in a high abundance, with the majority of grass species present being typical of disturbed habitats. The forb layer within the Old Fields vegetation unit has a low diversity when compared to the open grassland vegetation and is dominated by *Felicia muricata*, *Monsonia angustifolia* and *Geigeria ornativa* subsp. *ornativa*. Various areas with bare exposed soils are also present. Scattered bush clumps occur within the Old Field vegetation unit with woody species including *Searsia ciliata*, *S. pyroides*, *Vachellia karroo* and *Asparagus laricinus*. The overall ecological condition of this vegetation is poor due to historical soil disturbance and vegetation clearance and this area has a low potential for floral SCC to occur.



Figure 4-12: Representative photographs of the Old Fields vegetation unit, occurring within the south eastern portion of the study area.

The dominant floral species encountered within the Old Fields vegetation unit during the field assessment are included in Appendix A of the vegetation specialist report attached within Appendix D9 of Volume 2.

Wetland and Riparian Areas: Four watercourses were recorded within the study area, which can be classified as one non-perennial ephemeral river, two non-perennial episodic streams (drainage lines) and a single, small pan wetland (Limosella Consulting, 2018). The riparian vegetation is now denser compared to earlier years. The marginal zone of the stream is characterised by a grassy layer as well as some sedges and herbaceous species, many of which are terrestrial species and indicates the ephemeral nature of the stream. The non-marginal zone is dominated by woody vegetation as well as terrestrial grasses. The main woody species recorded within the riparian area include *Vachellia karroo*, *Ziziphus mucronata*, *Searsia lancea*, *S. pyroides*, *Asparagus laricinus* and *Scolopia zeyheri*. Some obligate wetland species, such as *Cyperus congesta*, also occurred in the dammed areas of the stream indicates that these pools often retain water for long periods after rainfall events (Limosella Consulting, 2018).

The episodic streams are very small, and also lacked woody species and were dominated by grasses similar to the adjacent terrestrial grasses with some additional species such as *Brachiaria eruciformis*, *Panicum coloratum* and *Pennisetum sphacelatum*.

A very small depressional pan wetland (325 m²) was recorded in close proximity to the episodic stream near the western border of the study site. Plant species recorded here include *Persicaria lapathifolia*, *Leptochloa fusca* and *Cyperus congesta* (Limosella Consulting, 2018).

Floral SCC recorded from the Wetland and Riparian vegetation unit include *Olea europaea* subsp. *africana*, which forms part of the woody riparian vegetation of the ephemeral stream.



Figure 4-13: Representative photographs of the Wetland and Riparian vegetation unit, indicating the diverse habitat associated with these features.

The dominant floral species encountered within the Wetland and Riparian vegetation unit during the field assessment are included in Appendix A of the vegetation specialist report attached within Appendix D9 of Volume 2.

Modified Grassland Areas: The Modified Grassland vegetation unit includes areas where active mining and associated activities are taking place, as well as areas currently under cultivation (Figure 4-14). Natural vegetation within these areas are mostly absent. The Modified areas has a low potential to support floral SCC due to the high level of anthropogenic impact that has occurred within this vegetation unit.



Figure 4-14: Representative photographs of the Modified Grassland vegetation unit.

Floral Species of Conservation Concern: An assessment considering the occurrence of floral SCC including suitable habitat to support any such species was undertaken.

No floral SCC are indicated by the SANBI Plants of Southern Africa (POSA) database to occur within the 2926AA QDS, and although no IUCN or SANBI RDL floral species were encountered within the study area, several provincially species were recorded as listed in Table 3 below. No tree species protected under the National Forest Act (Act No. 84 of 1998) or species listed in terms of the NEMBA TOPS Regulations (2015) were encountered within the study area during the field assessment.

Table 4-1: Floral SCC encountered within the study area.

Species	Common name	IUCN/ SANBI RDL STATUS	Protected	Vegetation Unit
<i>Olea europaea</i> subsp. <i>africana</i>	Wild olive	LC	FSNCO	Low Rocky Hill Rocky Grassland Wetland and Riparian
<i>Orbea lutea</i> subsp. <i>lutea</i>	Yellow carrion	LC	FSNCO	Low Rocky Hill

	flower			Rocky Grassland Open Grassland
<i>Aloe grandidentata</i>	Bontaalwyn	LC	FSNCO	Low Rocky Hill Rocky Grassland
<i>Boophone disticha</i>	Poison bulb/ Century plant	LC	FSNCO	Rocky Grassland
<i>Haemanthus humulis</i> subsp. <i>humulis</i>	Haemanthus/ Rabbit's ears	LC	FSNCO	Low Rocky Hill Rocky Grassland
<i>Ammocharis coranica</i>	Ground lily	LC	FSNCO	Open Grassland
<i>Nerine laticoma</i>	Nerine/ gifbol/ misrybol	LC	FSNCO	Open Grassland
<i>Brunsvigia radulosa</i>	Candelabra Flower	LC	FSNCO	Rocky Grassland
<i>Raphionacme dyeri</i>	Dyer's Raphio	LC (limited distribution)	FSNCO	Rocky Grassland
<i>Hypoxis hemerocallidea</i>	Star-flower	LC (decreasing)	-	Low Rocky Hill Rocky Grassland Open Grassland (suitable habitat)

The majority of floral SCC encountered are provincially protected and occurs within the Wetland and Riparian, the Low Rocky Hill and Rocky Grassland vegetation units. Through conserving these habitat areas within the proposed development, these species will also remain protected. As far as possible, the provincially protected floral species listed above should be conserved *in situ*, but where this is not possible it is recommended that these species be relocated to suitable similar habitat, within the study area under the supervision of a qualified botanist.

Medicinal Floral Species: Many floral species encountered within the study area have been recorded to have some medicinal use and therefore only the most prominent medicinal floral species encountered during the field assessment, as indicated by Van Wyk et al. (2005) and Van Wyk & Gericke (2003) are included in the table below.

Table 4-2: Medicinal floral species identified during the field assessment across all vegetation units.

Species	Common name	Plant parts used
<i>Boophone disticha</i>	Bushman poison bulb	Bulb scales.
<i>Datura stramonium</i>	Thornapple	Leaves, rarely green fruit.
<i>Gomphocarpus fruticosus</i>	Milkweed	Leaves, sometimes roots.
<i>Hilliardiella oligocephala</i>	Groenamara	Leaves and twigs, rarely roots.
<i>Hypoxis</i>	Star flower	Tuberous rootstock.

<i>hemerocallidea</i>		
<i>Olea europaea</i> subsp. <i>africana</i>	Wild olive	Dried leaves, sometimes roots or stem bark.
<i>Pellaea calomelanos</i>	Hard fern	Leaves and rhizomes.
<i>Scabiosa columbaria</i>	Wild scabious	Leaves or fleshy roots.
<i>Vachellia karroo</i>	Sweet thorn	Bark, leaves and gum, rarely roots.
<i>Ziziphus mucronata</i>	Buffalo thorn	Roots, bark or leaves.

The medicinal floral species listed above were encountered within the study area throughout all vegetation units. All medicinal species identified are indigenous with the exception of *Datura stramonium* which is a Category 1b alien and invasive species.

Alien Invasive Floral Species: Alien and invasive floral species lead to degradation of the ecological integrity of an area, which in turn may lead to, amongst others, a decline in and potential local extinction in indigenous species diversity, an ecological imbalance and the decreased productivity of grazing land (Bromilow, 2010). Alien invasive floral species must be controlled in terms of the Alien and Invasive Species Regulations (2014).

During the field assessment, the alien and invasive floral species encountered were identified and are listed in Table 5 below. The Categories 1a, 1b, 2 and 3 Listed Invasive Species Categories as indicated by the NEMBA Alien and Invasive Species Lists (2016) are also shown, as well as the categories as per CARA (Act 43 of 1983).

Table 4-3: NEMBA listed Alien floral species identified during the field assessment across all vegetation units.

Species	Common name	NEMBA Category	CARA Category
* <i>Achyranthes aspera</i>	Burweed	Not Listed (N/L)	1
* <i>Alternanthera pungens</i>	Khakiweed	N/L	N/L
* <i>Amaranthus hybridus</i>	Green amaranth	N/L	N/L
* <i>Argemone ochroleuca</i>	White-flowered Mexican poppy	1b	1
* <i>Bidens bipinnata</i>	Spanish needles	N/L	N/L
* <i>Chenopodium album</i>	Goosefoot	N/L	N/L
* <i>Chenopodium murale</i>	Nettle-leaves goosefoot	N/L	N/L
* <i>Datura ferox</i>	Large thorn apple	1b	1
* <i>Datura stramonium</i>	Common thornapple	1b	1

* <i>Galinsoga parviflora</i>	Small-flowered quick weed	N/L	N/L
* <i>Hibiscus trionum</i>	Bladder weed	N/L	N/L
* <i>Malva parviflora</i>	Small mallow	N/L	N/L
* <i>Opuntia engelmannii</i>	Cow's tongue cactus	N/L	N/L
* <i>Opuntia ficus-indica</i>	Prickly pear	1b	1
* <i>Portulaca oleracea</i>	Purslane	N/L	N/L
* <i>Schkuhria pinnata</i>	Small khakiweed	N/L	N/L
* <i>Sphaeralcea bonariensis</i>	Globemallow	N/L	N/L
* <i>Tagetes minuta</i>	Tall khakiweed	N/L	N/L
* <i>Xanthium spinosum</i>	Spiny cocklebur	1b	1
* <i>Xanthium strumarium</i>	Lagre cocklebur	1b	1
* <i>Zinnia peruviana</i>	Redstar zinnia	N/L	N/L

X – proposed CARA categories

***Category 1a** – Invasive species that require compulsory control.

Category 1b – Invasive species that require control by means of an invasive species management programme.

Category 2 – Commercially used plants that may be grown in demarcated areas, provided that there is a permit and that steps are taken to prevent their spread.

Category 3 – Ornamentally used plants that may no longer be planted. Existing plants may remain, except within the flood line of watercourses and wetlands, as long as all reasonable steps are taken to prevent their spread.

From the table above, it is evident that a moderate diversity of listed alien species occurs within the study area, with a number of Category 1b invasive species present within the study area. Listed alien species within the study area has to be controlled throughout all development phases of the proposed project.

4.1.8 Fauna

A Mammal and Herpetofaunal Habitat Assessment was conducted by I, Jacobus Casparus Petrus van Wyk of Limosella Consulting (see full report attached within Appendix D3; Volume 2). During the visit the site was surveyed and assessed among others for the mammal & herpetofaunal habitat components and current general conservation status of the property. Mammals, reptiles and amphibians were identified by visual sightings through random transect walks.

The faunal assessment was based on known distribution records or supported by field observations. The majority of species listed as well as observed with a conservation status were found in association with the local water features such as the non-perennial river, the two non-perennial streams and the small depressional pan wetland and the Rocky hill found on site.

Mammals: Based on mammal distribution maps of this site, species richness was assessed for the potential occurrence of Red Data Mammal species in the Free State Province (Lynch, C.D. 1983,

Friedman & Daly, 2004, Skinner & Chimimba, 2005, Apps, 2012 and Stuart & Stuart, 2015) such as: Oribi (*Ourebia ourebi*), White-tailed rat (*Mystromys albicaudatus*), Pangolin (*Mantis temminckii*), Brown hyena (*Hyaena brunnea*), Highveld Golden Mole (*Amblysomus septentrionalis*), Serval (*Leptailurus serval*), Southern African Hedgehog (*Atelerix frontalis*), Spotted-necked otter (*Lutra maculicollis*), African Weasel (*Poecilogale albinucha*), Bushveld Gerbil (*Tatera leucogaster*), Free State Pygmy Mouse (*Mus orangiae*), Sclater's Golden Mole (*Chlorotalpa sclateri*) and Sloggett's Rat (*Otomys sloggetti*).

All shrews such as the Forest shrew (*Myosorex varius*), Lesser Dwarf Shrew (*Suncus varilla*), Least Dwarf Shrew (*Suncus infinitesimus*), Lesser Red Musk Shrew (*Crocidura silacea*), Reddish-grey Musk Shrew (*Crocidura cyanea*), Swamp Musk Shrew (*Crocidura mariquensis*) and Tiny Musk Shrew (*Crocidura fuscomurina*) have the conservation status as Data Deficient. A number of bat species such as the De Winton's Long-eared Bat (*Laephotis wintoni*), Dent's Horseshoe Bat (*Rhinolophus denti*), Geoffroy's Horseshoe Bat (*Rhinolophus clivosus*), Lesueur's Wing-gland Bat/Hairy Bat (*Cistugo lesueri*), Straw-coloured Fruit Bat (*Eidolon helvum*), Schreibers' (Natal) Long-fingered Bat (*Miniopterus schreibersii*), Temminck's Hairy Bat (*Myotis tricolor*) and Welwitsch's Hairy Bat (*Myotis welwitschii*) have Red Data status.

No other Red Data or sensitive species are deemed present on the site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

Table 4-4: The mammal species observed or deduced to occupy the site.

	SCIENTIFIC NAME	ENGLISH NAME	Habitat
	Order Macroscelidea		
	Family: Leporidae	Elephant-shrews	
√	<i>Elephantulus myurus</i>	Eastern rock elephant	Rupicolous
	Order Tubulidentata		
	Family: Orycteropodidae	Aardvark	
?	<i>Orycteropus afer</i>	Aardvark	Terrestrial
	Order Hyracoidea		
	Family Procaviidae	Hyraxes	
√	<i>Procavia capensis</i>	Rock hyrax	Rupicolous
	Order Lagomorpha		
	Family: Leporidae	Hares, Rabbits and Rock Rabbits	
√	<i>Lepus saxatilis</i>	Scrub hare	Terrestrial
?	<i>Pronolagus rupestris</i>	Smith's red rock rabbit	Rupicolous
	Order Rodentia		
	Family: Bathyergidae	Mole-rats	

√	<i>Cryptomys hottentotus</i>	African mole rat	Terrestrial/Sub-terrain
	Family: Hystricidae	Porcupines	
√	<i>Hystrix africaeaustralis</i>	Cape porcupine	Terrestrial
	Family: Pedetidae	Springhare	
?	<i>Pedetes capensis</i>	Springhare	Terrestrial
	Family: Sciuridae	Squirrels	
√	<i>Xerus inauris</i>	South African ground squirrel	Terrestrial
	Family Myoxidae	Dormice	
?	<i>Graphiurus murinus</i>	Woodland dormouse	Arboreal
	Family: Muridae		
√	<i>Rhabdomys pumilio</i>	Four-striped grass mouse	Terrestrial
?	<i>Mus minutoides</i>	Pygmy mouse	Terrestrial
*	<i>Mastomys coucha</i>	Southern multimammate mouse	Terrestrial
*	<i>Otomys irroratus</i>	Vlei rat	Wetland/ Terrestrial
√	<i>Micaelamys namaquensis</i>	Namaqua rock mouse	Rupicolous
?	<i>Desmodillus auricularis</i>	Cape short-tailed gerbil	Terrestrial
√	<i>Gerbillurus brantsii</i>	Highveld gerbil	Terrestrial
?	<i>Malacothrix typica</i>	Gerbil mouse	Terrestrial
	Order Eulipotypha		
	Family: Soricidae	Shrews	
?	<i>Suncus varilla</i>	Lesser dwarf shrew	Terrestrial
?	<i>Crocidura cyanea</i>	Reddish-grey musk shrew	Terrestrial
?	<i>Crocidura fuscomurina</i>	Tiny musk shrew	Terrestrial
	Family: Erinaceidae	Hedgehog	
NT√	<i>Atelerix frontalis</i>	Southern African hedgehog	Terrestrial
	Order Chiroptera	Bats	
	Family: Pteropodidae	Fruit Bats	
NT?	<i>Edion helvum</i>	Sraw-coloured fruit bat	Aerial
	Family: Molossidae	Free-tailed bats	
√	<i>Tadarida aegyptiaca</i>	Egyptian free-tailed bat	Aerial
	Family: Vespertilionidae	Vesper bats	
NT?	<i>Miniopterus natalensis</i>	Natal long-fingered bat	Aerial
√	<i>Neoromicia capensis</i>	Cape serotine bat	Aerial
NT?	<i>Myotis welwitshii</i>	Welwirsch's hairy bat	Aerial
	Family: Nycteridae	Slit-faced bats	
?	<i>Nycteris thebaica</i>	Egyptian slit-faced bat	Aerial
	Rhinolophidae	Horseshoe bats	

NT?	<i>Rhinolophus clivosus</i>	Geoffroy's horseshoe bat	Aerial
	Order: Carnivora		
	Family: Hyaenidae	Hyaenas	
*	<i>Proteles cristatus</i>	Aardwolf	Terrestrial
NT?	<i>Hyaena brunnea</i>	Brown Hyaena	Terrestrial
	Family: Felidae	Cats	
?	<i>Caracal caracal</i>	Caracal	Terrestrial
*	<i>Felis silvestris</i>	African wild cat	Terrestrial
Vu?	<i>Felis nigripes</i>	Small spotted-cat	Terrestrial
	Family: Viverridae	Civets and Genets	
?	<i>Genetta genetta</i>	Small-spotted genet	Terrestrial/Arboreal
	Family: Herpestidae		
√	<i>Suricata suricarra</i>	Suricate	Terrestrial
*	<i>Galerella sanguinea</i>	Slender mongoose	Terrestrial
√	<i>Cynictis penicillata</i>	Yellow mongoose	Terrestrial
*	<i>Atilax paludinosus</i>	Marsh mongoose	Aquatic/ Terrestrial
?	<i>Galerella pulverulenta</i>	Cape grey mongoose	Terrestrial
?	<i>Ichneumia albicuada</i>	White-tailed mongoose	Terrestrial
	Family: Canidae	Foxes, wild dogs and jackals	
?	<i>Vulpes chama</i>	Cape Fox	Terrestrial
√	<i>Canis mesomelas</i>	Black-backed jackal	Terrestrial
	Family: Mustelidae	Otters, honey badger, weasel and polecat	
NT?	<i>Poecilogale albinucha</i>	African striped weasel	Terrestrial
?	<i>Ictonyx striatus</i>	Striped polecat	Terrestrial
	Order: Ruminantia		
	Family: Bovidae	Antelopes and buffalo	
√	<i>Damaliscus pygargus phillipsi</i>	Blesbok	Terrestrial
√	<i>Oryx gazella</i>	Gemsbok	Terrestrial
EN √	<i>Redunca fulvorufula</i>	Mountain Reedbuck	Terrestrial/ Rupicolous
?	<i>Sylvicapra grimmia</i>	Common duiker	Terrestrial
√	<i>Antidorcas marsupialis</i>	Springbok	Terrestrial
√	<i>Raphicerus campestris</i>	Steenbok	Terrestrial

Systematics and taxonomy as proposed by Lynch [1983], Bronner et.al [2003], Skinner & Chimimba [2005], Apps [2012] and Stuart & Stuart [2015].

√ Definitely there or have a high probability to occur;

* Medium probability to occur based on ecological and distributional parameters;

? Low probability to occur based on ecological parameters.

Table 4-5: Mammal species positively confirmed from the study site.

SCIENTIFIC NAME	ENGLISH NAME	OBSERVATION INDICATOR	HABITAT
<i>Procavia capensis</i>	Rock hyrax	Sight record	Rupicolous
<i>Lepus saxatilis</i>	Scrub hare	Sight record	Terrestrial/ Grassveld
<i>Hystrix africaeaustralis</i>	Cape porcupine	Quills	Terrestrial/ Grassveld
<i>Rhodomys pumilio</i>	Four-striped grass mouse	Sight record	Rupicolous/Terrestrial
<i>Cynictis penicillata</i>	Yellow mongoose	Sight record	Terrestrial/ Grassveld
<i>Damaliscus pygargus phillipsi</i>	Blesbok	Sight record	Terrestrial/ Grassveld
<i>Oryx gazella</i>	Gemsbok	Sight record	Terrestrial/ Grassveld
<i>Redunca fulvorufula</i>	Mountain Reedbuck	Sight record	Terrestrial/ Rupicolous
<i>Antidorcas marsupialis</i>	Springbok	Sight record	Terrestrial/ Grassveld

Rock hyrax, scrub hare, Cape porcupine, four-striped grass mouse and yellow mongoose are common throughout their extensive range. Due to the game farming industry, many antelope species have been re-introduced in their former range, like blesbok and springbok. This also includes areas where they have never occurred, like gemsbok in this instance. The mountain reedbuck status is Endangered in The Red List of Mammals of South Africa, Swaziland and Lesotho (Taylor *et al.* 2016).

Herpetofauna: The local occurrences of reptiles and amphibians are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. From a herpetological habitat perspective, it was established that all four major habitats is naturally present on the study site making it suitable for reptiles and amphibians. The species richness is fair to good due to the large size of the study site and all four vegetation habitat types occurring on the study site.

Table 4-6: The Reptile and Amphibian species deduced to reside on the site.

	SCIENTIFIC NAME	ENGLISH NAME
	CLASS: REPTILIA	REPTILES
	Order: TESTUDINES	TORTOISES & TERRAPINS
	Family: Pelomedusidae	Side-necked Terrapins
√	<i>Pelomedusa subrufa</i>	Marsh Terrapin
	Family: Testudinidae	Tortoises
*	<i>Homopus femoralis</i>	Greater Dwarf Tortoise
*	<i>Psammobates oculifer</i>	Serrated Tent tortoise
√	<i>Stigmochelys pardalis</i>	Leopard Tortoise
	Order: SQUAMATA	SCALE-BEARING REPTILES
	Suborder: LACERTILIA	LIZARDS
	Family: Gekkonidae	Geckos
?	<i>Hemidactylus mabouia</i> (Translocated)	Common Tropical House Gecko
?	<i>Lygodactylus capensis</i> (Translocated)	Common Dwarf Gecko
√	<i>Pachydactylus capensis</i>	Cape Gecko
	Family: Amphisbaenidae	Amphisbaenidae
?	<i>Monopeltis capensis</i>	Cape Worm Lizard
	Family: Lacertidae	Old World Lizards or Lacertids
*	<i>Nucras holubii</i>	Holub's Sandveld Lizard
?	<i>Pedioplanis lineocellatata lineocellatata</i>	Spotted Sand Lizard
	Family: Cordylidae	
√	<i>Karusasaurus polyzonus</i>	Southern Karusa Lizard
	Family: Gerrhosauridae	Plated Lizards
√	<i>Gerhosaurus flavigularis</i>	Yellow-throated Plated Lizard
	Family: Scincidae	Skinks
?	<i>Acontias gracilicauda</i>	Thin-tailed Legless Skink
√	<i>Afroablepharus wahlbergii</i>	Wahlberg's Snake-Eyed Skink
√	<i>Trachylepis capensis</i>	Cape Skink
√	<i>Trachylepis punctatissima</i>	Speckled Rock Skink
*	<i>Trachylepis punctulata</i>	Speckled Sand Skink
√	<i>Trachylepis varia</i>	Variable Skink
	Family: Varanidae	Monitors
?	<i>Varanus albigularis albigularis</i>	Southern Rock Monitor
?	<i>Varanus niloticus</i>	Nile Monitor
	Family: Agamidae	Agamas
√	<i>Agama aculeata distanti</i>	Eastern Ground Agama

	SCIENTIFIC NAME	ENGLISH NAME
√	<i>Agama atra</i>	Southern Rock Agama
	Suborder: SERPENTES	SNAKES
	Family: Typhlopidae	Blind Snakes
*	<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake
	Family: Leptotyphlopidae	Thread Snakes
√	<i>Leptotyphlops scutifrons</i>	Peter's Thread Snake
	Family: Viperidae	Adders
√	<i>Bitis arietans</i>	Puff Adder
	Family: Lamprophiidae	
*	<i>Aparallactus capensis</i>	Black-headed Centipede Eater
?	<i>Atractapis bibronii</i>	Bibron's Stiletto Snake
NT?	<i>Homoroselaps dorsalis</i>	Striped Harlequin Snake
?	<i>Xenocalamus bicolor bicolor</i>	Bicoloured Quill-Snouted Snake
√	<i>Boaedon capensis</i>	Common House Snake
*	<i>Lamprophis aurora</i>	Aurora House Snake
?	<i>Lycodonomorphus rufulus</i>	Brown Water Snake
?	<i>Lycophidion capense</i>	Cape Wolf Snake
?	<i>Psammophis notostictus</i>	Karoo Sand Snake
√	<i>Psammophis trinasalis</i>	Fork-Marked Sand Snake
?	<i>Psammophylax rhombeatus</i>	Spotted Grass Snake
√	<i>Psammophylax tritaeniatus</i>	Striped Grass Snake
?	<i>Duberria lutrix</i>	Common Slug Eater
*	<i>Prosymna sundevallii</i>	Sundevall's Shovel-snout
√	<i>Pseudaspis cana</i>	Mole Snake
	Family: Elapidae	Cobras, Mambas and Others
*	<i>Elapsoidea sundevallii</i>	Sundevall's Garter Snake
√	<i>Hemachatus haemachatus</i>	Rinkhals
√	<i>Naja nivea</i>	Cape Cobra
	Family: Colubridae	
√	<i>Crotaphopeltis hotamboeia</i>	Red-Lipped Snake
√	<i>Dasypeltis scabra</i>	Rhombic Egg Eater
	CLASS: AMPHIBIA	AMPHIBIANS
	Order: ANURA	FROGS
	Family: Pipidae	Clawed Frogs
√	<i>Xenopus laevis</i>	Common Platanna
	Family: Bufonidae	Toads

	SCIENTIFIC NAME	ENGLISH NAME
√	<i>Sclerophrys capensis</i>	Raucous Toad
?	<i>Vandijkophrynus gariensis gariensis</i>	Karoo Toad
?	<i>Poyntonophrynus vertebralis</i>	Southern Pygmy Toad
	Family: Hyperoliidae	Reed Frogs
√	<i>Kassina senegalensis</i>	Bubbling Kassina
	Family: Phrynobatrachidae	Puddle Frog
?	<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog
	Family: Pyxicephalidae	
*	<i>Amietia delalandii</i>	Common River Frog
?	<i>Amieta poyntoni</i>	Poynton's River Frog
√	<i>Cocosternum boettgeri</i>	Boettger's Caco
NT*	<i>Pyxicephalus adspersus</i>	Giant Bullfrog
√	<i>Tomopterna cryptotis</i>	Tremolo Sand Frog
<p>Systematic arrangement and nomenclature according to De Waal (1978), De Waal (1980a), De Waal (1980b), Branch (1998), Alexander & Marais (2007), Minter, <i>et.al</i> (2004), Bates, <i>et.al</i> (2014) and Du Preez & Carruthers (2017).</p> <p>Red Data species rankings as defined in Minter, <i>et.al</i>, (2004) Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (2004) and Bates, <i>et.al</i>, (2014) Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (2014) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, NT = Near Threatened, DD = Data Deficient. All other species are deemed of Least Concern</p> <p>√ <i>Definitely there or have a high probability to occur;</i> * <i>Medium probability to occur based on ecological and distributional parameters;</i> ? <i>Low probability to occur based on ecological parameters.</i></p>		

4.1.9 Avifauna

An avifauna assessment was conducted by Ryno Kemp (SACNASP # 117462/17) and Professor Andrew Edward McKechnie (SACNASP # 400205/05) from the Department of Zoology and Entomology, University of Pretoria. A summary of the study findings is included below, and a copy of the full report is included as Appendix D2 of Volume 2.

The study area falls within the grassland Biome that consists of both Bloemfontein dry grassland and Winburg Grassy Shrubland. However, during the site visit the avian habitats on the site consist mainly of disturbed grasslands, as the site have been already heavily disturbed by human activities and human events hold on the property for various big functions over the last two years. A small stream and wetland

area flow through the eastern side of the property and a rocky outcrop in the southern area of the property.

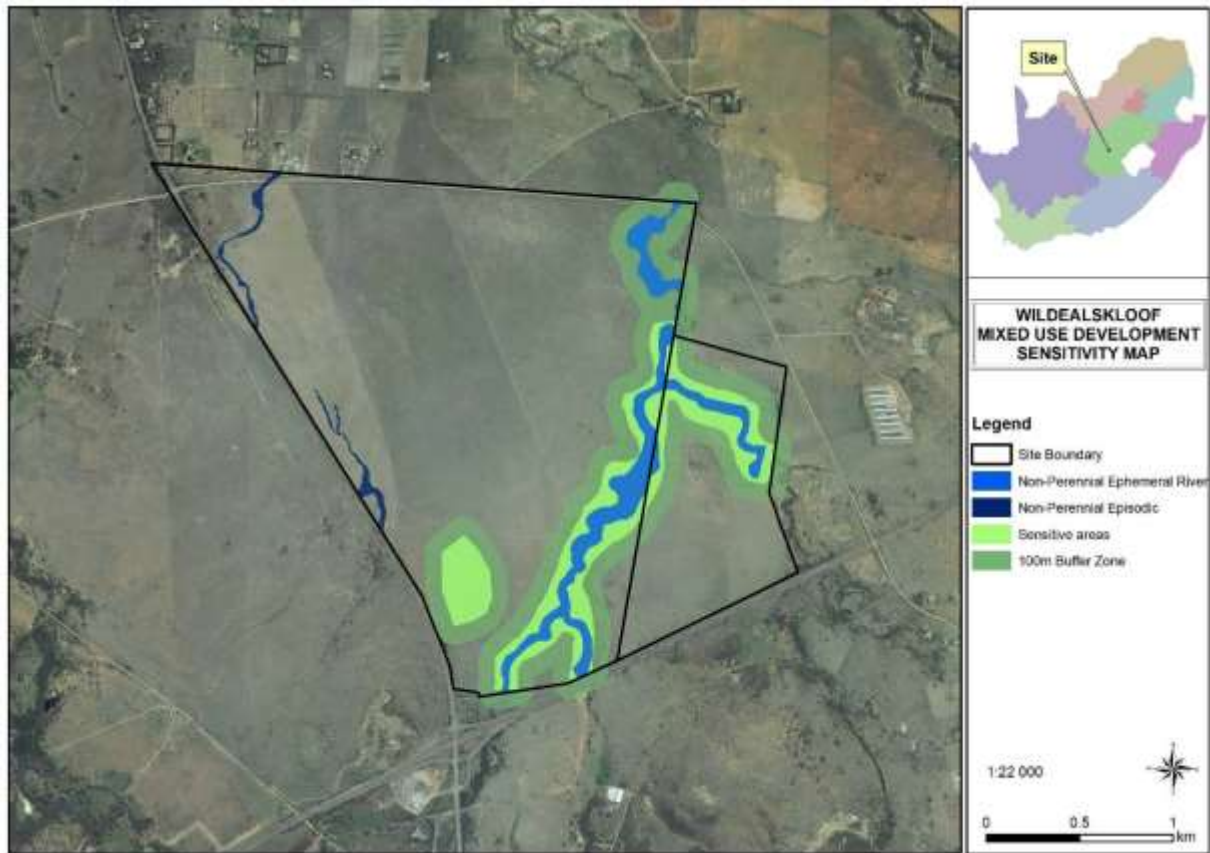


Figure 4-15: Avian and bird sensitivity map

The combination of these avian habitat types on the property support the comparatively high avian diversity with 57 confirmed species and a further 23 are considered highly likely to occur. There are no threatened or near threatened species considered to be particular concern in terms of the Mixed Use Development.

Threatened species occurring at the development site: A total of 30 threatened or near-threatened species have been recorded during SABAP 1 and SABAP 2 in the area considered for the desktop survey. The generally disturbed nature of the site and the frequent events held on the property with associated high levels of human activity make it unlikely that Secretarybird or African Grass-Owl occur here. For Lesser Kestrel, Black harrier and Peregrine Falcon, individuals could move through the area from time to time. It could be possible for big eagles such as Martial, Tawny and Verreaux's eagle occasionally traverse the area.

4.1.10 Air Quality

The Bloemfontein area, especially the northern suburbs are known for clean air because of a lack of major industrial facilities. It should also be noted that there are no major contributors to atmospheric emissions in the Bloemfontein area as there are no power stations generated from coal or significant mining activities etc.

The proposed site is in an open area where there are currently very little activities which can have negative impact on air quality. The only exception is a Shell Ultra City just south of the proposed site across the N1 which could have an insignificant negative contribution to the overall air quality. However, apart from additional emissions from vehicles, dust during construction and occasional fires, etc. there will not be any major contributors to atmospheric emissions because of the proposed development.

4.1.11 Noise

Activities associated with the proposed site and its surroundings pertain to residential units, small holdings, offices, guest houses, etc. There are no industrial facilities associated with the area which could elevate the ambient noise levels; however, the N1 is situated directly south of the proposed site which has an insignificant effect on the ambient noise levels. Ambient noise levels are therefore expected to be low excluding the construction phase.

Construction activities will add to an elevated noise level in the area. The development will be constructed in 21 phases. The construction period is estimated at ± 10 years or more.

4.2 Human Environment

4.2.1 Visual Quality of the Area

A visual assessment was conducted by Mr. Mader van den Berg of Skets Architects and Planning. A summary of the study findings is included below, and a copy of the full report is included as Appendix D8 of Volume 2.

The site is part of a larger region and contributes to the prevailing rural character due to its open grassland cover and undeveloped nature. The 587 ha open space is located in the northern outskirts of Bloemfontein in an area that portrays a typical farming land use, bordered by the N1 and R700 roads. The site is evenly sloped with a slight decline from the south to the north. A seasonal tributary dissects the site and is recognised by trees and shrubs on the banks. The site is located in a shallow basin with

elevated terrain to the south and south east providing sufficient screening from viewpoints further south. Views to the site is considered pleasing, but none of its attributes sets it apart or create a unique character. It is rather seen as a unit, seamlessly forming part of a greater agricultural region. The low hills and ridges to the south and south east provide a visually interesting backdrop to the site and adds to a sense of naturalness.

The region is sparsely developed with Mimosa Park Small Holdings to the north and Ribblesdale to the south east. Smaller developments such as to the south are tucked in between the shallow valleys. Woodland Hills Estate is approximately 3 km south west of the site, but is largely screened by the low ridge that separates the two sites. The northern suburbs of Bloemfontein are approximately 5.5 km south of the site but are well screened by the hills and ridges separating the two.

Although the site has an aesthetic appeal relating to its openness, natural vegetation and tranquil farming sense of place, it is considered common in the region. No outstanding qualities distinguish it from its surroundings and its cultural, religious and ecological values appear to be fairly ordinary.

Sensitivity of observers

The sensitivity of an observer is related to the value an observer has for the particular visual resource being impacted on. To determine viewer sensitivity a commonly used rating system is utilised (Table 4-7). This is a generic classification of observers and enables the visual impact specialist to establish a logical and consistent viewer sensitivity rating for viewers who are involved in different activities without engaging in extensive public surveys.

Table 4-7: Viewer Sensitivity

VIEWER SENSITIVITY	DEFINITION (BASED ON THE LANDSCAPE INSTITUTE, 2002 ED PP90-91)
High	Views from major tourist or recreational attractions or viewpoints promoted for or related to appreciation of the landscape, or from important landscape features. Users of all outdoor recreational facilities including public and local roads or tourist routes whose attention or interest may be focussed on the landscape; Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; Residents with views affected by the development; People generating an income from the visual resource or pristine quality of the environment.
Moderate	People engaged in outdoor sport or recreation (other than appreciation of the landscape); People commuting between work place and home or other destinations.
Low	People at their place of work or focussed on other work or activity; Commuters or motorists travelling at high speed through an area; Views from highly urbanised areas, commercial buildings or industrial zones. Views from heavily industrialised or blighted areas

Three main observer groups are identified in the study area namely; residents, tourists and motorists.

1. Residents in the study area are classified as visual receptors of high sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment.
 - a. Residents of the Mimosa Park Small Holdings north of the site, will experience the highest visual exposure due to their proximity to the site. Localised screening by garden vegetation and other trees do significantly reduce visibility of the site for the properties further away from the site (Figure 4-16).
 - b. Somerton Estate, Tredenham Hill and Ribblesdale Small Holdings south of the site, are within 3 km of the site and will experience a reduced visual exposure due to the slight topographic variance and trees that provide localised screening. They will however be able to see some of the higher buildings as this will exceed the height of the trees.
 - c. A sparse farming community are distributed to the west, north and east of the site and a very low viewer incidence is expected.

- d. Woodlands Hills Estate is approximately 3.5 km from the site and will experience partial views as a low ridge separates the two sites. The highest buildings will become visible as some will exceed the height of the topography. Visual exposure is expected to be much reduced due to localised screening provided by garden vegetation.
 - e. Partial views may also be experienced from the high lying areas of Heuwelsig and Rayton in Bloemfontein, but these viewpoints are approximately 5-6 km from the site and visual exposure becomes limited due to the distance factor.
2. A limited number of tourists are identified as affected observers due to the presence of Sangiro Game Lodge south of the site. Tourists are often classified as observers with a high sensitivity if their reason for visiting the area is for its visual excellence and pristine natural character. Sangiro Game Lodge offer some views of the natural vegetation with game as an added feature. The lodge is separated by the N1 highway and with clumps of trees growing next to the highway, localised visual screening significantly reduces visual exposure to the site. A boutique hotel and conference facilities are also present at Somerton and Tredenham Hill that attracts tourists. Their exposure is expected to be limited due to the hilly terrain in which these tourist attractions are situated and the possible screening that will occur;
 3. Motorists are the least sensitive group of observers due to the speed at which they travel and the brief exposure they will have to impacts. Motorists traveling on the N1 Highway and the R700 travel at great speeds and will have a brief encounter with the proposed development

In conclusion, the landscape character is considered to have a medium sensitivity. The site and its surroundings are not particularly unique, and its identity is typical of the rural Free State landscape. The grassy plains and small tributary are visually pleasing elements, but lack dramatic diversity to place it in a unique category. The site contributes to a regional sense of place that portrays a rural and sparsely developed sense of place with elements of natural features such as the undisturbed hills and tributary. A peaceful character prevails as farming activities cultivate land parcels while grasslands are grazed by cattle. The proposed urban development which will occupy approximately three quarters of the site will be in contrast with the context and will cause a significant change to the landscape character.

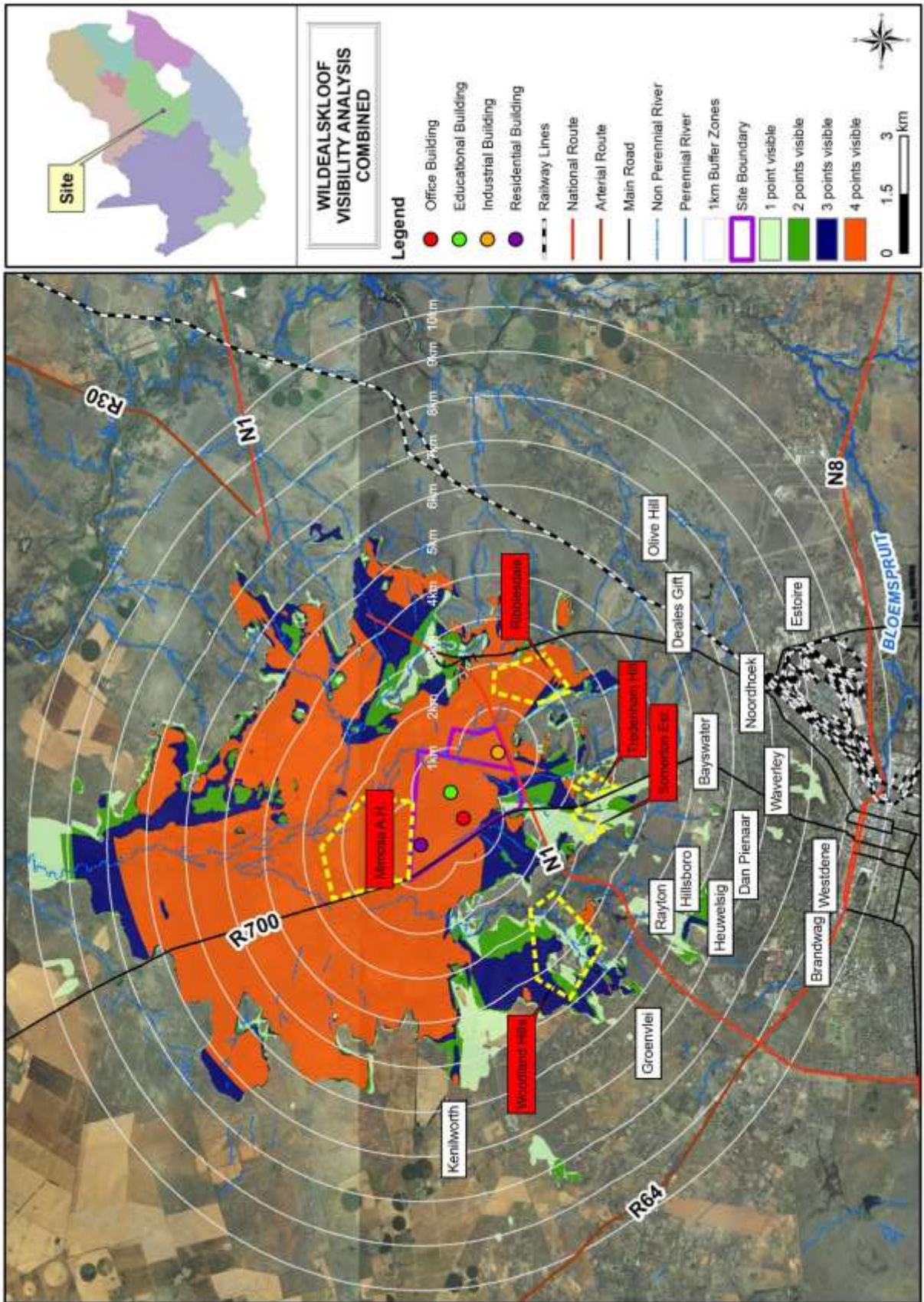


Figure 4-16: Viewer locations

4.2.2 Paleontological resources

The potential for paleontological resources on the site was investigated by Doctor Cindy Heidi of PSSA. A summary of the study findings is included below, and a copy of the full report is included as Appendix D5 of Volume 2.

The proposed footprint is underlain by sediments of the Volksrust Formation (Ecca Group, Karoo Super group) and the Adelaide Formation (Palingkloof Member) of the Beaufort Group (Karoo Super group). The Paleontological sensitivity of the Volksrust Formation is moderate while the paleontological sensitivity of the Adelaide Formation is very high. During a field survey of the development footprint, no fossiliferous outcrops were found within or adjacent to the study site.

