Draft Basic Assessment Report

Clayville Extension 59

Gaut 002/18 -19/E0042

January 2019

Executive Summary

TEXTURE
ENVIRONMENTAL CONSULTANTS

Executive Summary

1 INTRODUCTION

Adcock Ingram Healthcare (Pty) Ltd (the applicant) appointed Texture Environmental as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed development, Clayville Extension 59.

The proposed project is located on Remainder of Portion 107 (a Portion of Portion 73) of the Farm Olifantsfontein 410-JR, Ekurhuleni Metropolitan Municipality, Gauteng Province. The said property of 9,6740 hectares in extent, is located in Clayville Industrial, Olifantsfontein.

An application for environmental authorisation is submitted to the Gauteng Department of Agriculture and Rural Development (GDARD). The GDARD requires a Basic Assessment for this project. The Basic Assessment will conform to the National Environmental Management Act 107 of 1998 (as amended). The Basic Assessment will provide information about the proposed Clayville Extension 59, and its scope is restricted to this component of the project.

2 APPROACH TO THE BASIC ASSESSMENT PROCESS

The approach followed by the consultants is based on the specifications for the Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Gauteng Provincial Department of Agriculture and Rural Development, is the lead authority for this EIA process and the development needs to be authorised by this Department in accordance with the NEMA. To ensure that all requirements and processes in terms of the Acts are followed the following tasks need to be conducted:

The following has to be submitted to the GDARD:
- ✓ Application form for Authorisation
- ✓ Draft Basic Assessment Report
- ✓ Environmental Management Programme (EMPr)
- ✓ Final Basic Assessment Report

The environmental authority will review the Application and final Basic Assessment Report and the following decisions may be made:
- ✓ Grant authorisation of the activity
- ✓ Refuse the activity
- ✓ Request further information or investigations
- ✓ Refer the application to a scoping process where substantial additional investigations or assessments are required in order to make a decision.

3 PROJECT

An application for the establishment of a township on a part of Portion 107 of the farm Olifantsfontein 410-JR to be known as Clayville Extension 59 was submitted in terms of Section 96 (1) of the Town Planning and Township Ordinance, 1986 (Ord. 15 of 1986) to the Ekurhuleni Metropolitan Municipality. The township application was advertised as prescribed and approved “in principle” in terms of the Section 98(1) of the Town Planning and Townships Ordinance, 1986 (Ord.15 of 1986) on 04 September 2015.

Subsequently, in 2015 the property was purchased by Adcock Ingram Healthcare (Pty) Ltd who intend to finalise the township application as approved by the City of Ekurhuleni Metropolitan Municipality. Based on the approved land use rights, once the township is proclaimed the property owner intends to develop the 2 "Industrial 2" erven that comprise the township application. The township erven will be used by Adcock-Ingram, a multi-national pharmaceutical manufacturing company, as its centralised warehousing facility.

The township layout as approved/authorised in 2015 is attached in Appendix A2 of the Basic Assessment Report. Rob Fowler & Associates - Town and Regional Planners are the appointed town planners acting on behalf of the township owner.

The land use rights ascribed to the approved township is summarised in the table below for ease of reference.

Land Use	Erf No.	No. Erven	Area (ha)	FAR / Coverage	Footprint of Buildings (m2)
Industrial 2 5 storeys	1	7809	0.0100		32
Industrial 2 5 storeys	2	7810	9.6640	0.32 / 30%	30 925
Total			9.6740		30 957

Table 1: Land use Rights

The property is presently indicated as two erven that will be consolidated into a single erf measuring 9,6740 hectares. Both erven will be developed for "Industrial 2" purposes as is presently the case in the surrounding Clayville industrial complex. The proposed coverage is 30% and the Floor Space Ratio (FSR) will not exceed 0,32. The proposed height of buildings shall not exceed 5 storeys.

The Ekurhuleni Metropolitan Municipality, Infrastructure Services: Roads, Transport & Civil Works commented that access will not be allowed from the K27 (Olifantsfontein road) but will be allowed from Baksteen Road via Clayville Ext 58.
The Ekurhuleni Metropolitan Municipality, Infrastructure Services: Sewer and Water Engineering Services; as well as Electricity and Engineering had no objection against the application subject to their conditions.

The applicant proposes the activities at the warehouse facility to be the following:
- production of "over the counter" medicine
- warehouse storage of raw materials and packed product

An application for environmental approval is required for the finalisation of this township application.