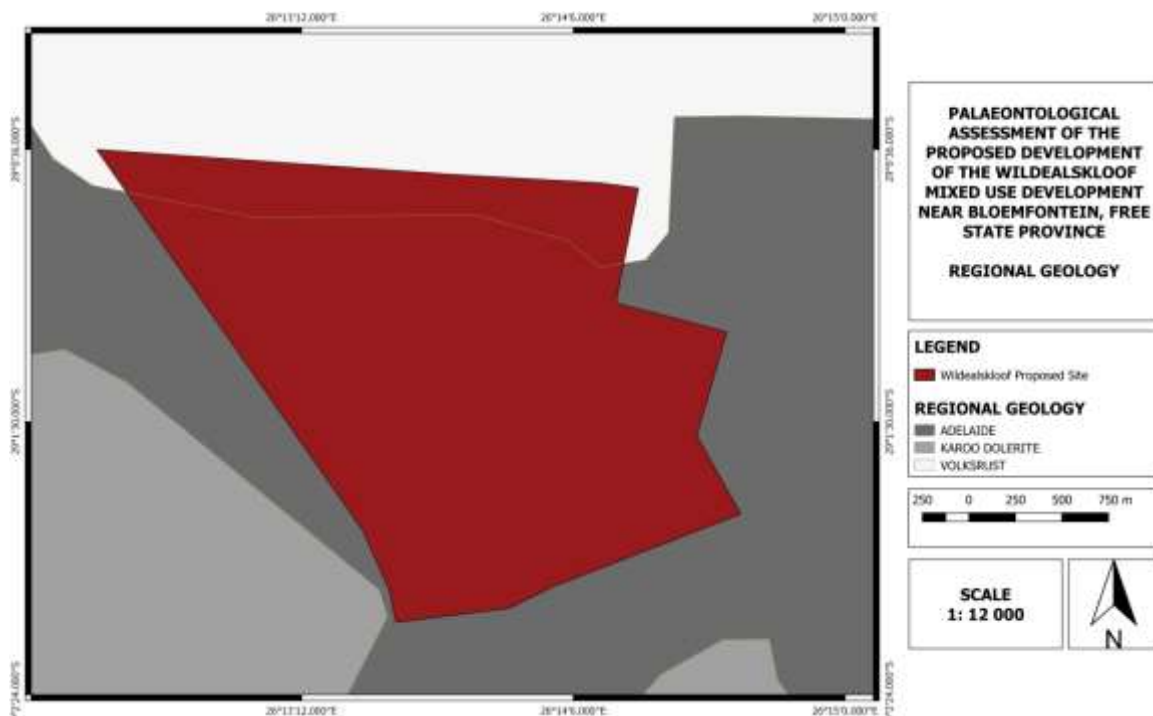


Figure 4-17 Geological map showing the location of the study area on the remaining extent of the Farm Olrig No. 1710 and Portion 4 of the Farm Wildealskloof No. 1205, Bloemfontein.

4.2.3 Archaeological and historical sites

A phase 1 archaeological impact assessment of the site was undertaken by Johnny van Schalkwyk- of Heritage Consultant to assess the potential impact of the project on archaeological and historical site. A summary of the study findings is included below, and a copy of the full report is included as Appendix D4 of Volume 2).

During the physical survey, the following sites, features and objects of cultural significance were identified in the study area (Fig. 4-18 to 4-21).

Stone Age

A low density scatter of MSA stone tools and flakes (Fig 4-5) was identified at the eastern foot of the hill located in the south-western corner of the study area.



Figure 4-18: A low density scatter of MSA stone tools and flakes

Iron Age: No sites, features or objects of cultural significance dating to the Iron Age were identified in the study area.

Historic period

1. An informal burial place containing approximately 10 graves marked (visibly poor due to the vegetation cover) all of which do not have formal headstones and are only marked with stone cairns, Bennyworth 2004), makes a compelling argument for a similar scenario of the farm Lilyvale 2123, southwest of the study area, that these graves might be linked to the British force that occupied the sangars surrounding the hill (see above). They are most probably graves of black people that were used as labourers at the camps. The informal grave site is located on Farm Olrig 1710; Coordinates S29, 02969, E26, 22727.

Records reflect that many of the Boer concentration camps set up by British forces retained black labour force to provide labour in the running of these camps and they were incarcerated usually within the defensive cordon around these places. As for the British garrisons, the same would have been true. Living areas for black labourers, accommodated in the labour camps would have been established within the defensive cordon and the men compelled to remain within the cordon do to martial law and state of war 2004:2.



Figure 4-19: Overview of an informal burial site

2. At least twenty structures which have been interpreted as sangars: Small, temporary fortified positions on the perimeter of a base and mostly used by sentries while on watch were identified on site. Although most of the sangars occur on the western side of the hill, a few were located on the eastern side. In one area on the western side of the hill, a well-built, straight stone wall occurs in front of some of the sangars. A few metres further west, a section of a narrow, paved road was identified. The stonework is similar to that of the stone wall. The sangars all conform to the same pattern: stone was excavated at the foot of the hill and stacked in a half-circle in front of the excavated area. This gave a type of trench in which the soldiers could hide from approaching enemy. Lookouts were probably station on top of the hill, which could have given advance warning. The identified structures are located on Farm Olrig 1710, Coordinates S29, 02997, E 2622577. These features are older than 60 years and reflect an event that took place at a specific point in time, which resulted in far-reaching consequence for the country as a whole.

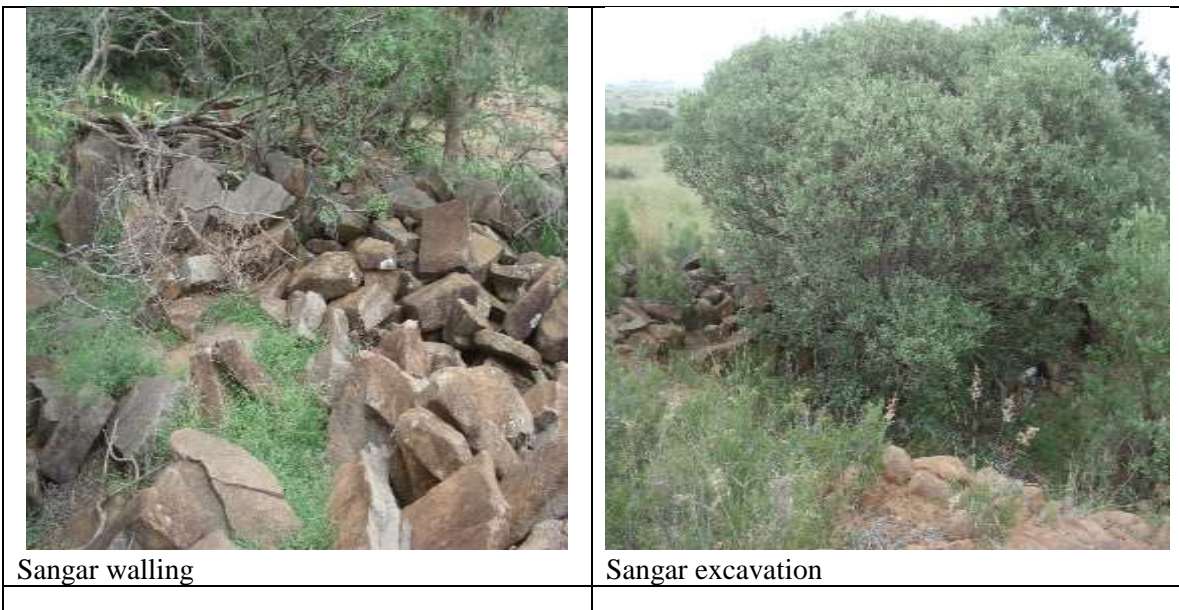




Figure 4-20: Overview of the sangars found on site

The image on the page overleaf shows the location of the identified heritage sites on the study site

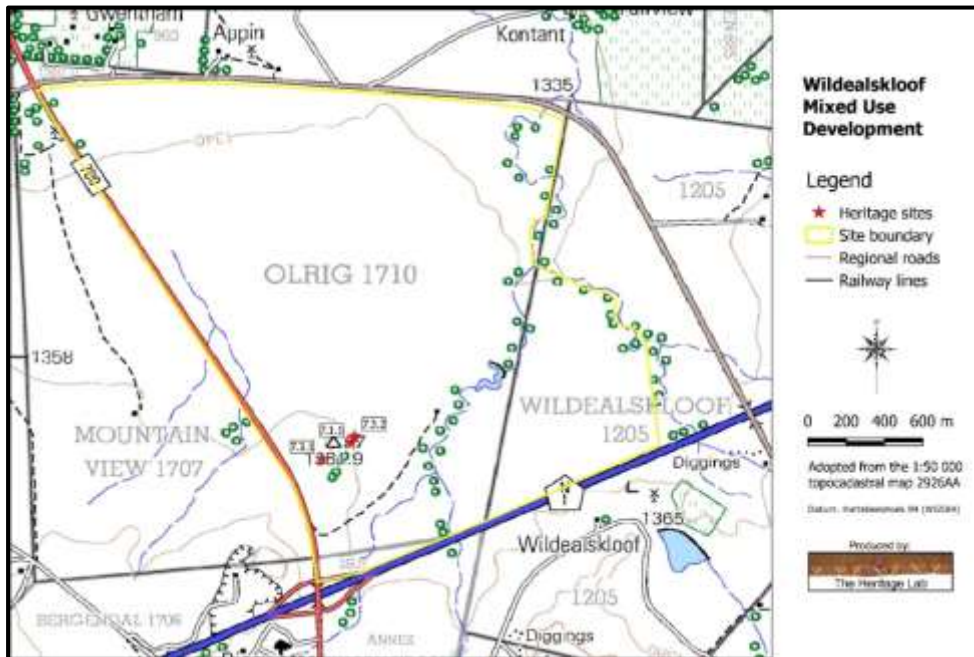


Figure 4-21: Location of heritage sensitive sites in the study area.

4.2.4 Agricultural Potential

An agriculture specialist study was undertaken by Johann Lanz (SACNASP Reg. no. 400268/12) of the University of Stellenbosch. The study assessed the impact of the proposed development on soil and agriculture potential/land capability. A summary of the study findings is included below, and a copy of the full report is included as Appendix D1 of Volume 2

The study site is used for the grazing of cattle, except for an approximately 1 hectare piece which is used for some vegetable cash crops under irrigation. The rest of the site has never been used for cultivated crop production. It has, in the past, been ploughed for grass establishment to improve grazing. Surrounding land use is largely grazing, and there is little cultivation across the land type within which the study site falls.

Land capability is defined as the combination of soil; climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The soil needs to be adequately thick to support root development and the drainage characteristics needs to be good to prevent chemical crusting on the surface

The higher land capability classes are suitable as arable land for the production of cultivated crops, while the lower suitability classes are only suitable as non-arable grazing land, or at the lowest extreme, not even suitable for grazing. In 2017 DAFF released updated and refined land capability mapping across the whole of South Africa. This has greatly improved the accuracy of the land capability rating for any particular piece of land anywhere in the country. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values of below 8 are generally not suitable for production of cultivated crops. The neighbouring land type, which has more suitable soils, has much more cultivation

The proposed project area is classified with a range of land capability evaluation values of between 4 and 8. The predominant land capability is 7. The land capability of the project area is therefore classified as being largely unsuitable (<8) for the rain fed production of cultivated crops. The land capability is limited by the low climatic moisture availability and the high clay content and somewhat shallow soils.



Figure 4-19. Photograph of typical site conditions.

4.2.1 Social and Economic Environment

A socio-economic study for the project was completed by An Kritzinger' of iAfrica Social Economic Assessment and Ingrid Snyman of Batho Earth (see Appendix D6 & D7 of Volume 2 for specialist study reports)

4.2.1.1 Mangaung Metropolitan Municipality

The proposed Wildealskloof Development falls within the Free State Province under the jurisdiction of the Mangaung Metropolitan Municipality (MMM) area which again falls under the Motheo District Municipality.

The Free State is located in the geographical center of South Africa. It can be described as a rural province of farmland, mountains, goldfields and widely dispersed towns. Its capital is Bloemfontein, which is South Africa's judicial capital. Although the Free State is the third-largest province in South Africa, it has the second-smallest population and the second-lowest population density. It covers an area of 129 825km² and has a population of 2 834 714, which constitutes 5.1% of the national population.

The MMM was formed after the local government elections in May 2011, and has been a local municipality since 2000 by amalgamating the Transitional Local Councils of Bloemfontein, Botshabelo, Thaba N'chu and two Rural Councils. During August 2016, the Naledi Local Municipality was merged into the MMM.

The MMM area covers an area of 9 886km² and hosts a population of about 787 000 people. The languages spoken in the area are mainly Sesotho, Afrikaans, English and Setswana. The main cities and towns include Bloemfontein, Botshabelo, Dewetsdorp, Mangaung, Thaba N'chu, Van Stadensrus, Brandfort (Majwemasheu) and Wepener.

The rural area of the MMM is characterized by extensive commercial farming, mainly mixed crop production and cattle farming, as well as subsistence and small farmers mostly operating in the areas surrounding Thaba N’chu and Botshabelo .

The Municipality serves approximately 265 500 households. The consumption patterns in Bloemfontein is almost three times higher than the other smaller areas such as Thaba N’chu and Botshabelo, due to the concentrated population figures in Bloemfontein and the presence of various commercial activities in and around the town .



Figure 4-20: Mangaung Metropolitan Municipality

As indicated above, the proposed Wildealskloof development falls within Ward 44 of MMM.

Social Profile

(a) Population Figures

According to 2016 Community Survey, the MMM had a population of 787 803 individuals. More than half of the population of the MMM is concentrated in the Bloemfontein area (52%), followed by Botshabelo (approximately 28%). The rural area has the lowest number of people (11%) dispersed through the area with some larger concentrations around the small towns.

In line with the population growth, there has been an increase in the number of households in the MMM. From 2001 there was an increase from 185 013 households in Mangaung to 231 921 households in 2011. In 2016 there were 265 414 households in Mangaung. The average household size in 2011 consisted on 3.1 individuals, with female households being on the increase. In 2011, Ward 44 had a total of 18 904 individuals residing within the ward.

(b) Age Groups and Gender

The age structure of the MMM indicates a fairly young population, as 27.1% of the population fell within the 0-15 year’s category. Estimations are that this figure has increased to 29.7% in 2016. The Community Survey of 2016 stated that 35% of the population falls within the 15-24 years age category. There would thus be a definite need for social activities, recreational facilities, sports and educational facilities, youth development, training, housing development and employment opportunities in the area in future. This young population profile in the area would result in various long term challenges such as employment creation and infrastructure development.

The largest section falls within the working age category, but indicating a decline in this sector from 2011 to 2016. The smallest section falls within the older age categories. The high number of dependents would put a lot of strain on the economically active sector.

According to the 2011 Statistics, and as indicated below, 19.9% of the population within Ward 44 falls within the 0-15 year’s age category, and 70.4% falls within the 15-64 year’s category. Only 9.6% of the population is over 65.

Table 4-8: Population of the MMM and Ward 44 according to age groups

Age Structure	MMM		Ward 44	
	2011	2016	2011	2016
Population under 15	27.1%	29.7%	19.9%	No data
Population 15 to 64	67.6%	65.0%	70.4%	No data
Population over 65	5.4%	5.3%	9.6%	No data

(c) Population Stability

Due to the limited number of employment opportunities in the area, and Bloemfontein serving as the economic hub, it is anticipated that Bloemfontein would experience a continued influx of people, with the other areas within the municipality then experiencing possible long term declines .

(d) Education and Skills Levels

The following table provides a summary of the education levels within the MMM and Ward 44.

Table 4-9: Education in MMM (aged 20+)¹ and Ward 44

Education (aged 20+)	MMM		Ward 44	
	2011	2016	2011	2016
No schooling	4.3%	5.2%	2.8%	No data
Grade 12	29.1%	32.8%	26.3%	No data
Higher education	13.1%	13.3%	30.5%	No data

From 1996 those without any schooling in the MMM have decreased from 10.1% to 4.3% in 2011. Those who finished Grade 12 have also increased from 18.7% in 2001 to 14.1% in 2011. These figures further improved towards 2016. In Ward 44, in 2011, only 2.8% of the population falling within the school going age had no schooling, whereas 26.3% achieved Grade 12 and 30.5% obtained a higher education. No recent figures with regards to the education levels are available for Ward 44 and it is thus unclear whether the number of those achieving Grade 12 or a higher education increased.

The MMM aims to reduce illiteracy among the population, but also strives to increase the ability of its residents to obtain access to education. The Mangaung IDP further indicated that nearly all children between the ages of 7 to 15 years are enrolled in schools. Enrolment figures for early childhood development have been increasing at a high rate over the years, which is a positive step towards ensuring proper education to all individuals.

The above emphasizes that the MMM should increase their economic development and job creation efforts to be able to meet the demands of the growing skills.

(e) Employment and Income

Bloemfontein experiences a large influx of jobseekers to the area, as this town forms the economic hub of the MMM and Free State Province. Most employed people are migrant workers in Bloemfontein and elsewhere, due to the limited employment opportunities in the larger area. The area is therefore also characterized by high unemployment rates.

Of the 292 971 economically active (employed or unemployed but looking for work) people in Mangaung, 27.7% are unemployed. 37.2% of the 150 128 economically active youth (15 – 34 years) in the area are unemployed. The unemployment rate and the youth unemployment rate at thus still remain a concern.

In Ward 44 of the 12 579 economically active (employed or unemployed but looking for work) people, 72.2% are employed and 4.3% are unemployed. These figures are thus in contrast to the figures of the overall MMM.

The majority of individuals (20.2%) within the MMM earn within the R19 601-R38 200 income category per annum, followed by 17.2% who earn from R9 601-R19 600 in 2011. According to Census 2011 there is still 11.4% of the population with no income. No figures with regards to the income levels of those within Ward 44 were obtained.

The MMM implemented the Youth Enterprise Development programme in 2015. This is aimed at unlocking opportunities for skills training and knowledge creation, and to develop and nurture the skills base in order to better employment prospects for the youth, by exposing them to on-the-job training, and supporting entrepreneurial skills among young people .

(f) Health and Community Health Services

The HIV/AIDS prevalence rate was 29.9% in 2011 which indicated a decline from 2009. This decline can possibly be attributed to some interventions by the municipality in terms of provision of services and health education.

(g) Infrastructure and Services

The following strategic risks that relate to infrastructure have been identified within the MMM:

- Unreliable bulk water supply from the source;
- Decline in water revenue, bulk and reticulation backlog in relation to water, sanitation, electricity, road and storm-water due to ageing infrastructure that increases pressure on repairs and the maintenance budget; and
- Maintenance backlogs in respect of service delivery infrastructure.

Due to the ageing water supply network, the MMM currently experiences extreme high volumes of water losses in the Bloemfontein area. All of the above infrastructural issues experienced within the metropolitan area need to be attended to.

(h) Safety and Security

There are more than eight police stations in the Bloemfontein area e.g. Batho, Bayswater, Kopanong, Kagisanong, Bloemspruit, Heidedal, Parkweg and Mangaung Police Stations.

Criminal activities in the area remains a concern, and requests for additional police stations in specific wards was raised during the public participation process undertaken for compiling the 2016-2022 MMM IDP .

Within the study area, the residents interviewed indicated that the crime levels are relatively low compared to the average crime rates within the MMM area. Very limited to no stock losses were experienced over the past couple of years. This statement is supported by 2016/2017 Statistics from the Bayswater Police Station.

(i) Housing

The MMM has a huge housing backlog which stood at 31 149 stands during 2016. Within Ward 44 the majority of residents reside in formal housing structures which include houses and townhouses made of brick and mortar, and dwellings made of traditional material. A very small portion of the dwellings within Ward 44 can be categorised as informal dwellings.

The bulk of the backlog within the MMM is within the Mangaung township area. However, significant progress has been made since 2001 in terms of the provision of formal housing. This also led to a decrease in the number of informal dwellings. Part of this decrease could also further be attributed to more formal houses being provided through some of the government housing programmes.

The MMM aims to fast-track the development of mixed housing in order to build integrated human settlement and invariably upgrade informal settlements. In addition to the existing municipal rental stock that consists of 361 units excluding plot houses, the City is implementing Social Housing and Community Residential Units (CRU) Projects that are geared towards the refurbishment and construction of new social housing units in partnership with the Free State Department of Human Settlement.

According to the IDP various mixed developments closer to transport corridors and employment opportunities are being prioritized. Vista Park 2 and 3, Hillside View, Airport Development Node and Estoire are prioritized mixed development for this term of local government ending in 2022.

Informal settlements are still found in the south eastern quadrant of Bloemfontein and in the Botshabelo area. The total number of informal settlements in the Mangaung area is 23 informal settlements with 62 15 informal dwellings (shack in back yard) and 27 143 informal dwellings (shack not in back yard).

Due to the in-migration of people to Bloemfontein, pressure on the local housing infrastructure would continue as the MMM would have to carry on to accommodate the new urban citizens and to provide basic services to all.

(j) Electricity

Centlec, a Municipal utility, is responsible for providing electricity in Mangaung. According to the Community Survey of 2016 the MMM is providing electricity services to 254 525 households.

Almost all dwellings within Ward 44 have access to electricity. No backlogs in this regard occur in the ward.

The ongoing growth in the MMM due to the new developments over the years resulted in electrical load growth as well. Centlec is thus faced with various challenges with regards to the provision of electricity.

(k) Water

The MMM provides water services to 214 445 households, but there is backlog of 17 555 households. 45.5% of households had access to water inside their dwelling. Within Ward 44, 87% of the households have access to a regional/local water scheme (operated by a Water Service Authority or provider), and 8.9% made use of borehole water for household purposes. The majority of dwellings in close proximity to the proposed site make use of borehole water.

The growing population, however, continues to place a huge demand on the municipality to continue to provide basic services and infrastructure.

(l) Local Economy

Bloemfontein is the economic hub and the provincial capital of the Free State. The city is also the commercial capital of the Free State and the judicial capital of South Africa. Mangaung is the largest contributor to the GDP of the province and is regarded as one of the most diverse economies.

The main economic sectors include community services (35.3%), finance (26.8%), trade (16%), transport (11.8%), and manufacturing (3.5%). The economy is further strongly driven by the government sector, which has seen the fastest growth in the last five years as a result of increased government programmes in livelihoods improvement interventions. The finance sector is the second-fastest growing sector due to very active estate and construction activities.

Bloemfontein is also ideally equipped to support demanding industrial activities and is the base of a huge agricultural area. It is incomparable in terms of locality, facilities, viability and accessibility, and displays a proud tradition of hospitality. Approximately 87% of economic production in Mangaung occurs in Bloemfontein while only 7% and 6% respectively occur in Botshabelo and Thaba N'chu.

The consumer market in Mangaung and its immediate vicinity is extensive as it not only includes local residents, but also the enormous buying power of Lesotho citizens, with farmers from the surrounding rural areas, boosting the retail market at month-end. It is estimated that more than 50% of the millions pumped into Lesotho from abroad is spent in Mangaung, representing a market of several million people.

The MMM decreased its share of the Free State's economy from 25.5% in 2001 to 29.8% in 2012. Concerning the population share that MMM nationally has of 1.4% (based on Census 2011), it should be mentioned that the 1.5% economic contribution is slightly larger than the population share. The economic contribution of 29.8% in the Free State in 2012 is also larger than its share of provincial population of approximately 27.2%.

Agriculture (general agriculture sectors and hunting) contributed 1.5% of the MMM economy in 2012.

The Gross Geographic Product (GGP) per capita provides an indication of the amount of production that takes place in an area in relation to the population of that area. Although Botshabelo and Thaba N'chu have relatively more people than economic activity, Bloemfontein has a strong GGP per capita.

In an area such as Mangaung, with its relatively high levels of unemployment and poverty, it can be expected that the SMME sector plays an even more important role in job creation and poverty alleviation. It is essential to strengthen the support systems available for SMMEs, as this informal economy makes an important contribution to the economic and social life of Mangaung. Due to the decline in formal employment and consequent increase in unemployment, many people seek alternative means of earning an income.

The MMM, however, faces a number of challenges in respect of economic development. These include:

- Coordinating and building on all the attempts to support economic development in the municipal area. Specifically, the coordination of activities of national government, the Free State Province, Motheo District Municipality as well as the private sector.
- Addressing the specific economic development priorities identified by communities in the ward planning process, as well as strategically in the IDP.
- The establishment of a broad stakeholder based economic development strategy and partnership is seen as a key mechanism for addressing these challenges and facilitating economic development in the area.

It was expected that from 2014 to 2019, the MMM would obtain an average annual growth rate of 2.01% in 2019 and thus will encumber the projected inclusive growth and creation of decent job opportunities for the citizens of the City.

5. Public Participation Process

Public participation is the involvement of all parties who potentially have an interest in a development or project, or may be affected by it.

The overall aim of the PPP is to ensure that all Interested and Affected Parties (IAPs) have adequate opportunities to provide input into the process. More specifically, the objectives of the PPP are as follows:

- Identify IAPs and notify them of the proposed project and of the EIA process;
- Provide an opportunity for IAPs to raise issues and concerns; and
- Provide an opportunity for IAPs to review the Environmental Impact Report prior to its finalisation.
- Inform and enrich decision-making.

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

5.1 Stakeholder Engagement Activities

The Public Participation Process that was undertaken to solicit public opinion regarding the proposed activity has included the following activities so far

5.2 Process followed to date

The following process was undertaken to facilitate the public participation for the proposed project.

5.2.1 Identification of Key Stakeholders

As required by the EIA Regulations, 2014, relevant local, provincial and national authorities, conservation bodies, local forums and representatives and surrounding land owners and occupants have been notified of the EIA and the release of the Scoping Report for comment.

Relevant authorities (Organs of State) have been automatically registered as IAPs. In accordance with the EIA Regulations, 2014 all other persons must request in writing to be placed on the register, submit written comments or attend meetings in order to be registered as stakeholders and included in future communication regarding the project, and advertisements advised that IAPs register as such. All respondents were then placed on the project database. This database was supplemented by I&APs that contacted our Public Participation consultant to be included on the database. The database was used

throughout the process to inform the stakeholders of the project and is attached within **Appendix C** of the report. The stakeholder database will be updated throughout the process.

5.2.2 Site notices

Three notices were erected on site and at visible and accessible locations close to the site on **Wednesday, 14 February 2018** to inform surrounding communities and immediately adjacent landowners of the proposed development. Photographic evidence of the site notices is included in **Appendix C2**.

5.2.3 Direct notification of identified I&APs

Identified I&APs, including key stakeholders representing the following sectors, were directly informed of the proposed development by e-mail and fax on Monday, Wednesday, **14 February 2018**. For the purposes of this the following authorities were consulted:

- Provincial Authorities
- Local Authorities
- Service providers
- Ward Councillor
- Non-governmental organizations

Please refer to **Appendix C2-a** for the Background Information Document and proof of email notification that was distributed to the I&APs identified as well as a list of identified and contacted I&APs, including directly adjacent landowners.

5.2.4 Hand - deliveries

Hand-deliveries were made to adjacent landowners within 100 meters of the proposed development on Wednesday, **14 February 2018**, to notify and inform them of the proposed project. For proof of the knock and Drop register refer to **Appendix C2-b**

5.2.5 Newspaper advertisements

An advertisement, notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Envirolution Consulting (Pty) Ltd was placed in

the Bloemfontein Courant Newspaper, **Wednesday, 14 February 2018**. A copy of the advertisement is included in **Appendix C3**.

5.2.6 Concerns raised by I&APs

The relevant local authorities and other stakeholders were informed of the proposed project via notification letters distributed on Wednesday, **14 February 2018**. Registration sheets were attached to the notification letters for the local stakeholders to register as Interested and Affected Party's (I&AP's) and to lodge their comments. Comments received and responses provided are in the stakeholder comments and responses provided (See **Table 5-2**). Please refer to **Appendix C2** for specific correspondences to and from I&APs.

5.2.7 Placement of Draft Scoping Report for public review

Registered stakeholders were notified by email, SMS or post of the availability of the Scoping Report for public comment. Hard copies of the full report were made available for viewing at the following venues:

- Mangaung Public Library on 21 Floreat Ave Bloemfontein Central, Bloemfontein.
- The electronic copy of the report was also made available on the following drop box link <https://www.dropbox.com/sh/7uzspn2e2tdhdee/AADVfhoikvMZl8gz-I42PENxa?dl=0>

Stakeholders were provided with a 30-day comment period (from the **16 May 2018** until **15 June 2018**) Proof of Circulation of the Draft Scoping Report to Organs of State and the public is attached within **Appendix C8**

5.2.8 Information Sharing Meeting

A Public Open Day is a public forum at which the findings of the Scoping Phase were presented for discussion. A Public Open Day was held on 9th June at the Pepper Tree Venue and Conference during the comment period to provide stakeholders with the opportunity to discuss any concerns related to the proposed project.

A Public Open Day is a public forum at which the findings of the Scoping Phase were presented for discussion. A Public Open Day was held during the Draft Scoping Report commenting period to provide stakeholders with the opportunity to discuss any concerns related to the proposed project.

A Public Open Days was held at the Pepper Tree Venue and Conference, Plot 5 Kenilworth, Kenilworth, Bloemfontein on **7th June 2018** from 17h00 – 18h30. The proof of meeting notes is attached within **Appendix C7**

5.2.9 Submission of Final Scoping Report for Authority Review

Following the initial review of the Draft Scoping Report, issues raised by authorities and the public were all summarised and responded to in Comment and Response Report., shown in section 5.3 of the page overleaf. The FSR also included a Plan of Study for EIA.

Submission of the FSR to DESTEA for approval of the Plan of Study for EIA and a decision regarding authorisation to proceed to the Impact Assessment phase of the EIA (received on 07 August 2018)

The activities that must still be conducted as part of the Assessment process are described below:

- Distribution of DEIR to public venues for review by IAPs, and submission to relevant authorities;
- Provision of a 30-day comment period on the DEIR;
- Holding of a Public Meeting to discuss findings of the EIA Phase with stakeholders
- Comments made on the DEIR and public meeting will be included in the FEIR
- Submission of the FEIR to DESTEA for a decision regarding environmental authorisation; and
- IAP notification of the decision and appeal process once received

5.3 Stakeholder Comments

Table 5-2: Comments and issues of concern raised by I&APs are listed below, along with the I&AP's name and means of communication in the Comment and Response Report (direct correspondence also attached within Appendix C2 & Appendix C8).

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
1.1	Dawie Venter sent via E-mail: 15 Feb 2018	Ms. Jubilee Bubala Envirolution Consulting sent via E-mail: 15 Feb 2018	Herewith I would like to register as an I&AP for the Wildealskloof mixed use Development. Kindly send me all necessary documentation.	<p>Thank you for contacting us regarding your interest in the application for a scoping and environmental impact assessment (EIA) and water use licence application for the proposed Wildealskloof Mixed use Development in Bloemfontein, Free State Province.</p> <p>The detailed report that will include all necessary documentation is under compilation and we anticipate releasing the said document for public review sometime in April. We are currently in the notification period in which IAPs are invited to register on the project database for a legislated 30 days period as detailed on the background information document that was left at your offices.</p> <p>Please note that, your details have been registered on the project database and you will be kept informed of the progress of the scoping and EIA process of this</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
				development Attached to email please find a Kmz file, locality map and BID letter that was distributed in the study area with a reason why Ideal Consulting is proposing development.
1.2	Rene Stevenson IAP sent via E-mail: 28 Feb 2018	Ms. Jubilee Bubala EAP sent via E-mail: 28 Feb 2018	I would like to register as an I&AP for the Wildealskloof mixed use development.	We confirm that you have been added to the project database. In this regard, you will be kept informed of any issues regarding the progress of this Environmental Impact Assessment. Please note that all relevant documentations are under compilation at this stage
	Please can you send information with respect to the proposed development to me?			
1.3a	Rene Stevenson IAP sent via E-mail:	Ms. Jubilee Bubala EAP sent via E-mail: 12 Mar 2018	Jubilee I note comments by I&AP need to be submitted on or before 19 Mar-18. Please provide the relevant information as soon as possible to allow me to make	The project is at the notification stage where we invite interested and affected party to comment and register on the proposed application. Most comments we get at this stage would be am interested in the project please

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
	12 Mar 2018		comments.	<p>add me on the project database.</p> <p>Soon after the 19th of March, the draft detailed reports will be released to public for review and then you can make additional comments based on the review of the report.</p> <p>You will be informed of the availability of this report as soon as it is ready.</p>
1.3b	<p>Rene Stevenson IAP sent via E-mail: 12 Mar 2018</p>	<p>Ms. Jubilee Bubala EAP sent via E-mail: 12 Mar 2018</p>	<p>Thank you for your response. I do not only want to be added to a project database, but would like to make comments and ask questions.</p> <p>As per the EIA regulations, I assume the Public Participation Process Phase 1 is currently being undertaken for this project. As per Chapter 6 section 41 of these regulations, please provide the Background Information Document to allow I&AP a reasonable opportunity to comment on the proposed application.</p> <p>With respect to the Water Use License Application, please provide the Bulk Services Report and any</p>	<p>Attached please find the requested documents (BID, Locality Map and Kmz file). Apologies I thought I shared these with you. For the bulk services report, this one I will need to source it from the town planner, however please note that some of these documents are still under compilation. It is unknown at this stage if the water pipes will connect to the existing Mangaung lines or if the development will be self-sufficient and underground water boreholes will be utilized. Similarly for other services (i.e. electrical and sewage) are also unknown at this stage. Nonetheless, for electricity, solar energy is also being investigated but still not confirmed. Am sure as the EIA unfolds all of this information will be readily available. I will keep</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			other relevant information.	you updated.
	Rene Stevenson IAP Formal letter sent via E-mail: 16 Mar 2018	Ms. Jubilee Bubala EAP. Formal letter sent via E-mail: 27 March 2018	<p>1. General</p> <p>a. How many residential opportunities are proposed in total?</p>	Approximately 7500 residential opportunities over the course of more than 10 years are proposed.
			b. What is the average number of people per residential opportunity, and how many people are estimated to reside at the development?	On an SA Average it is estimated that 4 people per household will account to about 30 000 people to reside in the development once completed.
			c. How will the influx of a large amount of people affect the area, from a community perspective?	The proposed development intends to create a new community with various social and economic opportunities. This will bring a new dynamic and investment opportunities to the city of Bloemfontein. Furthermore, it is foreseen that the existing community of the area will also benefit from the new and modern community facilities that will be available in the proposed development.
			d. Has a study been done on where the residents	Various employment opportunities will be available

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			of this development will be employed and what the employment capability of the area is?	within the development. An in-depth market study and socio economic study will be conducted and the IAP will be notified.
			e. How many non-residential opportunities are proposed in total, and how many people are estimated to work at the development?	Not known at this stage. Non Residential Land uses account to approximately 96 Stands.
			f. Are any informal settlement envisaged as part of this development?	No Informal settlements are foreseen or planned.
			g. Taking into consideration the fact that the proposed development borders on, and is surrounded by, open agricultural land, is it envisaged that illegal and/or informal settlement will occur on the fringes of this development? How will this be controlled?	No Informal settlements are foreseen or planned.
			h. Are the reasons for and the timing of the MMM decision to include the proposed Wildealskloof development as a Future Residential area in its Spatial Development	Yes, It is of public knowledge and can be obtained on the Mangaung Metropolitan Municipalities' website.

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			<p>Framework available to the public? If so, please can it be provided</p>	
			<p>i. Please provide evidence that the establishment of the medium to low income high density development on the northern outskirts of BFN aligns with the current MMM IDP</p>	<p>Please see the Spatial Development Framework of the MMM municipality and the Structure Plan for the north western areas. This can be obtained on the MMM website.</p>
			<p>j. What is being proposed in terms of safety and security and crime prevention?</p>	<p>The proposed township layout will enhance the effect of safe and sound layout planning as to prevent crime and enhance security. At this stage in planning no physical security measures has been planned due to the premature nature of the application.</p>
			<p>2. Built Environment</p> <p>a. From the 3D images on the website of Ideal Consulting, it appears that a large number of the residential opportunities will be high density. How many people are estimated to live on 1</p>	<p>An average density of 30 du/ ha is foreseen in the residential areas. Height will range from 1 storey dwelling units to 4 storey residential buildings.</p> <p>Non-residential buildings might range from 3 storeys to 10 storeys.</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			<p>hectare? Does this align with the current development in the area?</p> <p>b. What is the average and maximum height of the residential and non-residential buildings? Please provide details of the visual and architectural impact of the built environment of the development on the surrounding agricultural area</p>	
			<p>3. Water</p> <p>a. What is the water demand of the proposed development (i) on average per day and (ii) during peak demand periods? Please provide these numbers for each phase and in total for the development</p>	<p>The estimated water demand for the Proposed Development is 22.1195Mℓ/d</p>
			<p>b. Where will it be obtained?</p>	<p>It is proposed that the municipal water supply will be utilised for the Proposed Development</p>
			<p>c. If it is proposed that water is obtained from the municipal network, please provide evidence that the existing water supply</p>	<p>Upgrades to the existing municipal water supply will be required to accommodate for the Proposed Development</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			network can cope with the additional load during both peak and off-peak demand periods	
			d. Is it proposed that (some of) the water is obtained from boreholes? If so, please provide evidence that the aquifer cope with proposed additional drawdown. If the aquifer pump test report and geo-hydrological report are available to the public, please can it be provided?	<ul style="list-style-type: none"> » At this stage this option has not been considered. » The Geo-hydrological report will be made available to public during the DEIR review period anticipated to commence next week. You will be notified of the availability of the report
			e. If any water re-use, recover or recycle initiatives are being proposed for residential and non-residential consumers please provide details	Water re-use principles might be incorporated in the future
			f. If any rain water harvesting and grey-water use initiatives are being considered, please provide details	These principles might be considered in the future
			g. Is the Bulk Services Report available to the	The bulk services report will be made available to

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			public? If so, please can it be provided	public during the DEIR review period anticipated to commence next week. You will be notified of the availability of the report
			<p>4. Sanitation</p> <p>a. It is assumed that a full waterborne sanitation system is being proposed for the development. Please provide details on the estimated volume of wastewater to be generated, and the proposed sanitation system</p>	<p>The estimated sewerage flow for the Proposed Development is 20.5101Mℓ/d</p> <p>It is proposed to install a full waterborne sanitation system for the Proposed Development.</p>
			<p>b. If a treatment works is being proposed at the development, please provide details</p>	<p>It is proposed to construct a new Waste Water Treatment Works for the Proposed Development. Details of this facility are not yet available</p>
			<p>c. If not, which treatment works will be waste water be directed to? If the wastewater from the proposed development is directed to the northern treatment works, please provide evidence that this treatment works has the capacity to take existing inflows, new inflow (developments under construction in the</p>	<p>A new WWTW will be constructed for the Proposed Development</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			north, i.e. Wild Olive, Somerton, Bergendal) as well as inflows from the Wildeals Development.	
			5. Power supply a. What is the power demand of the all phases of the development?	The demand for the entire development is approximately 60MVA
			b. Please provide evidence that BFN's existing power supply network can meet the demand of all the phases of the proposed development	Centlec has undertaken a detailed network expansion plan for the ability to supply the growth in demand of the Northern suburbs. This development forms part of the development plan.
			c. I understand that the use of solar power is being considered. What percentage of the base load can be met by the proposed solar system? Please provide details of the solar system proposed	The base load will not form part of the solar initiatives but rather be a mechanism to reduce the peak loads
			d. Is the Electrical Services Report available to the public? If so, please can it be provided	The Electricity Services Report is available for your review during the draft Environmental impact report (EIR) review period anticipated to occur in August. You will be informed of Draft EIR availability.