4 PROJECT LOCALITY

The proposed project is located on the Remainder of Portion 107 (a Portion of Portion 73) of the Farm Olifantsfontein 410-JR, Ekurhuleni Metropolitan Municipality, Gauteng Province. The said property of 9,6740 hectares in extent, is located immediately adjoining the Clayville Industrial area, Olifantsfontein (Longitude and Latitude 25° 58' 10.33" S and 28° 13' 24.30" E), on the opposite side of Olifantsfontein Road and north of the formalised informal settlement Tswelopele, Tembisa and 2 to 3 km west of the R21. The entrance to the site is from the north off Baksteen Road. The site is located along the northern side of the old Provincial Road 795, also known as Olifantsfontein Road (R562).
The proposed project is set out in the Location Map below.

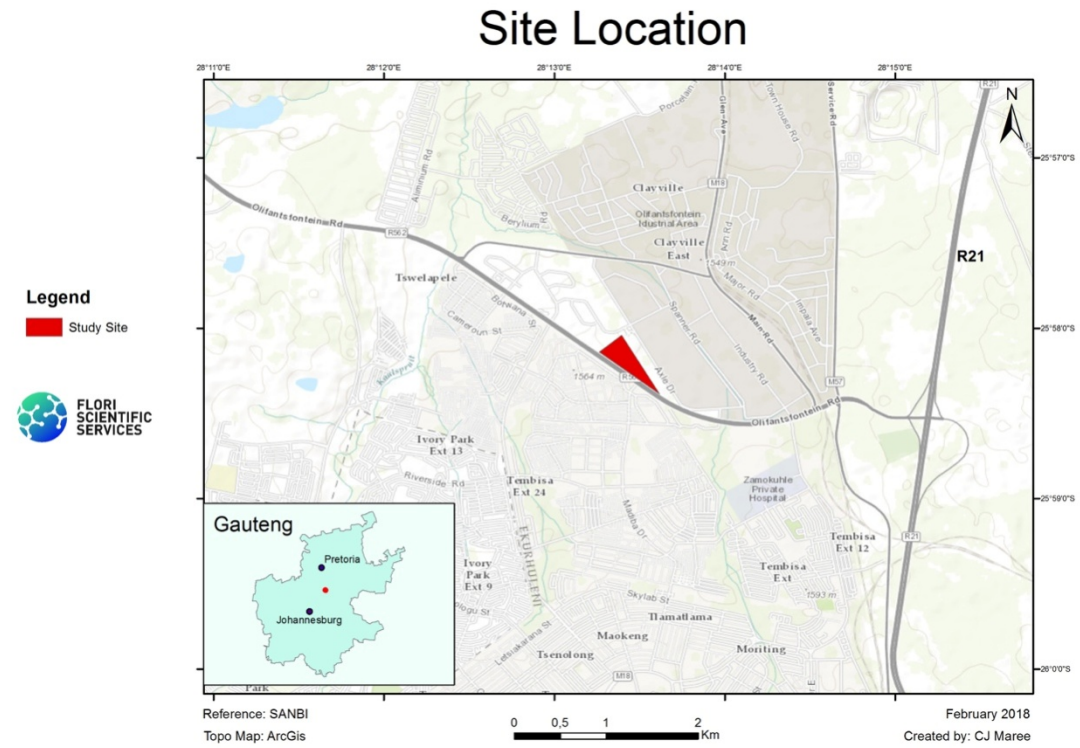

Figure 1: Site Location

The GPS coordinates of the main landmarks within the project area are as follows:

- Clayville X59 (Approximate centre): 25°58'11.24"S; 28°13'25.42"E.
- Adcock Ingram: 25°58'7.80"S; 28°13'29.23"E.
- 1:50 000 map grid references: 2528CC.

Figure 2: Study area location (Google Earth)

The study site is bordered in the south by Olifantsfontein Rd (R562) and in the east by the offices of Adcock Ingram. The site is situated almost midway between the N1 (west) and the R21 (east).

5 PROPERTY DESCRIPTIONS

The proposed township to be known as Clayville Extension 59 will be established on Remainder of Portion 107 (a Portion of Portion 73) of the Farm Olifantsfontein 410-JR, Ekurhuleni Metropolitan Municipality, Gauteng Province. The Surveyor-general 21-digit site reference number is T0JR00000000041000107.

6 TOPOGRAPHY

The topography of the greater area is predominantly that of low to moderately undulating plains with low hills and shallow, broad valleys. The study area is open plains with no distinctive rocky outcrops (koppies) are steep ravines or valleys. The natural downward slope is from northwest to southeast, with an average slope of between 0,5% - 1,3%. The average height above sea level for the study area is 1 540m, with a maximum and minimum of 1 544m and 1 437m, respectively. The study site is the red triangle in the figure below.