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			e. Is the company YBG (and/or Siris Holdings and/or its owners), currently engaged by Centlec to provide professional engineering master planning services, engaged by or partnered or affiliated to the Developer of the proposed development in any way?	Siris Holdings and or YBG are not involved in this development.
			6. Waste a. Please provide details on the estimated volume of waste to be generate at the proposed development	The estimated volume of solid waste to be generated by the Proposed Development is 3 707.48m ³ /week
			b. Please provide details of what will be done in terms of waste management	It is proposed to utilise the Mangaung Metropolitan Municipality's solid waste removal services
			c. If any re-use, recover, recycle waste initiatives are being considered, please provide details	None of these initiatives are being considered at the moment
			d. Which landfill will the waste from the development be directed to? If the waste	The Mangaung Metropolitan Municipality will have to confirm the available capacity and the proposed

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			<p>from the proposed development is directed to the northern landfill, please provide evidence that this landfill has the capacity to take existing influx, new influx (developments under construction in the north, i.e. Wild Olive, Somerton, and Bergendal) as well as influx from the Wildeals Development.</p>	<p>landfill site.</p>
			<p>7. Traffic and transport</p> <p>a. Please provide evidence that the R700 has the capacity to cater for additional traffic from the proposed development.</p>	<p>The Traffic Impact Assessment Report and Traffic Management Plan are available for your review during the draft Environmental impact report (EIR) review period anticipated to occur in August. You will be informed of Draft EIR availability.</p>
			<p>b. Is it proposed that the Ribbesdale – Bainsvlei (gravel) road will be a feeder road to the proposed development, and thus form a ring road around BFN? If so, will this road be upgraded?</p>	<p>Please see the Traffic Impact Assessment that will be available during the draft EIR review period. You will be informed of the Draft EIR availability.</p>
			<p>c. If a public transport network is being considered to and from the development, please provide details of this network</p>	<p>Please see the Traffic Impact Assessment that will be available during the draft EIR review period. You will be informed of the Draft EIR availability.</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE												
			d. Is the traffic impact assessment available to the public? If so, please provide it	Please see the Traffic Impact Assessment that will be available during the draft EIR review period. You will be informed of the Draft EIR availability.												
1.5	Johann Nel IAP Formal letter sent via E-mail: 20 Mar 2018	Ms. Jubilee Bubala EAP. Formal letter sent via E-mail: 07 May 2018	1. What is the total number of housing units that will be built on the farm?	8769 Units in total. The units will include single storey, Multi storey and lifestyle Estates stands.												
			2. What is the anticipated population which this development will cater for?	On a SA Average it is estimated that 4 people per household will account to about 30 000 people to reside in the development once completed.												
			3. What is the density of these residential units compared to the total area of the farm, or which portion of the total farm is allocated to the housing inclusive of each residential stand (if any).	<table border="1"> <thead> <tr> <th>Land Uses</th> <th>Area (Hectares)</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Residential Uses</td> <td>0.19</td> <td>8</td> </tr> <tr> <td>200m² single residential units</td> <td>2.81</td> <td>108</td> </tr> <tr> <td>250m² single residential units</td> <td>9.67</td> <td>312</td> </tr> <tr> <td>300m² single residential units</td> <td>16.09</td> <td>477</td> </tr> </tbody> </table>	Land Uses	Area (Hectares)	Units	Residential Uses	0.19	8	200m ² single residential units	2.81	108	250m ² single residential units	9.67	312
Land Uses	Area (Hectares)	Units														
Residential Uses	0.19	8														
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300m ² single residential units	16.09	477														

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE		
				400m ² single residential units	9.21	221
				500m ² single residential units	10.99	214
				600m ² single residential units	11.15	154
				700m ² single residential units	6.81	78
				800m ² single residential units	1.62	18
				900m ² single residential units	0.56	6
				Life style estate 900 m ² stands	31.29	23
				Life style estate 1000 m ² stands	2.19	346
				Multi Storey/RDP/FLIPS/Social 80du/ha	12.49	23
				Multi Storey/RDP/FLIPS/Social 120du/ha	12.57	999
				Multi Storey/RDP/FLIPS/Social	26.85	1508

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE	
				180du/ha	
				Total Units	8769
			<p>4. Has a study been done to determine the economic impact that this development will have on the adjacent property values (Woodland Hills, Heuwelsig, Oubos and Groenvlei) and the impact it will have on the broader community? If yes what was the findings of this study?</p>	<p>A socio-economic study for the project was completed by An Kritzinger of iAfrica Social Economic Assessment and Ingrid Snyman of Batho Earth (see the social economic reports (attached within Appendix D Volume 2 of the DEIR) that will be available during the draft EIR review period. You will be informed of the Draft EIR availability.</p>	
			<p>5. Will the completed units be sold off or will it form part of a government-funded social housing project?</p>	<p>Unknown at this stage</p>	
			<p>6. Can the current water supply to the City embody the additional capacity of a development of this magnitude?</p>	<p>Please see the Services Report that will be submitted together with the DEIR that will be made available to public during the review period.</p>	
			<p>7. Funding for the services, water, electricity</p>	<p>Please see the Services Report that will be submitted</p>	

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			sewer and roads be defined:	together with the DEIR that will be made available to public during the review period.
			7.1) Considering this proposed development is a distance from the existing residential development and services, who will ultimately pay for the connection of these services from the existing sites to the new development?	Please see the Services Report that will be submitted together with the DEIR that will be made available to public during the review period.
2	Ms Mpati Makoa (HO) Environmental Manager; SANRAL 27 March, 2018	Ms Bubala EAP 28 March, 2018	We thank you for bringing the proposed development to our attention, and we note that a Traffic Impact Assessment (TIA) is underway. Please note that there may be other specific information requirements in addition to the TIA. The relevant SANRAL office to liaise with is our Eastern Region. I have included some of my colleagues from the office, who should be able to assist.	Thank you very much for responding and guiding me to the right officials. I will add them on the project database and they will be kept informed of the progress of this scoping and environmental impact assessment. I will also liaison with them further regarding any additional information required
3	Mpolokeng Kolobe Mangaung Metropolitan Municipality	Ms Bubala EAP 27 March, 2018	This office requests more information concerning the proposed development in order to give meaningful comments. A hard copy of the environmental reports must be submitted to this office for review and comments. In the report to be submitted it must	Thank you very much for your swift response on the notification of a scoping and environmental impact assessment (EIA) and water use licence application for the proposed Wildealskloof Mixed use Development in Bloemfontein, Free State Province. The project is

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
	Manager Environmental Assessment Via Email 27 March, 2018		<p>clearly be demonstrated in which way the proposed development will Comply with the principles of environmental management as set out in Section 2 of the National Environmental Management Act 107 of 1998 which requires that environmental management must place people needs at the forefront of development and that development must be socially, environmentally and economically.</p>	<p>currently in the legislated 30 days process notification period in which we notify the Organs of State and the public about the development and inviting IAPs to register on the project database. Once this phase is completed we will release the draft scoping report to the public for comment and also to Organs of State including the Department of Environmental Assessment: Mangaung Metropolitan Municipality</p> <p>It is anticipated that this report will be ready in April. You will be informed of the Draft scoping report review period. The report will have all information pertaining to the principles of environmental management as set out in Section 2 of the National Environmental Management Act 107 of 1998 which requires that environmental management must place people needs at the forefront of development and that development must be socially, environmentally and economically</p>
	Ragna Redelstorff SAHRA	Ms Bubala EAP Sent via Email	Good afternoon,	Dear Ragna Thank you for your correspondence.

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
	Sent via Email 20 Feb, 2018	20 Feb, 2018	<p>Thank you for the notification!</p> <p>You are kindly reminded that SAHRA does not accept hardcopies, emails or website links as submissions. Please submit an application on the South African Heritage Resources Information System (SAHRIS). Please follow the step-by-step tutorial videos on the SAHRIS homepage (http://sahra.org.za/sahris/) and upload all documents to the case file.</p> <p>Kind regards,</p> <p>Ragna Redelstorff</p>	<p>Please note that, the email you received is a process notification of the intent to development. This is to inform the IAPs and Organs of State about the project and to invite IAPs to register on the project database. Once this phase is done. We will release the project report which is currently under compilation to the public & Organs of State for comment including the downloading of such reports on the SAHRIS website for your comment.</p>
Comments Received during the Draft Scoping Report Review Period				
1	Mr. Vivian Minnaar, Mangung Meopolitan Municipality Environmental	Ms Bubala EAP Sent via Email 20 June, 2018	Reference is made to your draft Scoping report received by this office regarding the above mentioned application. This office has reviewed the report and does not have any objections to the proposed development on conditions that:	Project support is noted

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
	Management Dept. 28 May 2018.		A detailed and complete Environmental Management Programme (EMPr) must be compiled and be submitted with the EIA reports. This EMPr must ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management and Environmental Management System (EMS) ISO 14001 Principles are adhered to. EMP must also include a management plan for the anticipated open spaces in order for it not to lose its environmental functionality and the loss of biodiversity	Comment noted, an EMPr will be compiled as per your recommendation and will be submitted with the EIA reports
			In addition to the specialist studies to be conducted the following studies must be conducted. a. Geotechnical study to determine the sub-surface, identify the soil and rock condition, recommend the most suitable foundation system, provide recommendation with regards to excavation and recommend anticipated material usage for foundation.	Comment noted; the geotechnical assessment report has been commissioned and will be included in the Draft Environmental Impact Report that will be submitted to all affected Organs of state and the public for comment during the EIA Phase.
			b. Flood line study to determine the 1:100 years flood line as per the requirement of the NEMA:	The Flood line study to determine the 1:100 years flood line is available.

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			Water Act number 36 of 1998.	
			The proposed land is properly zoned in terms of the appropriate Town Planning Scheme before any construction can commence on site.	Comment noted; a township establishment application will be submitted to the relevant authorities for approval.
			An alien control and monitoring programme must be developed, starting during the construction phase and to be carried over into the operational phase	Comment noted; an alien control and monitoring programme has been developed for the project
			In light of the above, all documents illustrating compliance to the conditions should be forwarded to this office for record keeping and compliance	Comment noted: all documents requested once available will be submitted to the Department for record keeping and compliance as requested. All the above recommendations provided by the Department will also be included in the project EMPr to ensure compliance.
2	Rural Development and Land Reform Property Management Directorate	Ms Bubala EAP Sent via Email 21 June, 2018	As the above mentioned properties are not state land the Department of Rural Development and Land Reform as in principle no objection to your application on condition that <ul style="list-style-type: none"> ▪ The existing farming activities like cattle, poultry etc., on Portion 1, 2 and 3 of the farm Wildealskloof 1205, are not to be affected at a later stage, and 	An agricultural specialist has been commissioned to undertake specialist studies and provide recommendations to the project which will be included in the project Environmental Management Programme (EMPr) for implementation to mitigate impacts that may arise as a result of the project.

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
	<p>18 May 2018.</p> <p>Formal letter sent via email</p>		<ul style="list-style-type: none"> ▪ Subject to approval granted by other State organs especially the Department of Agriculture? 	<p>It is with no argument that the site was previously agriculture; however in accordance to Council Resolution CNL 57A-13-28/04/2015, the IDP has been reviewed and adopted by the Council. The said portion of land is now included in the urban edge for earmarked for neighbouring development.</p> <p>The will be required to submit an application for township establishment to the requirements of the Municipality and no permitting/approval is required from the Department of Agriculture. The Department has been kept informed throughout the public participation of the scoping phase and no comments have been received from the Dept.</p> <p>All important approvals from other Organs of State like the Water Use Licence and Environmental Authorisation which has resulted in this scoping and EIA process are all underway.</p>
3	<p>Riaan Strydom</p> <p>Ms Bubala</p>	<p>Ms Bubala</p> <p>EAP</p>	<p>Request to be added on the project database and additional project information and status of the</p>	<p>This email confirms that you have been added on the project database.</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
	EAP Sent via Email 02 July, 2018	Sent via Email 02 July, 2018	application	<p>The Impact Assessment Phase includes the following below:</p> <ul style="list-style-type: none"> ○ Undertaking of specialist studies-currently on-going ○ The draft environmental impact assessment report with specialist findings will be released to the public for 30 days review and comment- this is anticipated to happen end of July or early August ○ A public meeting will be held during the same period that the Draft EIA will be out to public ○ Finalization of the final environmental impact assessment report and submission to DESTEA for decision making. A decision will be made within 107 days, following authority decision all IAPs on the database including yourself will be informed of this decision <p>You will be informed of the progress of the project as your details have been registered on the project</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
				<p>database.</p> <p>Attached to email for your information is the final scoping report submitted to DESTEA</p>
	<p>Riaan Strydom Ms Bubala EAP Sent via Email 16 July, 2018</p>	<p>Ms Bubala EAP Sent via Email 23 August, 2018</p>	<p>Thanks for the feedback/mail.</p> <p>Please note that the water course mentioned in the report might have an effect on the area north of the planned development's underground water.</p> <p>Mimosa Park and surrounding area rely totally on bore holes for water supply as there are NO municipal services in those areas.</p> <p>This needs to be investigated during the EIA study.</p> <p>Where will the development get its water from?</p>	<p>The developer is aware of the water scarcity in the area and does not intend to overall use groundwater resources for the development of this magnitude.</p> <p>Attached please find the Bulk Services report detailing the source of bulk services for the proposed</p> <p>Please note that we will be releasing the Draft Environmental Impact report (which details the source of bulk services) to public for review next week and we will also hold a public meeting sometime in September, you are on our project database and you will be kept informed of the progress of this application</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			<p>Thanks for the feedback.</p> <p>Please note that it will be appreciated if the meeting will be scheduled after hours or on a Saturday as most effected land owners are working during weekdays.</p>	<p>All in order w always endeavour to hold our public meetings either after 5pm on weekdays or on Saturdays to accommodate people that go to work</p>
Comments Received at the Information Sharing Meeting held during the Draft Scoping Report Review Period				
1	IAP Schalk van der Merwe 07 June 2018	Ms Bubala EAP Sent via Email 20 June, 2018	IAP Schalk van der Merwe: stated that he is the opposite neighbour and his property is Wildealskloof 1205. His concern is traffic at the T1 earth crossing and the bridge crossing at the NHS. How will the development address that with respect to traffic impacts	The traffic specialist has been commissioned to undertake studies related to traffic impacts and management. The traffic report will be made available to the public during the review period of the draft environmental impact assessment report.
			How will waste be managed	The applicant is in discussion with the Municipality regarding the management of waste. It must also be noted that the applicant has proposed a waste water treatment plant on site to managed waste water and sewage. Other waste like general waste that will emanate from the development is still under discussion with the Municipality
2	IAP Rene	Ms Bubala	IAP Rene Stevenson: All the questions that I have	Councilor Selma Pretorius: I have no information with

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
	Stevenson In person at the Information sharing Meeting in Bloemfontein Held on 9 th June 2018	EAP Councillor Selma Pretorius And Public Facilitator Moses Mahlangu Information sharing Meeting in Bloemfontein. Held on 9 th June 2018	asked on bulk services must be forwarded to the councillor so that she can forward all her queries to the officials at the Municipality responsible for bulk services to provide answers on the source of the bulk services (electricity, water, waste etc.) as I have not received any feedback from Envirolution.	respect to bulk services, however, I can forward your queries to the Municipality-though it must be noted that it takes a long time to receive feedback EAP Jubilee Bubala: At the time the questions were asked on bulk services it was regarded as a premature request. As we did not have information at the time and we still don't. The queries that IAP Rene Stevenson is enquiring on bulk services will be forwarded to the ward councillor as per the IAPs request
			IAP Rene Stevenson: Mangaung Metropolitan Municipality is under pressure for water resources who will provide municipal services required for such a huge development	EAP Jubilee Bubala: It is noted that the applicant will submit an application for township establishment and the municipality will make a decision based on available Municipal bulk services. We can't comment on behalf of the Municipality.
			IAP Rene Stevenson: Why are officials from the Municipality response for bulk services not here in the meeting?	EAP Jubilee Bubala: The officials from the Municipality responsible for bulk services are listed on the project database. We invited everyone on the database to attend, however we can't control who attends and does not attend the meeting.
			IAP Rene Stevenson: How can DESTEA authorise a development if information on bulk services in not	EAP Jubilee Bubala: The competent authority that authorises such developments based on environmental

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			available	impacts is DESTEA and the Township application that will incorporate bulk services will be submitted to the Municipality who has the mandate to authorise based on the need and desirability of the development and bulk services available. We cannot comment on behalf of the Municipality
			IAP Rene Stevenson: she needs the traffic report to also understand how traffic will be managed for anticipated 8000 households and also given that the N1 borders the site	Jubilee Bubala: The traffic specialist has been commissioned to undertake studies related to traffic impacts and management. The traffic report will be made available to the public during the review period of the draft environmental impact assessment report if the authority gives us a go ahead to proceed with the EIA phase
			IAP Rene Stevenson: I sent queries to Envirolution on if the company YBG (and/or Siris Holdings and/or its owners), currently engaged by Centlec to provide professional engineering master planning services, engaged by or partnered or affiliated to the Developer of the proposed development in any way but I they have not provided this response.	Jubilee Bubala: we have endeavoured to answer your questions by referring these to our client then responding to you. We were appointed by Ideal Consulting (represented by Mr Charles Le Roux) and we liaise with Ideal Consulting and the professional team appointed on this project as far as the EIA information is concerned. The names and companies referred to by you are not familiar to us and have no bearing to us in terms of our

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
				<p>appointment and mandate for this EIA and this information is out of the scope of our EIA Process.</p> <p>We will be happy to answer your questions wherein it relates to the project scope, EIA Process and associated aspects and impacts.</p>
			<p>IAP Rene Stevenson: I am fully aware that the Centlec is part of this development. First the study area was not part of the urban edge and then 6 months down the line, the Municipality included the project site as part of the urban edge. These are legal questions with legal implications and we require answers to them.</p>	<p>Jubilee Bubala: The Spatial Development Framework (SDF) of Mangaung Metropolitan Municipality (2016) includes the site within its planned urban edge. It can be argued that the development is in accordance with the macro framework policy of the Mangaung Metropolitan Municipality. However; we cannot comment on why the Municipality has included the project site that is beyond our scope of works.</p>
			<p>IAP Rene Stevenson: Centlec has access to public fund for constructing big infrastructure like power stations in strategic areas. Centlec decided to put 132kv power line right opposite the proposed site, for whom did they do that for; because that is a massive infrastructure to just erect were there are currently no household so Centlec did it deliberately so that the power line/substation can service this Wildealskloof development. Public funds are being used for private</p>	<p>Public Participation Facilitator Moses Mahlangu. That query is beyond the scope of the scoping and EIA it's better to address issues that are within the scope as we are unable to provide responses to concerns outside this Scoping & EIA.</p>

NO	RAISED BY	RESPONDENT	COMMENT	RESPONSE
			gain.	

The project has also appointed a socio economic specialist, to liaise directly with the surrounding community regarding the proposed development. Minutes of these face to face interviews are provided in the economic specialist Report attached within Appendix D7

Key environmental and social concerns identified during the PPP

Based on the comments received from IAPs, the following key potential social and environmental concerns have been identified:

- Economic concerns – decrease in property values in adjacent more affluent areas;
- Social issues – increased crime and social ills in adjacent more affluent areas;
- Traffic – issues relating to flow and safety (of both motorists and pedestrians);
- Services infrastructure – capacity to handle the additional load;
- Visual impacts and change in visual character;
- Pollution and litter resulting from the development;
- Noise.
- Air quality

6. Environmental Impact Assessment

This chapter serves to assess the significance of the positive and negative environmental impacts (direct, indirect, and cumulative) expected to be associated with the Wildealskloof mixed use development. The identification of potential impacts of the proposed activity is based on the following factors:

- The legal requirements;
- The nature of the proposed activity;
- The nature of the receiving environment; and
- Issues raised during the public participation process.

Considering the factors listed above, the following environmental impacts were identified which could potentially result from the proposed mixed use development on of the Farm Olrig No. 1710 & Portion 4 of the Farm Wildealskloof No. 1205, Bloemfontein.

- Visual impacts;
- Impacts on heritage resources;
- Impacts on Paleontological resources
- Traffic impacts;
- Impact on soils and Agriculture
- Ecological (Flora, Fauna and Avifauna) impacts;
- Impacts on aquatic environments
- Socio-economic impacts;

Other construction related impacts e.g.

- Waste management impacts;
- Noise Impacts;
- Air quality impacts;
- Storm water and erosion impacts
- Pollution due to inappropriate handling of hydrocarbons used on site;

Several of the impacts listed above require specialist input. A number of specialist studies were conducted during the scoping phase, with the aim of identifying any environmental constraints posed by the site at an early stage and where possible and necessary accommodate them in the proposed layout. Where relevant (socio-economic, traffic and ecological), these studies have been revised taking into account the amendments to the layout proposed in this DEIR. Baseline descriptions summarised from the specialist reports are included in Chapter 4. Details of the specialist team are included in Table 6-1. Other construction related impacts such as waste management, air quality, noise, storm water and

erosion, pollution due to inappropriate handling of hydrocarbons used on site were assessed in-house by the EAP.

Table 6-1: Details of specialist studies (bound separately as Volume 2 of the DEIR)

Study	Specialist	Appendix D
Soils and Agriculture	Johann Lanz (SACNASP Reg. no. 400268/12) University of Stellenbosch University	Appendix D1
Avifauna Assessment	Andrew McKechnie SACNASP # 400205/05	Appendix D2
Fauna Assessment	I, Jacobus Casparus Petrus van Wyk of Limosella Consulting	Appendix D3
Heritage Assessment	Johnny van Schalkwyk-Heritage Consultant	Appendix D4
Paleontology Assessment	Doctor Cindy Heidi (PSSA)	Appendix D5
Social Impact Assessment	Ingrid Snyman of Batho Earth	Appendix D6
Socio-Economic Assessment	An Kritzinger' of iAfrica	Appendix D7
Visual Assessment	Mr. Mader van den Berg of Skets Architects and Planning	Appendix D8
Vegetation Assessment	Michelle Pretorius (Pr. Sci. Nat No 400003) of Dimela Eco Consult	Appendix D9
Wetland Assessment	Antoinette Bootsma (Pr.Sci.Nat. No. 400222-09 – Botanical and Ecological Science) of Limosella Consulting	Appendix D10
Geotechnical Assessment	Wessel Badenhorst of Road Lab Consulting	Appendix D11
Traffic Assessment	Louis Du Toit of Mariteng Consulting	Appendix D12

6.1 Impact Rating Methodology

The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The criteria used to determine impact consequence are presented below

Criteria used to determine the consequence of the impact

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate with
 - a score of 1 being site specific,
 - 2 = local (site + immediate surrounds),
 - 3 = regional (the impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns) ,
 - 4 = national and
 - a score of 5 being international (where the impact has international ramifications that extend beyond the boundaries of South Africa).
- The **duration**, wherein it will be indicated whether:
 - very short duration (0–1 years) – assigned a score of 1;
 - short duration (2-5 years) - assigned a score of 2;
 - medium-term (5–15 years) – assigned a score of 3;
 - long term (> 15 years) - assigned a score of 4; or
 - permanent - assigned a score of 5
- The **consequences (magnitude)**, quantified on a scale from 0-10, where:
 - 0 is small and will have no effect on the environment;
 - 2 is minor and will not result in an impact on processes;
 - 4 is low and will cause a slight impact on processes;
 - 6 is moderate and will result in processes continuing but in a modified way;
 - 8 is high (processes are altered to the extent that they temporarily cease); and

- 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where:
 - 1 is very improbable (probably will not happen),
 - 2 is improbable (some possibility, but low likelihood),
 - 3 is probable (distinct possibility),
 - 4 is highly probable (most likely) and
 - 5 is definite (impact will occur regardless of any prevention measures).
- the **status**, which will be described as positive, negative or neutral.
- the degree to which the impact can be **reversed** (low, moderate, high).
- Whether the impact may cause **irreplaceable loss of resources** (Yes/No).
- Whether the impact can be *mitigated*.

The **significance** shall be determined through a synthesis of the characteristics described and can be assessed as low, medium or high.

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

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

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

< 30 points: **Low** (i.e. where this impact would not have a direct influence on the decision to develop in the area),

30-60 points: **Medium** (i.e. where the impact could influence the decision to develop in the area

unless it is effectively mitigated),

>60 points: **High** (i.e. Impact is significant, mitigation is critical to reduce impact or risk. Resulting impact could influence the decision depending on the possible mitigation. An impact which could influence the decision about whether or not to proceed with the project.).

Practicable mitigation and optimization measures are recommended and impacts are rated in the prescribed way both without and with the assumed effective implementation of mitigation and optimization measures. Mitigation and optimization measures are either:

- **Essential:** measures that must be implemented and are non-negotiable; and
- **Best Practice:** recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented.

Cumulative Impacts

Anthropogenic activities can result in numerous and complex effects on the natural and social environment. While many of these are direct and immediate, the environmental effects of individual activities (or projects) can combine and interact with other activities in time and space to cause incremental or aggregate effects. Effects from disparate activities may accumulate or interact to cause **additional** effects that may not be apparent when assessing the individual activities one at a time (Canadian Environmental Protection Agency, no date). Cumulative effects can also be defined as the total impact that a series of developments, either present, past or future, will have on the environment within a specific region over a particular period of time (DEAT IEM Guideline 7, Cumulative effects assessment, 2004).

The International Finance Corporation (IFC) states that environmental assessment should include consideration of "... *cumulative impacts of existing projects, the proposed project and anticipated future projects.*" For the purposes of this report, cumulative impacts are defined as 'direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors'.

Cumulative impacts can be distinguished as follows:

- ***Cumulative Impacts of Existing Activities:*** *It is reasonably straightforward to identify significant past and present projects and activities that may interact with the project to produce cumulative impacts, and in many respects, these are taken into account in the descriptions of the biophysical and socio-economic baseline; and*

- **Potential Cumulative Impacts of Future Activities:** *Relevant future projects that will be included in the assessment are defined as those that are ‘reasonably foreseeable’, i.e. those that have a high probability of implementation in the foreseeable future; speculation is not sufficient reason for inclusion. Such projects may include those for which EAs have already been granted, that are currently subject to EA applications or that have been identified in an IDP of the relevant local municipality.*

To define the level of cumulative impact, it is critical to look beyond the geographical boundaries and environmental impacts of a single development on the environment and consider the area of influence of the specific project as well as other developments currently in or proposed in the area and their understood impacts and area of influence. It may be that impacts experienced as a result of a single development are not considered to be significant, but when considered as part of a cumulative impact assessment, these require mitigation.

The assessment methodology proposed in this section of the report seeks to provide a practical means of assessing cumulative impacts as part of the environmental impact assessment and minimizes deviations from the methodology proposed for the project specific impact assessment. Key considerations for the application of this methodology are:

- The cumulative impact assessment will need to be undertaken with consideration given to developments that may have contributed to cumulative effects in the past, may be contributing or are anticipated to contribute in the foreseeable future. This needs to be relevant to the timeframe within which impacts are to be experienced as a result of the project itself (i.e. all phases for which the project specific impact assessment is being undertaken - this will need to include post closure activities and monitoring). Given that the baseline environment will already be impacted on by the historical and current contributors to the cumulative impact, it is only necessary when undertaking the cumulative impact assessment to place an emphasis on an identified future cumulative baseline environment;
- Cumulative impacts may not be applicable to all specialist disciplines. Specialists will advise and justify where they believe the project related impacts will be confined to the project area and not subject to or contributing to impacts in the broader area of influence as a whole. For example, if the project area is confined to a water catchment which is not anticipated to be impacted on by other developments (past, present or foreseeable future) then a cumulative impact assessment need not be considered for this environmental aspect;
- A cumulative impact assessment will need to be undertaken for a specific area of influence which will be determined by the impact itself and the baseline environment in which it is

proposed e.g. if project specific biodiversity impacts are similar in nature to those experienced 40 km away, but the two areas are linked in terms of biodiversity functioning and/or the cumulative impact will be a significant depletion of a particular species, then the area under consideration for the biodiversity cumulative impact assessment must address the entire area between the two sites. This will vary across specialist disciplines and therefore a single area of influence for the cumulative impact assessment cannot be set and will be advised by the specialist concerned;

- The baseline environment for the cumulative impact assessment differs from that of the project specific baseline e.g. the air quality baseline for the project will differ from the air quality baseline that is considered for a cumulative impact assessment where a number of mines are likely to be developed within a region in the future and all contributing to a cumulative ambient air quality. While a difference in defining the cumulative baseline is noted, the impact assessment methodology to be employed will remain unchanged; and
- The cumulative impact assessment can only be undertaken where information is readily available to do so and as such will only be an initial assessment of the likely cumulative impact in terms of knowledge available at the time of the assessment. As it is critical to understand the information sources and limitations that exist, each specialist will be required to provide an outline on what their information sources are for the assessment and where limitations exist.

For the most part, cumulative effects or aspects thereof are too uncertain to be quantifiable, due to mainly lack of data availability and accuracy. This is particularly true of cumulative effects arising from potential or future projects, the design or details of which may not be finalized or available and the direct and indirect impacts of which have not yet been assessed. Given the limited detail available regarding such future developments, the analysis will be of a more generic nature and focus on key issues and sensitivities for the project and how these might be influenced by cumulative impacts with other activities. The proposed approach for the cumulative impact assessment will be as follows:

- From the EAP's knowledge of the project area and anticipated impacts associated with the project, the likely geographical extent that needs to be considered for the cumulative impact assessment for the particular discipline will be identified. This may be refined as additional information becomes available through the life of the study and/or through a better understanding of linked impacts between various disciplines.

- Sources of cumulative change will be identified – what is important to note here, is that this can be done historically and with consideration of the present state (which will be done as part of the project specific baseline data collection, unless a larger area of influence needs to be considered) and then further information with regard to proposed developments in the area will be considered. The future developments that will need to be incorporated into each study are:
 - Those for which EAs have already been granted;
 - Those that are currently subject to environmental authorization applications and for which there is currently information available; and
 - Those forming part of Provincial or National initiatives.
- Where further developments are identified, but are not yet at the stage of planning as detailed above, these will be noted as excluded from the current cumulative impact assessment.
- The cumulative baseline environment will be defined.

In most cases only qualitative assessments of cumulative impacts will be presented, i.e. they will not be formally rated.

6.2 Alternatives Assessment

The following alternatives have been considered and assessed through this EIA report. The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects are considered. The details pertaining to each alternative considered, as well as the technical preference are provided below:

Design Layout Alternative 2 (Less preferred option) is proposed as indicated in the Figure 6.2 below. The design is similar to Design Layout Alternative 1 (Most preferred option) indicated in the Figure 7.1 for the majority of its orientation except on the south western section where Design Layout Alternative is proposing a heavy industrial land use in an area reported to be highly sensitive from a heritage and ecological perspective. The Layout Alternative 1 (Figure 6-1) proposed a public open space to the south-western corner of the study site (where the high sensitive hill and the rocky grassland and heritage resources were identified) to avoid land use features that would negatively impact on the identified heritage and ecological resources. Nonetheless the majority of the high floral sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both layout alternatives. The difference between the two layouts emanates from the fact that the high floral sensitivity Low Rocky Hill, Rocky Grassland vegetation units and heritage site were

excluded from any development and instead included within a designated Open Space in **layout Alternative 1**



Figure 6-1: Overview of the Design Layout Alternative 1.



Figure 6-2: Overview of the Design Layout Alternative 2

As detailed above, **Layout Alternative 2** follows in the majority the same orientation of Alternative layout 1 and Alternative layout 2 was initially proposed as the preferred alignment. However, during specialist investigations, it was found that this layout would impact negatively upon an existing informal burial place containing approximately 10 graves marked by stone cairns. A low density scatter (1/5m²) of MSA stone tools (blades and scrapers) and flakes and at least twenty structures identified as sangars occur on the western side of the hill. The rocky hill is also known to be highly sensitive in terms of vegetation, fauna and avifauna. **Layout Alternative 1** was then proposed to include the said sensitive areas as part of a designated Open Space area.

It was found that the preferred layout Alternative 1 as well as Layout Alternative 2 would have an impact on the footprint of the project and surrounding areas. The magnitude of the impacts and the type of environment that will be influenced were comparatively evaluated in the EIA process in order to recommend an option and focus the specialist studies. The specialist studies were based on the full understanding of the nature of the impacts and include mitigation options for the Layout Alternatives considered. A comparative table has been drawn up where the various environments as well as the impact of the activity on those environments were classified in a simplistic way in order to establish an option with:

- a) the least possible impacts;
- b) avoidance of impacts;
- c) manageable impacts;
- d) mitigation possibility

The No Go Option was included in the assessment.

6.3 Description and assessment of issues and potential impacts

The sections which follow provide a summary of the findings of the assessment of potential impacts associated with the construction and operation of the proposed Wildealskloof Mixed Use Development. The assessment of potential issues presented in this chapter has involved key input from specialist consultants, the public and the project proponent. Issues were assessed in terms of the criteria detailed in section 6.1. The nature of the potential impact is discussed, and the significance is calculated with and without the implementation of mitigation measures. Recommendations are made regarding mitigation/enhancement and management measures for potentially significant impacts and the possibility of residual and cumulative impacts are noted.

6.3.1 Visual Impact Assessment:

6.3.1.1 Description of Visual Impacts

- The site is currently undeveloped, and clearing and development of the site, as well as lighting at night, will change its visual character, which may be perceived negatively particularly by observer's. Three observer groups are identified in the study area namely; residents, tourists and motorists. Residents and tourists are considered the most sensitive receptors. Residents from Mimosa Park S.H. and Ribblesdale are expected to experience the highest levels of visual exposure. Viewer incidence is however low due to the low population density. Affected tourists are identified as those visiting the nearby Sangiro Game Lodge and attractions at Tredenham Hill and Somerton Estate. A high viewer incidence is expected for motorists due to the high traffic volumes on the N1. Motorist`s exposure to the visual impacts will however be brief and therefore their sensitivity is considered low.
- Mitigation measures are however paramount to alleviate the anticipated impacts. Screen planting will yield the greatest result and should be planted along the perimeter of the development in the early stages to gain maturity as soon as possible. The development should also consider roof gardens as well as adopt a vision of "greening" to compensate for the loss of vegetation. These measures should form part of a master plan development during the design and implementation phases.
- No fatally flawed issues are identified on the bases of visual impacts, but serious consideration should be given to the IDP of Mangaung Metropolitan Municipality in order to adhere to town planning schemes etc.

6.3.1.2 Summary of impacts associated with the proposed Wildealskloof Mixed Use Development during the construction and operational phase

The two layout alternatives discussed in section 6.2 do not differ in any significant way as far as the impacts on the visual specialist is concerned. Therefore, there is no significant difference in the potential impacts associated with these alternatives, and the impacts for the two alternatives are not comparatively assessed in the assessment tables below. The impacts assessment tables below apply to Design Layout Alternative 1 and Design Layout Alternative 2.

Nature of impact Visual Impact Severity			
<p>Activity: The construction phase is expected to expand over an extensive period, presumably +20 years as the development will be implemented over several phases. This will concentrate construction in certain areas and not the whole site at once. The size of the construction area will depend on the phase to be developed. Bulk services may be implemented over the whole site in the initial phases. Heavy machinery, earth moving equipment and delivery trucks will be operational during the installation of bulk services. Building teams will start the construction of the infrastructure as required by the phase to be developed. The construction phase will introduce new elements to the visual environment that are uncharacteristic and in contrast with the existing rural landscape character. The existing vegetation cover will be removed and the underlying soil will be exposed due to earthworks. This may lead to unsightly scarring of the landscape and possible dust clouds may occur on windy days. Visual intrusion can be expected due to the unsightly construction activity and the negative interference on the views of the surrounding observers. Construction activities will gradually transfer into undeveloped phases until the development is complete.</p>			
Severity of impacts on observers (OB) and landscape character (LC)			
		Without mitigation	With mitigation
Construction phase			
Probability	OB	Highly probable (4)	Probable (3)
	LC	<i>Definite (5)</i>	<i>Definite (5)</i>
Duration	OB	Long term (4)	Medium term (3)
	LC	<i>Long term (4)</i>	<i>Long term (4)</i>
Extent	OB	Regional (3)	Local area (2)
	LC	<i>Local area(2)</i>	<i>Local area (2)</i>
Magnitude	OB	Medium (6)	Low (4)
	LC	<i>High (8)</i>	<i>Medium(6)</i>
Severity	OB	(52) Medium	(27) Low
	LC	(70) High	(60) Medium
Status	OB	Negative	Negative
	LC	<i>Negative</i>	<i>Negative</i>
Can impacts be mitigated?	Yes		
<p>Mitigation:</p> <ul style="list-style-type: none"> ▪ Keep the construction site neat and tidy at all times. Remove any waste from the site or contain it in an enclosed area out of sight from sensitive viewpoints. ▪ Implement dust suppression methods during the construction process. ▪ Screen construction activities where possible. Temporary screening can be provided via a temporary shade cloth or corrugated iron fence to limit visual exposure of surrounding observers. ▪ Plant perimeter trees during the construction phase in order to start with a program of vegetative screening. ▪ The introduction of open water bodies is a certain way of increasing the aesthetic value of the site. 			

The opportunity exists that storm water retention dams should be incorporated in the layout of the development to manage storm water effectively before being released into the Stinkhoutspruit. This is subject to a successful application for a water use license.

- Appoint Architects, Landscape Architects and/or Urban Designers to implement sound urban design principles and develop a masterplan for the area that is sensitive towards the environment. Implement principles to address, scale and proportion of spaces, responsiveness of these spaces in terms of its context, legibility of the user, variety to provide a rich experience, robustness of usage and creation of a unique identity. These are concepts promulgated by urban design theorists and should be further explored by a professional in the field.

Operational phase

Nature of impact: Due to the phased approach, some phases may be operational while others are still under construction. The completed development will have transformed the site into a large-scale urban node with new land uses ranging from residential, commercial, offices and industrial to name a few. This is in stark contrast to the current 587ha open grassland within a rural environment that plays a part in establishing a rural character and tranquil farming sense of place. The landscape character will experience a loss in open space, and will be replaced by an urban, mixed-use development. This transformation will cause a major change in the local landscape character and will impact on surrounding observer's views. Their views will be impacted due to the removal of familiar landscape attributes and the subsequent negative effects on the visual value and aesthetic quality of the visual resource.

Probability	OB	Definite (5)	Highly probable (4)
	<i>LC</i>	<i>Definite (5)</i>	<i>Definite(5)</i>
Duration	OB	Permanent (5)	Long term (4)
	<i>LC</i>	<i>Permanent (5)</i>	<i>Permanent (5)</i>
Extent	OB	Regional (3)	Local area (2)
	<i>LC</i>	<i>Local area (2)</i>	<i>Local area(2)</i>
Magnitude	OB	Medium (6)	Low (4)
	<i>LC</i>	<i>High(8)</i>	<i>Medium(6)</i>
Severity	OB	(70) High	(40) Medium
	<i>LC</i>	(75) High	(65) High
Status	OB	Negative	Negative
	<i>LC</i>	<i>Negative</i>	<i>Negative</i>
Reversibility	OB	Low	Medium
	<i>LC</i>	<i>Low</i>	<i>Low</i>
Irreplaceable loss of resources?			

OB	High	Medium
<i>LC</i>	<i>High</i>	<i>High</i>
Can impacts be mitigated: Yes,		
<p>Mitigation</p> <ul style="list-style-type: none"> ▪ Establish a philosophy that the development should be shrouded in vegetation and that more vegetation is visible than building facades, roofs, parking areas etc. Plant street trees and perimeter planting as soon as possible and appoint a horticulturist to guide on species. This will increase the screening capacity of the site from outside views. ▪ Encourage all future property owners in the development to “green” their properties by implementing an incentive scheme or subsidising such initiatives. ▪ Roof- and vertical gardens are relatively novel building features in South African architecture but have proven valuable on levels of urban ecology and micro-climatic control. Installation of such features will compensate for the loss in grassland and reinstate some ecological function. ▪ Maintain an architectural character that provides for green open spaces and corridors into the development. Approximately a quarter of the development is dedicated for open space but consider creative ways of enlarging this footprint. ▪ Avoid large bulky buildings with uninteresting facades. Instead, stagger and articulate the facades on horizontal and vertical planes to create shadow lines and to reduce the perceivable mass of the buildings. A mixed palette of building materials that are well designed to create unity within diversity will also create interesting and varied patterns. ▪ Avoid large open parking areas that are typically associated with shopping centres and offices. Consider basement parking for the majority of the facilities or introduce plenty of parking lot trees to minimise the visibility of hard surfaces. ▪ Avoid obtrusive lighting of the development. Obtrusive lighting, otherwise known as light pollution, can range from glare to light spillage that causes a nuisance to surrounding viewers. 		
Cumulative impacts: No risk of cumulative impacts as this is the only urban development in this context.		
<p>Residual Risks: Residual risks will occur if the development remains the size it is planned to be and building heights are kept as proposed. No remediation, compensation or enhancement mitigation will completely eliminate the visual and landscape impacts. An avoidance measure of relocating the development to another site will not cause any residual risks.</p>		
The No Go Alternative: A No Go Alternative will not change the status quo of the area.		

6.3.2.3 Comparative Assessment of layout Alternatives

In terms of impacts arising from Visual Nuisance a result of construction and operation activities, the impacts would be the similar for both **Layout Alternative 1** and **Layout Alternative 2**. No Option is preferred over the other in this regard from a Visual Perspective. Both Options will have the same impacts.

6.3.2 Heritage Impacts

6.3.2.1 Description of Heritage Impacts

During specialist investigations, it was found that the **Layout Alternative 2** would impact negatively upon the following heritage resources

- An existing informal burial place containing approximately 10 graves marked by stone cairns. Farm: Orlig 1710; Coordinates: S 29,02969, E 26,22727.
- A low density scatter (1/5m²) of MSA stone tools (blades and scrapers) and flakes was identified at the eastern foot of the hill located in the south-western corner of the study area. Farm: Orlig 1710; Coordinates: S 29,03001, E 26,22709
- At least twenty structures identified as sangars occur on the western side of the hill, with a few located on the eastern side. Farm: Orlig 1710; Coordinates: S 29,02997, 26,22577

See HIA in Appendix D-4 Volume 2 of this EIA Report.

Layout Alternative 2 has in its layout a Heavy Industrial land use where heritage resources are located.

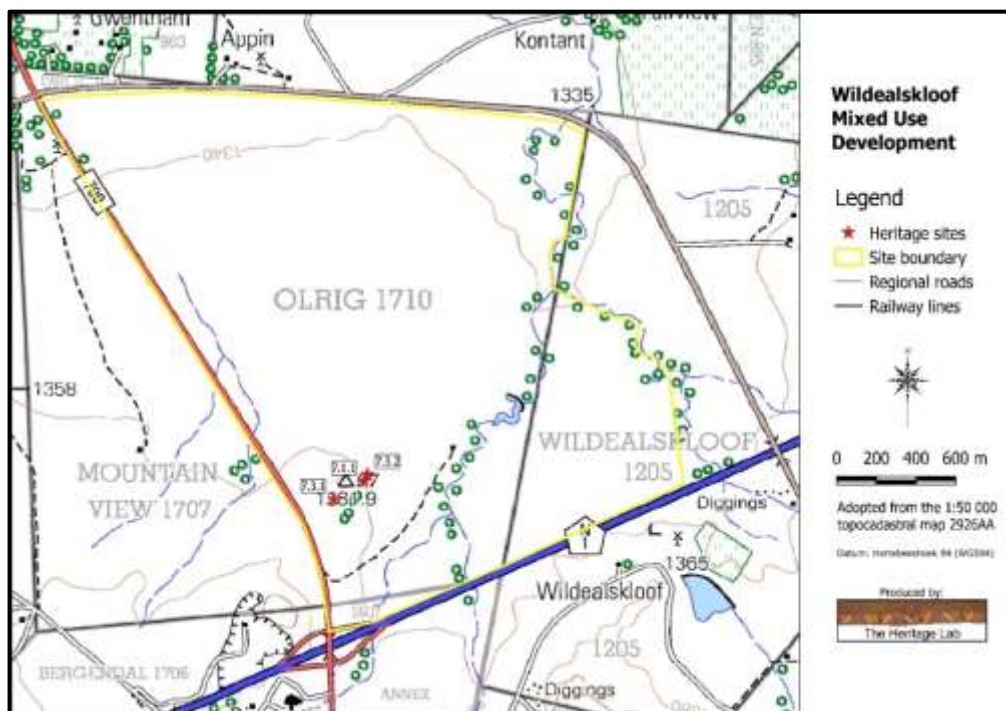


Figure 6-1: Location of heritage sites in the study area.

As mitigation of this impact, the **Layout Alternative 1** proposes the area of heritage site be reserved as a public open space/ conservation area to avoid and protect the various identified features (sangars and burial site) on and at the base of the hill in the south-western section of the study area (Please refer to conceptual layouts in Appendix B). No other heritage features were identified in the project area, but should any artefacts be discovered during site clearing, the prescribed procedures should be followed to avoid damage or disturbance thereof.