Figure 3: Gradient profile of study site

7 GEOLOGY AND SOILS

Archaean granite and gneiss of the Halfway House Granite are at the core of the Johannesburg Dome on which the study area is situated. The soils tend to generally be leached, shallow, coarsely grained and sandy, that are poor in nutrients of Glenrosa form. A small area of the region is built by ultramafics (Barnard, 2000).

The site is located on dolomite and chert and associated soil derivatives of the Chuniespoort Group. Post Transvaal Supergroup intrusives occur extensively in the subsurface profile across the site. Karoo rocks occur in the north western sector of the site.

8 SITE AND SURROUNDING LAND USES

The site is shaped like a triangle and walled off with a 3 meter high brick wall. The landcover of the study site is primarily that of open, moderately to severely degraded grassland. An existing pipeline servitude is present along the R562 (Olifantsfontein Rd) border of the site. The pipeline is within the study site on the southern boundary. Three powerlines run from the northern top corner of the property to the bottom eastern corner of the property (parallel and next to a stormwater channel (Figure below). There is presently no active landuses on the site.

Figure 4: Land uses of study area

9 NEED AND DESIRABILITY

The site itself is within an industrial development which is an extension of the existing Clayville industrial node. The industrial property is well located relative to the R21 freeway further to the east and the N1 freeway to the west. This industrial development will also be a much needed employment base for the many residents of Tswelapele and neighbouring Tembisa. There is a substantial demand for new industrial and related commercial developments in this part of Clayville.

It is proposed that this township will be developed as a new pharmaceutical manufacturing and warehousing facility for Adcock Ingram, and as a well planned and integrated industrial park environment.
This application is in accordance with the agreed development proposals for this part of Clayville.

In view of the above it is the applicant's opinion that the proposed development can be deemed desirable and should not have a detrimental impact on the surrounding properties or the environment.

10 LEGAL REQUIREMENTS

10.1 National Environmental Management Act

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended and the EIA Regulations 2014, an application for environmental authorisation for certain listed activities must be submitted to the relevant authority, the Gauteng Department of Agriculture and Rural Development (GDARD).

A Basic Assessment (BA) process for this proposed project is being undertaken by Texture Environmental. The listed activities for the proposed Clayville X59 are the following:

Table 2: Listed Activities

Listed Activity	Activity/ Project Description
Listing Notice 1 Activity 27 The **clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation**, except where such clearance of indigenous vegetation is required for – i. the undertaking of a linear activity; or ii. maintenance purposes undertaken in accordance with a maintenance management plan.	The construction of the proposed development will entail the clearance of more that 1 hectares of indigenous vegetation, but less than 20 hectares. The impacted study area is 9,6740 hectares. As a result, **approximately 9,6740 hectares of indigenous vegetation** will thus be cleared.
Listing Notice 3 Activity 4 The **development of a road wider than 4 metres** with a reserve less than 13,5 metres. **c. Gauteng** i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus Areas; iii. Gauteng Protected Area Expansion Priority Areas; iv. Sites identified as **Critical Biodiversity Areas (CBAs)** or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans; v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004); vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority; vii. Sites identified as high potential agricultural land in terms of Gauteng Agricultural Potential Atlas; viii. Important Bird and Biodiversity Area (IBA); ix. Sites or areas identified in terms of an international convention; x. Sites managed as protected areas by provincial authorities, or declared as nature reserves in terms of the Nature Conservation Ordinance (Ordinance 12 of 1983) or the NEMPAA; xi. Sites designated as nature reserves in terms of municipal Spatial Development Frameworks; or xii. Sites zoned for conservation use or public open space or equivalent zoning.	According to the Gauteng Conservation Plan (C-Plan) version 3.3, the study area is within a **Critical Biodiversity Area** (CBAs). Access to be obtained off the new cul-de-sac through Clayville Extension 58. The road width proposed to be: Incoming lanes: 1 x 4,5m and 1 x 3,5m Outgoing lane: 1 x 4,5m Total width = 12,5m
Listing Notice 3 Activity 10 - **Not applicable** The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. c. Gauteng i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus Areas; iii. Gauteng Protected Area Expansion Priority Areas; iv. Sites identified as **Critical Biodiversity Areas (CBAs)** or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans; v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004); vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority; vii. Sites identified as high potential agricultural land in terms of Gauteng Agricultural Potential Atlas; viii. Sites or areas identified in terms of an international convention; ix. Sites managed as protected areas by provincial authorities, or declared as nature reserves in terms of the Nature Conservation Ordinance (Ordinance 12 of 1983) or the NEMPAA; x. Sites designated as nature reserves in terms of municipal Spatial Development Frameworks;	**Not applicable** To make provision for the storage of pharmaceutical waste and raw product. Hazardous Waste Generated in the Lab per month: Acid Waste = 0.1 m3 HPLC Waste = 0.3 m3 Organic Waste = 0.2 m3 Inorganic Waste = 0.2 m3 Powder waste = 0.2 m3 Ammonium Waste = 0.05 m3 Total = 1.05 m3 Flammable chemicals stored in the warehouse per month: Hydrochloric acid - Total 2.52m3 Bulk ethanol – Total 15m3 Diesel storage for emergency electrical standby generator sets – Total 10m3 The site is within a **Critical Biodiversity Area** (CBAs), but the total storage of dangerous