6.3.2.2 Summary of impacts associated with the proposed road during the construction and operational phase

Destruction/Alteration of Heritage artefacts or features - Layout Alternative 1		
Nature: Destruction of or damage of heritage features must be avoided.		
<ul style="list-style-type: none"> ▪ An existing informal burial place containing approximately 10 graves marked by stone cairns. (Farm: Olig 1710; Coordinates: S 29, 02969, E 26, 22727). ▪ A low density scatter (1/5m²) of MSA stone tools (blades and scrapers) and flakes was identified at the eastern foot of the hill located in the south-western corner of the study area. (Farm: Olig 1710; Coordinates: S 29, 03001, E 26, 22709). ▪ At least twenty structures identified as sangars occur on the western side of the hill, with a few located on the eastern side. (Farm: Olig 1710; Coordinates: S 29,02997, 26,22577) 		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
<i>Probability</i>	Improbable (2)	Highly improbable (1)
<i>Duration</i>	Short Duration (2)	Short Duration (2)
<i>Extent</i>	Limited to the region (3)	Limited to the Local Area (2)
<i>Magnitude</i>	Minor (2)	Minor (1)
<i>Significance</i>	14 (Low)	5 (Low)
<i>Status (positive or negative)</i>	Negative	Neutral
<i>Reversibility</i>	Moderate	High
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	
OPERATIONAL PHASE		
No further impact is expected during operation of the Wildealskloof mixed use development		
Mitigation:		
<ul style="list-style-type: none"> ▪ A site management plan should be developed to protect the various identified features (sangars and 		

<p>burial site) on and at the base of the hill in the south-western section of the study area. This should include, inter alia, <u>fencing off the area by creating a buffer zone of at least 50 metres calculated from the foot of the hill</u>; controlling access to the area; and informing residents and their visitors about the legal aspects regarding the destruction of the features or the removal of any artefacts from the site.</p> <ul style="list-style-type: none"> ▪ should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
<p>Cumulative impacts: None anticipated. There are no anticipated fatal flaws with regard the construction of the wildealskloof mixed use development with Layout Alternative 1 as this alternative was designed to avoid the heritage features (sangars, graves and MSA stone tools and flakes) found on site</p>
<p>Residual Risks: None anticipated provided that the mitigation measures are implemented.</p>
<p>No Go Alternative</p> <p>A No Go Alternative will not add to the destruction of any heritage resources within the area</p>

Destruction/Alteration of Heritage artefacts or features - Layout Alternative 2		
<p><i>Nature:</i> Destruction of or damage to heritage features must be avoided.</p> <ul style="list-style-type: none"> ▪ An existing informal burial place containing approximately 10 graves marked by stone cairns. Farm: Olrig 1710; Coordinates: S 29,02969, E 26,22727. ▪ A low density scatter (1/5m²) of MSA stone tools (blades and scrapers) and flakes was identified at the eastern foot of the hill located in the south-western corner of the study area. Farm: Olrig 1710; Coordinates: S 29,03001, E 26,22709 ▪ At least twenty structures identified as sangars occur on the western side of the hill, with a few located on the eastern side. Farm: Olrig 1710; Coordinates: S 29,02997, 26,22577 <p>The above heritage features all fall within this Layout Alternative 2 as a site earmarked for heavy industrial land use</p>		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
<i>Probability</i>	Definite (5)	Highly probable (4)
<i>Duration</i>	Medium-term (3)	Medium-term (3)
<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)
<i>Magnitude</i>	High (8)	Medium (6)
<i>Significance</i>	65 (High)	44 (Medium)
<i>Status (positive or negative)</i>	Negative	Neutral
<i>Reversibility</i>	Medium	High
<i>Irreplaceable loss of</i>	Low	Low

<i>resources?</i>		
<i>Can impacts be mitigated?</i>	Yes	
OPERATIONAL PHASE		
No further impact is expected during operation of the Wildealskloof Mixed Use Development		
<p>Mitigation:</p> <ul style="list-style-type: none"> ▪ A site management plan should be developed to protect the various identified features (sangars and burial site) on and at the base of the hill in the south-western section of the study area. This should include, inter alia, fencing off the area by creating a buffer zone of at least 50 metres calculated from the foot of the hill; controlling access to the area; and informing residents and their visitors about the legal aspects regarding the destruction of the features or the removal of any artefacts from the site ▪ No person may destroy damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site. ▪ Should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. <p><u>Relocation of graves</u></p> <ul style="list-style-type: none"> ▪ If the graves are younger than 60 years, an undertaker can be contracted to deal with the exhumation and reburial. This will include public participation, organising cemeteries, coffins, etc. They need permits and have their own requirements that must be adhered to. ▪ If the graves are older than 60 years old or of undetermined age, an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. This is a requirement by law. <p>Once it has been decided to relocate particular graves, the following steps should be taken:</p> <ul style="list-style-type: none"> ▪ Notices of the intention to relocate the graves need to be put up at the burial site for a period of 60 days. This should contain information where communities and family members can contact the developer/archaeologist/public-relations officer/undertaker. All information pertaining to the identification of the graves needs to be documented for the application of a SAHRA permit. The notices need to be in at least 3 languages, English, and two other languages. This is a requirement by law. ▪ Notices of the intention needs to be placed in at least two local newspapers and have the same information as the above point. This is a requirement by law. ▪ Local radio stations can also be used to try contact family members. This is not required by law, but is helpful in trying to contact family members. ▪ During this time (60 days) a suitable cemetery need to be identified close to the development area or otherwise one specified by the family of the deceased. 		

<ul style="list-style-type: none">▪ An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account. This is a requirement by law.▪ Once the 60 days has passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.▪ Once the permit has been received, the graves may be exhumed and relocated.▪ All headstones must be relocated with the graves as well as any items found in the grave.
<p>Cumulative impacts: Cumulative impact may result in permanent loss of heritage resources in the area. However the impact is assessed as low significance</p>
<p>Residual Risks: None anticipated provided that the mitigation measures are implemented.</p>
<p>No Go Alternative A No Go Alternative will not add to the destruction of any heritage resources within the area</p>

6.3.2.3 Comparative Assessment of layout Alternatives

In terms of impacts arising from destruction/alteration of **Heritage artefacts or features** a result of construction activities, the impacts would be the similar for **Layout Alternative 1** and **Layout Alternative 2** for the majority of the study site, apart from the fact that **Layout Alternative 2 would impact on the graves**. Therefore **Layout Alternative 1 is nominated as the preferred** alternative for the Wildealskloof Mixed Use Development.

6.3.4 Paleontological Impacts

6.3.4.1 Description of Paleontological Impacts

During a field survey of the development footprint, no fossiliferous outcrops were found. For this reason, a low paleontological sensitivity is allocated to the development footprint. Irrespective of the uncommon occurrence of fossils a solitary fossil may be of scientific value as many fossil taxa are known from a single fossil. The recording of fossils will expand our knowledge of the Paleontological Heritage of the development area. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the Wildealskloof mixed used development and associated infrastructure will be of a low significance in paleontological terms. There is no difference between the Layout Alternative 1 and Layout Alternative 2 and therefore they are assessed together below

<p>Nature: The excavations and clearing of vegetation during the construction phase will consist of digging into the superficial sediment cover as well as underlying deeper bedrock. These excavations will change the existing topography and may possibly disturb, destroy or permanently close-in fossils at or below the ground surface. These fossils will then be lost for research.</p>
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Impacts on Paleontological Heritage are likely to happen only within the construction phase. No impacts are expected to occur during the operation phase.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Local(1)	Local(1)
<i>Duration</i>	Long term/permanent (5)	Long term/permanent (5)
<i>Magnitude</i>	Minor (2)	Minor (1)
<i>Probability</i>	Improbable (1)	Improbable (1)
<i>Significance</i>	Low (8)	Low (7)
<i>Status (positive or negative)</i>	Negative	Neutral
<i>Reversibility</i>	Irreversible	Irreversible
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation: Not necessary</p> <p>The proposed footprint is underlain by sediments of the Volksrust Formation (Ecca Group, Karoo Supergroup) and the Adelaide Formation (Palingkloof Member) of the Beaufort Group (Karoo Supergroup). The Paleontological sensitivity of the Volksrust Formation is moderate while the paleontological sensitivity of the Adelaide Formation is very high. The lack of fossils at the proposed development footprint indicates that the impact of the development is of low significance in paleontological terms.</p> <p>Chance find Procedure</p> <ul style="list-style-type: none"> • When a chance find is made the person must instantly stop all work near the find. • The site must be secured to protect it from any additional damage • The finder of the fossil heritage must immediately report the find to his/her direct supervisor, according to the reporting protocols instituted by the Mine/development management. The supervisor must in turn report the find to his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant palaeontologist. • The ECO must appoint a relevant palaeontologist to investigate and access the chance find and site. • Both ECO and palaeontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find report, including records of all actions taken, persons involved and contacted, comments received and findings. • These documents will be necessary to request authorizations and permits from the relevant Authorities to continue with the work on site 		

- The reports and all other documents will be submitted to SAHRA by the palaeontologist.
- The report will include recommendations for additional specialist work if necessary, or request approval to continue with the development.
- Once the required approvals have been issued, the Mine/development may carry on with the development.
- The ECO will close off the chance find procedure and would be required to implement any requirements issued by the Authority and to add it to the operational management plan.

Residual Risk:

Loss of paleontological heritage if impacts are not avoided

No Go Alternative

A No Go Alternative will not change the status quo of the area

6.3.4.3 Comparative Assessment of layout Alternatives

In terms of impacts arising from Paleontological Impacts as a result of construction and operation activities, the impacts would be the similar for both **Layout Alternative 1** and **Layout Alternative 2**. No Option is preferred over the other in this regard from a Paleontological Perspective. Both Options will have the same impacts.

6.3.5 Impacts on traffic of existing roads

6.3.5.1 Description of traffic Impacts

During the development of the Wildealskloof Mixed-use Development the following activities will be undertaken which may result on traffic impact in the project area

Proposed road network upgrade – background traffic demand: Some road upgrade required to accommodate the current and future traffic demand on the road network.

- **Proposed road network upgrade** – latent land use rights traffic: Based on the analysis, the "latent rights" along with the proposed development will be responsible for road upgrade within the study area
- **Proposed road network upgrade** – development traffic: The proposed development will have to contribute proportional to the final road upgrades to be considered reasonable for the study area.
- **Access Arrangements:** Access to the study area will be provided from Road S1066 and Road R700.

- **Public Transport Assessments:** Limited public transport services are provided on Road R700 and Road S1066. Given the extent of the development and the demographics of the potential residents, substantial upgrades will be required.
- **Non-Motorized Transport Assessments:** No non-motorized transport facilities are provided on Road R700 and Road S1066 (abutting the site).

6.3.5.2. Summary of impacts associated with the proposed Wildealskloof Mixed use development during the construction and operational phase

The two layout alternatives options discussed in section 6.2 do not differ in any significant way as far as the impacts on the traffic is concerned. Therefore, there is no significant difference in the potential impacts associated with these alternatives, and the impacts for the two alternatives are not going to be assessed separately in the assessment tables below. The impacts assessment tables below apply to both Layout Alternative 1 and Layout Alternative 2

Traffic		
Nature: Traffic will be congested in the study area as a result of construction activities. In addition, traffic increase can lead to road damage, erosion, accidents and even traffic delays. Construction machinery and heavy vehicles are likely to generate dust which is likely to be perceptible by adjacent residents. Planned future external roads upgrades that have a realistic probability of construction will impact on local traffic. During operation, traffic circulation is expected to improve from the current situation.		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
<i>Probability</i>	Definite (5)	Probable (3)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Extent</i>	Limited to Local Area (2)	Limited to Site (1)
<i>Magnitude</i>	High (8)	Low (4)
<i>Significance</i>	70 (High)	27 (low),
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Low
<i>Irreplaceable loss of resources?</i>	Medium	Low
<i>Can impacts be mitigated?</i>	Yes	
Mitigation:		

- Vehicular movement of construction vehicles beyond the property boundaries of the site should be outside the am and pm peak hours.
- Where new access roads are required during the upgrade of external roads, they should disturb as limited an area as possible
- Areas demarcated as being out of bounds for construction personnel must be sign posted and must be regarded strictly as “no-go” areas. No contractor’s personnel, vehicles or machinery may access these areas. Very strict control must be exercised over this aspect of construction activities
- Ensure that the necessary signage and traffic measures are implemented for safe and convenient use for other motorist.
- Traffic marshals/officers must be appointed to assist with smooth movement of motorists during construction phase.
- Traffic informative signs must be posted on site warning of motorist of possible closure of some lanes and to consider alternatives routes or public transport.
- Signage on speed limit must be displayed on site.
- Measures must also be put in place to ensure that these access points do not get built up with mud or sand
- The construction of the external road upgrades discussed in Section 6 of the Traffic Impact Report the latent rights, as well as the development to contribute proportional to the upgrades.
- A road master plan is required for the study area to investigate additional link road from the south to support Road R700 and Road R30.
- The construction of the internal roads must be as shown on Mariteng Plan No.: 186-30-01 to 07 (Rev 0).

The following public transport facilities to be included in the final township layout:

- 2.0m paved sidewalks along both sides of all roads with a road reserve width of 20m or wider.
- 2.0m paved sidewalks along one side of all roads with a road reserve width of 16m.
- Provide taxi stops and pedestrian crossings at the school sites.
- Provide taxi stops along certain main internal township roads.
- Provide taxis stops along Road S1066, downstream of Intersection 11 (Whistling Tree Boulevard) and on Road R700, downstream of Intersection 12 (Wildeals Boulevard) and Intersection 13 (Industry Way).
- Provide raised pedestrian crossings along certain roads.
- Pedestrian loading/off loading facilities at the school sites.
- Investigate the provision of a taxi rank at the "Regional Shopping Centre on Erf 1977.

<p>The proposed township will be developed in twenty one (21) phases. A detailed public transport and sidewalk management plan should be prepared during each of the phases. The preliminary details are illustrated in Mariteng Plan No.: 186-30-01 to 07 (Rev 0) of the Traffic Impact Report.</p>		
OPERATIONAL PHASE		
<p>It is expected that residents may own a car/s, or use public transport for their daily commuting. During operations an increase in traffic in the high AM and PM peak hours can be expected from the development if proper traffic access control system were not properly implemented at construction phase. However impacts will be lesser than those of construction phase.</p>		
<i>Probability</i>	Probable (3)	Improbable (2)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Extent</i>	Limited to Site (1)	Limited to Site (1)
<i>Magnitude</i>	Medium (6)	Minor (2)
<i>Significance</i>	33 (Medium)	14 (Low)
<i>Status (positive or negative)</i>	Negative	Negative
<p>Mitigation:</p> <ul style="list-style-type: none"> • Ensure that the entry point to the development has a proper entry and exist system to avoid the backlog of traffic along Road S1066 which will provide direct access to site. • The proposed township will be developed in twenty one (21) phases. A detailed public transport and sidewalk management plan should be prepared during each of the phases. The preliminary details are illustrated in Mariteng Plan No.: 186-30-01 to 07 (Rev 0) of the Traffic Impact Report. 		
<p>Cumulative impacts: Expected to be moderate, should the recommended mitigation measures not be adequately implemented. Residents within close vicinity to the proposed infrastructure are expected to be affected.</p>		
<p>Residual Risks: None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.</p>		
<p>No Go Alternative</p> <p>A No Go Alternative will not change the status quo of the area.</p>		

6.3.5.2 Comparative Assessment of Layout Alternatives

In terms of impacts arising from traffic as a result of construction activities, there is **no significance difference** in the potential impacts associated with the two layout alternatives. The traffic impact will

be similar for both layout alternatives. Therefore, there is **no preference** between the two layout alternatives.

6.3.6 Soil and Agricultural Impacts

6.3.6.1 Description of agricultural Impacts

The following impacts are identified as the major impacts associated with the development and which are assessed, for the construction and operational phases of two layout alternatives

Loss of agricultural land Soils of the study site are predominantly fairly shallow, dark coloured, clay-rich soils on underlying rock, of the Arcadia, Milkwood and Bonheim soil forms, with some rock outcrops. The soil on site limit the rainfed crop production as they are high in clay content, with shrink-swell characteristics, limited depth and occurrence of rock outcrops. The very high clay content soils are limited in terms of their plant available moisture reservoir. The limited moisture reservoir, in combination with fairly low rainfall, makes the study area unsuitable for rain fed crop production. Insufficient water availability limits the potential for irrigation. There is only one impact of the development on agriculture, and that is the loss to agriculture of approximately 580 hectares of agriculturally zoned land due to rezoning and development of the site to a mixed use development. Once the land is lost to a mixed use development other impacts that could potentially impact agricultural land, such as erosion and changes to soil fertility become irrelevant because the land is no longer agricultural land.

6.3.6.2. Summary of impacts associated with the proposed Wildealskloof Mixed use development during the construction and operational phase

The two layout alternatives options discussed in section 6.2 do not differ in any significant way as far as the impacts on the agriculture is concerned. Therefore, there is no significant difference in the potential impacts associated with these alternatives, and the impacts for the two alternatives are not going to be assessed separately in the assessment tables below. The impacts assessment tables below apply to both Layout Alternative 1 and Layout Alternative 2.

Nature: Loss of agricultural land		
Caused by: change in land use across the entire site and having the effect of: a cessation of all agricultural production from the site.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		

Extent	Site specific (1)	No mitigation possible
Duration	Permanent (5)	
Magnitude	Low (4)	
Probability	Definite (5)	
Significance	Medium (50)	
Status	Negative	
Reversibility	Irreversible	
Irreplaceable loss of resources?	There is an irreplaceable loss of the agricultural production land across the site, but this is almost entirely grazing land, and therefore not of high agricultural value	
Can impacts be mitigated?	No	
<p>Cumulative impacts: The overall loss of agricultural land on the outskirts of Bloemfontein due to other developments. Agricultural land adjacent to urban areas is under inevitable pressure from development. In this case the low agricultural potential of the land, limits the significance of its loss to agriculture.</p>		
<p>Residual risks: No mitigation possible so same as impacts without mitigation</p>		
<p>OPERATIONAL PHASE</p> <p>Once the land is lost to a mixed use development during construction, no further impact is expected during operation of the Wildealskloof mixed use development because the land is no longer agricultural land.</p>		
<p>No Go Alternative</p> <p>A No Go Alternative will not change the status quo of the area. The baseline conditions will remain the same</p>		

6.3.6.2 Comparative Assessment of Layout Alternatives

In terms of impacts arising from traffic as a result of construction activities, there is **no difference** in the potential impacts associated with the two layout alternatives. The soil and agriculture impact will be similar for both alternatives. Therefore, there is **no preference** between the two layout alternatives.

6.3.7 Impacts on Avifauna

6.3.7.1 Description of avifauna Impacts

Impacts on Fauna: The main environmental concern regarding avifauna on site is with the following:

Loss of avifaunal habitat and ecological structure –The already disturbed avian grassland habitat will be lost in the areas cleared for all the developments proposed in the project. The impact can be reduced by avoiding any development on the eastern side of the stream as well as the rocky outcrop on the property. These proposed areas can be used as the conservation area on the property that will allow avian diversity to remain on the property. The wetland area was identified as a NO-GO area, direct and indirect impact on the area must be avoided at all cost. Additional habitat loss may occur during the construction phase on surrounding grasslands

Disturbance – construction activities during the development will cause disturbance to birds on the proposed property. This impact will be most severe if it affects breeding birds, and disturbance should be kept to a minimum. In conclusion, given the highly disturbed nature of the grassland on the western side of the property, the avifaunal impacts of the Wildealskloof Mixed Use Development will be of low severity, with relatively few mitigation measurements necessary

6.3.7.2 Summary of Avifauna impacts associated with the proposed Wildealskloof Mixed Use Development during the construction and operational phase

The two Layout alternatives discussed in section 6.2 do differ slightly with respect to impacts on the avifauna. The difference lies in the fact that Layout Alternative 1 has preserved the rocky outcrop which is one of the sensitive areas of avifauna and Layout Alternative 2 proposes a heavy industrial development on the sensitive outcrop area. The impacts for the two layout alternatives are therefore assessed separately as detailed below

Habitat loss- Layout Alternative 1		
<i>Nature:</i> Avian habitats will be lost in the areas cleared for the development. In the case of the Wildealskloof Mixed Use Development, this impact will be of low severity on the disturbed nature of the habitats on the property. Additional habitat loss may occur during the construction phase.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Limited to Site (2)	Limited to Site (2)
<i>Duration</i>	Medium term (3)	Medium term (3)
<i>Magnitude</i>	Moderate (7)	Moderate(6)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	48 Medium	33 Medium

<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Extent</i>	Limited to Site (1)	Limited to Site (1)
<i>Duration</i>	Long-term (4)	Long-term (4)
<i>Magnitude</i>	Moderate (6)	Low (5)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	44 (Medium)	30 (Medium)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Low
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	
Mitigation:		
<ul style="list-style-type: none"> • If possible reduce the number of developments on the eastern side of the stream to reduce the impact on the stream. • Minimise the impact on the stream and wetland area. • Minimise the disturbance to the rocky outcrop. • Minimise areas cleared for construction activities. These should be clearly demarcated, and personnel should be instructed to remain in the designated areas at all times. 		
Cumulative impacts: Will result in additional loss of natural habitat in an area that is already highly disturbed.		
Residual Risks: None anticipated provided that the mitigation measures are implemented correctly.		
No Go Alternative		
A No Go Alternative will not change the status quo of the area		

Disturbance- layout Alternative 1		
Nature: The presence of vehicles and personnel during construction will create disturbance for birds on the proposed site. This disturbance will be most likely manifested through increased stress levels modulated by the stress hormone corticosterone, with consequences for breeding success, immune function and foraging.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Limited to Site (2)	Limited to Site (2)
<i>Duration</i>	Long-term (2)	Short term (4)
<i>Magnitude</i>	Low (5)	Low (4)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	44 (Medium)	30 (Medium)

<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Extent</i>	Limited to Route (1)	Limited to Route (1)
<i>Duration</i>	Permanent (5)	Permanent (5)
<i>Magnitude</i>	Low (4)	Low (3)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	40 (Medium)	27 (Low)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate	Moderate
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	
Mitigation:		
<ul style="list-style-type: none"> The development will probably be done in different phases over several years. Hence, clearly for each phase of the development should be done outside the breeding season of most birds and when migrants are absent (winter months). Construction of the eastern side of the stream should use an alternative gate on the southern side of the property avoid crossing the stream during the construction. Construction workers must be instructed to minimise disturbance of birds at all times. Illegal hunting of birds must be strictly prevented Minimise the impact on the rocky outcrop 		
Cumulative impacts: Construction activities and the inhabitants of humans in their new homes on the property will increase the overall levels of human disturbance on the site.		
Residual Risks: None anticipated provided that the mitigation measures are implemented correctly.		
No Go Alternative		
A No Go Alternative will not change the status quo of the area		

Habitat loss- Layout Alternative 2		
<i>Nature:</i> Avian habitats will be lost in the areas cleared for the development. In the case of the Wildealskloof Mixed Use Development, this impact will be of low severity on the disturbed nature of the habitats on the property. Additional habitat loss may occur during the construction phase.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Limited to Site (2)	Limited to Site (2)
<i>Duration</i>	Medium term (3)	Medium term (3)

<i>Magnitude</i>	Moderate (8)	Moderate (7)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	52 (Medium)	36 (Medium)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Extent</i>	Limited to Site (1)	Limited to Site (1)
<i>Duration</i>	Long-term (4)	Long-term (4)
<i>Magnitude</i>	Moderate (7)	Moderate (6)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	48 (Medium)	33 (Medium)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Low
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	
Mitigation:		
<ul style="list-style-type: none"> • If possible reduce the number of developments on the eastern side of the stream to reduce the impact of the stream. • Minimise the impact on the stream and wetland area. • Minimise areas cleared for construction activities. These should be clearly demarcated, and personnel should be instructed to remain in the designated areas at all times. 		
Cumulative impacts: Will result in additional loss of natural habitat in an area that is already highly disturbed.		
Residual Risks: None anticipated provided that the mitigation measures are implemented correctly.		
No Go Alternative		
A No Go Alternative will not change the status quo of the area		

Disturbance- layout Alternative 2		
<i>Nature:</i> The presence of vehicles and personnel during construction will create disturbance for birds on the proposed site. This disturbance will be most likely manifested through increased stress levels modulated by the stress hormone corticosterone, with consequences for breeding success, immune function and foraging.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Limited to Site (2)	Limited to Site (2)
<i>Duration</i>	Long-term (4)	Short term (4)
<i>Magnitude</i>	Moderate (6)	Low (5)

Probability	Highly probable (4)	Probable (3)
Significance	48 (Medium)	33 (Medium)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Extent	Limited to Route (1)	Limited to Route (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (5)	Low (3)
Probability	Highly probable (4)	Probable (3)
Significance	44 (Medium)	30 (Medium)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • The development will probably be done in different phases over several years. Hence, clearly for each phase of the development should be done outside the breeding season of most birds and when migrants are absent (winter months). • An additional gate should be provided for the construction of the developments on the eastern side of the stream to reduce the impact on the stream. • Construction workers must be instructed to minimise disturbance of birds at all times. • Illegal hunting of birds must be strictly prevented 		
Cumulative impacts: Construction activities and the inhabitants of humans in their new homes on the property will increase the overall levels of human disturbance on the site.		
Residual Risks: None anticipated provided that the mitigation measures are implemented correctly.		
No Go Alternative		
A No Go Alternative will not change the status quo of the area		

6.3.7.3 Comparative Assessment of layout Alternatives

Two layout alternatives are considered for the project (section 6.2). When considering these layout alternatives from a avifauna perspective, the majority of the high avifauna sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both alternatives. As per Layout Alternative 1, the high avifauna sensitivity Low Rocky Hill and Rocky Grassland vegetation units are also included within a designated Open Space area, while development of these vegetation units are proposed in the Layout Alternative 2. Of the two layout alternatives considered, the Layout Alternative 1 is the preferred alternative from an avifauna perspective.

6.3.8 Impacts on Mammal & Herpetofaunal

6.3.8.1 Description of Mammal & Hepertofauna Impacts

Impacts on Fauna: The main environmental concern regarding Mammal & Hepertofauna on site is with the following:

- Destruction of natural and sensitive mammals & Hepertofauna habitat
- Loss of ecosystem function of wetlands
- Poaching of wildlife in the vicinity
- Reduction of natural migratory and faunal dispersal routes.
- Possible increase in exotic vegetation
- Displacement of indigenous mammals & vertebrates

6.3.8.2 Summary of Mammal & Hepertofauna impacts associated with the proposed Wildealskloof Mixed Use Development during the construction and operational phase

The two Layout alternatives discussed in section 6.2 do differ slightly with respect to impacts on the avifauna. The difference lies in the fact that Layout Alternative 1 has preserved the rocky outcrop which is one of the sensitive areas of avifauna and Layout Alternative 2 proposes a heavy industrial development on the sensitive outcrop area. The impacts for the two layout alternatives are therefore assessed separately as detailed below

Destruction of natural and sensitive mammals & Hepertofauna habitat		
<i>Nature:</i> Due to the nature of construction of such a development, much of the existing natural habitat will be destroyed. Heavy motor vehicle usage along the study site will expose the soils on the site to		
<i>ACTIVITY:</i> The source of this impact includes the compaction of soil, the removal of vegetation. This leads to certain species becoming proportionally rarer within local context.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Probability</i>	Definite (5)	Probable (3)
<i>Duration</i>	Long term (4)	Medium-term (3)
<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	60 (Medium)	27 (low)

<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Definite (5)	Probable (3)
<i>Duration</i>	Medium-term (3)	Medium-term (3)
<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	55 (Medium)	27 (low)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Low
<i>Irreplaceable loss of resources?</i>	High	Low
<i>Can impacts be mitigated?</i>	Yes	
Mitigation:		
<ol style="list-style-type: none"> 1. No construction should be done on or near the hill. 2. Restrict construction activities to the smallest possible area of development site. 3. Cordon off of the wetland to restrict the movement of construction vehicles and construction 		
Cumulative impacts: Construction and operational activities may result in cumulative impact to the natural habitat on the study site and even beyond. It is very imperative that effective protective measures should be put into place and monitored, especially sensitive areas. A rehabilitation plan should be put into action should any degradation be observed on natural areas.		
Residual Risks: Impacts on the natural and sensitive habitat are likely to be permanent unless rehabilitated.		

Loss of ecosystem function of wetlands		
Nature: Construction runs the risk of interfering with ecosystem function, such as reduction in water quality and dispersal, soil pollution or underground water contamination.		
ACTIVITY: The sources of this impact include the compaction of soil, the removal of vegetation, and surface water redirection during construction activities. Permanent changes to water flows during the operational phase are related to changes storm water flows		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Probability</i>	Definite (5)	Probable (3)
<i>Duration</i>	Long term (4)	Medium-term (3)
<i>Extent</i>	Regional (3)	Limited to Local Area (2)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	65 (high)	27 (low)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Definite (5)	Probable (3)

Duration	Medium-term (3)	Medium-term (3)
Extent	Regional (3)	Limited to Local Area (2)
Magnitude	Moderate (6)	Low (4)
Significance	60 (high)	27 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	High	Low
Can impacts be mitigated?	Yes	
Mitigation:		
<ol style="list-style-type: none"> 1. Effective storm water management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. 2. An environmentally friendly storm water design should be formulated based on empirical data showing how a neutral effect on the regional hydrograph will be achieved. 3. High energy storm water input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account during the design phase and mitigated effectively 		
Cumulative impacts: Construction and operational activities may result in cumulative impact to the water courses within the local catchments and beyond. It is very imperative that effective protective measures should be put into place and monitored. A rehabilitation plan should be put into action should any degradation be observed as a result from storm water or sediment input. Increases in storm water flows will definitely cause permanent degradation downstream unless mitigated at the design level.		
Residual Risks: Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.		

Poaching of wildlife in the vicinity		
Nature: The site is vulnerable to hunting/trapping by construction workers. Harassing and hunting by construction workers could be expected.		
ACTIVITY: The source of this impact includes the killing of wildlife for food or selling of live animals or parts of animals for the muti trade.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Definite (5)	Probable (3)
Duration	Medium-term (2)	Medium-term (2)
Extent	Limited to Local Area (2)	Limited to Local Area (2)
Magnitude	Moderate (5)	Low (3)
Significance	45 (high)	21 (low)
Status (positive or negative)	Negative	Negative

OPERATIONAL PHASE		
<i>Probability</i>	Probable (3)	Probable, but unlikely (2)
<i>Duration</i>	Medium-term (3)	Medium-term (3)
<i>Extent</i>	Limited to Local Area (3)	Limited to Local Area (2)
<i>Magnitude</i>	Low (6)	Low (3)
<i>Significance</i>	36 (Moderate)	16 (Low)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Low
<i>Irreplaceable loss of resources?</i>	High	Low
<i>Can impacts be mitigated?</i>	Yes	
Mitigation:		
1. Education of the construction staff about the value of wildlife and environmental sensitivity. 2. Restrict access to the suitable and sensitive habitats of faunal species. 3. The contractor/contractors must ensure that no animals are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.		
Cumulative impacts: Regular monitoring should be implemented during construction.		
Residual Risks: Impacts of poaching is mainly during the operational phase.		

Reduction of natural migratory and faunal dispersal routes.		
<i>Nature:</i> Changing the natural and seasonal local movement of mammals and Heperto fauna.		
ACTIVITY: The source of this impact includes the interruption of breeding and foraging area for frog species, the compaction of soil for burrowing and the removal of vegetation.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Probability</i>	Definite (5)	Probable (3)
<i>Duration</i>	Long term (4)	Medium-term (3)
<i>Extent</i>	Regional (3)	Limited to Local Area (2)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	65 (high)	27 (low)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Definite (5)	Probable (3)
<i>Duration</i>	Medium-term (3)	Medium-term (3)
<i>Extent</i>	Regional (3)	Limited to Local Area (2)
<i>Magnitude</i>	Moderate (6)	Low (4)

Significance	60 (Medium)	27 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	High	Low
Can impacts be mitigated?	Yes	
Mitigation:		
1. Ensure the maintenance of a proposed 30 metres buffer along drainage lines as primary dispersal corridor. 2. Ensure any crossing opportunities at roads (culverts, pipes and bridges) are designed to also facilitate		
Cumulative impacts: Construction and operational activities may result in cumulative impact to the traditional migration routes of mammals, reptiles and especially frogs on the study site and on adjacent properties. It is very imperative that effective protective measures should be put into place to protected wetlands and their buffer areas. The increases roads and traffic will definitely cause permanent disruptions of migration routes unless mitigation took place.		
Residual Risks: Impacts on migrations are likely to be permanent unless large green belts and buffer areas are implemented.		

Possible increase in exotic vegetation		
Nature: Introduction and spread of alien vegetation.		
Activity: The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before		
	Without mitigation	With mitigation
CONSTRUCTION		
Probability	Probable (3)	Probable (3)
Duration	Medium-term (3)	Short duration (2)
Extent	Regional (4)	Local (2)
Magnitude	Low (4)	Low (4)
Significance	33 (moderate)	24 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL		
Probability	Probable (3)	Possible (2)
Duration	Medium-term (3)	Medium-term (3)
Extent	Regional (4)	Limited to Local Area (2)
Magnitude	Low (4)	Low (4)
Significance	33 (moderate)	18 (low)
Status (positive or negative)	Negative	Negative

Reversibility	Low	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> • Implement an Alien Plant Control Plan • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish. • Rehabilitate or vegetate disturbed areas 		
<p>Cumulative impacts: Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.</p>		
<p>Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>		
<p>No Go Alternative</p> <p>A No Go Alternative will not change the status quo of the area</p>		

Displacement of indigenous mammals & vertebrates		
<p>Nature: The development will modify the natural habitat of various vertebrates. These species may no longer be able to find suitable habitat. The proposed development may lead to a decline in population numbers, but not to local extinction.</p>		
<p>ACTIVITY: The sources of this impact include the compaction of soil, the removal of vegetation and the pollution of wetlands.</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Definite (5)	Probable (3)
Duration	Long term (4)	Medium-term (3)
Extent	Limited to Local Area (2)	Limited to Local Area (2)
Magnitude	Moderate (6)	Low (4)
Significance	60 (Medium)	27 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Definite (5)	Probable (3)
Duration	Medium-term (3)	Medium-term (3)
Extent	Limited to Local Area (2)	Limited to Local Area (2)
Magnitude	Moderate (6)	Low (4)
Significance	55 (Medium)	27 (low)
Status (positive or negative)	Negative	Negative

<i>Reversibility</i>	Low	Low
<i>Irreplaceable loss of resources?</i>	High	Low
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
1. Maintenance of corridors should minimise losses and assist with any subsequent recolonization of the site.		
<i>Cumulative impacts:</i> Localised destruction of habitat of increased ecological sensitivity, such as the Low Rocky Hill, Rocky Grassland and Wetland and Riparian areas and associated buffer zones due to the encroachment of construction activities into these areas.		
<i>Residual Risks:</i> The biodiversity of species and the number of each species will decrease and that will affect food webs.		
<i>No Go Alternative</i>		
<i>A No Go Alternative will not change the status quo of the area</i>		

6.3.8.3 Comparative Assessment of layout Alternatives

The non-perennial river, the two non-perennial streams and the small depression pan wetland, as well as their buffer zones, should be considered as ecologically sensitive. The hill or kopje is also sensitive and must be excluded from any development due to unique habitats and the presence of many species, including the mountain reedbuck.

Two layout alternatives are considered for the project (section 6.2). When considering these layout alternatives from a Mammal & Hepertofauna perspective, the majority of the high avifauna sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both alternatives. The sensitive hill or kopje has been excluded from any development and instead included within a designated Open Space area with Layout Alternative 1, while development of these unique habitats are proposed in the Layout Alternative 2. Therefore of the two layout alternatives considered, the **Layout Alternative 1** is the preferred alternative from Mammal & Hepertofauna perspective.

6.3.9 Impacts on Vegetation

6.3.9.1 Description of Vegetation Impacts

Impacts on Flora: The vegetation was classified into five broad groups and assigned ecological sensitivity as described on the page overleaf.

Vegetation Unit	Score achieved	Floral Ecological Sensitivity	Development Implications
Low Rocky Hill vegetation unit	4.2	High	The biodiversity of this vegetation unit should be conserved with development and disturbance within these areas is strongly discouraged. Rehabilitation and eradication/ control of listed alien floral species within these areas must be considered.
Rocky Grassland vegetation unit	4.2	High	The biodiversity of this vegetation unit should be conserved as part of the development as far as possible and disturbance within these areas is strongly discouraged. Rehabilitation and eradication/ control of listed alien floral species within these areas must be considered.
Open Grassland vegetation unit	3.4	Intermediate	Development within this vegetation unit will not lead to a significant loss of floral biodiversity and habitat within the larger region; however it is recommended that partial conservation of selected intact grassland portions be incorporated into the open space areas planned as part of the mixed-use development. Edge effects within these areas must be strictly managed to avoid disturbance within adjacent natural habitat. Where provincially protected floral Species of Conservation Concern (SCC) fall within the developments, permits have to be obtained from the Free State Province Department of Economic Development, Tourism and Environmental Affairs (DETEA) for relocation of such species to similar suitable habitat within the boundaries of the study area.
Old Fields vegetation unit	2	Low	These areas should be optimised for development.
Wetland and Riparian vegetation unit	4.4	High	The biodiversity and ecological functioning of this vegetation unit should be conserved as part of the development and disturbance within these areas is strongly discouraged. Rehabilitation and eradication/ control of listed alien floral species within these areas must be considered.
Modified Grassland vegetation unit	1.6	Low	These areas should be optimised for development.

Potential impacts expected with the proposed development included the following

- (i) Loss of flora habitat (ii) Loss of floral species diversity and (iii) Loss of floral SCC.

6.3.9.2 Summary of impacts associated with the proposed Wildealskloof Mixed Use Development during the construction and operational phase.

The two Layout alternatives discussed in section 6.2 do not differ significantly from one another. The impacts for the two layout alternatives are therefore assessed together as detailed below.

Loss of floral habitat.		
Nature: Loss of floral habitat		
Loss of floral habitat may result from various activities during the construction and operational phases of the proposed development, including:		
<ul style="list-style-type: none"> • Clearing of vegetation for construction purposes. • Disturbance of soils leading to increased erosion. • Erosion as a result of infrastructure development and storm water runoff. • Localised destruction of habitat of increased ecological sensitivity, such as the Low Rocky Hill, Rocky Grassland and Wetland and Riparian areas and associated buffer zones due to the encroachment of construction activities into these areas. • An increase in alien and invasive floral species as a result of habitat disturbance. • Movement of construction and operational vehicles through sensitive habitat areas. • Compaction of soils due to vehicular movement. • Dust generation. • Littering and dumping of waste material outside of designated areas. • Landscaping activities may lead to altered floral habitat. • Ineffective rehabilitation of exposed and impacted areas and failure to implement alien floral control and eradication measures leading to on-going proliferation of alien species. • Compaction of soils reducing floral re-establishment success. • On-going disturbance within the study area and alteration of runoff patterns may lead to erosion and sedimentation of the Wetland and Riparian Habitat Unit. 		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Definite (5)	Highly probable (4)
Duration	Permanent (5)	Permanent (5)
Extent	Local area (2)	Site (1)
Magnitude	Very high (10)	High (8)
Significance	85 (High)	56 (Medium)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		

Probability	Highly probable (4)	Probable (3)
Duration	Long term (4)	Medium term (3)
Extent	Local Area (2)	Site (1)
Magnitude	Medium (6)	Low (4)
Significance	48 (Medium)	24 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	High	Medium
Can impacts be mitigated?	Yes	
Mitigation:		
<p>The following mitigation measures are proposed in order to limit or reduce the impact of the proposed project on floral habitat</p> <ul style="list-style-type: none"> • Areas of increased ecological importance and sensitivity (such as the low rocky hill, rocky grassland areas, wetlands and riparian areas and associated buffer zones) should be considered during the pre-construction and planning phases and development within these areas should be avoided and incorporated into the open space and conservation areas planned as part of the project. • As far as possible, portions of intact open grassland areas should also be conserved as part of the open space areas planned as part of the project. • Adequate open space and conservation areas, to include sensitive habitat areas identified, should be considered in the proposed project layout. • The amount of vegetation cleared should be limited to only what is required. • Site camps and other temporary infrastructure are to be placed within areas that have already been modified. • All sensitive areas and buffer zones in the vicinity of the development footprint should be clearly indicated on site and be off limits for construction vehicles and workers. • Construction vehicles should be restricted to travelling only on designated roadways, and as far as on existing roadways, to limit the ecological footprint of the proposed development activities. • Edge effects from construction activities, such as erosion and alien floral species proliferation and spread, should be managed throughout the development. • No littering or dumping of waste and construction material within natural areas to be excluded from the development footprint areas may be allowed. All excess material must be removed from the construction areas once works has been completed. • Alien plant proliferation within disturbed areas should be controlled through the implementation of an on-going monitoring and eradication programme for all invasive and weed plant species already growing within the study area and expected to be introduced to the study area during the development, with specific emphasis on Category 1b species. • Runoff and erosion prevention is to be implemented on any exposed slopes. • Any disturbed and compacted areas outside of the development footprint areas which is to form part of the planned open space areas must be ripped, reprofiled and vegetated with an indigenous grass 		

<p>species mixture upon completion of construction works. As far as possible, indigenous plants naturally growing within the region (refer to Appendix C) should be used for this purpose.</p> <ul style="list-style-type: none"> • As part of the landscaping for the mixed-use development it is recommended that an indigenous approach be implemented, which will also impact positively on management, water use and sustainability of the gardens? Such an approach will also ensure habitat provision for indigenous faunal species, such as birds. • In planning the project some connectivity with the surrounding natural areas and residential units could be considered. ▪ As part of the project, rehabilitation of sensitive habitat in terms of alien species control, ripping and vegetation of compacted areas, etc. is recommended. If executed successfully this will allow for the on-going habitat provision for both faunal and floral species.
<p>Cumulative impacts:</p> <p>Overall cumulative impacts as a result of the proposed project are considered to be high. This is due to the extensive footprint area of the study area and the possibility that the proposed development will lead to similar development being planned and implemented in the larger region. This could cumulatively lead to the loss of migratory and dispersal connectivity of both faunal and floral species, loss of support habitat for CBA areas, as well as further degradation of any intact Bloemfontein Dry Grassland that may occur in the area.</p>
<p>Residual Risks:</p> <p>Residual risks associated with the project are considered to be moderate. Such risks include ineffective rehabilitation leading to permanent habitat loss and the on-going proliferation of alien species once construction activities have been completed.</p>
<p>No Go Alternative</p> <p>A No Go Alternative will not change the status quo of the area</p>

<p>Nature: Loss of floral species diversity.</p>		
<p>Activity: Loss of floral species diversity may result from various activities during the construction and operational phases of the project, including:</p> <ul style="list-style-type: none"> • Clearing of vegetation. • Construction of infrastructure and access roads through areas of increased ecological sensitivity such as wetland areas and associated buffer zones. • An increase in alien and invasive floral species as a result of disturbance. • Erosion as a result of soil disturbance and inefficient storm water management. • Movement of construction and operational vehicles through floral communities of increased ecological sensitivity. • Compaction of soils due to vehicular movement. 		
	<p>Without mitigation</p>	<p>With mitigation</p>

CONSTRUCTION PHASE		
Probability	Definite (5)	Highly Probable (4)
Duration	Permanent (5)	Long term (4)
Extent	Local area (2)	Site (1)
Magnitude	Medium (6)	Medium (6)
Significance	65 (High)	44 (Medium)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (2)
Duration	Long term (4)	Medium term (3)
Extent	Local Area (2)	Site (1)
Magnitude	Moderate (6)	Low (4)
Significance	36 (Medium)	16 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	High	Medium
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • Areas of increased ecological importance and sensitivity (such as wetlands and associated buffer zones, the rocky hill and rocky grassland areas) should be considered during the planning and pre-construction phase and excluded from development as this will significantly lower floral diversity loss. In addition, it is recommended that selected intact grassland portions be conserved for this purpose and to allow for species dispersal across open space corridors. • The amount of vegetation cleared should be limited to what is absolutely necessary. • Infrastructure is to be placed outside of areas of increased ecological sensitivity such as wetland areas and associated buffer zones, the low rocky hill and rocky grassland areas. • All sensitive areas and buffer zones in the vicinity of the development footprint should be clearly indicated on site and be off limits for construction vehicles and workers. • Construction vehicles should be restricted to travelling only on designated roadway, and as far as possible existing roadways, to limit the ecological footprint of the proposed development activities. • Edge effects from construction activities should be managed throughout the development. • No littering or dumping of waste and construction material may be allowed. All excess material must be removed from the construction areas once works has been completed. • Alien plant proliferation within disturbed areas should be controlled through the implementation 		

of an alien and invasive species management plan.

- Disturbed and compacted areas must be ripped, reprofiled and vegetated with an indigenous grass species mixture, specific to the relevant vegetation type, upon completion of construction works.
- Provincially protected as well as other indigenous bulbous species and geophytes should be rescued and relocated to open space areas within the development to reduce diversity loss. A walkthrough prior to construction by the suitably qualified botanist is recommended to identify these species.
- As part of the landscaping of the proposed development, a high diversity of locally indigenous flora, such as relocated species rescued from the development footprint, could be reintroduced into communal open space areas, as part of residential gardens and as part of wetland rehabilitation activities.

Cumulative impacts:

Overall cumulative impacts as a result of the proposed project are considered to be low. Cumulative impacts may include the combined impact of various similar developments in the area. Cumulative impacts may include the cumulative loss of floral species diversity within the larger region. The disturbance of large areas of natural vegetation in the region may contribute towards increased alien plant species proliferation, as well as bush encroachment in the region.

Residual Risks:

Residual risks include the permanent loss of and altered floral species diversity within the vicinity of the proposed infrastructure and surrounds as a result of ineffective or lack of rehabilitation activities where disturbance has occurred.

No Go Alternative

A No Go Alternative will not change the status quo of the area

Nature: Loss of floral Species of Conservation Concern.

Activity:

Loss of potential floral SCC may result from various activities during the construction and operational phases of the project, including:

- Site clearance and removal of vegetation leading to a direct loss of confirmed floral SCC, potential floral SCC and medicinal species, including the fragmentation of potential floral SCC populations.
- Construction of infrastructure and access roads through sensitive habitat leading to a loss of potential floral SCC and medicinal species.
- Removal or collection of medicinal/ protected floral species from the study area and surrounds.
- Vehicular movement beyond existing access roads and the designated development footprint area and ineffective management of edge effects leading to impacts on potential floral SCC.
- Poor management of edge effects leading to impacts on potential floral SCC.

	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Highly probable (5)	Probable (3)
Duration	Permanent (5)	Permanent (5)
Extent	Local area (2)	Site (1)
Magnitude	High (8)	High (8)
Significance	75 (High)	39 (Medium)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (2)
Duration	Permanent (5)	Long term (4)
Extent	Local Area (2)	Site (1)
Magnitude	Medium (6)	Medium (6)
Significance	36 (Medium)	22 (Low)
Status (positive or negative)	Negative	Negative
Reversibility		
Reversibility	Low	Low
Irreplaceable loss of resources?		
Irreplaceable loss of resources?	High	Medium
Can impacts be mitigated?		
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • During the surveying and site-pegging phase of surface infrastructure, any floral SCC that may be potentially affected by surface infrastructure must be marked and where possible, relocated to suitable habitat surrounding the disturbance footprint. Relevant permits must be applied for from the Free State DETEA, if required, prior to the construction phase. • In line with Eko Environmental (2016), the following is recommended: ‘It is recommended that a walkthrough of the site be done prior to construction to mark and map all protected plants on the site. Following this transplanting of succulent and bulb species should be done adequately and establishment overseen by an ecologist or person with suitable qualifications. These species should be transplanted to areas excluded from development’. • Floral SCC encountered within the study area may also be conserved <i>in situ</i> and within open space areas planned as part of the proposed development. • Should any floral SCC not encountered during the field assessment be noted within the study area, these species should be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist. • Floral SCC are to be handled with care and the relocation of these plant species to nearby suitable similar habitat is to be overseen by a suitably qualified botanist. • No collection of floral SCC or medicinal floral species must be allowed by construction personnel or during the operational phase of the project. • Edge effect control needs to be implemented to ensure no further degradation and potential loss of 		

floral SCC outside of the proposed project footprint area. <ul style="list-style-type: none">• It must be ensured that operational activities are kept strictly within the development footprint.
Cumulative impacts: A high number of provincial floral SCC is known to occur in the larger region. Transformation and further loss of habitat within the area may result in such species facing extinction.
Residual Risks: Should floral SCC be impacted or destroyed during the development process, loss of such species within the study area is likely to be permanent.
No Go Alternative A No Go Alternative will not change the status quo of the area

6.3.9.3 Comparative Assessment of layout Alternatives

Two layout alternatives are considered for the project (Section 6.2). When considering these layout alternatives from a floral perspective, the majority of the high floral sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both alternatives. The high floral sensitivity Low Rocky Hill and Rocky Grassland vegetation units are also included within a designated Open Space area, while development of these vegetation units is proposed in the Layout Alternative 2. Of the two layout alternatives considered, the *layout alternative 1* is the preferred alternative from a floral perspective.

6.3.10 Impact on Wetlands and River courses:

6.3.10.1 Description of Impacts on Wetlands and River courses:

Four watercourses were recorded on the study site. The watercourses can be classified as one non-perennial ephemeral river, two non-perennial episodic streams (drainage lines) and one very small depressional pan wetland. Construction may lead to some direct or indirect loss of or damage to seasonal wetlands or drainage lines.

Broad potential impacts that may be associated with the proposed development include:

- Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow or increasing flood flows
- Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount)

- Introduction and spread of alien vegetation
- Loss and disturbance of watercourse habitat and fringe vegetation.
- Changes in water quality due to pollution.
- Changing the physical structure within a water resource (habitat) including its associated buffer zone

Cumulative Impacts -Cumulative impacts are anticipated (mostly at the wetland floodplain) and are discussed in the impact tables

6.3.10.2. Summary of impacts associated with the proposed Wildealskloof Mixed Use Development during the construction and operational phase.

The two design layout alternatives discussed in section 6.2 do not differ in any significant way as far as the impacts on the wetland is concerned. There is therefore, no difference in the potential impacts associated with these alternatives as the majority of the Wetland found on site are included as part of a Public Open Space area within both layout alternatives. In this regard, the impacts for both Layout alternative 1 and Layout alternative 2. are similar and therefore assessed together within the wetland impacts assessment tables below.

Changes in water flow regime		
<i>Nature:</i> Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow or increasing flood flows		
<i>ACTIVITY:</i> The source of this impact includes the compaction of soil, the removal of vegetation, and surface water redirection during construction activities. Permanent changes to water flows during the operational phase are related to changed storm water flows, discharge from the WWTW and changes resulting from the attenuation structures		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Probability</i>	Definite (5)	Highly Probable (4)
<i>Duration</i>	Long term (4)	Medium-term (3)
<i>Extent</i>	Regional (3)	Limited to Local Area (2)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Significance</i>	65 (High)	44 (Medium)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Definite (5)	Highly Probable (4)
<i>Duration</i>	Medium-term (3)	Medium-term (3)
<i>Extent</i>	Regional (3)	Limited to Local Area (2)
<i>Magnitude</i>	Moderate (6)	Moderate (6)

Significance	60 (Medium)	44 (Medium)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of	High	Low
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • Effective storm water management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. • An environmentally friendly storm water design should be formulated based on empirical data showing how a neutral effect on the regional hydrograph will be achieved. • High energy storm water input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account during the design phase and mitigated effectively • Implement the principles set out in The South African Guidelines for Sustainable Drainage Systems (SuDS) (Armitage <i>et al</i>, 2013) 		
Cumulative impacts: Construction and operational activities may result in cumulative impact to the water courses within the local catchments and beyond. These impacts include local and downstream erosion, sedimentation and canalization of watercourses. It is imperative that effective protective measures should be put into place and their efficiency monitored. A rehabilitation plan should be put into action should any degradation be observed as a result from water discharge or sediment input. Increases in storm water flows		
Residual Risks: Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.		
No Go Alternative		
A No Go Alternative will not change the status quo of the area		

Nature: Introduction and spread of alien vegetation.		
Activity: The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plans can easily colonise and impact on downstream users.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Probable (3)	Probable (3)
Duration	Medium-term (3)	Short duration (2)
Extent	Regional (4)	Local (2)

<i>Magnitude</i>	Low (4)	Low (4)
<i>Significance</i>	33 (Medium)	24 (low)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Probable (3)	Possible (2)
<i>Duration</i>	Medium-term (3)	Medium-term (3)
<i>Extent</i>	Regional (4)	Limited to Local Area (2)
<i>Magnitude</i>	Low (4)	Low (4)
<i>Significance</i>	33 (Medium)	18 (low)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Moderate
<i>Irreplaceable loss of</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> • Implement an Alien Plant Control Plan • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards. • Monitor the establishment of alien invasive species within the areas affected by the construction and 		
<p>Cumulative impacts: Regional increase in the density and composition of alien invasive plants. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.</p>		
<p>Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>		
<p>No Go Alternative</p> <p>A No Go Alternative will not change the status quo of the area</p>		

Nature: Loss and disturbance of watercourse habitat and fringe vegetation.		
<i>Activity:</i> Direct development within watercourse areas, including crossings and the construction of attenuation structures in the stream channel and the construction of discharge points.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Probability</i>	Definite (5)	Definite (5)
<i>Duration</i>	Medium-term (3)	Short term (2)
<i>Extent</i>	Regional (2)	Local Area (2)
<i>Magnitude</i>	High (8)	Low (4)
<i>Significance</i>	65 (high)	40 (Medium)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Probable (3)	Possible (2)

<i>Duration</i>	Medium-term (3)	Short-term (2)
<i>Extent</i>	Local Area (2)	Local Area (2)
<i>Magnitude</i>	High (8)	Low (4)
<i>Significance</i>	39 (Medium)	16 (Low)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Moderate
<i>Irreplaceable loss of</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	
Mitigation:		
<ul style="list-style-type: none"> • Where construction occurs in the demarcated watercourse and buffer, extra precautions should be implemented to so as to minimize habitat loss. • Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse or associated buffer zones. • Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas • Weed control in buffer zone • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. • Monitor the establishment of alien invasive species within the areas affected by the construction and 		
Cumulative impacts: Expected to be moderate and include the loss of specialized habitat.		
Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.		
No Go Alternative		
A No Go Alternative means the status quo/baseline conditions of the site will remain the same		

Nature: Changes in water quality due to pollution.		
<i>Activity:</i> Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/ivers and a reduction in watercourse function as well as human and animal waste.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Probability</i>	Probable (3)	Possible(2)
<i>Duration</i>	Medium-term (3)	Medium-term (3)
<i>Extent</i>	Regional (3)	Local Area (2)
<i>Magnitude</i>	High (8)	Low (4)
<i>Significance</i>	42 (Medium)	18 (Low)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Duration</i>	Medium-term (3)	Short-term (2)
<i>Extent</i>	Local Area (2)	Local Area (2)
<i>Magnitude</i>	High (8)	Low (4)
<i>Significance</i>	52 (Medium)	24 (low)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Moderate
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone. • Implementation of appropriate storm water management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse. • The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. • Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer. • Maintenance of buffer zones to trap sediments with associated toxins • Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects. • Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse • Ensure that no operational activities impact on the watercourse or buffer area. This includes edge 		
<i>Cumulative impacts:</i> Expected to be moderate and includes a regional decrease in water quality. Once in the system it may take many years for some toxins to be eradicated.		

Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary. Littering and failure of services during the operation phase of the development should particularly be addressed.

No Go Alternative

A No Go Alternative means the status quo/baseline conditions of the site will remain the same

6.3.10.3 Comparative Assessment of Layout Alternatives

In terms of impacts arising from wetland as a result of construction and operation activities, there is **no difference** in the potential impacts associated with the two layout alternatives. The wetland impact will be similar for both alternatives. Therefore, there is **no preference** between the two layout alternatives from a wetland perspective.

6.3.11 Impact on the Social Environment

6.3.11.1 Description of Impacts on the Social Environment

Broad potential impacts that may be associated with the proposed development during the construction phase include the following

1. Population Change
2. Inflow of temporary workers
3. Influx of jobseekers
4. Employment opportunities
5. Impact on Land Use
6. Impact on sense of place
7. Safety and Security Risks
8. Health Risks
9. Impact on housing
10. Infrastructure and Services
11. Intrusion Impacts

6.3.10.2 Summary of impacts associated with the proposed Wildealskloof Mixed Use Development during the construction and operational phase.

The two design layout alternatives discussed in section 6.2 do not differ in any significant way as far as the impacts on the social environment is concerned. There is therefore, no difference in the potential impacts associated with these alternatives. In this regard, the impacts for both Layout

alternative 1 and Layout alternative 2 are therefore assessed together within the social impacts assessment tables below.

Please note that the impact tables are are slightly different from the tables used in this report, under social economic the impacts are assessed as per each phase of the development in separate tables due to different identified activities at each phase of the development and different mitigations measures.

Nature: Population Change		
<p>Activity: Population change during the construction phase refers to the number of workers that would have a temporary impact on the local population size, density and demographic profile.</p> <p>At this stage the number of individuals that could be employed during the construction phases of the project total approximately 3 000 individuals. All of these would thus not be permanently on site which would result in a temporary population change of varying intensity during the different construction phases.</p> <p>The intensity of the impact is difficult to determine as it is not known how the phases of the development would interlink and how many of these construction workers would be from elsewhere (outside the municipal boundaries) and who would be sourced locally (within the boundaries of the MMM). If all individuals would be from outside the MMM, it could result in some population increase in the Bloemfontein area, especially within Ward 44 (approximately 15.8% population increase in the Ward) during the construction phase (estimated at ± 10 years or more). It is however anticipated that some of the workforce would be locally sourced which would lessen this temporary negative impact.</p> <p>The presence of these construction workers and the impact on the existing nearby residents should be considered with the likelihood of residents starting to occupy some of the residential units developed as part of the different phases of the mixed housing development. The population increase could thus be even higher.</p> <p>Negative impacts mainly relate to additional pressure on health, educational, and community services, impact on daily living and movement patterns of existing residents and so forth. These impacts would be further discussed in the document. The proposed site is not occupied at the moment and therefore one of the main concerns for the neighbouring residents would be the increased risk in community safety and criminal activities, as a result of the increase in people movement.</p> <p>The process with regards to the population change should be guided by a code of conduct for the workforce and the inflow of jobseekers must be controlled. If not successful, severe negative impacts on the resident population within the area (e.g. Mimosa Park Agricultural Holdings) are anticipated.</p> <p>The positive impact associated with an increase in the population size during the relative long construction phase relate to the increase in buying power. Local retail centres and on-site informal traders would definitely be able to benefit from this situation.</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		

<i>Extent</i>	Local (3)	Local (3)
<i>Duration</i>	Medium Term (3)	Medium Term (3)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Definite (5)	Highly Probable (4)
<i>Significance</i>	Medium (60)	Medium (48)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate: Impact can be reversed	Moderate: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	High	High
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • Local labourers should be employed where possible to limit unnecessary temporary increase in the local population. • Construction workers falling within the medium skilled to lower skilled category to avoid possible conflict arising between locals and an outside workforce (e.g. workers from Gauteng). • Introduce contractual obligations for contractors to use local labour as far as possible. • Labourers should remain at their existing residences. No workers should thus be accommodated on site at night. The erection of a construction camp where workers would be housed would not be recommended. • Before construction commences, representatives from the MMM, other community leaders (e.g. councillors) and as well as management structures of the security villages and complexes, as well as representatives of the residential areas should be informed of the details of the contractors, size of the workforce and construction schedules. • The contractor should make certain that the workforce carry identification tags or uniforms to be easily identifiable. It should furthermore be ensured that the inflow of workers and their presence in the local communities do not create conflict in the surrounding communities. • Local community organisations and policing forums / neighbourhood watches must be informed of the presence of the workforce (where relevant). 		
<p>Cumulative impacts:</p>		

<ul style="list-style-type: none"> • Construction workers remaining in the larger area once this development has been completed. • Possible increased impacts on service delivery and infrastructure due to the pressure of additional individuals within the area although only temporary • Possible increased medium-term buying power • Possible cumulative intrusion impacts due to other mixed use and residential developments planned in the Bloemfontein area
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Construction workers remaining in the larger area once this development has been completed.
<p>No Go Alternative</p> <p>A No Go Alternative means the status quo/baseline conditions of the site will remain the same</p>

Nature.Inflow of Temporary Workers		
<p>Activity</p> <ul style="list-style-type: none"> • The construction phase is expected to last approximately ten (10) years or longer (depending on the phasing) and would result in the employment of various individuals. At this stage estimations are that the cumulative number of job opportunities over the entire construction period would total 3 000 opportunities. • It is however difficult to determine the composition of the workers not sourced locally as well as the number of construction workers and contractors that could be hired from within the local community. Irrespective of where the workers would be sourced, the presence of the temporary workforce and individuals searching for work during the construction phase would result in different intrusion impacts. Due to the movement and conduct of workers on and off site within an area with a current low population density, the impacts anticipated include noise creation, littering, safety and security risks, general misconduct as well as possible conflict between outside workers and the local population. The anticipated impacts would be more intense during the peak construction period but could still materialise in the long term. 		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Extent	Regional (5)	Local (3)
Duration	Medium Term (3)	Medium Term (3)

<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Definite (5)	Highly Probable (4)
<i>Significance</i>	High (70)	Medium (48)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate: Impact can be reversed	Low: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Moderate	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • A construction project of this size would usually make use of large established contractors with their own teams of workers, but the use of local labour and contractors must be maximised where possible. • Construction workers falling within the semi-skilled to unskilled category should be sourced from the local population within the MMM, where possible, to avoid conflict arising between locals and the outside workforce, but also to limit the need for any temporary accommodation facilities • Develop a strategy to involve local labour in the construction process e.g. communicate the construction requirements through the local leaderships such as the ward councillors, residents associations and representatives of the MMM, and advertise in the local newspapers in the local languages. • If the majority of the construction workers could be sourced locally it would immediately lessen the negative impacts associated with a medium-term inflow of workers. • An awareness/communication campaign with regards to the appointment of contractors should be launched to ensure transparency and an understanding among the community members of the process followed. • Unrealistic employment expectations should not be created. • Specify the conduct of contract workers in worker related management plans and employment contracts. • Workers should be transported to site on a daily basis. Preferably, from a social perspective an accommodation facility should not be constructed on site. If this cannot be avoided, the contractors should ensure that “outside” workers reside in suitable facilities to avoid the establishment of informal houses and illegal sub-letting. • Construction workers should be supervised at all times. • Construction activities should be kept to normal working hours e.g. from 7 am until 5 pm during weekdays. 		

- Property owners surrounding the construction areas should be informed of the construction schedules and activities.
- Security on-site should be present for the entire duration of the construction period
- Possible environmental pollution due to the localised increase in the population figures should be attended to through sound environmental management of the construction site.
- Conflict between outsiders and the local communities should not be excluded.
- As far as possible, the movement of construction workers during operational hours should be confined to the work site to avoid any potential negative impact on the neighbouring property owners' daily living and movement patterns.
- Construction workers should be easily identified as part of the construction team by e.g. wearing specific clothing and/or identity tags.
- Criminal incidents should be communicated to the local SAPS.
- The development of informal vending "stations" where food and small goods are sold should be properly managed, to avoid littering, safety risks and possible environmental pollution

Cumulative impacts:

- Construction workers remaining in the larger area once this development has been completed.
- Possible increased impacts on service delivery and infrastructure due to the pressure of additional individuals within the area although only temporary
- Possible increased medium-term buying power
- Possible cumulative intrusion impacts due to other mixed use and residential developments planned in the Bloemfontein area

Residual Risks:

Construction workers remaining in the larger area once this development has been completed.

No Go Alternative

A No Go Alternative means the status quo/baseline conditions of the site will remain the same e

Nature: Inflow of Jobseekers		
<p>Activity: Apart from the inflow of workers, another aspect that could have an impact on the social environment during the construction phase, that should be considered, is the expected inflow of ‘out of the area’ and ‘local’ jobseekers. The proposed Wildealskloof site is located within a low density area. An inflow of jobseekers would have a definite intrusion impact on the rural area and surrounds.</p> <p>Due to the following factors, the presence of jobseekers at the construction site would be highly probable:</p> <ul style="list-style-type: none"> ○ The length of the construction period; ○ The site is in close proximity to settlements with high population densities; ○ The level of socio-economic development and low-income levels of communities in and around Bloemfontein e.g. Mangaung, Botshabelo, Thaba N’chu, Soutpan (Ikgomotseng), Verkeerdevlei (Tshepong), Brandfort (Majwemasheu), Reddersburg (Matoporong), Edenburg (Ha-Rasebei), Dealesville (Tswaraganang) and so forth; ○ The site is located adjacent main routes and thus easily accessible; ○ The high unemployment rate among the youth in the area; ○ The existing in-migration of individuals to the Bloemfontein area in search of employment and land to stay. 		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Local (4)	Local (3)
<i>Duration</i>	Medium Term (3)	Medium Term (3)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	Medium (52)	Medium (36)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate: Impact can be reversed	Low: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Moderate	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process. • The development, publication and widespread dissemination of a recruitment policy could serve to 		

encourage local employment and reduce the potential influx of jobseekers to the area.

- The communication strategy should ensure that unrealistic employment expectations are not created.
- The establishment of a labour desk to deal with jobseekers could be investigated.
- No temporary workers should be employed from jobseekers gathering at the construction site.
- The lower skilled and medium skilled positions should be filled by permanent residents from the surrounding areas where possible. Proof of residence should be provided when applying for jobs.
- The applicant and contractors should ensure a fair and transparent recruiting process to limit the potential for conflict between locals in search of employment.

Cumulative impacts:

- Possible permanent settlement of job seekers in the area with associated cumulative impacts
- Possible increased inflow of large numbers of jobseekers and jobseekers being unsuccessful in obtaining employment at this project
- Sub-letting of properties or rooms (backyard shacks) could increase due to the influx of jobseekers putting more pressure on the land available and on the existing infrastructure
- Possible cumulative impacts due to other mixed use and residential developments planned in the Bloemfontein area

Residual Risks:

- Possible permanent settlement of job seekers in the area once this development has been completed.

No Go Alternative

A No Go Alternative means the status quo/baseline conditions of the site will remain the same

Nature: Employment Opportunities and Local Procurement		
<p>Activity: This aspect refers to the extent to which employment opportunities emerging from the proposed project match the job skills of the unemployed in the area, as well as to the creation of new job opportunities. (Also refer to the Economic Impact Assessment in this regard).</p> <p>The total number of job opportunities over the entire construction period of approximately 10 years would be approximately 3 000 opportunities. It should, however, be noted that some jobs would roll over from previous phases and that the phases would overlap to some extent. The majority of these jobs would fall within the lower skilled category (approximately 2 800), with approximately 50 jobs within the higher skilled category (workers with tertiary academic qualifications) and 150 jobs within the medium skilled category (workers with technical qualifications up to grade 12).</p> <p>The majority of employment opportunities created by the construction activities would thus involve unskilled and semi-skilled labour (e.g. bricklayers, plasterers, painters, electricians, plumbers, carpenters and sheet metal workers and so forth) with some skilled (site supervision) and highly skilled categories (engineers, quantity surveyors etc.).</p> <p>It is thus likely that the proposed project could result in positive economic impacts for locals within the medium and lower skilled categories, as well as result in indirect benefits for the larger population. The creation of employment among the local community members of Ward 44 and Mangaung, as well as areas nearby Bloemfontein such as Botshabelo, Thaba N’chu, Soutpan (Ikgomotseng), Verkeerdevlei (Tshepong), Brandfort (Majwemasheu), Reddersburg (Matoporong), Edenburg (Ha-Rasebei), Dealesville (Tswaraganang) and so forth is critical.</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Extent	Local (3)	Regional (5)
Duration	Medium Term (3)	Medium Term (3)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)
Significance	Medium (30) (+)	Medium (56) (+)
Status (positive or negative)	Positive	Positive
Reversibility	Moderate: Impact can be reversed	Moderate: Impact can be reversed
Irreplaceable loss of resources?	Low	Low

<i>Can impacts be enhanced?</i>	Yes	Yes
<p>Enhancement:</p> <ul style="list-style-type: none"> • Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process. • The development, publication and widespread dissemination of a recruitment policy could serve to encourage local employment and reduce the potential influx of jobseekers to the area. • The communication strategy should ensure that unrealistic employment expectations are not created. • It is recommended that local individuals applying for work should submit their Curriculum Vitae (CV's) through local community structures. Some proof of residence should be attached • The development of skills and the creation of opportunities to obtain experience through the build-up phase are of critical importance to ensure that the medium and lower skilled positions can be filled from local individuals. • If feasible undertake a skills audit of an available workforce within the closest communities) including the assistance of the local councilors and other representative community structures (e.g. the residents associations) in the process. • To ensure a positive impact among locals within the medium and lower skilled categories would require some training programmes to start once the project has received a positive environmental authorisation and/or continue with on-site training for the duration of the construction phase, even if only focused on a limited number of individuals • Guidance concerning legal requirements to which locals should adhere to, to make them employable, such as the standard construction industry requirements should be attended to • Training of contract workers and/or community members should focus on construction related skills to equip trainees/beneficiaries with the necessary portable skills to find employment at other similar employment sectors in future. 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Possible improved skills among some locals that were involved with the construction of other related housing projects in the Bloemfontein area. 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Skilled and experienced individuals who would be able to find employment opportunities in similar industries. 		

No Go Alternative

A No Go Option means the status quo/baseline conditions of the site will remain the same

Nature: Impact on Land Use

Activity: The land under discussion is currently zoned as ‘agricultural’ and the development footprint area has to be rezoned to a township. The land is currently used for agricultural related activities which would cease once construction start. The existing land user(s) is the owner of the property who would be involved with the proposed development. No negative economic impacts for the property owner due to the change in land-use is thus foreseen

Concerns of neighbouring property owners with regards to the rezoning of the land refer to the change in land use that would result in an intrusion on the existing land-uses in the area which mainly include smallholdings and game farming.

The area to the west of the site and the R700 (Mountain View 1707 – 215 ha) belongs to Our Father’s Church. The company started the construction of a private school which would cater for pre-school learners up to Grade 12 learners. The facilities planned would be able to accommodate approximately 1000 learners once fully completed. The school hall and administrative buildings have been completed. Currently 165 learners are accommodated at Our Father’s Academy in Bloemfontein town who would be moved to the new facility. It is planned to occupy the premises in 2019, but the upgrading of the road at the entrance to the facility still need to be undertaken.

Wildealskloof 1205 Portion 2 and 3 which are situated directly to the east of the proposed development accommodates infrastructure for poultry production. No farming, however, are taking place at the moment and it seems as if the infrastructure has been mothballed. No impact on these land portions are thus foreseen due to the change in the land use.

No direct negative social impacts due to the change in land use, except for a possible increase in construction vehicles on the R700, are anticipated to impact on the residential estates, Sangiro Lodge and the fuelling station to the south of the site and the N1.

Hunting is undertaken on the game farm Waveren 1103 (572 ha) which is situated to the north west of the proposed Wildealskloof site. The Mimosa Park Agricultural Holdings is situated to the north of the site. Agricultural related activities and the land use on these properties would not be directly impacted on during the construction phase and the associated change in the land use. Security risks, increased fire risks, littering, unauthorised entry of the properties, poaching, theft of game/animals, and the possible negative impacts on the water quality and quantity from boreholes, however, are of concern.

It should be noted that the proposed development plan to make use of municipal water supplies. It is thus highly unlikely that the proposed development could impact on the adjacent properties’ borehole capacities.

The movement of construction workers and construction vehicles on the R700 could pose safety and security risk for the learners that would be attending Our Father’s Academy, as well as to the residents making use of the road

<p>on a daily basis. Other concerns would relate to the possible increase in crime and misconduct of construction workers in the area during the construction phase.</p> <p>Overall, the change in land use would have an impact on the sense of place</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Local (4)	Local (3)
<i>Duration</i>	Medium Term (3)	Medium Term (3)
<i>Magnitude</i>	High (8)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Highly Probable (4)
<i>Significance</i>	Medium (60)	Medium (48)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate: Impact can be reversed to some extent	Moderate: Impact can be reversed to some extent
<i>Irreplaceable loss of resources?</i>	High	Moderate
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • Communicate the project schedule to the neighbouring landowners to allow them to plan for anticipated negative impacts. • Construction workers to abide to a code of conduct. • Construction vehicles to adhere to speed limits and traffic regulations. 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • More land use changes in the area due to development pressure to the north of Bloemfontein 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Change in rural characteristics of the area. 		
<p>No Go Alternative</p> <p>A No Go Alternative means the status quo/baseline conditions of the site will remain the same</p>		

Nature: Impact on sense of place		
<p>Activity: Residents stay in the area mainly due to the rural character of the area and the ideal proximity to Bloemfontein town and associated amenities. The social impact associated with the impact on the sense of place relates to the change in the landscape character and visual impact of the proposed Wildealskloof Mixed Use Development. The impacts in this regard refer to the actual construction site, possible storage of equipment and construction vehicles (laydown area), as well as the disruption of the soil and vegetation. The construction area would further be visible to the road users travelling on the N1, R700 and S1066.</p> <p>The above construction activities, influx of workers and people movement, together with the construction vehicle movement and increase in noise would thus disturb the overall rural sense of place. Due to the length of the construction period, the impacts on the sense of place are therefore deemed significant. It should also be noted that even though these impacts would diminish once the construction phase has been completed; it would then be replaced by the permanent infrastructure associated with the development.</p> <p>These impacts would influence the existing residents' experience of their area and subsequently impact on their perceived quality of life.</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Local (4)	Local (3)
<i>Duration</i>	Medium Term (3)	Medium Term (3)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	Medium (52)	Medium (36)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	High: Impact cannot be reversed	High: Impact cannot be reversed
<i>Irreplaceable loss of resources?</i>	High	High
<i>Can impacts be mitigated?</i>	To a limited extent	To a limited extent
<p>Mitigation:</p> <ul style="list-style-type: none"> • The construction site should be kept litter free • Site rehabilitation on the different sections of the site should occur as soon as the construction process allows 		

<ul style="list-style-type: none"> The recommendations made by the Visual Impact Assessment should be adhered to
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> Cumulative visual impact and impact on sense of place due to urbanisation of the larger area to the north of Bloemfontein.
<p>Residual Risks:</p> <ul style="list-style-type: none"> Even though the temporary construction related impacts on the sense of place can be mitigated it should be noted that the construction period is of a relative long duration. Impacts on the sense of place would continue once the construction phases have been completed.
<p>No Go Alternative</p> <p>A No Go Alternative means the status quo/baseline conditions of the site will remain the same</p>

Nature: Safety and Security Related Impacts		
<p>Activity: An increase in the number of people in one area is usually associated with an increase in crime. The construction phase of the proposed project would be approximately 10 years and would result in an influx of 3 000 workers in total. Movement of additional people in and around the area could thus increase criminal activities especially burglaries and theft, resulting in negative impacts on the safety of the local community. The more vulnerable sectors of the community such as the poor, farm or smallholding owners and the elderly would specifically be at risk. Landowners consulted indicated that the crime levels in the area are quite low.</p> <p>An increased risk in veld fires due to the presence of construction workers and construction related activities on site could also be of concern. Fires would pose a threat to nearby residents and houses residing on the agricultural holdings and farms.</p> <p>The movement of construction vehicles transporting workers, goods and materials on the local roads, automatically increase the risks of vehicle and pedestrian accidents.</p> <p>Further safety concerns during the construction phase relate to on-site construction workers that would be exposed to construction related safety risks, the possibility of children accessing the construction site, as well as unauthorised entry to the construction areas.</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Extent	Local (4)	Local (3)
Duration	Medium Term (3)	Medium Term (3)

Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Probable (3)
Significance	Medium (52)	Medium (36)
Status (positive or negative)	Negative	Negative
Reversibility	Low: Impact can be reversed	Low: Impact can be reversed
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • Local labour should be employed as far as possible to limit the number of outsiders in the area. • The movement of construction workers should be confined to the work site to avoid any increased safety and security risks. • Before construction commences, representatives from the MMM, the ward councillors and Residents Associations, as well as neighbouring communities should be informed of the details of the construction company, size of the workforce and construction schedules. • Construction workers should be easily identified as part of the construction team by e.g. wearing specific clothing and/or identity tags • Operational safety risks should be addressed as part of the Occupational Health and Safety Act (1993) • A Fire/Emergency Management Plan should be developed and implemented. It is important that this management plan and associated communication channels are developed at the outset of the construction phase. It would be important to regularly review the functionality and efficiency of such a plan in conjunction with the local emergency teams, representatives of the MMM and neighbouring landowners • Open fires for cooking and related purposes should not be allowed on site. • Appropriate fire fighting equipment should be on site and construction workers should be appropriately trained for fire fighting • The construction area should be fenced or access to the area should be controlled to avoid animals or unauthorised people entering the area without authorisation. • Speed limits on the local roads should be enforced. 		

<ul style="list-style-type: none"> Speeding of construction vehicles must be strictly monitored
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> Increased crime levels due to increased people movement and overall urbanisation within the area Increased safety risks on the local roads due to the increased traffic volumes.
<p>Residual Risks:</p> <ul style="list-style-type: none"> Possible increase in crime

Nature: Health Risks		
<p>Activity: The HIV/AIDS prevalence rate within the MMM was 29.9% in 2011, which remains high. The presence of the large workforce and the length of the construction period raise concerns with regards to the possible increase in Sexually Transmitted Diseases (STDs).</p> <p>The construction activities in itself further increases the risks of construction related accidents and injury to the workforce. The increased traffic expected on the local roads further intensifies this risk.</p> <p>Existing health and emergency services could come under added pressure during the construction phase due to the general population growth in the area as a result of the number of construction team members (especially during peak construction periods).</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Extent	Local (4)	Local (3)
Duration	Medium Term (3)	Medium Term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Probable (3)
Significance	Medium (52)	Medium (36)
Status (positive or negative)	Negative	Negative
Reversibility	Low: Impact can be reversed	Low: Impact can be reversed

<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
Mitigation:		
<ul style="list-style-type: none"> • Maximise the employment of locals where possible • First aid supplies should be available at various points at the construction site • Emergency and health services should be notified of the construction schedule and peak construction periods • Information distributed as part of established HIV/Aids awareness campaigns undertaken in the area by the MMM and Dept. of Health should again be focused on and communicated to the local workforce • The general health of construction workers should be monitored on an on-going basis 		
Cumulative impacts:		
<ul style="list-style-type: none"> • Cumulative pressure on local health services. 		
Residual Risks:		
<ul style="list-style-type: none"> • Possible increase in HIV/Aids and related diseases 		
No Go Alternative		
A No Go Alternative means the status quo/baseline conditions of the site will remain the same		

Nature: Impact on Housing
<p>Activity: As part of the proposed Wildealskloof Mixed-Use Development, there would be a change in the amount, type and affordability of the local housing stock. The development will include the following types of houses: Single residential units; A lifestyle estate with stands between 900m² and 1000m²; and Multi storey / RDP / FLIPS Social units (total of approximately 8 769 units).</p> <p>FLISP refers to the The Finance Linked Individual Subsidy Programme (FLISP). This programme was developed to enable first time home-ownership to households in the 'affordable or gap' market, that is, people earning between R3 501 and R15 000 per month. Individuals in these salary bands generally find it hard to qualify for housing finance and their income is regarded as low for mortgage finance, but too high to qualify for the government 'free-house' subsidy scheme. Any residential property acquired with a FLISP subsidy may not exceed the R300 000 price margin².</p>

Social housing provides good quality rental accommodation for the upper end of the low income market (R1500 - R15 000). The primary objective is urban restructuring, and the creation of sustainable human settlements³.

Based on the income levels within the MMM, there is a large category of individuals and households that fall within the above mentioned income brackets. It is therefore anticipated that the RDP, FLISP and Social housing proposed as part of the Wildealskloof Mixed Use Development would be appropriate to and address the needs of the wider community within Bloemfontein and Mangaung, as well as potential home owners from areas further afield such as Botshabelo and Thaba N'chu. The development will thus provide housing opportunities for individuals falling within lower and higher income brackets (Single residential units and the Lifestyle Estate).

The residential component of the Mixed Use Housing Development further makes provision for a retirement village which would be easily accessible to the aged and would be to an advantage to families with elderly members.

The proposed development would thus result in positive impacts as it would result in a change in the amount, type and affordability of housing stock within the area. This potential change in the level of the local housing choice is appropriate to the needs of the wider MMM community.

	Without mitigation	With mitigation
<i>Extent</i>	Local (3)	Regional (5)
<i>Duration</i>	Medium Term (3)	Medium Term (3)
<i>Magnitude</i>	Moderate (6)	High (8)
<i>Probability</i>	Probable (3)	Highly Probable (4)
<i>Significance</i>	Medium (36) (+)	High (64) (+)
<i>Status (positive or negative)</i>	Positive	Positive
<i>Reversibility</i>	Moderate: Impact can be reversed	Moderate: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Moderate	Moderate
<i>Can impacts be enhanced?</i>	Yes	Yes

Enhancement:

- As RDP housing is proposed as part of the proposed development, it is imperative to ensure the buy in from the relevant government departments prior to the project's implementation. Government and private sector processes would therefore have to be aligned.
- Potential home owners interested in the RDP houses and GAP housing (FLISP and Social Housing) section of the development, should be made aware of the requirements and criteria that have to be met

<p>prior to applying for these schemes</p> <ul style="list-style-type: none"> • A clear and transparent process would therefore have to be followed when negotiations with the potential home owners commence with regards to the future of the properties and the subsequent impact on the home owners
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Housing needs of the wider community would be addressed by the proposed development, as well as other developments planned in the area.
<p>Residual Risks: None anticipated.</p>
<p>No Go Alternative A No Go Alternative means the status quo/baseline conditions of the site will remain the same</p>

<p>Nature: Impact on Infrastructure and Services-</p>
<p>Activity: Service delivery in the area is a challenge due to the past settlement patterns, and rapid urbanisation with the additional inflow of large numbers of outsiders to the area. A development of this nature would require additional basic infrastructure and services such as roads, emergency services, safety and security services, electricity, water and sewerage for the various components of the proposed development.</p> <p>It is understood that the developer would be responsible for the bulk of the services provision, but will jointly plan with the Municipality for the infrastructure upgrades.</p> <p>In terms of water provision it should be noted that the MMM has experienced several water interruptions and water shortages over the past few years which resulted in the implementation of different water restrictions. Apart from supply limitations, the Metro is also experiencing increasing demand because of natural growth and migration as people move to the Metro in search of education, training and work opportunities. The Municipality thus serves approximately 230 000 households consisting of 720 000 users. Bloemfontein’s daily consumption comprises approximately 145Mℓ. Estimates are that due to the average population growth of 1, 2% per year, the water demand will increase with approximately 30% over the next 20 years. During the first few years the demand would be even greater to address the backlog of approximately 50 000 formal stands without waterborne sanitation. The proposed Mangaung Gariiep Water Augmentation Project (MGWAP) is planning to abstract approximately 120 Mℓ/day at Gariepdam to supply potable water to the Mangaung Metropolitan Municipality and its associated towns. This project, however, has not yet received the necessary authorisations to be implemented⁴.</p> <p>Cumulative impacts in terms of service provision on other service providers such as Centlec (new power lines) could also transpire.</p> <p>The adequacy of the existing services and extent of the upgrading of infrastructure (e.g. water, electricity, sewage,</p>

waste and so forth) required should be investigated and addressed. Upgrading of infrastructure and services could result in significant financial impacts on the MMM and/or developer. At this stage, infrastructure development that is anticipated to be developed as part of the development includes a waste water and sewage treatment works, internal roads, a solar plant to provide electricity for lighting of public open spaces, a substation, a water reservoir, and storm water infrastructure.

The negative impact (additional pressure) on the infrastructure development and maintenance therefore remains a critical issue to be addressed and successfully dealt with prior to the construction phase of the proposed project. Hence, infrastructure development should not be isolated from existing services. This thus calls for a successful integration of the additional services into the existing service delivery system of the MMM.