xi. Sites zoned for conservation use or public open space or equivalent zoning; or xii. Important Bird and Biodiversity Areas (IBA).	goods occurs in containers with a **combined capacity of less than 30m3.**
Listing Notice 3 Activity 12 The clearance of an area of **300 square metres or more of indigenous vegetation** except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan **c. Gauteng** (i) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (ii) Within **Critical Biodiversity Areas** or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or (iii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	According to the Gauteng Conservation Plan (C-Plan) version 3.3, the study area is within a **Critical Biodiversity Area** (CBAs). The construction of the proposed development will entail the clearance of more that 1 hectares of indigenous vegetation, but less than 20 hectares. The impacted study area is 9,6740 hectares, of which 9,6740 hectares of indigenous vegetation will be cleared.

11 FEASIBLE AND REASONABLE ALTERNATIVES

During investigations various alternatives were investigated. The best options will be determined through the environmental and specialist studies, as well as public opinion.
The following alternatives have been identified and are described as follows:

11.1 Layout Alternatives

Preferred Layout

The sensitivity assessment takes a number of issues into consideration. These include the terrestrial and the aquatic ecology of the site and immediate surrounding area; the conservation status of the vegetation type in which the study site is situated; the presence of pristine veldtypes; the presence of red data fauna and flora species; and the presence of ideal habitats for priority species (which include, but are not limited to red data species), the presence of heritage resources etc.

From an environmental perspective, most of the study site is assessed to be of medium sensitivity. This is because, the study site is predominantly degraded grassland, with no pristine grassland present. No Highly Sensitive or 'No-Go' habitats or environments occur on the study site. Few indigenous large trees are present with most being alien species such as blackwattle (Acacia mearnsii) or gumtrees (Eucalyptus spp.). No protected trees species are present in the study area. No red data (Critically endangered, endangered or vulnerable) species were observed during field investigations. Other important orange data species for Gauteng, such as Habenaria species (Ghost orchids) and Lithops lesiei (stone plants), were not observed either. It is unlikely that any red data mammal species, snakes, or other reptile species are present in the study area. The reasons are that the surrounding areas are highly urbanised, with little natural corridors and ideal habitats present for the free movement and sustaining of most red data listed species. Much of the ecological linkages between the site and surrounding natural areas have been lost due to the increase in development around the site.
Further to the above, according to the Gauteng Conservation Plan (C-Plan) version 3.3, the study area is within a Critical Biodiversity Areas (CBAs). The impacts of the project are however seen as Medium, even though it is within a demarcated CBA area, because there are no high sensitive habitats, 'no-go' zones, pristine grassland or red data species present on site.
The complete site is deemed suitable for development, and subsequently no layout options could therefore be investigated.

11.2 Alternative Activity

Current and future development trends in the area: Industrial vs Residential development - Proposal/ preferred

The proposed development can be deemed desirable and in line with future development trends for the area:

- The character of the area has changed over time as a result of continuous development, supporting logistics and industrial uses.
- The area appears to be vibrant and dynamic due to the establishment of a range of commercial and industrial land uses. The impact of the proposed rights will consequently not affect the character of the area, and it is further felt that the site is ideally suited for the proposed use.
- It will support the existing commercial and industrial development in the area.
- Noises caused by the development will be in accordance with the uses within the area.

Based on the above benefits to the community the proposed light industrial development is regarded as the preferred land use alternative.

11.3 No-Go Alternative

From an environmental perspective, most of the study site is assessed to be of medium/low sensitivity. This is because, the study site is predominantly degraded grassland, with no pristine grassland present. No Highly Sensitive or 'No-Go' habitats or environments occur on the study site. Few indigenous large trees are present with most being alien species and no protected trees species. No red data species were observed during field investigations. It is unlikely that any red data mammal species, snakes, or other reptile species are present in the study area. The reasons are that the surrounding areas are highly urbanised, with little natural corridors and ideal habitats present for the free movement and sustaining of most red data listed species. Much of the ecological linkages between the site and surrounding natural areas have been lost due to the increase in development around the site.