	Without mitigation	With mitigation
Construction Phase		
Extent	Regional (5)	Regional (5)
Duration	Medium Term (3)	Medium Term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Probable (3)
Significance	Medium (56)	Medium (42)
Status (positive or negative)	Negative	Negative
Reversibility	Low: Impact can be reversed	Low: Impact can be reversed
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> An integrated planning process should be initiated to pro-actively determine the infrastructure requirements and service needs to enable the developer and the MMM to supply and install these associated infrastructure and services. Maximise the employment of locals where possible to limit any additional burden on the existing infrastructure 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> Cumulative pressure on the provision of services and infrastructure due to the normal local population 		

growth and due to the proposed development.
Residual Risks:
<ul style="list-style-type: none"> • Pressure on the provision of services and infrastructure due to the proposed development
No Go Alternative
A No Go Alternative means the status quo/baseline conditions of the site will remain the same

Nature: Intrusion Impacts		
<p>Activity: Intrusion impacts refer to <u>visual impacts</u>, <u>increased traffic volumes</u> as well as <u>possible noise</u> and <u>dust pollution</u>. As indicated under Section Error! Reference source not found. (Of the visual specialist report), the isual impacts associated with the construction phase would change the landscape character and subsequently impact on the sense of place.</p> <p>During the construction phase, building material and goods required for the construction would mainly be transported on the R700. Concerns were raised that the R700 would thus become congested and that the risk of accidents would increase. Non-compliance to speed limits would further escalate the risks. The overall daily living and movement patterns of residents using this road would thus be negatively affected due to the iincrease in traffic intensity, congestion and pollution. Recommendations for the upgrading of the R700 were made.</p> <p>Noise related impacts created during the construction phase of the project are highly probable. These are anticipated to emanate from general construction activities, the movement on construction workers, heavy vehicles travelling to and from the site, the noise created by the ‘reverse indication’ of the trucks, and the noise generated by the general construction activities. This noise could be particularly intrusive as the area can be classified as an area with existing low ambient noise levels.</p> <p>Dust pollution could be possible due to the construction activities and fugitive dust from vehicle movement making use of gravel access roads on and around site the site. Residents of Mimosa Park Smallholdings could be negatively affected</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Extent	Local (4)	Local (3)
Duration	Medium Term (3)	Medium Term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Probable (3)

<i>Significance</i>	Medium (52)	Medium (36)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low: Impact can be reversed	Low: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • Construction workers should be confined to the construction area as far as possible, and should be easily identified. • Construction activities should keep to normal working hours e.g. 7 am until 5 pm. • Noise should be kept to the minimum. • The construction area should be fenced to avoid unauthorised entry by animals or children. • Access roads and entrances to the site should be carefully planned to limit any intrusion impacts, noise and dust pollution, as well as to limit any risks of accidents. • Construction vehicles should adhere to the speed levels. • Construction vehicles and those transporting materials and goods should be inspected to ensure that these are in good working order and not overloaded. • Source material and goods locally as far as possible to limit transportation of these over long distances • On-site gravel roads should be sprayed with water to limit dust pollution during the construction phase • Dust suppression methods should be strictly implemented if and where required 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Cumulative intrusion impacts due to urbanisation of the larger area to the north of Bloemfontein 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Change in rural character of the area with increased noise levels and movement of people 		
<p>No Go Alternative</p> <p>A No Go Alternative means the status quo/baseline conditions of the site will remain the same</p>		

Potential Operational Phase Social Impacts

The operational phase of a mixed use development of this nature such as the Wildealskloof Mixed Use Development is a long term process. The following impacts are anticipated to occur during the operational stages of the proposed project:

1. Population Change
2. Employment Opportunities
3. Impact on Property Values
4. Introduction of new social classes
5. Impact on daily living and movement patterns
6. Impact on educational facilities
7. Impact on health care facilities
8. Impact on sense of place
9. Safety and Security risks
10. Infrastructure and services

Nature: Population Change

Activity: The proposed Wildealskloof development is anticipated to have a marked population change with severe impacts in terms of its size and density. According to 2016 Community Survey, the MMM had a population of 787 803 individuals (Community Survey of 2016) and Ward 44 had a total of 18 904 individuals residing within the ward (2011 statistics).

The overlap of some of the construction phases and the gradual influx of residents occupying residential units should be considered. A rapid change in the local population could thus start during the construction phase and continue in the long term. It is however not known whether residents would come from Bloemfontein or areas further afield such as Soutpan (Ikgomotseng), Brandfort (Majwemasheu), Botshabelo, Thaba N’chu and elsewhere. Irrespective of the source of the influx, once the entire development has been implemented, an estimated increase of between 28 000 to 30 000 residents are expected to be concentrated within Ward 44.

This increase of approximately 3.8% in the population in Bloemfontein (based on 2016 figures) and above normal increase in the local population in Ward 44 would result in more individuals residing in the Ward, than is currently the case (based on 2011 statistics).

It may not safely be assumed that the characteristics of people who occupy new dwellings will match the profile of residents in the neighbouring area. The change in the age profile and the social impacts associated with these changes, when various families move into the area, are anticipated to be mitigated by the integrated development which will address the need for educational and recreational facilities. Aged care services have also been provided for by the proposed development through the development of a hospital and clinic, as well as a retirement village.

This population increase would therefore result in various socio-economic impacts. This sudden increase and above normal annual increase in the local population in Ward 44 would put additional pressure on the already challenged local infrastructure and services. These impacts would start to manifest in the short term but would continue to be apparent in the long term.

The proposed site for the Wildealskloof Mixed Use Development is situated in a low density area. An increase in the population size and density would result in various negative and positive socio-economic impacts. The sudden increase in the population figures could be overwhelming to the residents currently living on the smallholdings and who chose to live in a semi-rural area. Intrusion impacts would affect them negatively and their quality of life could be compromised.

The positive impact associated with an increase in the population size relate to the increase in the localised buying power and increased tax base of the MMM.

	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (3)	Local (3)
<i>Duration</i>	Long Term (4)	Permanent (5)
<i>Magnitude</i>	High (8)	Moderate (6)

<i>Probability</i>	Definite (5)	Highly Probable (4)
<i>Significance</i>	High (75)	Medium (56)
<i>Status (positive or negative)</i>	Negative / Positive	Negative / Positive
<i>Reversibility</i>	Moderate: Impact can be reversed	Moderate: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	High	High
<i>Can impacts be mitigated?</i>	Yes	Yes
Mitigation:		
<ul style="list-style-type: none"> • A phased approach in terms of the development should be followed as this could spread population change impacts over a couple of years • A phased approach could allow associated infrastructure and services to be implemented to accommodate the additional population • Pro-active planning with regards to infrastructure and service needs by the MMM is imperative • Implementation and/or upgrading of the necessary infrastructure and services e.g. roads, water supply and waste facilities are required. 		
Cumulative impacts:		
<ul style="list-style-type: none"> • Boost to the local economy • Change in population size and density with resultant socio-economic impacts. 		
Residual Risks:		
<ul style="list-style-type: none"> • Change in population size and density with resultant socio-economic impacts. 		
<p>No Go Alternative</p> <p>A No Go Alternative means the status quo/baseline conditions of the site will remain the same</p>		

Nature Employment Opportunities and Local Procurement.		
<p>Activity: During the operational phase of the proposed Wildealskloof Mixed Land Development, various permanent employment opportunities would become available. Typical permanent employment opportunities would relate to the educational/institutional and business/commercial section e.g. business owners and their personnel, general staff, domestic services, teachers, administrative staff and so forth which opens the employment market to more women than construction activities.</p> <p>A further focus could be on establishing a local material supply chain linked to on-going services in maintenance work such as plumbing, electrical work, woodwork and light manufacturing. The provision and maintenance of infrastructure, such as road and storm water drainage, should further be considered as possible local opportunities</p> <p>Further indirect positive employment impacts are the indirect economic spin-offs and indirect job opportunities created as a result of the proposed development and the associated increase in the population with their increased expenditure and increased need for goods and services.</p> <p>Care should be taken to ensure that the employment status of the newcomers remain positive to create a stable local economy and to guarantee the socio-economic stability of the area.</p> <p>It is still possible that, once the development has been completed, that those households that directly benefited from the project and who has a stable income could create job opportunities for the unemployed also living within the MMM area.</p>		
	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (3)	Regional (5)
<i>Duration</i>	Long Term (4)	Permanent (5)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Probable (3)	Highly Probable (4)
<i>Significance</i>	Medium (36) (+)	High (64) (+)
<i>Status (positive or negative)</i>	Positive	Positive
<i>Reversibility</i>	Moderate: Impact can be reversed	Moderate: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be enhanced?</i>	Yes	Yes

<p>Enhancement:</p> <ul style="list-style-type: none"> • The Local Economic Development Plan (LED) of the MMM should take note and address the issue of local employment creation with the assistance of the local economic sectors. • The increased population should thus be incorporated into the larger economic systems to ensure local economic prosperity and resilience • Establish a local material supply chain linked to ongoing services in maintenance work such as plumbing, electrical work, woodwork and light manufacturing
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Economic growth and development and possibly some diversification of the local economy
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Economic growth and development and possibly some diversification of the local economy.
<p>No Go Alternative</p> <p>A No Go Alternative means the status quo/baseline conditions of the site will remain the same</p>

<p>Nature: Impact on Property Values</p>
<p>Activity: The proposed site for the development is situated within a low density agricultural area with Mimosa Park smallholdings to the north of the site. The Woodland Hills Wildlife Estate is situated to the west of the proposed development. The land to the east of the proposed site and south of the N1 is also still being used for agricultural purposes, with the Ribblesdale small holding area to the south east of the site. The area to the south of the N1 (approximately 2 km south of the proposed site) is characterised by various new residential estates accessed from the R700. The construction of the next phase of the Woodland Hills Wildlife Estate has started to the east of the existing development. The land opposite the proposed site, located to the west of the R700, belongs to Our Father’s Home Church (Mountain View 1707: RE/1707). A school has been built within the northern section of this property, but has not yet been occupied by learners. The Waveren Game Farm (Waveren 1103) is situated to the north west of the proposed site</p> <p>A development of this scale would impact on the sense of place (rural quality of life) due to rapid urbanisation, the township development encroaching in the rural area, as well as due to the social challenges and perceived or real increase in crime accompanying such developments.</p> <p>Initially, the proposed development could, in the short term, devalue the properties in close proximity to this development due to the influx of workers and jobseekers (the latter possibly without proper accommodation) and other less desirable developments as a result of the presence of these individuals (e.g. informal trading, shebeens, prostitution, possible increase in crime, environmental degradation of the area, littering, noise pollution, air quality</p>

impacts due to fires used for cooking and the increased risk of fires spreading to surrounding properties and the agricultural holdings). Should the resource use further be negatively impacted (e.g. in the worst case scenario if groundwater pollution occur as a result of the proposed development) it would lead to cumulative negative financial impacts.

Property owners of the adjacent properties might thus find it difficult to sell their properties at reasonable market-related prices, due to the densification in close proximity, the social concerns attached to the sudden increase in the population figures, as well as due to the increase in traffic and noise. Property owners, however, are of the opinion that once the development is completed, that property values would return to normal or even increase.

Most studies with regards to property values however included the hedonic pricing method where the price of a property is determined by its characteristics such as property size, the quality of the neighbourhood in which the property is situated, the condition of the house structure, quality of local schools, crime rates and features included in the property e.g. swimming pools and so forth. It is thus difficult to provide a general indication of the impact on the property values as it would definitely depend on the hedonic pricing structure applied to each individual property and the location in terms of the new development.

From a social point of view, it is however, still important to note that any decrease in the property values would result in financial losses for residents when selling their properties at market value and not at “replacement value”. This could further lead to sellers being unable to replace their properties with similar residences elsewhere. Uncertainties in this regard, as well as to uncertainties regarding the area’s future could lead to stress amongst the affected residents, especially the elderly.

It is thus imperative that uncontrolled urban sprawl is contained and that the development is implemented based on best practice and according to all Environmental, as well as Construction (building) Regulations and Guidelines.

	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (4)	Local (4)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	Medium (56)	Medium (42)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate: Impact can be reversed to some extent	Moderate: Impact can be reversed to some extent

<i>Irreplaceable loss of resources?</i>	High	Moderate
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • The proposed development should be implemented in such a way that the agricultural land is preserved in support of the livelihoods of those residing on those properties. • Infrastructure and services as part of the proposed Wildealskloof Mixed Use Development should be properly maintained. • The road infrastructure should be maintained and in roads within the study area should be upgraded when required (e.g. tarring, resurfacing or widening where traffic volumes and road design warrant such upgrades). • An increase in the population density could result in the increase in criminal activities. Pro-active measures by the community and local policing structures as well as the SAPS should be implemented to combat and prevent heightened criminal activities. • Public open spaces forming part of the development should be kept crime free • Public open spaces should be maintained to ensure no littering, and to ensure continued safe and environmentally sound areas. 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Changes in the property values due to development pressure to the north of Bloemfontein 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Change in the zoning and character of the area due to densification, impacting on the value of adjacent properties. 		
<p>No Go Alternative</p> <p>A No Go Alternative means the status quo/baseline conditions of the site will remain the same</p>		

<p>Nature: Daily Living and Movement Patterns</p>
<p>Activity Once the development has been completed, additional traffic created by residents and visitors travelling to and from the residential area could impact on the existing and new residents' daily living and movement patterns. A</p>

large part of the residents would possibly also make use of public transport facilities. Traffic to and from the Bloemfontein CBD and especially on the R700 will increase, if a large section of the residents do not work within the area. Traffic patterns and volumes could require further road upgrading. Planned access to the development should thus be carefully planned to not worsen congestion. Further accesses to the proposed development and road upgrading should ensure that the risk of accidents is limited.

As a large part of the residents would continue to make use of public transport facilities, road designs should consider the construction of pedestrian walkways, as well as taxi and bus ranks. Taxi routes and subsidised bus routes (including bus and taxi stop shelters) should thus form part of the development plan for this area and/or should link with the existing services.

Within the development zone, distances between housing, workplaces, retail businesses, and other destination would be lessened which would result in positive impacts for those residents staying and working in the area.

Residents of the proposed Wildealskloof Mixed Use Development would thus have access to health, welfare, education, community and commercial services through the services and facilities planned as part of the development. Overall positive impacts in terms of the daily living and movement patterns of residents of Wildealskloof are thus anticipated. The negative intrusion impacts that would impact on the existing neighboring residents' daily living and movement patterns should also be noted (Also refer to other sections in the report).

	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (4)	Local (4)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	Medium (56)	Medium (42)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low: Impacts can be reversed	Low: Impacts can be reversed
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
Mitigation:		
<ul style="list-style-type: none"> • Speed limits on the local roads should be enforced. 		

- Taxi routes, subsidized bus routes (including bus and taxi stop shelters) and pedestrian walkways should be included in the development.
- A strong emphasis needs to be placed on ensuring the safety of pedestrians, and notably school children crossing local roads.
- Internal roads should be tarred with proper lighting.
- The R700 should be upgraded and maintained to be able to accommodate the increase in traffic volumes and to adhere to engineering standards.
- The S1066 situated to the north and east of the site should be upgraded.
- A planning forum with regards to bulk infrastructure development should be established to ensure integrated planning

Cumulative impacts:

- Possible increase in traffic congestion and accident risks due to all the development pressure to the north of the N1

Residual Risks:

- Possible increase in traffic congestion
- Possible increase in risk of accidents

No Go Alternative

A No Go Alternative means the status quo/baseline conditions of the site will remain the same

Nature: Introduction of new social classes

Activity: The proposed project is anticipated to bring about a group of people that will expand the existing social classes in the area, but also by establishing new social classes (based on income levels). Tenure options will range from fully subsidised, to higher income residential units. The mixed land use would thus accommodate an ever growing integrated population.

For the existing neighboring residents the development can be seen as just a “new social class” and urbanization that would be in closer proximity to them. It is thus anticipated that such a perception and the concerns with regards to the increase in crime and possible impact on the water quality and quantity, would hinder acceptance and integration between these communities and those residing with the Wildealskloof development.

It should however be noted that the beneficiaries of the RDP houses would still be required to pay for all municipal rates which may include water and electricity or other service charges. Many beneficiaries however may not be in a financial position to be able to afford these rates and service charges. They may then again use their houses to generate income by renting them out to people from outside the area. If such a situation develops it would be a setback to the development and the process of social integration.

Feelings of antagonism between existing residents and newcomers, as well as all residents of Wildealskloof could

remain evident for a period of time. Care should thus be taken to not further entrench the disparity between the different social classes based on the type of housing units occupied.

The social integration of the residents will remain a challenge for the foreseeable future. It is anticipated that it will take some time for social integration to really materialise. The principle of densification and different integrated social classes would have to be accepted as affordability for such housing projects remains a critical issue.

	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (4)	Local (4)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	Medium (56)	Medium (42)
<i>Status (positive or negative)</i>	Negative / Potentially Positive	Negative / Potentially Positive
<i>Reversibility</i>	Moderate: Impact can be reversed	Moderate: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes

Mitigation:

- An ongoing communication channel between the developer, MMM, local landowners and local representatives should be established.
- Situations where social barriers or distrust could be created between the residents should be avoided.
- The development should provide affordable high density residential components that would not have the characteristics of a low income development. This could assist in breaking down barriers between different social classes.
- Safety and security issues should be addressed and pro-active measures should be implemented to limit any criminal activities
- The development of the Wildealskloof development should be phased to ensure a sound development and acceptable implementation of infrastructure to ensure that dissatisfaction with regards to infrastructure does not create social conflict

Cumulative impacts:

- None anticipated

Residual Risks:

- Possible conflict between different groupings
- Possible acceptance of cultural values and differences between different population groups and/or cultural

groups and/or socio-economic groups resulting in sound social integration

NO GO Option

A No Go Option means the status quo/baseline conditions of the site will remain the same

Nature: Impact on Educational Facilities

Activity: As part of the proposed mixed use development, approximately 8 769 residential units are planned, which include housing opportunities for first time home owners. It is thus likely that the increased population profile would include families with children who would significantly increase the need for early learning facilities for infants, as well as primary schools for younger schoolchildren and secondary schools.

As part of the development, educational facilities and school residences are planned, but it should still be ensured that the planned facilities accommodate the long term needs of the number of learners that will be residing in Wildealskloof to avoid possible negative social impacts in this regard.

	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (4)	Local (4)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Probable (3)	Highly Probable (4)
<i>Significance</i>	Medium (42) (+)	Medium (56) (+)
<i>Status (positive or negative)</i>	Positive	Positive
<i>Reversibility</i>	Moderate: Impact can be reversed to some extent	Moderate: Impact can be reversed to some extent
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes

Mitigation:

- The Crèche and other educational facilities planned as part of the development must be designed in such a manner as to provide safe and convenient access, appropriate lighting and other safety features to ensure the safety of the school going children.
- The planned educational facilities should thus be made accessible to all residents and should be designed as such to cater for all the learners in the area and for future learners.
- The schools should be accessible to learners from poor backgrounds.
- The developer, MMM and Department of Education should cooperate in developing a school development

<p>plan as it is a complicated process that requires skill and know-how to be executed successfully.</p>
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Possible increased need for educational facilities due to all developments within the area.
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Negative socio-economic development if schools are not built and phased according to the needs of the residential occupancy rate.
<p>NO GO Option</p> <p>A No Go Option means the status quo/baseline conditions of the site will remain the same</p>

Nature: Impact on Health Care Facilities		
<p>Activity: New residents within the Wildealskloof Development who are employed are likely to have medical cover and will therefore also make use of private health care facilities. The anticipated residential profile, however, is likely to include some residents that would be dependent on public healthcare facilities. At present, there is no clinic or hospital in Ward 44.</p> <p>As part of the development, health care facilities are planned, although details in this regard and by whom it will be operated has not yet been finalised. The plan is to develop a full time operational clinic with permanent doctors and nurses on duty. It should, however, be ensured that the planned facilities accommodate the different needs of the residents of the Wildealskloof Development.</p> <p>The positive impacts of available health care facilities would be extended to all residents within Ward 44 and other nearby areas.</p>		
	Without mitigation	With mitigation
OPERATION PHASE		
Extent	Local (4)	Local (4)
Duration	Long Term (4)	Long Term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)
Significance	Medium (42) (+)	Medium (56) (+)

<i>Status (positive or negative)</i>	Positive	Positive
<i>Reversibility</i>	Moderate: Impact can be reversed to some extent	Moderate: Impact can be reversed to some extent
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • The planned health care facilities should be phased to accommodate the needs of the development's growing population and rate of occupancy • The planned facilities accommodate the different needs of the residents of the Wildealskloof Development 		
<p>Cumulative impacts:</p> <p>None anticipated</p>		
<p>Residual Risks:</p> <p>None anticipated</p>		
<p>NO GO Option</p> <p>A No Go Option means the status quo/baseline conditions of the site will remain the same</p>		

Nature: Impact on Sense of Place

Activity: The permanent visual impact was assessed as part of the Visual Impact Assessment. The following discussion should thus be read from a social perspective as the impact on the sense of place, but also in conjunction with the Visual Impact Assessment.

The study area is characterised by an open rural landscape with scattered hilltops. The fact that the area is sparsely populated is one of the main aspects contributing to the rural sense of place and peacefulness of the area.

The proposed development will have a permanent visual impact on the currently ‘undisturbed’ site on which it would be located. It will further change the perception that the surrounding landowners have of their living environment. The most marked impact with regards to the sense of place would be for the residents of the agricultural holdings which are situated in close proximity to the development. Sense of place could be affected by intrusion impacts (noise and dust), safety and security issues, visual impacts, an increase in movement or traffic and so forth. The high density development with its related infrastructure would disturb their viewpoints and change the character of their surrounding area significantly, which would impact on the overall sense of place.

The sense of place could furthermore be affected by the change in the sense of security experienced by property owners within close proximity to the site. The area is characterised by low levels of crimes. The densification and increased movement of people could have an impact on the criminal activities in the area. This situation should thus not be worsened to allow the sense of place in this regard to remain unchanged.

Those that would benefit from the accommodation types being made available through this development could welcome the change in the focus of the community.

	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (4)	Local (4)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Definite (5)	Highly Probable (4)
<i>Significance</i>	High (70)	Medium (56)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate: Impact can be reversed to some extent	Moderate: Impact can be reversed to some extent
<i>Irreplaceable loss of</i>	High	Moderate

<i>resources?</i>		
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • Building designs should take the character of the area into account and should not detract from the existing sense of place • Designing of walls, roofs and buildings should be done in such a manner to blend in with the natural environment. • Lighting issues should receive the attention it deserves to avoid any light pollution at night. • The mitigation measures of the Visual Impact Assessment should be strictly implemented 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Severe change in landscape character due to development pressure to the north of the N1 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Severe change in landscape character 		
<p>NO GO Option</p> <p>A No Go Option means the status quo/baseline conditions of the site will remain the same</p>		

<p>Nature: Impact on Safety and Security risks</p>
<p>Activity: The completion of the proposed development would suddenly lead to a significant increase in the local population count. Crime levels in the area could thus increase just based on the increase in the population figures. As indicated previously, the crime levels in the area are relatively low. The population increase could thus warrant the extension of the local police service over time. It is uncertain whether this would be achievable, but failure to attend to possible criminal activities and the enforcement of strict security measures, as well as lack of appointment of additional police personnel could thus have negative impacts on the quality of life of all the residents involved.</p> <p>The proposed development could thus assist by ensuring that safety and security features form part of the development e.g. some form of access control, security guards patrolling the area, and the placement of security cameras and lighting at strategic places.</p> <p>In addition, it is critical that the local SAPS with the assistance of community members and other law enforcement agencies respond effectively to any criminal activities in the area. A local programme must ensure that the appropriate policing resources, solutions and tactics are assigned and implemented to address the specific safety and security needs, demands and desires of the area.</p>

	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (4)	Local (3)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	Medium (56)	Medium (39)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate: Impact can be reversed	Low: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • The MMM and local police service must assist in creating a safe city through community development, the protection of vulnerable groups, improvements to by-law compliance and enforcement, and responding to emergency and disaster situations. • The Wildealskloof Development should ensure that the sport and recreational areas provide a safe and inclusive environment for women and girls, and provide men and women with equal access to resources and activities of their preference • Lighting as security measure at night should be implemented as part of the development • Sub-letting as part of this development should not be allowed to ensure that the quality of life of the residents in the area remain high. • The local policing services should sufficiently respond to any criminal activities • Public spaces and religious areas/churches should be designed to ensure safe and well maintained public places. Consideration should be given to sufficient lighting and good sightlines and other elements of safe design 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Possible increase in overall crime levels due to overall urbanisation in the area 		
<p>Residual Risks:</p>		

- Possible increase in overall crime levels.

NO GO Option

A No Go Option means the status quo/baseline conditions of the site will remain the same

Nature: Impact on Infrastructure and Services

Activity: The change in the population profile would thus be accommodated as part of the development as the residents of the proposed Wildealskloof Mixed Use Development would have access to health, welfare (hospital and clinic), education (schools and crèches), community (churches, parks and recreational facilities) and commercial services (hotel, office park, industrial park and retail services) through the services and facilities planned as part of the development.

By providing this type of infrastructure, even though it would be over a long period of time, the development would assist the MMM to address the backlog and needs in terms of housing provision, as well as the provision of educational and health care services.

The development, however, calls for a successful integration of the additional services with the existing service delivery system of the MMM. It is thus imperative for the MMM to ensure access to adequate housing, by providing the associated services that would support the sustainability of the development.

Managing waste generated by such a development is also a source of concern. Should existing landfill sites not be able to cater for the development’s waste requirements, additional landfills should be established. This is unfortunately not an easy and quick process due to social and environmental concerns usually raised in opposition to the establishment of new sites. Recycling of waste by the community is another option that could be investigated to minimise the volumes of waste generated.

	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Regional (5)	Regional (5)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	Medium (60)	Medium (45)
<i>Status (positive or negative)</i>	Negative	Negative

<i>Reversibility</i>	Low: Impact can be reversed	Low: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • A pro-active integrated planning approach to spatial planning and the development of infrastructure and services are urgently required. • The development of the Wildealskloof development should be phased to ensure a sound development and acceptable implementation of infrastructure • Future management of infrastructure and the provision of services to the residents should be effective and continuous. • The developers and MMM should provide a high level of certainty to landowners with regard to the status and future of their agricultural type of properties. • The improved municipal income generated by the proposed project should be used to ensure enhanced service delivery and infrastructure developments in the area. This would thus add to ensuring that the broader community also experience the benefits created by the proposed development. • It should be ensured that a sufficient and effective transport system is put in place (taxi routes, subsidized bus routes (including bus and taxi stop shelters and pedestrian walkways) • Recycling of waste by the community is another option that could be investigated to minimize the volumes of waste generated. This could further assist in indirect employment opportunities for the local residents • Local procurement of suppliers and contractors for the housing process and transport system should be promoted • “Green building and designs” could lessen the need for additional infrastructure and services (e.g. electricity supply). 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Increased pressure on the capacity of the MMM to supply infrastructure and services associated with such a development. 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • Possible lack of maintenance of the infrastructure. 		
<p>NO GO Option</p> <p>A No Go Option means the status quo/baseline conditions of the site will remain the same</p>		

6.3.10.3 Comparative Assessment of Layout Alternatives

In terms of impacts arising from the social environment as a result of construction and operation activities, there is **no difference** in the potential impacts associated with the two layout alternatives. Therefore, there is **no preference** between the two layout alternatives from a social perspective.

6.3.12 Impact on the Socio- Economic Environment

6.3.12.1 Description of Impacts on the Social Economic Environment

Broad potential impacts that may be associated with the proposed development during the construction phase include the following.

12. Population Change Impact on local employment and income levels during construction
13. Impact on local businesses during construction
14. Permanent loss of agricultural land
15. The impact on property values during construction
16. Impact on low income groups and income distribution
17. Impact on tax income during construction

Broad potential impacts that may be associated with the proposed development during the construction phase include the following.

1. Impact on local employment and income levels during operations
2. Impact on local businesses during operations
3. Permanent loss of agricultural land
4. The impact on economic infrastructure and public services
5. Impact on tax income during operations

6.3.11.2 Summary of impacts associated with the proposed Wildealskloof Mixed Use Development during the construction and operational phase.

The two design layout alternatives discussed in section 6.2 do not differ in any significant way as far as the impacts on the economic environment is concerned. There is therefore, no difference in the potential impacts associated with these alternatives. In this regard, the impacts for both Layout alternative 1 and Layout alternative 2 are therefore assessed together within the 1 economic impacts assessment tables below

Nature: Impact on local employment and income levels during construction		
Activity: Increase in household income levels due to employment creation during the construction phase This is a positive impact		
	Without enhancement	With enhancement
CONSTRUCTION PHASE		
<i>Extent</i>	Regional (3)	Regional (3)
<i>Duration</i>	Medium Term (3)	Medium Term (3)
<i>Magnitude</i>	Moderate (6)	Moderate/high (7)
<i>Probability</i>	Definite (5)	Definite (5)
<i>Significance</i>	Medium (60) (+)	High (65) (+)
<i>Status (positive or negative)</i>	Positive	Positive
<i>Reversibility</i>	N/A	N/A
<i>Irreplaceable loss of resources?</i>	N/A	N/A
<i>Can impacts be enhanced?</i>	Yes	Yes
Enhancement:		
<ul style="list-style-type: none"> • Develop a supplier base of local suppliers and ensure that the maximum percentage (if possible higher than 30%) is sourced from local suppliers • Develop and implement contractor management plans and include specifications for: <ul style="list-style-type: none"> ○ The use local labour as far as possible especially in the low and medium skilled categories ○ Up-skilling of unskilled local labour ○ Preference to local suppliers within MMM • Engage with the Municipal LED and Mangaung Business Chamber on a regular basis to facilitate the assistance of local SMMEs suppliers in the MMM construction industry • Plan for an exit strategy for unskilled and medium skilled workers and facilitate on-going work after construction (e.g. as art of residential and other property maintenance program) 		
Cumulative impacts:		
<ul style="list-style-type: none"> • Possible cumulative intrusion impacts due to other mixed use and residential developments planned in the Bloemfontein area • Possible improved skills among some locals that were involved with the construction of other related housing projects in the Bloemfontein area. 		
Residual Risks:		

- N/A

NO GO Option

A No Go Option means the status quo/baseline conditions of the site will remain the same

Nature: Negative impact on other businesses during construction

Activity: Due to the magnitude of the project the development could impact negatively on other sectors by influencing the wage costs of construction labour and ‘drawing down’ unskilled and medium skilled labour from other sectors in MMM.

	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Regional (3)	Regional (3)
<i>Duration</i>	Medium Term (3)	Medium Term (3)
<i>Magnitude</i>	Moderate (6)	Low (2)
<i>Probability</i>	Possible (2)	Possible (2)
<i>Significance</i>	Low (24) (-)	Low (16) (-)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	High (can be reversed)	High (can be reversed)
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
Mitigation:		
<ul style="list-style-type: none"> • Phase the development starting with a smaller project and monitor and resolves issues related to the impact on the local market through regular interactions with a representative forum including adjacent farmers • During the entire construction process engage with a representative forum including adjacent farmers that meets regularly to discuss and resolve potential negative impacts or shared issues (related to the development (e.g. labour draw down, shared transport issues etc.)) 		
Cumulative impacts:		
<ul style="list-style-type: none"> • The impact could be increased with a number of construction projects currently within MMM 		
Residual Risks:		
<ul style="list-style-type: none"> • Low 		

Nature: Negative impact on other businesses during operation		
<p>Activity: The development has the potential to shift income from existing commercial activities to the new development as argued in section 12.1 of the social economic specialist report). In the case of a regional mall, there could for instance be an impact on the recently completed Northridge Mall less than 5km from the development.</p>		
	Without mitigation	With mitigation
OPERATIONAL PHASE		
<i>Extent</i>	Regional (3)	Regional (3)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Moderate (6)	Low (2)
<i>Probability</i>	Probable (3)	Probable (3))
<i>Significance</i>	Medium (39) (-)	Low (27)-
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	High (can be reversed)	High (can be reversed)
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	With effort	With effort
<p>Mitigation:</p> <ul style="list-style-type: none"> • Where possible, attract new greenfield commercial investments to the development • Assist the Mangaung Business Chamber and LED office in marketing MMM within the broader region as retail and investment destination 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Other commercial developments planned for MMM (e.g. the N8 corridor) could increase the impact 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • High 		
<p>NO GO Option</p> <p>A No Go Option means the status quo/baseline conditions of the site will remain the same</p>		

Nature: Permanent loss of agricultural land during construction		
<p>Activity: The development is situated in relatively low value agricultural land mainly used for extensive livestock and crop farming. The average GVA per square km arable land in Mangaung is about the same as the provincial average at close to R 350 000/sq km compared to a national average of more than R 750 000/sq km in 2017. Based on these estimates, the total agricultural economic output/GVA potentially lost due to the development could be less than R3m compared to the anticipated annual GVA during the construction period of more than R700m per annum for a 10 year period.</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Local (1)	Local (1)
<i>Duration</i>	Permanent (5)	Permanent (5)
<i>Magnitude</i>	Low (4)	Low (4)
<i>Probability</i>	Definite (5)	Definite (5)
<i>Significance</i>	Medium (50) (-)	Medium (50) (-)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Low
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	With effort	With effort
<p>Mitigation:</p> <ul style="list-style-type: none"> • None – no go option 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • None 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • High 		
<p>NO GO Option</p> <p>A No Go Option means the status quo/baseline conditions of the site will remain the same</p>		

Nature: Permanent loss of agricultural land during operations		
<p>Activity: The development is situated in relatively low value agricultural land mainly used for extensive livestock and crop farming. The average GVA per square km arable land in Mangaung is about the same as the provincial average at close to R 350 000/sq km compared to a national average of more than R 750 000/sq km in 2017. Based on these estimates, the total agricultural economic output/GVA potentially lost due to the development could be less than R3m compared to the anticipated annual GVA during the construction period of more than R700m per annum for a 10 year period.</p>		
	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Local (1)	Local (1)
<i>Duration</i>	Permanent (5)	Permanent (5)
<i>Magnitude</i>	Low (4)	Low (4)
<i>Probability</i>	Definite (5)	Definite (5)
<i>Significance</i>	Medium (50) (-)	Medium (50) (-)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low	Low
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	With effort	With effort
<p>Mitigation:</p> <ul style="list-style-type: none"> • None – no go option 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • None 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> • High 		
<p>NO GO Option</p> <p>A No Go Option means the status quo/baseline conditions of the site will remain the same</p>		

Nature: Impact on property values during construction
<p>Activity: Potential negative impact on adjacent property values during construction</p> <p>It is possible that the proposed development could devalue the properties in close proximity to this</p>

development due to disamenities related to the construction process, e.g. noise pollution, air and water quality impacts, increased loitering and safety concerns. Over the longer term property values of areas adjacent to the development to return to their normal levels and could be expected to increase due to the residential character of the surrounding area.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
<i>Extent</i>	Regional (3)	Regional (3)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Medium (6)	Low (4)
<i>Probability</i>	Probable (3)	Probable (3)
<i>Significance</i>	Medium (39)-	Medium (33)-
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Moderate: Impact can be reversed to some extent	Moderate: Impact can be reversed to some extent
<i>Irreplaceable loss of resources?</i>	High	Moderate
<i>Can impacts be mitigated?</i>	Yes	Yes
Mitigation:		
<ul style="list-style-type: none"> The proposed development should be implemented in phases, in particular considering other high income residential developments in the north of Bloemfontein During the construction phase the implementation of the social management plan also forms an important measure to mitigate against disamenities (security risks and influx of people) that could negatively impact on the prices of adjacent properties during the construction phase 		
Cumulative impacts:		
<ul style="list-style-type: none"> Changes in the property values due to development pressure to the north of Bloemfontein 		
Residual Risks:		
<ul style="list-style-type: none"> Change in the zoning and character of the area due to densification, impacting on the value of adjacent properties. 		
OPERATION PHASE		
<p>The development offers a range of residential properties varying from affordable housing (R600 000 and less) to upmarket (R3.5m). Based on local interviews (see section 16) the long term impact on residential property prices in the larger MMM area is expected to be negligible. The argument is based on the relatively low impact that the development will have on housing stock relative to market demand especially at the affordability level (R600 000 and less) as well as the phased approach that the development is likely to follow.</p>		

Nature: Impact on Economic Infrastructure and Services (Transport, Energy and Water)		
<p>Facility: The development is situated in a low density area without municipal bulk water and sanitation services. As mentioned above groundwater resources in the local area is already under pressure as a result of the long drought in the area. Based on local interviews (see section 16 of the economic specialist report) it is our understanding that the developer will be financially responsible for bulk infrastructure (water, sanitation, waste, energy and road upgrades) in the development.</p> <p>The development is also outside any efficient public transport system. There is furthermore a risk that an integrated public infrastructure system for MMM (if implemented) will not extend as far as the development. As mentioned above, there is only one bus service provided by the private (non-subsidised) company Interstate in the vicinity of the development. The route runs from Brandfort to Bloemfontein and back once a day.</p>		
	Without mitigation	With mitigation
OPERATION PHASE		
<i>Extent</i>	Regional (3)	Regional (3)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	Medium (52)-	Medium (39)-
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Low: Impact can be reversed	Low: Impact can be reversed
<i>Irreplaceable loss of resources?</i>	Low	Low
<i>Can impacts be mitigated?</i>	Yes	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> As per the social management plan with specific emphasis on the facilitation of an effective public transport system in the area 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> Other property developments to the north of Bloemfontein could decrease the costs of developers to fund services in the area e.g. road upgrades 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> Possible lack of maintenance of the infrastructure 		

- High transport costs for low income groups staying in development working in Bloemfontein CBD

NO GO Option

A No Go Option means the status quo/baseline conditions of the site will remain the same

Nature: Positive Impact on the income of low income households and income distribution in MMM during construction

Activity: During the construction phase the development could distribute 11% of the total income generated to low income households compared to 30% to medium income households and 59% to high income households. Despite the relatively low portion to low income households, the portion is slightly higher than the income group's share in total household income generated in MMM as indicated in Table 14 below. This implies a slight shift in income to low income households especially relative to medium income households. The shift however will make no significant impact in the distribution of incomes in MMM as high income share in the development is expected to be higher than their share in total household income earned in MMM.

This is a **positive impact**

	Without enhancement	With enhancement
CONSTRUCTION PHASE		
<i>Extent</i>	Regional (3)	Regional (3)
<i>Duration</i>	Medium Term (3)	Medium Term (3)
<i>Magnitude</i>	Minor (2)	Low (4)
<i>Probability</i>	Definite (5)	Definite (5)
<i>Significance</i>	Medium (40) (+)	Medium (50) (+)
<i>Status (positive or negative)</i>	Positive	Positive
<i>Reversibility</i>	N/A	N/A
<i>Irreplaceable loss of resources?</i>	N/A	N/A
<i>Can impacts be enhanced?</i>	Yes	Yes
Enhancement:		
<ul style="list-style-type: none"> • Develop and implement contractor management plans and include specifications for: <ul style="list-style-type: none"> ○ The use local labour as far as possible especially in the low and medium skilled categories ○ Up-skilling of unskilled local labour ○ Preference to local suppliers within MMM • Plan for an exit strategy for unskilled and medium skilled workers and facilitate on-going work after construction (e.g. as art of residential and other property maintenance program) 		
Cumulative impacts:		

<ul style="list-style-type: none"> Possible cumulative intrusion impacts due to other mixed use and residential developments planned in the Bloemfontein area
<p>Residual Risks:</p> <ul style="list-style-type: none"> N/A
<p>NO GO Option</p> <p>A No Go Option means the status quo/baseline conditions of the site will remain the same</p>

Nature: Increase in tax income		
<p>Activity: The increased economic activity during the construction phase will increase central government revenues during the construction phase due to increased income taxes, value added taxes and taxes on contractors' profits. The general tax income per R1 of GVA generated in the country is about 0.32c implying that the total GVA generated per annum during the construction phase could increase central government tax income by an estimated R 575m per annum for the 10 year construction period.</p> <p>This is a positive impact</p>		
	Without enhancement	With enhancement
CONSTRUCTION PHASE		
<i>Extent</i>	National (4)	Regional (3)
<i>Duration</i>	Medium term (3)	Medium Term (3)
<i>Magnitude</i>	Low (4)	Low (4)
<i>Probability</i>	Definite (5)	Definite (5)
<i>Significance</i>	Medium (55) (+)	Medium (55) (+)
<i>Status (positive or negative)</i>	Positive	Positive
<i>Reversibility</i>	N/A	N/A
<i>Irreplaceable loss of resources?</i>	N/A	N/A
<i>Can impacts be enhanced?</i>	No	No
<p>Enhancement:</p> <ul style="list-style-type: none"> None 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> None 		
<p>Residual Risks:</p> <ul style="list-style-type: none"> N/A 		
OPERATION PHASE		
<p>The net increase in commercial activities and tax income is largely unknown during the operational phase. However it can be expected that local government revenue from property taxes could increase significantly due to the development. Since the developers are expected the foot the larger bill for bulk services, this could imply</p>		

a net increase in municipal income for MMM over the long term.

Nature: Impact on local employment and income levels during operations

Activity: Apart from residential units, the development will also host a number of commercial entities including a filling station, hotel, a regional mall, retail facilities and a light industrial area. For these commercial entities to contribute to additional income and employment opportunities in the Mangaung area (and not merely shift income and employment from one area to another) the following should occur:

- Residents from outside Bloemfontein relocate to the development
- New Greenfield investments are attracted to the development
- The development acts as a catalyst for other investment in MMM
- The development draw more consumers to MMM e.g. through an increase in ‘retail tourism’ in MMM

Based on local interviews (see section 16), it is unlikely that the investment will attract much new investment to MMM without a deliberate effort from the developer. Currently there is a risk that the investment might just shift income and opportunities from one side of the town to another. Foreign investment in MMM is currently at low levels due to perceived levels of red tape and corruption and the lack of competitive edge that the metro has over other destinations such as other metros in South Africa e.g. Cape Town.

The development is however likely to continue to impact positively on income levels in Mangaung through the provision of continued work to unskilled and medium skilled workers employed during construction in security and maintenance services related to the property.

This is a **positive impact**

	Without enhancement	With enhancement
OPERATIONAL PHASE		
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)
Significance	Medium (33) (+)	Medium (52) (+)
Status (positive or negative)	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of	N/A	N/A

<i>resources?</i>		
<i>Can impacts be enhanced?</i>	Yes	Yes
Enhancement:		
<ul style="list-style-type: none"> • Where possible, attract new greenfield commercial investments to the development • Assist the Mangaung Business Chamber and LED office in marketing MMM within the broader region as retail and investment destination • Establish a local material supply chain linked to ongoing services in maintenance work such as plumbing, electrical work, woodwork and light manufacturing on the estate 		
Cumulative impacts:		
<ul style="list-style-type: none"> • None 		
Residual Risks:		
<ul style="list-style-type: none"> • N/A 		
NO GO Alternative		
A No Go Option means the status quo/baseline conditions of the area will remain the same		

6.3.11.3 Comparative Assessment of Layout Alternatives

From an **economic perspective**, there is no significant difference in the potential impacts of the two layout alternatives. Therefore, there is **no preference** between the two layout alternatives from an economic perspective.

6.3.13 Air Quality Impacts

6.3.13.1 Description of air quality Impacts

The following impacts are identified as the major impacts associated with the development and which are assessed, for the construction phases of two layout alternatives.

- Noise
- Dust
- Exhaust Air Emissions

6.3.13.2. Summary of impacts associated with the proposed Wildealskloof Mixed use development during the construction and operational phase

The two layout alternatives options discussed in section 6.2 do not differ in any significant way as far as the impacts on the air quality is concerned. Therefore, there is no significant difference in the potential impacts associated with these alternatives, and the impacts for the two alternatives are not

going to be assessed separately in the assessment tables below. The impacts assessment tables below apply to both Layout Alternative 1 and Layout Alternative 2.

Nature: Air Quality Impact		
Activity		
<ol style="list-style-type: none"> 1. Noise: Movement of moving construction vehicles may add to the background noise in the area. 2. Dust: Clearance of vegetation will expose bare ground and movement of heavy duty vehicles and machinery on site will generate dust 3. Vehicular emissions (e.g. carbon monoxide) release from construction machinery and vehicles 		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Duration</i>	Medium-term (3)	Very short-term (1)
<i>Extent</i>	Limited to the Local Area (2)	Limited to Site (1)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	44 (Moderate)	18 (low)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	Moderate	Low
<i>Can impacts be mitigated?</i>	Yes	
OPERATIONAL PHASE		
No significant impacts are expected on air quality during operation of the development		
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • Working hours should be kept between daylight hours during the construction phase, and/or as any deviation that is approved by the relevant authorities. • The contractor must ensure that open fires on the site for heating, smoking or cooking are not allowed except in designated areas. • A comprehensive employee induction programme covering air quality must be included in the induction programme. This must be addressed in the construction EMP as the best practice. • A continuous dust monitoring process needs to be undertaken during construction. • Speed restriction of 40km/h must be implemented for all construction vehicles. • All vehicles transporting friable materials such as sand, rubble etc. must be covered by a tarpaulin or wet down. • No burning of refuse or vegetation is permitted on site. • Ensure no blown litter to other neighbouring farmlands • An appropriate dust suppressant must be applied on all exposed areas as required to minimise/control 		

<p>airborne dust.</p> <ul style="list-style-type: none"> • Construction vehicles must be in good working order. Smoking vehicles should be taken for maintenance • Dust masks must be provided to the construction crew • Provide Personal Protective Equipment (PPE) such as dust masks for workers when required • Construction activities must be limited to normal working hours and according to municipal bylaws, i.e. working hours must be limited to weekdays only. • If construction is required on the weekend; permission from adjacent landowners will be required prior to construction. • No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site. • Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers etc.) must be used as per operating instructions and maintained properly during site operations. • Provide Personal Protective Equipment (PPE) such as ear plugs for workers when required • Ensure construction noise does not exceed 85 decibels in accordance to the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). • Ensure all construction machinery and vehicles are in good working order, no vehicles that will release black smoke to the environment should be allowed on site. • All forms of dust/air pollution must be managed in terms of the NEMA Air Quality Act (AQA) 2004, (Act 39 of 2004); this includes the control of noxious and offensive gases, smoke, dust and vehicular emissions. Under no circumstances may toxic pollutants of high concentration be released into the air. • Construction activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment • Unnecessary honking of construction vehicles should not be allowed on site. • Introduce a formal recording system/grievance mechanism to capture public perceptions and complaints with regard to noise impact.
<p>Cumulative impacts None anticipated</p>
<p>Residual Risks: None anticipated</p>
<p>NO GO Alternative A No Go Option means the status quo/baseline conditions of the area will remain the same</p>

6.3.13.2 Comparative Assessment of Layout Alternatives

In terms of impacts arising from air quality as a result of construction activities, there is **no difference** in the potential impacts associated with the two layout alternatives. The impact will be similar for both alternatives. Therefore, there is **no preference** between the two layout alternatives.

6.3.14 Pollution Impacts due to inappropriate waste management

6.3.14.1 Description of pollution Impacts

The following impacts are identified as the major impacts associated with the development and which are assessed, for the construction and operation phases of two layout alternatives.

- Visual nuisance due to unsightlyness of the site from inappropriate waste management
- Blown litter

6.3.14.2. Summary of impacts associated with the proposed Wildealskloof Mixed use development during the construction and operational phase

The two layout alternatives options discussed in section 6.2 do not differ in any significant way as far as the impacts on the air quality is concerned. Therefore, there is no significant difference in the potential impacts associated with these alternatives, and the impacts for the two alternatives are not going to be assessed separately in the assessment tables below. The impacts assessment tables below apply to both Layout Alternative 1 and Layout Alternative 2.

Nature Pollution due to inappropriate management of generated waste on site		
Activity: The development may generate waste which may result in unsightliness and potential pollution. This is valid equally for both Alternatives.		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
<i>Probability</i>	Highly probable (4)	Probable (2)
<i>Duration</i>	Medium-term (5)	Very short-term (1)
<i>Extent</i>	Limited to the Local Area (2)	Limited to Site (1)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	52 (Moderate)	12 (low)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
No significant impacts are expected on Pollution emanating from waste generation during operation of the Wildealskloof Mixed Use Development. It is expected that waste will be collected on a weekly basis by the Municipality.		
<i>Probability</i>	Improbable (2)	Improbable (2)
<i>Duration</i>	Very short-term (1)	Very short-term (1)
<i>Extent</i>	Limited to Site (1)	Limited to Site (1)
<i>Magnitude</i>	Minor (2)	Minor (2)
<i>Significance</i>	8 (low)	8 (low)
<i>Status (positive or negative)</i>	Negative	Negative (Negligible)
<i>Reversibility</i>	Low	Moderate
<i>Irreplaceable loss of resources?</i>	Moderate	Low

<i>Can impacts be mitigated?</i>	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> • Regular litter picking and general waste bins must be readily available for litter disposal and general housekeeping. • All solid waste generated during the construction process must be placed in a designated waste collection area within the construction camp and must not be allowed to blow around the site, be accessible to animals, or be placed in piles adjacent the waste skips / bins. • All solid waste must then be disposed of at the nearest licensed landfill and safe disposal certificates obtained and retained on file. • Separate waste skips/ bins for the different waste streams must be available on site. • The waste containers must be appropriate to the waste type contained therein and where necessary should be lined and covered. This will be managed through the site specific EMPr and monitored by the ECO. • No waste (hazardous or general) will be disposed of in the wetland and around the construction footprint. • All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site • All excess material and rubble must be removed from the site so not to restrict the rehabilitation process. • Adequate chemical toilet facilities must be provided for all staff members as standard construction practice. Monitor the sewerage facilities for spillages, and handle any spillages as hazardous waste; • Chemical toilets must be placed within the construction camp and not in close proximity to the river/wetlands. The chemical toilets to be provided must be from a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record. • General waste must not at any time be mixed with hazardous waste. • No burning of refuse or vegetation is permitted on site. • Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period of the project are disposed of an approved at dumping site as approved by the Municipality. • A comprehensive employee induction programme, covering waste management protocols. This must be addressed in the construction EMPr as the best practice. • The Contractor shall provide sanitation facilities in the form of chemical toilets, at all camps, offices, workshops and construction sites for staff and visitors. No other form of sanitation will be permitted unless a connection with a local sewer main is possible. The provision of this facility will comply with current legislation. A minimum of one toilet per 11 people or within 100 meters of the work site in order to prevent any breach of sanitary bylaws or offence to public decency. • All staff are to use the toilets at all times rather than informal defecation in the environment. • Any sewerage spillages must be regarded as hazardous and cleaned up immediately using appropriate PPE • Provided designated eating and smoking areas. • Screening for unsightly works 	

<i>Cumulative impacts</i> None expected
<i>Residual Risks:</i> None anticipated
<i>NO GO Alternative</i> A No Go Option means the status quo/baseline conditions of the area will remain the same

6.3.14.2 Comparative Assessment of Layout Alternatives

In terms of impacts arising from pollution due to inappropriate management of generated waste on site as a result of construction and operation activities, there is **no difference** in the potential impacts associated with the two layout alternatives. The impact will be similar for both alternatives. Therefore, there is **no preference** between the two layout alternatives

6.3.15 Storm water runoff and erosion impacts

6.3.15.1 Description of pollution Impacts

The following impacts are identified as the major impacts associated with the development and which are assessed, for the construction and operation phases of two layout alternatives.

- Erosion
- Storm water runoff (cleared vegetation will reduce the infiltration of rainwater to below water aquifers)
- Storm water runoff (more especially during the operation phase as hardened surfaces prevent the infiltration of storm water to below water aquifers)
- Potential sedimentation of the watercourse

6.3.15.2. Summary of impacts associated with the proposed Wildealskloof Mixed use development during the construction and operational phase

The two layout alternatives options discussed in section 6.2 do not differ in any significant way as far as the impacts on the air quality is concerned. Therefore, there is no significant difference in the potential impacts associated with these alternatives, and the impacts for the two alternatives are not going to be assessed separately in the assessment tables below. The impacts assessment tables below apply to both Layout Alternative 1 and Layout Alternative 2.

Nature Storm water runoff and erosion		
Activity: The clearing of vegetation during construction and increased hardened surfaces during operation may result in storm water runoff and potential erosion. This is valid equally for both Alternatives.		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
<i>Probability</i>	Probable (2)	Probable (2)
<i>Duration</i>	Medium-term (5)	Very short-term (1)
<i>Extent</i>	Limited to the Local Area (2)	Limited to Site (1)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	26 (Low)	12 (low)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Duration</i>	Short-term (2)	Very Short-term (1)

<i>Extent</i>	Limited to the Local Area (2)	Local Area (2)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	40 (Medium)	21 (low)
<i>Status (positive or negative)</i>	Negative	Negative (Negligible)
<i>Reversibility</i>	Low	Moderate
<i>Irreplaceable loss of resources?</i>	Moderate	Low
<i>Can impacts be mitigated?</i>	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> • A detailed storm water management plan for the site (including storm water management to be implemented temporarily during construction phase and permanent measures to be installed for the operation phase) must be approved by the Local Municipality • A storm water management and erosion control plan, as well as a rehabilitation plan should be implemented. • Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced; this must be done in consultation with the ECO • The contractor shall ensure that excessive quantities of sand, silt and silt-laden water do not enter watercourses. Appropriate measures, e.g. erection of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses must be taken • Silt trenches between the works area and downstream wetland could be used to trap any sediment washing off the works area and to prevent scouring of the stream line in case of heavy flows. This will provide protection for the downstream section of the wetland • Where wetlands are adjacent to the construction areas and these areas slopes toward the wetland, install sediment barriers along the edge of the construction areas as necessary to prevent sediment flow into the wetland, including the section of the road extension that runs parallel to the wetland • Sediment barriers must be properly maintained throughout construction and reinstalled as necessary until replaced by permanent erosion controls or restoration of adjacent upland areas is complete • It is important that topsoil should be conserved in areas where bedrock is shallow to avoid sedimentation. • No topsoil or subsoil should be stockpiled next to the watercourse. • Should water need to be pumped around the works area and discharged back into the wetland, care must be taken to ensure that the water is discharged in a manner that does not cause siltation or erosion downstream. As such it is recommended that any water to be discharged from pumping around the construction area or from dewatering operations be first discharged into a structure that allows the settlement of all suspended material, and which allows the diffuse discharge of water 		
<p>Cumulative impacts None expected</p>		
<p>Residual Risks: None anticipated</p>		
<p>NO GO Alternative</p>		

A No Go Option means the status quo/baseline conditions of the area will remain the same

6.3.15.2 Comparative Assessment of Layout Alternatives

In terms of impacts arising from Storm water runoff and erosion as a result of construction and operation activities, there is **no difference** in the potential impacts associated with the two layout alternatives. The impact will be similar for both alternatives. Therefore, there is **no preference** between the two layout alternatives

6.3.16 Pollution impacts from inappropriate handling of hazardous material on site

6.3.16.1 Description of pollution Impacts

The following impacts are identified as the major impacts associated with the development and which are assessed, for the construction and operation phases of two layout alternatives.

- Soil contamination
- Contamination of storm water
- Potential contamination of groundwater resources

6.3.16.2. Summary of impacts associated with the proposed Wildealskloof Mixed use development during the construction and operational phase

The two layout alternatives options discussed in section 6.2 do not differ in any significant way as far as the impacts on the air quality is concerned. Therefore, there is no significant difference in the potential impacts associated with these alternatives, and the impacts for the two alternatives are not going to be assessed separately in the assessment tables below. The impacts assessment tables below apply to both Layout Alternative 1 and Layout Alternative 2.

Nature: Pollution impacts from inappropriate handling of hazardous materials on site		
Activity: The inappropriate handling of hazardous materials e.g. cement, hydrocarbon etc.) used on site may result in pollution to soil and water resources		
<i>. (it is also worth noting that three filling stations are proposed on site and during hydrocarbon tank installation spillages may occur). This is valid equally for both Alternatives.</i>		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
<i>Probability</i>	Definite (5)	Highly Probable (4)
<i>Duration</i>	Medium-term (3)	Medium-term (3)
<i>Extent</i>	Limited to site (1)	Limited to site (1)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	50 (Medium)	24 (low)
<i>Status (positive or negative)</i>	Negative	Negative
OPERATIONAL PHASE		
<i>Probability</i>	Improbable (2)	Very improbable (1)
<i>Duration</i>	Long-term (4)	Long-term (4)
<i>Extent</i>	Limited to the Local Area (2)	Local Area (2)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	24 (Low)	10 (Very low)

<i>Status (positive or negative)</i>	Negative	Negative (Negligible)
<i>Reversibility</i>	Low	Moderate
<i>Irreplaceable loss of resources?</i>	Moderate	Low
<i>Can impacts be mitigated?</i>	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> All fuel stored on Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants. Drip trays are to be inspected on a weekly basis for leaks and effectiveness, and emptied. This is to be closely monitored during rain events to prevent overflow. Spill kits must be available on site for the clean-up of any hydrocarbon spillages Hazardous chemicals or potentially hazardous chemicals used during construction shall be stored in secondary containers. Safety Data Sheets (SDSs) must always be readily available on site for all chemicals and hazardous substances to be used on site. An appropriate storm water management system must be included in the final site layout. The design must ensure that all runoff from the forecourt is directed into the storm water management system, which must include an oil/water separator. No storm water runoff may be concentrated onto adjacent properties All fuel stored on Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants. Drip trays are to be inspected on a weekly basis for leaks and effectiveness, and emptied. This is to be closely monitored during rain events to prevent overflow. Spill kits must be available on site for the cleanup of any hydrocarbon spillages. Hazardous chemicals or potentially hazardous chemicals used during construction shall be stored in secondary containers. The mixing of cement must not be undertaken directly on bare soils, hard durable plastic, wheelbarrows or metal containers can be used. <p><u>Requirements for the construction of filling stations</u></p> <ul style="list-style-type: none"> As far as possible, all yards and storage areas to be enclosed by masonry walls or screens. The parking bays should be paved with brick or other unit pavers to minimise expansive asphalt areas. All tanks, piping and filler points should be designed such that there is secondary containment as a safety precaution should a leak develop. Secondary containment includes but is not limited to the construction of concrete bunkers for tanks and concrete channels for piping a filler points <p>(i) <u>Tank, pipes and other work installation</u></p> <ul style="list-style-type: none"> Applicant must at own cost install a water connection point to the satisfaction of the council. This may include a suitably sized reservoir with a booster pump station 		

<ul style="list-style-type: none"> • The applicant must install a bio chemical sanitation system to the requirements of the Department of Water Affairs • Tank and pipe work installation must comply with the necessary SANS codes especially SANS 1535 and SANS 089-3 • The Underground storage tanks (USTs) will be composite tanks constructed and installed according to relevant National Building Regulation and SANS codes (10089-3, 10400:1987, 1020, 10142-1, 10108, 10131-2) • The UST installation must comply with SANS 10089 part 1 (storage of dangerous goods in USTs). • The USTs must have a secondary containment area to prevent subsurface leaks from seeping directly into the ground.
<p>Cumulative impacts None expected</p>
<p>Residual Risks: None anticipated</p>
<p>NO GO Alternative A No Go Option means the status quo/baseline conditions of the area will remain the same</p>

6.3.16.2 Comparative Assessment of Layout Alternatives

In terms of impacts arising pollution of soil, storm water, groundwater as a result of inappropriate handling of hazardous materials (e.g. cement, hydrocarbons etc.) during the construction and operation activities, there is **no difference** in the potential impacts associated with the two layout alternatives. The impact will be similar for both alternatives. Therefore, there is **no preference** between the two layout alternatives

6.3.17 Other Impacts

6.3.17.1 Impacts on Topography, Soils and Geology

The study area is generally flat with one hill on the study site. Little impacts are anticipated. The soils on site are high in clay content, with shrink-swell characteristics, limited depth and occurrence of rock outcrops. No Cumulative impacts would be relevant.

6.3.17.2 Impact on groundwater

During the geohydrology survey reported that no ground water was encountered during the geotechnical investigation. This indicates a low water table; therefore potential impacts to ground water in this regard will be negligible. No Cumulative impacts would be relevant.

6.3.17.3 Impacts on the Land Use

The site was previously zoned as agriculture but the IDP has been reviewed and the portion of land is now included in the urban edge earmarked for development. The Spatial Development Framework (SDF) of Mangaung Metropolitan Municipality (2016) has thus included the proposed Wildealskloof Mixed Use site within its planned urban edge. The planned development is thus in accordance with the macro framework policy of the Mangaung Metropolitan Municipality and the applicant can submit a township establishment in line with the requirements of the Municipality. There is therefore no impact on land use.

6.4 Cumulative Impacts

Cumulative impacts in relation to an activity are defined in the Environmental Impact Assessment Regulations (Government Notice R982) as meaning “the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area”.

There is a legislated requirement to assess cumulative impacts associated with a proposed development. This chapter looks at whether the proposed project’s potential impacts become more significant when considered in combination with the other known or proposed development within the area.

As shown on the image below, there are Master Site Development Plans and township applications one such is proposed on *the Remainder of the farm Bergendal 1706. The proposed development will have a footprint of 39.56ha. The proposed project entails residential development of 106 special residential dwelling erven, 1 institutional erf 1 private open space*). The said development is proposed opposite the Wildealskloof mixed use development.

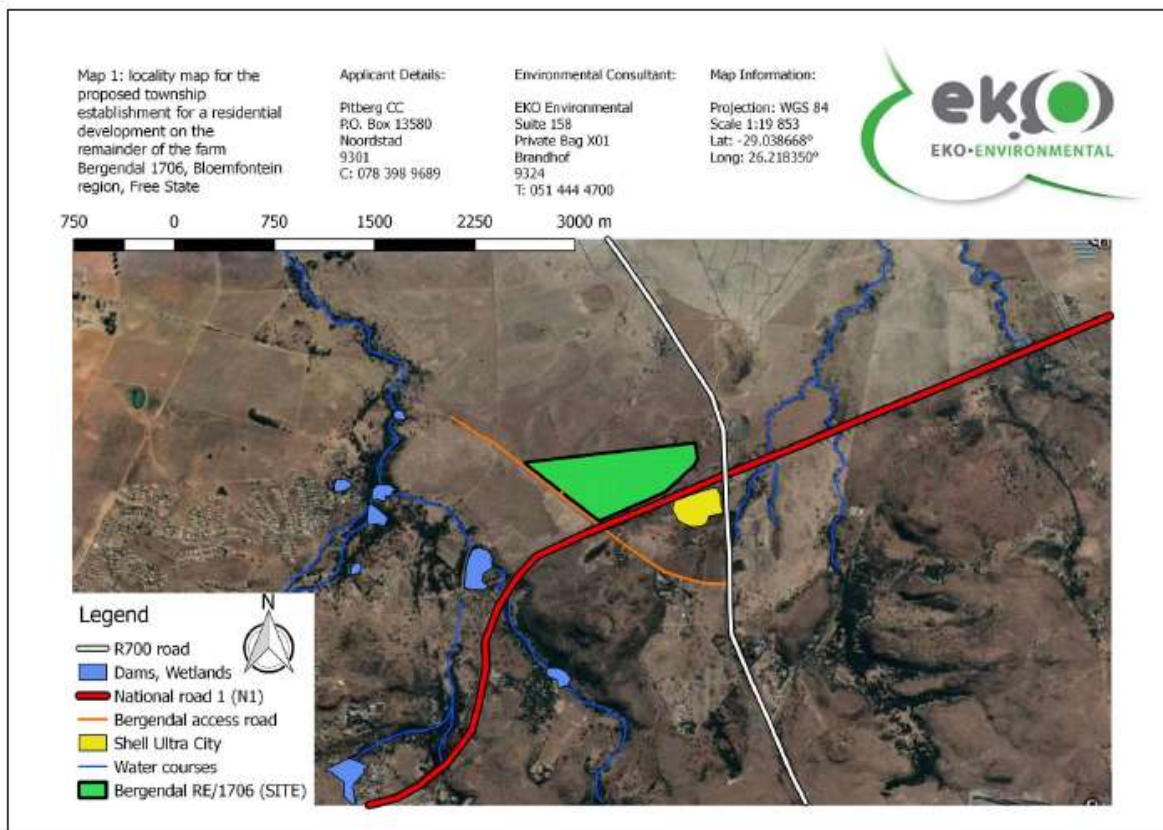
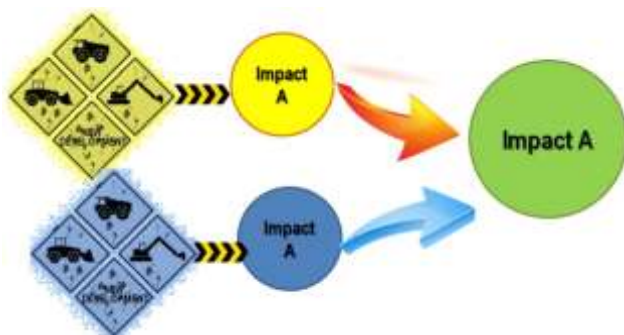


Figure 6-1: other township developments proposed in the area; source EkO Environmental EIA public documents

The project has a combined effect when assessed in conjunction with other activities such as the one in figure 6-1. The individual insignificant impacts of several developments might have a significant **cumulative** adverse impact on the environment when viewed together, as illustrated in the graph below



The following cumulative impacts have been identified in terms of the proposed development:

- Potential loss of vegetation and habitat due to this and other developments in the area: Excessive clearing of vegetation as a result of multiple project could significantly impact local and regional population dynamics plants species regarded as Near Threatened as well as other type of

grasslands within the project area. This can influence runoff and storm water flow patterns and dynamics, which could cause excessive accelerated erosion of small ephemeral drainage lines, rivers and this, could also have detrimental effects on wetlands within the area. Large-scale disturbance of indigenous vegetation creates a major opportunity for the establishment of invasive species and the uncontrolled spread of alien invasive into adjacent agricultural land and rangelands. Cumulative impacts on ecology are expected to be of low to moderate significance as other developments planned around the project are on similar habitats.

- Cumulative Impact on wetlands:

- (i) *Changes in water flow regime:* Construction and operational activities may result in cumulative impact to the water courses within the local catchments and beyond. These impacts include local and downstream erosion, sedimentation and canalization of watercourses. It is imperative that effective protective measures should be put into place and their efficiency monitored. A rehabilitation plan should be put into action should any degradation be observed as a result from water discharge or sediment input. Increases in storm water flows will definitely cause permanent degradation downstream unless mitigated at the design level.
- (ii) *Changes in sediment entering and exiting the system:* Cumulative impacts are expected to be high. Cumulative impacts include smothering of vegetation and loss of capacity of downstream water bodies. Reversing this process is unlikely and should be prevented in the first place.
- (iii) *Introduction and spread of alien vegetation:* Regional increase in the density and composition of alien invasive plants. Regular monitoring should be implemented during construction, rehabilitation including for a period.
- (iv) *Loss and disturbance of watercourse habitat and fringe vegetation.* Cumulative impacts are expected to be moderate and include the loss of specialized habitat.
- (v) *Changes in water quality due to pollution:* Cumulative impacts are expected to be moderate and include a regional decrease in water quality. Once in the system it may take many years for some toxins to be eradicated.

- Cumulative Impact on Vegetation:

- (vi) *Loss of floral habitat:* Overall cumulative impacts as a result of the proposed project are considered to be high. This is due to the extensive footprint area of the study area and the possibility that the proposed development will lead to similar development being planned and implemented in the larger region. This could cumulatively lead to the loss of migratory and dispersal connectivity of both faunal and floral species, loss of support habitat for CBA areas, as well as further degradation of any intact Bloemfontein Dry Grassland that may occur in the area.
- (vii) *Loss of floral species diversity:* Overall cumulative impacts as a result of the proposed project are considered to be low. Cumulative impacts may include the combined impact of various similar developments in the area. Cumulative impacts may include the cumulative loss of floral species diversity within the larger region. The disturbance

of large areas of natural vegetation in the region may contribute towards increased alien plant species proliferation, as well as bush encroachment in the region.

(viii) *Loss of floral Species of Conservation Concern.* A high number of provincial floral SCC is known to occur in the larger region. Transformation and further loss of habitat within the area may result in such species facing extinction.

- Cumulative Impact on Heritage Resources: Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive. Archaeological materials such as the graveyard, MSA stone tools (blades and scrapers) and flakes (Stone or Iron Age) material and at least twenty structures identified as sangars occur on the western side of the hill, with a few located on the eastern side on the proposed site. It still remains important for each planned development to observe mitigation measures and to incorporate any sensitive heritage features into the layout plans where possible. The Cumulative impact will therefore be low if mitigation measures are implemented.
- Cumulative Impact on Paleontological Resources: Negligible
- Cumulative Impact on avifauna
 - (i) Habitat loss: Cumulative impacts will result in additional loss of natural habitat in an area that is already highly disturbed.
- Impact on Traffic: There will be potential traffic congestion problems on secondary roads due to this project and other new township developments proposed in the area especially if construction of these township developments will happen at the same time and if no mitigation measures are implemented.

Cumulative impact on Visual: No risk of cumulative impacts as this is the only urban development in this context.

- Potential loss of viable and high potential agricultural/ grazing land: Agricultural land adjacent to urban areas is under inevitable pressure from development. The overall loss of agricultural land on the outskirts of Bloemfontein due to other developments is low. In this case the low agricultural potential of the land, limits the significance of its loss to agriculture. The cumulative impact is offset by major limitations to agriculture in the area limited by the soil types and the low rainfall received in the area. The soil limitations for rain fed crop production are high clay content, with shrink-swell characteristics, limited depth and occurrence of rock outcrops. The very high clay content soils are limited in terms of their plant available moisture reservoir. The limited moisture reservoirs, in combination with fairly low rainfall, make the study area unsuitable for rain fed crop

production. Insufficient water availability limits the potential for irrigation and viable crop production

Impact on the Social Environment: The development will have positive and negative social impacts both during construction and operation as follows

(i) Negative Cumulative impacts

- Changes in the property values due to development pressure to the north of Bloemfontein
- Other property developments to the north of Bloemfontein could decrease the costs of developers to fund services in the area e.g. road upgrades

The cumulative impacts will be Medium with or without mitigation

(ii) Positive Cumulative Impacts

- local employment and income
- Economic growth
- Possible cumulative intrusion impacts due to other mixed use and residential developments planned in the Bloemfontein area

The cumulative impacts will be Medium with or without enhancement.

Impact on the Economic Environment: The development will have positive and negative social impacts both during construction and operation as follows

(i) Negative cumulative impacts

- Changes in the property values due to development pressure to the north of Bloemfontein.
- Other property developments to the north of Bloemfontein could decrease the costs of developers to fund services in the area e.g. road upgrades

The economic negative cumulative impacts will be medium with or without mitigation

(ii) Positive Cumulative Impacts

- Possible cumulative intrusion impacts due to other mixed use and residential developments planned in the Bloemfontein area
- Possible improved skills among some locals that were involved with the construction of other related housing projects in the Bloemfontein area.
- Positive Impact on the income of low income households and income distribution in MMM during construction.

The economic positive cumulative impacts will be medium with or without enhancement

6.5 Assessment of the Do Nothing Alternative

The 'Do-Nothing' alternative is the option of not constructing the proposed Wildealskloof Mixed Use Development. Should this alternative be selected, there would be no environmental impacts on the site due to the construction and operation activities. The development is proposed on an area already

impacted by other anthropogenic activities such as agriculture (possible overgrazing), quarrying, while the majority of the study site was cleared with large road sections. The land capability on the proposed site is limited by the low climatic moisture availability and the high clay content and somewhat shallow soils. In addition the project site is now included within the urban edge and therefore the site is appropriate for the intended development.

At a social economic level, the social issues identified would not materialise should the proposed project not proceed and the status quo in the area would therefore remain. Construction related impacts on the social environment that are expected would therefore not occur which could be viewed by some as positive. Long term possible negative impacts on the daily living and movement patterns, land-use, and sense of place and change of character of the area would thus also be negated.

The most significant social impact with regards to the no-go alternative would result in a significant loss in terms of addressing the housing needs in the MMM area. Meeting housing needs remains one of the MMM's biggest challenges. Furthermore, the possible extension of informal settlements in the already densely populated areas in close proximity to the proposed development would not be curbed.

The opportunity costs would include the loss of employment and business opportunities associated with the construction phase of the project, as well as the long term economic benefits for local businesses, industries and service providers due to the increased population figures.

The need for low-income housing opportunities to assist the poor out of poverty and cater for the informal settlements area is a critical issue. The issue thus revolve around the challenge of poverty and ensuring that vulnerability, inequality and social exclusion are addressed. Furthermore, the development aims to aid urban integration. Therefore, due to the housing needs within the MMM, it is not recommended that the no-go alternative be pursued. In addition the identified impacts with the proposed development can also be mitigated to acceptable levels

6.6 Summary of Impacts

Table 6-1 summarises all potential impacts associated with the proposed construction and operation of the Wildealskloof Mixed Use Development.

Table 6-1: Summary of impacts associated with the proposed construction and operation of the Wildealskloof Mixed Use Development.

Layout Alternative 1 (Proposed) and Layout Alternative 2 Designs

Impact Category	Construction		Operation	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Visual (Observer)	(52) Medium	(27) Low	(70) High	(40) Medium
Visual (Landscape character)	(70) High	(60) Medium	(75) High	(65) High
Destruction/Alteration of Heritage artefacts or features - Layout Alternative 1	14 (Low)	5 (Low)	NO impact expected during operation	
Destruction/Alteration of Heritage artefacts or features Layout Alternative 2	65 (High)	44 (Medium)	NO impact expected during operation	
Paleontological Impacts	(8) Low	(7) Low	NO impact expected during operation	
Traffic Impacts	70 (High)	27 (low),	33 (Medium)	14 (Low)
Soil and Agricultural Impacts	50 (Medium)	-	NO impact expected during operation	
Avifauna Habitat loss Layout Alternative 1	48 Medium	33 Medium	44 (Medium)	30 (Medium)
Avifauna Disturbance layout Alternative 1	44 (Medium)	30 (Medium)	40 (Medium)	27 (Low)
Avifauna Habitat loss Layout Alternative 2	52 (Medium)	36 (Medium)	48 (Medium)	33 (Medium)
Avifauna Disturbance layout Alternative 2	48 (Medium)	33 (Medium)	44 (Medium)	30 (Medium)

Loss of floral vegetation habitat	85 (High)	56 (Medium)	48 (Medium)	24 (Low)
Loss of floral species diversity.	65 (High)	44 (Medium)	36 (Medium)	16 (Low)
Loss of floral Species of Conservation Concern	75 (High)	39 (Medium)	36 (Medium)	16 (Low)
Changes in wetland water flow regime	65 (High)	44 (Medium)	60 (Medium)	44 (Medium)
Introduction and spread of alien vegetation in wetlands.	33 (Medium)	24 (low)	33 (Medium)	18 (low)
Loss and disturbance of watercourse habitat and fringe vegetation	65 (high)	40 (Medium)	39 (Medium)	16 (Low)
Changes in wetland water quality due to pollution	42 (Medium)	18 (Low)	52 (Medium)	24 (low)
Destruction of natural and sensitive mammals & Heperto fauna habitat	60 (Medium)	27 (low)	55 (Medium)	27 (low)
Loss of ecosystem function of wetlands	65 (high)	27 (low)	60 (Medium)	27 (low)
Poaching of wildlife in the vicinity	45 (Medium)	21 (low)	36 (Medium)	16 (Low)
Reduction of natural migratory and faunal dispersal routes.	65 (high)	27 (low)	60 (Medium)	27 (low)
Possible increase in exotic vegetation	33 (Medium)	24 (low)	33 (moderate)	18 (low)
Displacement of indigenous mammals & vertebrates	60 (Medium)	27 (low)	55 (Medium)	27 (low)
Impact on air quality	44 (Moderate)	18 (low)	NO impact expected during operation	
Potential soil and groundwater contamination			NO impact expected during operation	

Pollution due to inappropriate handling of generated waste on site	52 (Moderate)	12 (low)	8 (low)	8 (low)
Storm water runoff and erosion	26 (Low)	12 (low)	40 (Medium)	21 (low)
Pollution impacts from inappropriate handling of hazardous materials on site	50 (Medium)	24 (low)	24 (Low)	10 (Very low)
Population Change	(60) Medium	(48) Medium	High (75)	Medium (56)
Inflow of temporary workers	(70) High	(48) Medium	NO impact expected during operation	
Influx of jobseekers	(52) Medium	(36) Medium	NO impact expected during operation	
Employment opportunities	(30) (+)Medium	(56) (+)Medium	Medium (36) (+)	High (64) (+)
Impact on Land Use	(60) Medium	(48) Medium	NO impact expected during operation	
Impact on sense of place	(52) Medium	(36) Medium	High (70)	Medium (56)
Safety and Security Risks	(52) Medium	(36) Medium	Medium (56)	Medium (39)
Health Risks	(52) Medium	Medium (36)	NO impact expected during operation	
Impact on housing	(36) (+)Medium	(64) (+)High	NO impact expected during operation	
Infrastructure and Services	(56) Medium	(42) Medium	Medium (60)	Medium (45)
Intrusion Impacts	(52) Medium	(36) Medium	NO impact expected during operation	
Impact on Property Values	NO impact expected during construction		(56) Medium	(42) Medium
Introduction of new social classes	NO impact expected during construction		(56) Medium	(42) Medium
Impact on daily living and movement patterns	NO impact expected during construction		(56) Medium	(42) Medium
Impact on educational facilities	NO impact expected during construction		(42) (+)Medium	(56) (+)Medium
Impact on health care facilities	NO impact expected during construction		(42) (+)Medium	(56) (+)Medium
Increase of household income levels from employment and supply opportunities	(60) (+)Medium	High (65) (+)	NO impact expected during operation	

Negative impact on adjacent economic activities	(24) (-)Low	Low (16) (-)	NO impact expected during operation	
Permanent loss of land	(50) (-)Medium	(50) (-)Medium	50) (-)Medium	(50) (-)Medium
Negative impact on adjacent property values	(39)(-) Medium	(33)- Medium	NO impact expected during operation	
Positive Impact on the income of low income households	(40) (+)Medium	(50) (+)Medium	NO impact expected during operation	
Increase in tax income of central government	(55) (+)Medium	(55) (+)Medium	NO impact expected during operation	
Increase in local employment and income opportunities during operations	NO impact expected during construction		(33) (+)Medium	(52) (+)Medium
Negative impact on other businesses	NO impact expected during construction		(39) (-)Medium	(27)- Low
Pressure on public transport in remote area	NO impact expected during construction		(52)(-) Medium	(39) - Medium
Increase in revenues income for local government	NO impact expected during construction		(55) (+)Medium	(55) (+)Medium

7. CONCLUSIONS AND RECOMMENDATIONS

This chapter provides an Environmental Impact Statement, summarizes the key findings and recommendations in the EIA Report. The conclusions and recommendations of this EIA are the result of the assessment identified by specialists and parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area.

Envirolution Consulting (Pty) Ltd was contracted by Ideal Consulting as the independent environmental consultants to conduct the Environmental Impact Assessment (EIA) Process on behalf of Ideal Consulting, and undertake a Scoping & Environmental EIA) process for the proposed Wildealskloof Mixed Use Development. The Wildealskloof Mixed Use Development is proposed to be developed on the remaining extent of the Farm Orlig No. 1710 & Portion 4 of the Farm Wildealskloof No. 1205, Bloemfontein, Free State Province. The site is adjacent to the Provincial Road R700 and the National Road N1 and is approximately 10 km North of Bloemfontein CBD. The site geographical coordinates are: 29°01'26.76"S: 26°13'48.64"E: The site falls within the jurisdiction of Mangaung Metropolitan Municipality.

The details pertaining to each alternative considered, as well as the technical preference are provided below:

Design Layout Alternative 2 (Less preferred option) is proposed as indicated in the Figure 7.2 below. The design is similar to Design Layout Alternative 1 (Most preferred option) indicated in the Figure 7.1 for the majority of its orientation except on the south western section where Design Layout Alternative is proposing a heavy industrial land use in an area reported to be highly sensitive from a heritage and ecological perspective. The Layout Alternative 1 (Figure 7-2) proposed a public open space to the south-western corner of the study site (where the high sensitive hill and the rocky grassland and heritage resources were identified) to avoid land use features that would negatively impact on the identified heritage and ecological resources. Nonetheless the majority of the high floral sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both layout alternatives. The difference between the two layouts emanates from the fact that the high floral sensitivity Low Rocky Hill, Rocky Grassland vegetation units and heritage site were excluded from any development and instead included within a designated Open Space in **layout Alternative 1**

Please refer to Figure 7-3, 7-4 & 7.5 for the sensitivities aforementioned above.



Figure 7-1: Overview of the Design Layout Alternative 1.



Figure 7-2: Overview of the Design Layout Alternative 2

An EIA process, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing, and reporting environmental impacts associated with an activity. The EIA process forms part of the planning of a project and informs the final design of a development. In terms of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), Ideal Consulting, requires authorisation from the Department of Economic Development, Small Business Development, Tourism and Environmental Affairs (DESTEA) for the construction of the Wildealskloof Mixed Use Development. In terms of sections 24 and 24D of NEMA, as read with the EIA Regulations of R982, R983, R984 and R985 as amended by GN R326, R327, R324 and R325), a Scoping and an EIA Phase have been undertaken for the proposed project. As part of this EIA process comprehensive, independent environmental studies have been undertaken in accordance with the EIA Regulations. The conclusions and recommendations of this EIA are the result of the assessment of identified impacts by specialists, and the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area. A summary of the recommendations and conclusions for the proposed Wildealskloof Mixed Use Development project is provided in this Chapter.

7.1 Summary of Conclusions

The preceding chapters of this report together with the specialist studies contained within **Appendices D Volume 2** provide a detailed assessment of potential impacts on the social and biophysical environment that may result from the proposed project. This chapter concludes the EIA Report by providing a summary of the conclusions of the assessment of the proposed Wildealskloof Mixed Use Development. In so doing, it draws on the information gathered as part of the EIA process and the knowledge gained by the environmental specialist consultants and presents an informed opinion of the environmental impacts associated with the proposed project. Environmental specifications for the management of potential impacts are detailed within the Draft Environmental Management Plan (EMPr) included within Appendix E-1 of the main report.

The assessment of potential environmental impact presented in this report is based on an understanding of the infrastructure proposed provided by Ideal Consulting. Layout options have been considered and comparatively assessed. Environmental impacts of the proposed project are expected to be associated with the construction and operation activities. The majority of the environmental impacts associated with the development will occur during the construction phase. Environmental issues associated with the construction

The most significant environmental impacts identified and assessed to be associated with the proposed Wildealskloof Mixed Use Development include:

- Impacts on ecology (flora, fauna)occurring on the site (and
- Impacts on wetlands
- Heritage impacts
- Visual impacts
- Traffic impacts
- Social impacts (negative and positive)
- Socio economic impacts (negative and positive)

Other impacts which could have an impact on the environment include:

- Social and economic impacts (positive and negative)
- Visual impact (intrusion, negative viewer perceptions and visibility of the facility)

These and other environmental issues were originally identified to be associated with any of the layout alternatives considered. The environmental sensitivities identified in Figure 7.1 (heritage), 7.2 (ecology) & 7.3 (wetland) identified during the EIA Phase have informed recommendations made regarding the preferred alternative for implementation. The final placement of infrastructure within the proffered site must be informed by technical criteria and environmental sensitivities.

The following sections provide a summary of the assessment of the proposed Wildealskloof mixed Use Development.

7.1.2 Identified potential impacts resulting from the physical modification/disturbance of the site for the construction and operation of the proposed Wildealskloof Mixed Use Development

The above mentioned impacts are summarised as follows and the conclusions are drawn from the specialist studies undertaken within this scoping and EIA process.

7.1.2.1 Impact on Paleontological Resources

The study area was assessed in terms of the archaeological component of Section 35 of the NHRA during a field survey of the development footprint, no fossiliferous outcrops were found. For this reason, a low paleontological sensitivity is allocated to the development footprint. Irrespective of the uncommon

occurrence of fossils a solitary fossil may be of scientific value as many fossil taxa are known from a single fossil. The recording of fossils will expand our knowledge of the Paleontological Heritage of the development area. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the Wildealskloof mixed used development and associated infrastructure will be of a low significance in paleontological terms. It is therefore considered that the construction and operation of the Wildealskloof development is deemed appropriate and feasible and will not lead to detrimental impacts on the paleontological resources of the area. From a paleontological perspective, the construction and operation of the development may be authorised as the whole extent as the development footprint is not considered sensitive in terms of paleontological resources.