It is suggested that to maintain the status quo is not the best option for the macro environment. The do-nothing ("no go") option would entail not using the site and maintaining the site as is. From certain perspectives this is not a viable option as the site is situated within a light industrial area. By not developing the site, the site will be anomalous in the context of the surrounding land-uses, and some of the direct and indirect socio-economic benefits (i.e. job creation, etc.) will not materialise.

The No-Go development alternative could therefore not be considered the responsible way to manage the site.

12 SPECIALIST INPUT

Specialist input was obtained to investigate the impact of the various alternatives that could accomplish the purpose of the project. The specialist input is summarised as follows:

12.1 Biodiversity Assessment

A Biodiversity Assessment (Terrestrial Ecology and Wetland Assessment) has been conducted by Flori Scientific Services. Refer to Appendix G.
The report identified the following:

Vegetation
The veldtype in which the study area is situated is known as Carletonville Dolomite Grassland (Mucina & Rutherford, 2006), or Rocky Highveld Grassland (Low & Rebelo, 1998). The grassland veldtype is characterised by slightly undulating plains dissected by prominent rocky chert ridges and with species-rich grasslands forming a complex mosaic pattern dominated by many species. Few indigenous large trees are present with most being alien species such as blackwattle (*Acacia mearnsii*) or gumtrees (*Eucalyptu*s spp.). The study area is characteristic of Carletonville Dolomite Grassland, but is however fairly degraded with no pristine grassland present.

Priority Floral Species
No red data (Critically endangered, endangered or vulnerable) species were observed during field investigations. Other important orange data species for Gauteng, such as *Habenaria* species (Ghost orchids) and *Lithops lesiei* (stone plants), were not observed either.

Protected tree species
No protected trees species are present in the study area.

Alien plants identified in the Study Area
A number of alien plant species (weeds) occur on site. In particular the site is filled with large alien tree species such as pines (*Pinus pinaster*), blue gums (*Eucalyptus* spp.), syringa (*Melia azedarach*) and even black wattle (*Acacia mearnsii*).

Conservation status
The official conservation status of Carletonville Dolomite Grassland is not threatened, which is according to Gauteng's conservation plan (C-Plan v.3.3) and the threatened ecosystems database and mapping of the South African National Biodiversity Institute (www.bgis.sanbi.org). However, it is safe to say that all of Highveld and Gauteng Province's grasslands are under threat due to continued loss as a result mainly of urbanisation and cultivation pressures.

Fauna
It is unlikely that any red data mammal species, snakes, or other reptile species are present in the study area. The reasons are that the surrounding areas are highly urbanised, with little natural corridors and ideal habitats present for the free movement and sustaining of most red data listed species. The highly urbanised nature of the region will result in low faunal species-richness, especially in terms of priority species. The lack of ideal habitats, including freely availably sources of open surface water such as streams, rivers and wetlands further reduce the likely presence of priority and other faunal species on the study site. It is however, reasonable to accept that some of these more mobile species might occasional visit the study area, including birds, as it does have open grassland areas.

Watercourses
There are no distinctive watercourses in the study area. This includes wetlands and fresh water pans.

Drainage Region
The study area is situated in the Primary Drainage Area (PDA) of A and the Quaternary Drainage Area (QDA) of A21B. The study area is within the Limpopo Water Management Area (WMA 1) and under the jurisdiction of the Limpopo Catchment Management Agency (CMA 1). The Sub-Water Management Area, in which the study site is situated, is the Crocodile (West) Sub-WMA.

Priority areas
According to the datasets obtained from Dept. Water & Sanitation (DWS), Dept. Environmental Affairs (DEA), SA National Biodiversity Institute (SANBI), BirdLife SA and the Gauteng

Conservation Plan (C-PLAN v3.3), the study site does not fall within any national priority areas. These priority areas include National fresh water ecosystem priority areas (NFEPA) areas, wetlands, important bird areas (IBAs), nature reserves, National protected areas expansion strategy (NPAES) areas, threatened ecosystems and threatened veldtypes.

GDARD Conservation Plan v3.3

According to GDARD's Conservation Plan (C-Plan v3.3), which is the nucleus for conservation in Gauteng, the study area is situated within a Critical Biodiversity Area (CBA: Important Area). Critical biodiversity areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (SANBI, 2007). The impacts of the project are however seen as Medium, even though it is within a demarcated CBA area, because there are no high sensitive habitats, 'no-go' zones, pristine grassland or red data species present on site.

Ecological Sensitivity

The sensitivity assessment identifies those areas and habitats within the study site that have a high conservation value and that may be sensitive to disturbance. All watercourses, including seasonal streams and drainage lines are always deemed to be sensitive, even if they are badly degraded. However, no watercourses are present within the study area. The study site is predominantly degraded grassland, with no pristine grassland present. No Highly Sensitive or 'No-Go' habitats or environments occur on the study site.