7.1.2.2 Impact on Heritage Resources

In terms of the built environment of the area (Section 34), the following heritage resources were discovered during the survey

- An existing informal burial place containing approximately 10 graves marked by stone cairns. (Farm: Orlig 1710; Coordinates: S 29, 02969, E 26, 22727).
- A low density scatter (1/5m²) of MSA stone tools (blades and scrapers) and flakes was identified at the eastern foot of the hill located in the south-western corner of the study area. (Farm: Orlig 1710; Coordinates: S 29, 03001, E 26, 22709).
- At least twenty structures identified as sangars occur on the western side of the hill, with a few located on the eastern side. (Farm: Orlig 1710; Coordinates: S 29, 02997, 26, 22577).

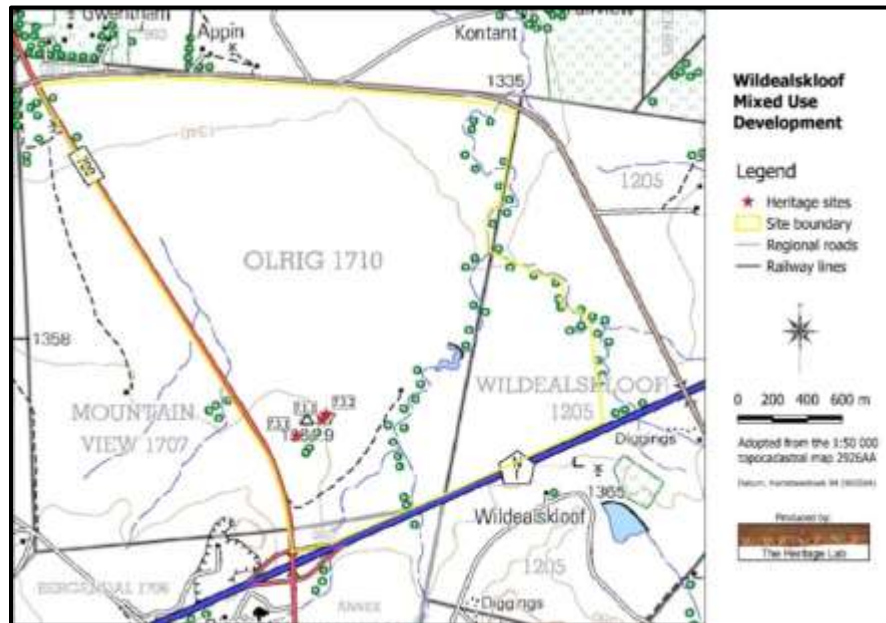


Figure 7-3: Location of heritage sites in the study area

Based on the results of the field survey of the proposed Wildealskloof Mixed Use Development there are **no significant heritage risks** associated with the development and from an archaeological point of view there is no reason why the development should not proceed if the recommendations as made in the report area adhered by and based on approval from SAHRA. Nonetheless of the two provided layouts, Layout Alternative 1 is more preferred as it has excluded the heritage sites from being developed and instead included the heritage site as part of the public open space

7.1.2.3 Impacts on Soil, Agriculture and Land use

Soils of the study site are predominantly fairly shallow, dark coloured, clay-rich soils on underlying rock, of the Arcadia, Milkwood and Bonheim soil forms, with some rock outcrops. The soil limitations for rain fed crop production are high clay content, with shrink-swell characteristics, limited depth and occurrence of rock outcrops. The very high clay content soils are limited in terms of their plant available moisture reservoir. The limited moisture reservoirs, in combination with fairly low rainfall, make the study area unsuitable for rain fed crop production. Insufficient water availability limits the potential for irrigation.

There is only one impact of the development on agriculture, and that is the loss to agriculture of the 580 hectares of agriculturally zoned land used for grazing due to rezoning and occupation of the site by the development. Because the land is unsuitable for cultivation, its loss as agricultural land is assessed as being of only medium significance.

Because the proposed development site is only suitable as grazing land, it is agriculturally strategic, from a regional and national food security point of view, to target such non-arable and less scarce land for satisfying inevitable urban development requirements, rather than higher potential arable land in the area. For this reason, from an agricultural impact point of view, the development should be authorised. There are no conditions resulting from this assessment that need to be included in the Environmental Authorisation.

7.1.2.4 Impacts on Vegetation

The proposed Wildealskloof Mixed Use development will impact largely on the transformed open grassland that was found to be of intermediate flora ecological sensitivity. However, low rocky hill and Rocky grassland vegetation and wetland and riparian vegetation unit were also recorded on site and were classified as high sensitivity to the proposed development. In addition, a number of Provincial species of conservation concern were also identified on site namely *Haemanthus humilis subsp. Humilis*, *Boophone disticha*; *Brunsvigia radulosa*, *Hypoxis hemerocallidea*, *Ammorcharis coranica*; *Nerine laticoma*, *Raphionacme dyeri*,

This assessment noted that the proposed development mainly makes use of areas where historical impacts took place (transformed open grassland of low ecological sensitivity). The majority of the high floral sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both layout alternatives. The high floral sensitivity Low Rocky Hill and Rocky Grassland vegetation units are also included within a designated Open Space in layout Alternative 1.

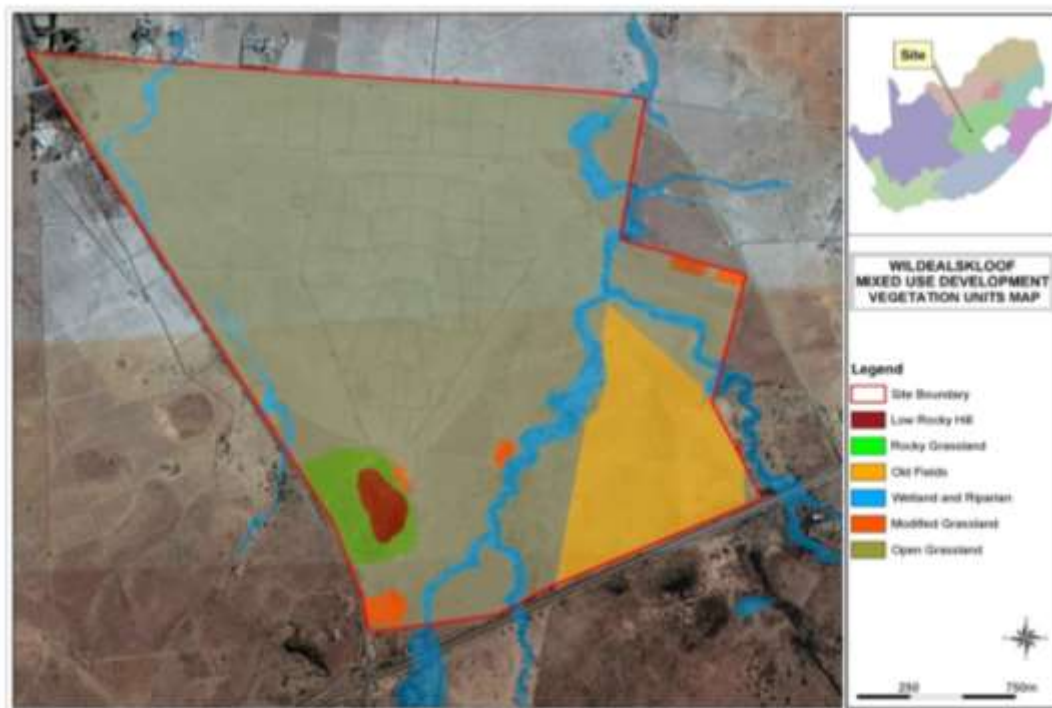


Figure 7-4: Sensitivity Map showing the rocky grassland, hill or kopje and wetland which must be excluded from any development due to unique habitats and the presence of many species, including the mountain reedbuck.

From the results of the impact assessment, it was found that the majority of the potential impacts may be reduced to medium or low significance impact levels. Based on the information gathered during the background and field assessments with regards to the ecological condition of the vegetation within the study area, it is the opinion of the vegetation specialist that the proposed project be considered favourably from a floral resource perspective, taking integrated environmental management into consideration and provided that the mitigation measures as set out in this report are implemented.

Such mitigation includes the conservation of the wetland areas and appropriate buffer areas identified, the conservation of the Low Rocky Hill and surrounding Rocky Grassland vegetation units as identified during the assessment, as well as considering conserving selected intact portions of open grassland within the study area as part of the open space areas of the development. In addition, the rehabilitation of any areas impacted as a result of the proposed project, the eradication and control of alien vegetation within the study area (with emphasis on the eradication of National Environmental Management Biodiversity Act (NEMBA) listed Category 1b species), as well as the on-going control and prevention of spread of alien species that may proliferate during operational of the project should take place.

In summary, from a vegetation perspective, **no objection can be raised** should development of the Wildealskloof proceed. Two layout alternatives are considered for the project (refer to Appendix A). When considering these layout alternatives from a floral perspective, the majority of the high floral sensitivity Wetland and Riparian vegetation units is included as part of a Public Open Space area within both alternatives. The high floral sensitivity Low Rocky Hill and Rocky Grassland vegetation units are also included within a designated Open Space area, while developments of these vegetation units are proposed in the alternative layout. Of the two layout alternatives considered, the layout Alternative 1 is the preferred alternative from a floral perspective.

7.1.1.5 Impact on Fauna

Overall, the remaining natural terrestrial habitats are considered as of only Medium-Low sensitivity, except for the non-perennial river, the two non-perennial streams and the small depressional pan wetland, as well as their buffer zones, should be considered as Medium-High ecologically sensitive. The hill or kopje is also sensitive and must be excluded from any development due to unique habitats and the presence of many species, including the mountain reedbeek. The Endangered Species treat the site as part of their home ranges / territories. There is a possibility that about 9 species of mammals with a Red Data status may occur on the study site. Most of these species include bats, which move over huge distances. It is very difficult to confirm whether any of the bat species are present on any study site, but there is a possibility that some red data bats species does occur on this particular study site.

In optimum conditions the possibility exists that the Southern African hedgehog may occur on the study site. There is a very small chance that the small spotted-cat, brown hyena and African striped weasel could occur on this particular study site. The possibility exists that at least some individuals of giant bullfrog and striped harlequin snake occur on the study site.

The development is expected to destruct mammal and herpetofauna habitats and also displace individual animals and vertebrates rather than populations, hence it is concluded that irreplaceable loss of species will not occur within the general area nor will any Red Data species be significantly affected.

From a mammal and Hepertofauna perspective, **no objection can be raised** should development of the Wildealskloof Mixed Use Development proceed.

7.1.1.6 Visual Impacts

The significance of the visual impact is determined through separate assessments of impacts on the landscape character and impacts on observers in the study area. This has been done for the construction and operational phases as each phase presents different impacts. The landscape character and the observers are receptors in the study area and have different sensitivities when confronted with an alteration to the status quo scenario. It is expected that each receptor will respond differently to the visual impacts.

The sources of impact originate from the construction activities during the lengthy construction phase and the major land use change and associated transformation of the baseline conditions in the study area.

The scale of the assessment includes the regional area up to 10 km but with a maximum impact zone reduced to a 3 km radius. The study area is considered to have a moderate VAC due to the varied topography to the south and south east as well as the major influence of vegetation on localised screening capacity. The baseline character is defined by a predominantly rural landscape with a land cover of grassland, agricultural fields and natural vegetation along tributaries and on hills and ridges.

Three observer groups are identified in the study area namely; residents, tourists and motorists. Residents and tourists are considered the most sensitive receptors. Residents from Mimosa Park S.H. and Ribblesdale are expected to experience the highest levels of visual exposure. Viewer incidence is however low due to the low population density. Affected tourists are identified as those visiting the nearby Sangiro Game Lodge and attractions at Tredenham Hill and Somerton Estate. A high viewer incidence is expected for motorists due to the high traffic volumes on the N1. Motorists' exposure to the visual impacts will however be brief and therefore their sensitivity is considered low.

The landscape character is considered to have a medium sensitivity. The site and its surroundings are not particularly unique, and its identity is typical of the rural Free State landscape. The grassy plains and small tributary are visually pleasing elements, but lack dramatic diversity to place it in a unique category. The site contributes to a regional sense of place that portrays a rural and sparsely developed sense of place with elements of natural features such as the undisturbed hills and tributary. A peaceful character prevails as farming activities cultivate land parcels while grasslands are grazed by cattle.

The essence of determining the significance of a visual impact centres on the severity of the potential impacts, and the sensitivity of the affected receptors. During the construction phase, moderate to

moderate/minor impacts are expected on the receptors with the highest rating being on the residents, tourists and landscape character. A major significant impact will occur during the operational phase on the residents and tourists, mainly due to the substantial visual change from a rural land use to a mixed-use development.

Mitigation measures are however paramount to alleviate the anticipated impacts. Screen planting will yield the greatest result and should be planted along the perimeter of the development in the early stages to gain maturity as soon as possible. The development should also consider roof gardens as well as adopt a vision of “greening” to compensate for the loss of vegetation. These measures should form part of a master plan development during the design and implementation phases.

No fatally flawed issues are identified on the bases of visual impacts, but serious consideration should be given to the IDP of Mangaung Metropolitan Municipality in order to adhere to town planning schemes etc.

7.1.1.7 Impact on Wetland

Four watercourses were recorded on the study site. The watercourses can be classified as one non-perennial ephemeral river, two non-perennial episodic streams (drainage lines) and one very small depressional pan wetland.

The episodic streams are very small and no clear channel could be discerned. The episodic streams also lacked woody species and were dominated by grasses similar to the adjacent terrestrial grasses with some additional species such as *Brachiaria eruciformis*, *Panicum coloratum* and *Pennisetum sphacelatum*. The site visit was conducted after heavy rains and no water flow was seen in these streams. Thus these small episodic streams are not likely to contribute greatly to stream flow regulation or conveyance of water.

The ephemeral stream located in the north eastern corner runs through to the south east and western corner of the study site. It is dominated by dense woody riparian vegetation. The stream flows from south to north where it flows into the Stinkhoutspruit River approximately 2 km north of the study site. During the site visit the main channel was recorded as flowing

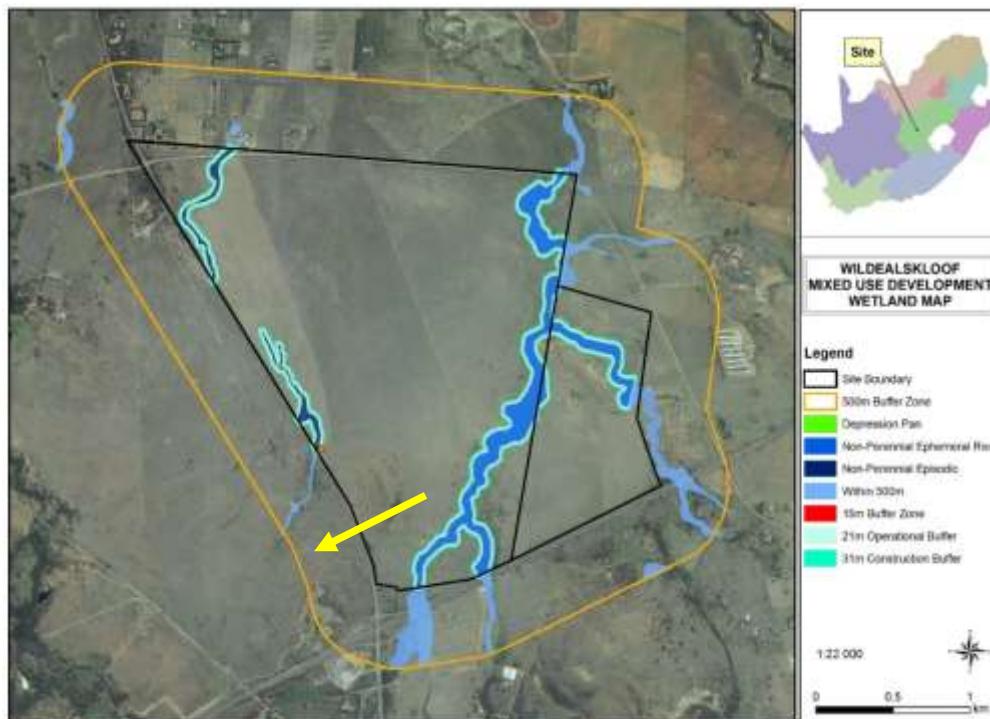


Figure 7-5: The location and extent of watercourses in relation to the study site and the associated scientific buffer. The yellow arrow points to the pan

The current assessment finds that a minimum buffer of (15-31) m from the edge of the wetland boundaries during the construction phase and (15-22) m from the edge of the wetland boundaries during the operation phase should be respected. Should development occur within the watercourse it is important that appropriate mitigation measures are put into place and carefully monitored to ensure minimal impact to regional hydrology. The majority of the Wetland sensitive area is included as part of a Public Open Space area within both layout alternatives. This assessment has demonstrated that the development is feasible and that there are no fatal flaws from a wetland perspective.

7.1.1.8 Social Impacts

The proposed Wildealskloof Mixed Use Development could result in different negative social impacts with varying rates of intensity and significance. The construction phase will span approximately 10 years or longer. The main positive socio-economic impact during this phase refer to the 3 000 opportunities that would be provided over this period of time. The presence of these construction workers in the area would have a temporary impact on the population profile for the duration of the construction phase. Intrusion impacts would thus mainly be felt by the residents of the smallholdings in close proximity to the

proposed development. The negative social impacts associated with an inflow of a workforce and jobseekers (mainly temporary) could be minimised should local residents be employed.

Other intrusion impacts related to noise, vibration, dust, odour or air pollution, to nearby residents due to the on-going construction activities that would last approximately 10 years. These impacts and activities would already change the amenity or aesthetic appeal of the semi-rural area. The sense of place would thus be permanently altered.

The proposed development would require different infrastructure and services. Although new infrastructure would be created by the proposed development itself, and services would be provided, some inputs in this regard would be required from the MMM. The provision of water, as well as the availability of water remains a concern. From a social point of view, it is important to note that any decrease in the property values of properties surrounding the site would have severe negative financial implications for the affected landowners. It is thus imperative that uncontrolled urban sprawl is contained and that the development is implemented based on best practice. The water quality and quantity of these residents must further not be negatively affected by activities associated with the proposed development.

The proposed site is not occupied at the moment and therefore one of the main concerns for the neighbouring residents would be the increased risk in community safety and criminal activities, as a result of the increase in people movement and increase in the population profile (construction workers and occupiers of the residential units). Concerns from the existing residents with regards to safety risks should not be dismissed as irrational and therefore unimportant.

The proposed Wildealskloof development is anticipated to have a marked population change with severe impacts in terms of its size and density. A rapid change in the local population could thus start during the construction phase and continue in the long term. The population increase also refers to the inflow of workers and possible jobseekers. This population increase would therefore result in various socio-economic impacts and would put additional pressure on the already challenged local infrastructure and services. The key mitigation measure in this regard would be the employment of locals as far as possible.

As the proposed site is situated in a low density area, the sudden increase in the population figures could be overwhelming to the residents currently living on the smallholdings and who chose to live in a semi-rural area. The land use changes and possible impact on the existing residents' sense of place cannot be reversed and would start to materialise during the construction phase and continue until the development has been completed. The rural area would change to a high density urban area. The impact on the sense of place and intrusion impacts would affect them negatively and their quality of life could be compromised.

A well-managed housing development would however assist in addressing the local housing needs. Strict procedures and enforcement of environmental regulations are thus vital to the well-being of all the residents.

The proposed project would have the following anticipated positive social impacts:

- Even though the majority of the job opportunities would only be of a temporary nature, it could still result in positive spin-offs especially in the area characterised by relative low employment levels. The development is not anticipated to significantly reduce the unemployment rate of the area, but it would still contribute to relieving poverty in the area.
- Educational and health care facilities are further planned as part of the development. To maximize the benefits, it must be ensured that the planned facilities accommodate the long term needs of the number of learners and residents.
- The MMM's tax base would be extended resulting in improved income due to the proposed development.
- New business developments could materialise to meet the needs of the increased population profile.
- The proposed development would provide a choice in housing types which would attend to the different economic needs within one township.
- The benefits that would accrue through the provision of housing infrastructure as such would be enhanced if the local community members would be the occupiers of the houses.
- Further enhancement of benefits would refer to the local procurement and use of local labour, especially during the construction phase
- At this stage, it is believed that the majority of the negative social impacts associated with the construction and operation of the proposed development could respond to mitigation and would depend on the adherence to the environmental guidelines.

It should be noted that the social integration of the residents could remain a challenge for the foreseeable future. The principle of densification and different integrated social classes would however have to be accepted as affordability for such housing projects remains a critical issue.

Concluding Remarks

The proposed Wildealskloof Mixed Use Development aims to ensure integrated development by addressing the housing needs of a wide range of community members with different income levels. The different type of housing on offer will thus accommodate a wide range of families. Educational and health care facilities, office parks, an industrial area and so forth will further assist in ensuring a sustainable development.

Possible negative impacts associated with the increase in the population profile can be addressed during the construction period and during the operational phase due to the phased approach in occupying the residential sections. The development, on the other hand, would assist to accommodate the ever growing population. Safety and security issues would remain a concern and the mitigation measures to avoid any increase in criminal activities should be strictly implemented.

The majority of the negative social impacts associated with the construction and operation of the proposed development could respond to mitigation and would depend on the adherence to the environmental guidelines.

This development could further ensure economic growth, assist to reduce poverty by creating new employment opportunities, boost growth for different businesses, help improve livelihoods and the economic growth of a specific location. This would raise the living standards of those residing in the development.

An integrated planning process with the MMM is required to ensure sustainable development and that the needs for infrastructure and services are timeously met. On-going and constructive communication between the developer, the local landowners and the MMM would thus be the main platform for ensuring the success of the proposed project.

Based on the findings of the SIA, it is thus recommended that the proposed development be considered by the authorities

7.1.2.0 Socio Economic Impacts

The proposed Wildealskloof mixed use development could have a large positive effect on the local economy of MMM during the construction phase and could continue to contribute positively to the local economy during the operations phase provided that attention is given to attracting new Greenfield investments to the development.

A potential economic concern related to the development is the remote location in relation to the Bloemfontein CBD, its location in a low density area and its lack of alignment to the spatial policy of urban densification and the development of the N8 corridor to the east. Its positive contribution to the spatial economy is that it is a mixed used development that could reduce the traveling time of low income residents who are working in planned commercial activities within development. However it is still foreseen that a large portion of low income residents will still have to make use of public transport working on the outside.

Despite the shortcomings, the development is in line with current market-driven spatial trends developments in the Bloemfontein area and is expected to have a net positive economic impact on the economy of MMM. It also supports the spatial strategies in contributing to the de-racialization of the built environment by promoting the development of affordable or governments-sponsored properties in high value areas. Based on the economic assessment specialist, it is recommended that the project should be granted its environmental authorisation to proceed.

Cumulative Impacts

The study area is situated approximately 10km from the Bloemfontein central business District. The closest town is Bloemfontein. The site and the immediate surrounding areas are mostly agricultural farmland with cultivated or grazing fields dominating the study area. On a regional basis the N1 provide access to the study area. Prominent features in or near the study area include:

The Bloemfontein Botanical Gardens are situated 2.2 km south of the site, but a couple of small hills visually separate the two locations from each other.

- The Bainsvlei / Ribblesdale Road (S1066) runs to the north and east of the site, with the Mimosa Park Smallholdings situated to the north of the farms and north of the Bainsvlei / Ribblesdale Road.
- The Summerwood Country Estate and Guesthouse which hosts conferences and functions (e.g. weddings) is located within the Mimosa Park Smallholdings. The majority of the smallholdings adjacent the site is used for residential purposes with some limited agricultural activities such as the grazing of livestock.
- The Gwen Bali waterpark is also situated on one of these smallholdings just to the north of the site.
- Approximately 3-5 km to the west of the proposed site is the existing Woodland Hills Wildlife Estate. The construction of the next phase of the Woodland Hills Wildlife Estate has started to the east of the existing development. The land opposite the proposed site, located to the west of the R700, belongs to Our Father's Home Church (Mountain View 1707: RE/1707). A school has been built within the northern section of this property, but has not yet been occupied by learners.
- The Waveren Game Farm (Waveren 1103) is situated to the north west of the proposed site.
- The area to the south of the N1 (approximately 2 km south of the proposed site) is characterised by various new residential estates, such as the Oubos Landgoed Estate, Somerton, Penrose, Fredenham Valley, Strathearn Estate, Wild Olive Estate and the Tredenham Boutique Hotel.
- The Sangiro Game Lodge that offers accommodation on a small game reserve is also situated to the south of the site, opposite the Shell Ultra City. The implementation of bulk services for further residential developments on the property of Sangiro Game Lodge has also started.
- The land to the east of the proposed site and south of the N1 is also still being used for agricultural purposes, with the Ribblesdale small holding area to the south east of the site. Some sections of these smallholdings are occupied by and used for industrial related activities. Wildealskloof 1205 Portion 2 and 3 which are situated directly to the east of the proposed development accommodates infrastructure for poultry production but are currently not in use.
- There are a number of planned township developments within the study area including (refer to Figure 6-1)

Considering the nature of the proposed development project, as well as the existing and planned developments in the area, there is potential for cumulative impacts to occur. Based on the findings of the specialist reports undertaken for the project the cumulative impacts for the proposed Wildealskloof Mixed Use Development are expected to be low to Moderate

Table 7-1: Summary of cumulative impact significance (refer also to specialist reports contained within Appendix D: Volume 2.

Specialist Report	Cumulative impact significance (pre-mitigation)	Cumulative impact significance (post-mitigation)
Ecology	No preference	No preference
Vegetation	High-Low	High-Low
Avifauna	Low	Low
Wetland	Low	Low
Soils and agricultural potential	Negligible	Negligible
Visual	No risk of cumulative impacts as this is the only urban development in this context.	
Heritage	Low	Low
Palaeontology	Negligible	Negligible
Social impact	Low-	Low-
Social impact	Low +	Low +
Socio economic	Medium-Low (-)	Medium-Low (-)
Social economic	High-Medium (+)	High-Medium (+)
Traffic	Moderate	Low

7.2 Nomination of Preferred Alternatives

In terms of the specialist studies undertaken, the following conclusions were made regarding the two Design Layout Alternatives:

Table 7-2: Conclusions of specialist findings (refer also to specialist reports contained within Appendix D: Volume 2.

Specialists	Layout	Layout	Preference of Alternatives
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	Alternative 1 (S1)	Alternative 2 (S2)	Preferred	Least Preferred
Wetland impact	√	√	Equally suitable	
Traffic Impact	√	√	Equally suitable	
Palaeontology	√	√	Equally suitable	
Heritage	√	x	Layout Alternative 1 (S1)	Layout Alternative 2 (S2)
Avifauna impact	√	x	Layout Alternative 1 (S1)	Layout Alternative 2 (S2)
Fauna impact	√	x	Layout Alternative 1 (S1)	Layout Alternative 2 (S2)
Flora impact	√	x	Layout Alternative 1 (S1)	Layout Alternative 2 (S2)
Soil and Agriculture Impact	√	√	Equally suitable	
Social Impact	√	√	Equally suitable	
Socio Economic	√	√	Equally suitable	

Two layout alternatives are considered for the project (section 6.2). When considering these layout alternatives the majority of the high sensitivity e.g. the Wetland and Riparian vegetation units is included as part of a Public Open Space area within both alternatives. The sensitive hill or kopje has been excluded from any development and instead included within a designated Open Space area within Layout Alternative 1, while development of these unique habitats are proposed in the Layout Alternative 2. Even though in the majority both layout are similar and both have endeavours to avoid very high sensitive areas. From a flora, fauna, avifauna, fauna and heritage perspective, Layout Alternative 2 is less preferred as the design proposes a heavy industrial land use where areas of ecological (flora, fauna, avifauna) sensitivities as well as heritage sensitivities (e.g. an existing informal burial place containing approximately 10 graves marked by stone cairns A low density scatter (1/5m²) of MSA stone tools (blades and scrapers) and flakes and at least twenty structures identified as sangars occur on the western side of the hill). Design Layout Alternative 1 considers the sensitivity of this area and has left the area as public open space to avoid the features. For these reasons, **Design Alternative 1** is therefore nominated as the **preferred alternative for implementation**.

The other identified construction impacts such as the noise, pollution due to inappropriate handling of waste on site and air pollution are all those that are common to a built environment and can all be mitigated to have a very low significance.



Figure 7-6: Overview of the Nominated layout. Refer to Appendix A3 for an A3 Conceptual Design.

7.3 Assessment of the No Go Alternative

The 'Do-Nothing' alternative is the option of not constructing the proposed Wildealskloof Mixed Use Development. Should this alternative be selected, there would be no environmental impacts on the site due to the construction and operation activities. The development is proposed on an area already impacted by other anthropogenic activities such as agriculture (possible overgrazing), quarrying, while the majority of the study site was cleared with large road sections. The land capability on the proposed site is limited by the low climatic moisture availability and the high clay content and somewhat shallow soils. In addition the project site is now included within the urban edge and therefore the site is appropriate for the intended development.

At a social economic level, the social issues identified would not materialise should the proposed project not proceed and the status quo in the area would therefore remain. Construction related impacts on the social environment that are expected would therefore not occur which could be viewed by some as positive. Long term possible negative impacts on the daily living and movement patterns, land-use, and sense of place and change of character of the area would thus also be negated.

The most significant social impact with regards to the no-go alternative would result in a significant loss in terms of addressing the housing needs in the MMM area. Meeting housing needs remains one of the MMM's biggest challenges. Furthermore, the possible extension of informal settlements in the already densely populated areas in close proximity to the proposed development would not be curbed.

The opportunity costs would include the loss of employment and business opportunities associated with the construction phase of the project, as well as the long term economic benefits for local businesses, industries and service providers due to the increased population figures.

The need for low-income housing opportunities to assist the poor out of poverty and cater for the informal settlements area is a critical issue. The issue thus revolve around the challenge of poverty and ensuring that vulnerability, inequality and social exclusion are addressed. Furthermore, the development aims to aid urban integration. Therefore, due to the housing needs within the MMM, it is not recommended that the no-go alternative be pursued. In addition the identified impacts with the proposed development can also be mitigated to acceptable levels

7.4 Overall Conclusion (Impact Statement)

The idea of the Wildealskloof development was born from the need of an all-inclusive socio-economic mixed-use development to the north of the Bloemfontein CBD. TAs the CBD of Bloemfontein is under great pressure for development, the idea of creating a new economic hub to the north of Bloemfontein is an

exciting new possibility.

Tenure options will range from fully subsidised, to higher income residential units. The reality of a mixed land use development will bring the "new urbanism" idea of life to Bloemfontein. Giving life to a development that will change the face of Bloemfontein for the future and relieving pressure from the Bloemfontein CBD. Development around cities and towns are necessary to accommodate an ever growing population. This development is imperative to Mangaung Metropolitan Municipality as it addresses the need of basic services, housing, economic growth, job opportunities and in turn reduces poverty levels within the metropolitan. This activity is in line with the 2017 Integrated Development Plan of Mangaung Metro as the area and its vicinity is earmarked for future residential development.

Layout Alternative 1 (Figure 7.4 & Annexure A3) avoids some of the high sensitivities identified on the site, and is nominated as the preferred alternatives following the full assessment through this EIA process for the following reasons:

- In terms of impacts arising from destruction/alteration of Heritage artefacts or features a result of construction activities, the impacts would be the similar for Layout Alternative 1 and Layout Alternative 2 for most of the site orientation, apart from the fact that Layout Alternative 2 would impact on the graves and also other heritage resources such as a low density scatter of MSA stone tools and flakes identified at the eastern foot of the hill located in the south-western corner of the study site are; and approximately twenty structures identified as sangars also occurring on the western side of the hill, with a few located on the eastern side.
- From a flora, avifauna and fauna perspective, there is no significant difference in the potential impacts of the two design layout alternatives for the majority of the alignments. A difference emanate with the identified high sensitive rocky grassland, hill or kopje also located on the south-western corner of the study site. , Design Layout alternative 2 would impact on the rocky grassland and hill which has been identified in this EIA as an area of high sensitivity from an ecological perspectives. This land use conflict results in the Design Alternative 2 being less desirable from an ecological (flora fauna, and avifauna) perspective.

However, it must be noted that they are certain sensitivities on site that are unavoidable by either of the alternatives. In order to protect biodiversity and conserve sensitive environments during development, steps that should be followed are to firstly avoid, then minimize, then repair or restore, and finally compensate for, or offset the negative effects of any development on biodiversity (Macfarlane *et al*, 2014). Thus where the impact is unavoidable, the impacts must be minimised and the unavoidable and

unforeseen impacts restored or rehabilitated. The section below summarises how this mitigation hierarchy has been applied to mitigate impacts that are likely to occur on site.

- **Impacts on wetland and riparian vegetation grassland:** Vegetation associated with the wetland and riparian vegetation unit was classified as being of high sensitivity, it is recommended that the storm water outlets, attenuation facilities and the two road bridges proposed in some sections of the wetland should be constructed with minimal impacts. Due to the nature of the development, neither of the proposed alternative can avoid this area, though the use of wetland rehabilitation and monitoring plan (Appendix F) as well as the findings of the flood line determination report (Appendix F), this impact can be minimised and managed.
- **Impacts on open grassland:** The open grassland covers an area covers an area of approximately 80% of the study site. The grassland has an intermediate flora ecological sensitivity. Due to the nature of the development it is inevitable that the development will not impact on this grassland. Although Development within this vegetation unit will not lead to a significant loss of floral biodiversity and habitat within the larger region, however it is recommended that partial conservation of selected intact grassland portions be incorporated into the open space areas planned as part of the mixed-use development. Edge effects within these areas must be strictly managed to avoid disturbance within adjacent natural habitat. Where provincially protected floral Species of Conservation Concern (SCC) fall within the developments, e.g. *Ammorcharis coranica*, *Nerine laticoma*, *Raphionacme dyeri* permits have to be obtained from the Free State **Province Department of Economic Development, Tourism and Environmental Affairs (DESTEA)** for relocation of such species to similar suitable habitat within the boundaries of the study area
- **Impact on wetlands:** Although both, the majority of the high sensitivity Wetland and Riparian area is included as part of a Public Open Space area within both design layout alternatives. It is recommended that a minimum buffer of 30 m from the edge of the wetland boundaries should be respected. However, technically based on the nature of the development, this impact cannot be totally avoided totally, but though the use of wetland rehabilitation and monitoring plan (Appendix E). The wetland rehabilitation and monitoring plan is specific to the construction of some of the land uses of the proposed development that will fall within the delineated wetlands or within the protective buffer thereof, including construction of storm water outlets and attenuation facilities that could impact on the wetlands. In addition, the rehabilitation plan also applies to disturbances in wetlands where absolutely necessary in order to construct the aforementioned land uses. The overall objective of this plan is to return the environment in and around footprint of the road to a state as close to the state prior to construction and to limit or negate any construction and operational associated impacts.

In addition, a flood line determination report (Appendix F) has been undertaken in the EIA investigations as part of the formulation of mitigation for the impact of storm water structures on the receiving environment i.e. the floodplain and streams. These recommendations are aimed to reduce the impact the storm water outlets, attenuation facilities and the two road bridges construction will have on water resources within the study area. The wetland report has recommended that the designs for outlet should include vegetated, rock lined bio-retention ponds to ensure slow release of water into the watercourse. The two road bridges that will span over the watercourse must be constructed with less impact on the wetland.

The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no insurmountable environmental or social constraints that prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented. The project has considered constraints, and is considered to meet the requirements of sustainable development. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Programme (EMPr) for the proposed Wildealskloof Mixed Use Development and are included within **Appendix E**. With reference to the information available at this planning approval stage in the project cycle, the confidence in the environmental assessment undertaken is regarded as acceptable provided all measures are taken to protect and preserve surrounding environment.

7.5 Overall Recommendation

In terms of Section 31 (n) of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section a qualified opinion is ventured and in this regard Envirolution believes that sufficient information is available for DESTEA to make a decision. The fundamental decision is whether to allow a development that is in line with the country's targets with regard to provision of housing basic services and job creation, which is also in line with global trends. It is also noted that the proposed development is not predicted to pose significant negative environmental or social impacts that cannot be mitigated to acceptable levels, and none of the specialists have noted any fatal flaws relating to the development. Significant positive socio-economic impacts are also predicted to result from the proposed project, and the development will contribute towards economic growth for MMM

With the above in mind, and in terms of meeting the objectives of sustainable development, the EAP is of the view that DESTEA should authorise the development of the proposed Wildealskloof Mixed Use Development, subject to effective implementation of the mitigation measures and EMPr proposed in this EIA.

The following recommendations must also be included as part of the conditions.

- Alternative 1 is implemented as a preferred layout alternative from an environmental perspective.
- The draft Environmental Management Programme (EMPr) as contained within Appendix E-1 of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed road.
- It is recommended that any floral Species of Conservation Concern (SCC) encountered within the proposed development footprint areas, be either rescued and relocated under the supervision of a botanist to areas such as the Wetland and Riparian vegetation unit and associated buffer zone or rocky hill and grassland areas, which should be excluded from development.
- Should any floral SCC be encountered prior to or during the construction process within the proposed development footprint area, it is recommended that such species be rescued and relocated with the assistance of a specialist botanist and obtain permits to do so from the local authorities.
- In addition, should any floral SCC be rescued and relocated, the relocation success must be monitored annually during the growing season for a period of three years by visual inspection.
- It is recommended that a buffer zone of at least 20 meters should be kept from the identified heritage site ruins as these sites might contain unmarked graves. If this is not possible it is recommended that through the social team a community representative is taken to these areas to show and / or confirm the presence of graves prior to construction. An archival study must be conducted prior to construction to determine the age and history of the ruins if the ruins will be impacted on.
- Should graves be required to be relocated or any of the identified heritage material to be disturbed, a permit from PHRA/SAHRA as well as other institutions will be required.
- A water use license must be obtained from Department of Water Affairs prior to the commencement of construction activities.
- Compile a comprehensive storm-water management method statement, as part of the final design of the project and implement during construction and operation.
- An independent Environmental Control Officer (ECO) must be appointed by the project developer prior to the commencement of any authorised activities.
- Applications for all other relevant and required permits required must be submitted to the relevant regulating authorities.
- Monthly monitoring reports must be submitted to DESTEA for the evaluation of the projects compliance to the EMPr and Environmental authorisation.
- All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1994), and the implementation of a monitoring programme in this regard is recommended.
- Existing tracks/roads should be used as far as possible, and construction activities should be limited to the authorised site.
- Disturbed areas should be rehabilitated as soon as possible once construction is complete in an area.

- The Developer shall ensure that adequate protection measures are taken to minimize the potential risk of theft during the construction and operational phase.
- The developer must obtain all necessary permits prior to the commencement of construction.
- A public complaints register must be available on site to record any issues of concern from the public regarding the project.
- Implementation of the environmental awareness education to the contractor's during and prior to construction
- Continued consultation and engagement with all relevant stakeholders - especially property owners, neighbouring and local communities, and respective municipalities during labour recruitment and procurement for services and supplies during construction phase.

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Consultation

Mr. Reuben Saaman: Landowner of farm Waveren 1103

Mr. A.J. le Roux: Landowner of Remaining Extent of the Farm Olrig No. 1710 and Portion 4 of the Farm Wildealskloof No. 1205

Mr B. Botha and Mrs. E. Botha: Landowners: Gwentham RE/963

Mr. Freek Meyer: CEO Woodland Hills Wildlife Estate

Cllr. Selme Pretorius: Councillor of Ward 44

Mr. Jacques du Plessis: Landowner of the farm Fairview 2845 Portion 11

Ms. Frederika (Gerda) Venter & Mr. Karl Venter: Fairview: north of site smallholding

Mr. Emile Fourie: Our Fathers Home: Owner of Mountain view RE/1707

Mr. Chris Kleynhans: Landowner of the farm Fairview 2845 (Mooifontein)

Mr. Renier van Niekerk

Mr. Marius Strydom: Sangiro Game Lodge: Annex Wildealskloof 7/2607

Ms. Marilda de Bruin: Mountain view 2845 Portion 10

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APPENDICES

The following appendices are attached to this report:

APPENDIX A: MAPS

- Appendix A.1: Locality Maps
- Appendix A.2: Sensitivity Maps
- Appendix A.3: Preliminary Design
- APPENDIX B: DESTEA CORRESPONDENCE
- APPENDIX C: PUBLIC PARTICIPATION REPORT
- Appendix C.1: Proof of Site Notices
- Appendix C.2: Background Information Document & Correspondence to & from IAPs
- Appendix C.3: Knock & Drop Register
- Appendix C.4: Newspaper Advertisement
- Appendix C.5: Project Database
- Appendix C.6: Correspondence with Organs of State
- Appendix C.7: Minutes of the Information Sharing Meeting & Attendance Register
- Appendix C.8: Proof of Draft Scoping Report Circulation to Organs of State & the Public
- Appendix C.9: Comments Received on the Draft Scoping Report
- Appendix C10: Public Meeting & Attendance Register (N/A-to be held during the review period of the DEIR)

APPENDIX D: SPECIALIST REPORTS VOLUME 2

- Appendix D.1: Agriculture Assessment Report
- Appendix D-2: Avifauna Assessment Report
- Appendix D-3: Mammal & Hepertofauna Impact Assessment Report
- Appendix D.4: heritage Assessment Report
- Appendix D.5: Paleontological Impact Assessment Report
- Appendix D.6: Social Impact Assessment Report
- Appendix D.7: Socio-Economic Impact Assessment Report
- Appendix D.8: Visual Assessment Report
- Appendix: D-9 Vegetation Assessment Report
- Appendix D-10: Wetland impact Assessment Report
- Appendix D-11: geotechnical Assessment Report
- Appendix: D-12 Traffic Impact Assessment Report
- APPENDIX E: SITE MANAGEMENT PLANS

- Appendix E-1: Draft Environmental Management Plan
- Appendix E-2: Alien Management and Monitoring Plan
- Appendix E-3 Wetland Rehabilitation and Monitoring Plan
- Appendix E-3: Phase 1 traffic management plan

APPENDIX F-OTHER INFORMATION

- Appendix F-1: Bulk Services Report
- Appendix F-2: Floodline Determination Report
- Appendix F.3: EAP Declaration and Affirmation
- Appendix F-4: Specialist Declarations