The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components. The highest calculated sensitivity unit of the two categories is taken to represent the sensitivity of that ecological unit, whether it is floristic or faunal in nature.

Ecological sensitivity analysis

Ecological community	Floristic sensitivity	Faunal sensitivity	Ecological sensitivity	Development Go-ahead
Grassland	Medium / Low	Medium / Low	Medium / Low	Go-Slow

Figure 5: Sensitivity map

Fatal flaws
There are no fatal flaws.

MITIGATION OF IMPACT
During construction
The following mitigating measures are recommended to assist in reducing potential impacts during the initial construction of the site:

- No activities are allowed to overshoot the demarcated boundaries of the proposed township. This includes topsoil or excess soil that might be pushed or stored (even on a temporary basis).
- Roads to be maintained during construction to prevent erosion.
- Dust controls to be implemented.
- Any and all temporary storage or dwelling facilities to be situated within the boundaries of the proposed site.
- All temporary lay-down areas to be situated within the study site and areas to be rehabilitated after construction, but as part of the construction phase.
- A site-specific storm water management plan to be compiled and implemented. The implementation, which will prevent erosion, siltation of drainage lines outside of the site, contamination of groundwater and contamination of drainage lines due to improper runoff.
- General litter control and maintenance to be implemented daily and removal thereof to a registered landfill site done as often as needed.
- All alien trees may be removed (especially blackwattle).
- The planting of indigenous trees such as karee (*Searsia lancea*) and white stinkwood (*Celtis africana*) would be a positive impact from the project. These can be used along borders, even close to walls.
- Preferably only use indigenous species and low water species in landscaping, which will also be a positive impact.

Operation phase
The following mitigating measures are recommended for the operation phase:

- A maintenance plan to be implemented, which includes the control of invasive alien weed species.
- Maintenance plan to also include erosion control, roads and stormwater run-off on the site.

12.2 Heritage Impact Assessment – request for exemption

Archaetnos Culture & Cultural Resource Consultants submitted a request for exemption from conducting a Heritage Impact Assessment. Refer to Appendix G.
The following is applicable:

- The entire site is disturbed. It consists of grassland and pioneer plants such as weeds, a small rock outcrop and remains of wattle plantations.
- Other signs of disturbance include a berm and storm water channel (both earthen) running along the north-eastern boundary from the northern top corner to the eastern corner, three powerlines which run from the northern top corner of the property to the bottom eastern corner of the property (parallel and next to the storm water channel as well as a pipeline along the southern boundary of the property.
- No sites of cultural heritage significance are located on site.

Due to the mentioned factors, the chances therefore of finding any heritage related features are indeed extremely slim. It is therefore believed that an additional Heritage Impact Assessment (HIA) is not needed for this project. The letter serves as an exemption request to the relevant heritage authority.

Recommendations/Mitigation
Should construction work begin for this project:

- The developer should note that due to the nature of archaeological material, such sites, objects or features, as well as graves and burials may be uncovered during construction activities on site.
- Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.
- If any evidence of archaeological sites or remains (eg, remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials, or other categories of heritage resources are found during the proposed activities, SAHRA APM Unit (021 462 4502) must be alerted immediately, and a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings.

12.3 Dolomite Stability investigation

Design stage dolomite stability investigations were conducted by Intraconsult Engineers during December 2018. Appendix G refers.
The recommendations are as follows:
The dolomite stability of the site is described in terms of a single dolomite hazard zone **characterised as reflecting a low to medium inherent susceptibility of sinkhole and subsidence formation with respect to ingress of water and with respect to anthropogenic ground water level draw down, i.e. Inherent Hazard Class 1/4//1/4.**

1 Design Hazard Class

The design hazard class is as follows:

Inherent Hazard Class (Drawing IR870.1/1)	Design Hazard Class
1/4//1/4	4

2 Appropriate development in relation to the hazard characterisation

In accordance with SANS 1936, Part 1, Table 1 (2012) the permissible development in the identified hazard zone is as follows:

Design Hazard Class	Land Usage Type	Land Usage Permitted with Dolomite Area Designation and footprint investigation requirement in terms of Deemed-To-Satisfy
4	Commercial and miscellaneous non-residential usage	C1 (D3 + FPI), C2 (D3 + FPI), C3 (D3 + FPI), C5 (D3 + DLI), C6 (D3 + DLI), C7 (D3 + FPI), C8 (D3)

Various land uses permitted in the identified Design Hazard Class	
Land Use Class	**Definitions**
Commercial and miscellaneous non-residential usage	

Various land uses permitted in the identified Design Hazard Class	
Land Use Class	**Definitions**
C1	Places of detention, police stations, and institutional homes for the handicapped or aged
C2	Hospitals, hostels, hotels
C3	Commercial developments ≤ 3 storeys, including railway stations, shops, wholesale stores, offices, places of worship, theatrical, indoor sports or public assembly venues, other institutional land uses, such as universities, schools, colleges, libraries, exhibition halls and museums, light (dry) industrial developments, dry manufacturing, commercial uses such as warehousing, packaging, electrical sub-stations, filling stations
C4	Commercial developments > 3 storeys, including railway stations, shops, wholesale stores, offices, places of worship, theatrical, indoor sports or public assembly venues, other institutional land uses, such as universities, schools, colleges, libraries, exhibition halls and museums, light (dry) industrial developments, dry manufacturing, commercial uses such as warehousing, packaging, electrical sub-stations
C5	Filling depots, processing plants or any other areas for the storage of liquids, waste sites
C6	Outdoor storage facilities, stock yards, container depots
C7	Parking garages
C8	Parking areas

Based on the contents of SANS 1936 (2012) and the information gathered during these investigations of the SDP, the site may be utilised for the proposed light (dry) Industrial Warehouse development and related offices and facilities provided the recommendations contained in this report and in SANS 1936 (2012 – or successors in title) are applied.

3 The following additional recommendations are made:

- All service trenches in the development should be inspected during construction to permit further detailed verification of soil and stability conditions e.g. attention must be paid to the presence of potential palaeosinkhole conditions in trenches and open works. Following the completion of this process a DRMP (Dolomite Risk Management Plan should be compiled for the development as per the requirements of SANS 1936 (2012).
- The Dolomite Specialist should document the findings of the geotechnical monitoring process in a SANS 1936 (2012) implementation report (Construction Completion Report). This report should contain a DRMP (Dolomite Risk Management Plan) compiled for the development as per the requirements of SANS 1936 (2012).

4 Dolomite Area Designations

The Inherent Hazard Class identified on site relates to the Dolomite Area Designations as follows for the proposed land use defined:

Design Hazard Class	Dolomite Area Designation with respect to the proposed landuse
4	Dolomite Area Designation D3 for light (dry) industrial warehousing development in accordance with SANS 1936 (2012)
Land use codes defined above and in Section 5 of this report	

The definition of the selected Dolomite Area Designations are as follows:

D Designation	Description
D1	No precautionary measures are required.
D2	General precautionary measures, in accordance with the requirements of SANS 1936-3, that are intended to prevent the concentrated ingress of water into the ground, are required.
D3	Precautionary measures in addition to those pertaining to the prevention of concentrated ingress of water into the ground, in accordance with the relevant requirements of SANS 1936-3, are required.
D4	Development may only be considered provided the following requirements are met: • Involvement of Competence Level 4 geo-practitioner in all the categories of the geotechnical engineering work, i.e. site characterization, analysis and design, supervision and review, supervision of execution and management (primary geo-practitioner). • Review and acceptance of all the categories of the geotechnical engineering work by a Competence Level 4 peer. This peer reviewer may not be a business associate of the primary geo-practitioner(s) and may not have a vested interest in the project. • All the categories of the geotechnical engineering work to be reviewed and accepted by the Authority who may request a further review by an Authority designated Competence Level 4 peer, if required. • The responsible Local Authority must indicate its commitment to maintain dolomite risk management principles in accordance with SANS 1936-4.

The development of the site is permissable provided that:

1) The SDP, new structures and foundations of new structures or additions are designed in compliance with SANS 1936 Part 3 (2012);
2) Precautionary measures are implemented;
3) Wet services are designed taking the hazard classification into account;
4) Existing wet services traversing or impinging on the site are assessed and upgraded in line with current industry standards, where required;
5) Monitoring and maintenance takes place;
6) Dolomite risk management is applied in compliance with SANS 1936 Part 4 (2012 and successors in title).

5 Provisional foundations recommendations and solutions

It is recommended that the proposed structures to be erected in the areas designated as Dolomite Area Designation D3 be placed on rationally designed foundations. The general philosophy to be applied to design of foundations is broadly the following:

- A nascent sinkhole having a **nominal** diameter 5m occurring anywhere beneath or adjacent to the building will not result in toppling or sliding failure of the building (or portion of the building) into such a sinkhole or subsidence.
- The design is such that, in the event of catastrophic loss of support, there is sufficient structural stability to allow occupants to safely escape from the building after the occurrence of the sinkhole.
- It should be understood that sinkholes are typically surrounded by an outer peripheral zone of less catastrophic ground subsidence.

The above are guideline principles. It is essential that the contents of SANS 1936, (2012) are applied to the design of structures.

6 Provisional Monitoring Designations

Provisional Monitoring Designations are identified and delineated according to the Inherent Hazard classification of the site. The procedure in the designation of monitoring activities and frequencies for the development is described in Section 5 of this report:

Design Hazard Class		**Monitoring Designation**
4		$(AB)^{12}C^{24}D^{na}E^{3}$
Explanation		
A	Visual inspections of ground, structures and infrastructure (e.g. roads, storm water canals, ditches) immediately after construction and thereafter quarterly for 2 years, thereafter annually.	
B	Visual inspection of stormwater systems crossing the site for blockages immediately after construction and thereafter quarterly for 2 years, thereafter annually..	
C	In the event of a cracks or problems being identified during visual inspections, the wet services should be tested immediately. If no problems arise, test wet services once every two years.	
D	No precision monitoring of the ground level is required at present.	
E	Ekurhuleni Metropolitan Municipality has a Dolomite Risk Management Strategy that includes a programme of groundwater level monitoring and control. The ground water levels in the aquifer in which this site is located should be recorded every three months by the local authority and included in the EMM's risk management system, for necessary action as and when required.	

Monitoring designations assigned during this investigation are deemed *provisional* and should be finalised as part of the Dolomite Risk Management Plan.

7 Water precautionary measures

The proposed development should be planned and designed appropriately in relation to the hazard characterisation. In order to reduce the likelihood of sinkholes and subsidences occurring, precautionary measures are required.

In this context, the stability and safety of the proposed development will depend on the application and maintenance of the precautionary and remedial measures outlined in this report.

The minimum standards applicable to any design work, new services, future upgrading, repair

or maintenance work are in accordance with **SANS 1936, Part 3 (2012 and successors in title):** Design and construction of buildings, structures and infrastructure" now forms part of the National Building Regulations and must be complied with as a point of departure.

8 Dolomite Risk Management

A Dolomite Risk Management Plan (DRMP) should be drawn up for the proposed development. Dolomite Risk Management should incorporate steps to mitigate risk before, during and after construction.

Furthermore, according to SANS 1936 Part 4 (2012), every Local Authority in whose jurisdiction dolomite land occurs should establish, document, implement and maintain a Dolomite Risk Management System.

9 Pro-active maintenance of waterbearing services and other infrastructure

The generally variable subsurface conditions noted during these investigations, necessitates the introduction of a pro-active maintenance strategy for water bearing infrastructure. This maintenance strategy and precautionary measures provided in this report should be adhered to in order to reduce the probability of the occurrence of ground movement events. *It should be emphasised that the formation of sinkholes and subsidences can only be prevented in this area, by the implementation of a strict maintenance system.* Although the primary objective of such a maintenance strategy is to reduce the probability of ground movement there are other important benefits, inter alia:

- a reduction in bulk water wastage by timeous maintenance,
- avoiding crises expenditure
- reducing pollution of the aquifer
- involving the community in order to enhance the exchange of information
- developing and evaluating performance criteria in conjunction with the potential stability characterisation,
- permitting the identification of sub-areas in the township which should be prioritised for service maintenance or replacement.

10 Perched ground water conditions

Seasonal perched groundwater conditions should be anticipated on the intrusive and Karoo rocks.

12.4 Civil Engineering Services

Theo van Niekerk & Associates, Civil & Structural Consulting Engineers compiled a report titled *"Engineering Outline Scheme Report*" dated 17 September 2009. Refer to Appendix G.

1 Water Supply

A 250mm ⌀ water main is situated along the eastern verge of Axle Drive, and 250 mm⌀ water main is situated along the southern verge of Baksteen Road. According to Ekurhuleni Metropolitan Council GIS records, the water main in Baksteen Road terminates opposite the western boundary of erf 1017 Clayville Extension 11.
No pressures were confirmed, but historical data from other developments in Axle Drive indicated an operating pressure of between 3.5 and 6 bar.

The following Bulk Services will be required:

Water Mains

The 250mm ⌀ water main in Baksteen road will have to be extended to the entrance of the proposed Clayville Extension 58, and from there along the proposed road servitude to the entrance to this development. This is on the assumption that the water main had not been extended to adjacent developments already.

If the adjacent proposed Clayville Extension 58 is developed before this development, the bulk water main extension mentioned above may not be necessary as it will be done as part of that development, or it may only be necessary to partially upgrade this line to provide adequate capacity.

Required internal services:

Water Reticulation

The proposed reticulation for the development as shown on the Proposed Services Layout, will be installed by the Developer and the ownership will remain with the Developer, except for connections to bulk services.

NOTE: A detailed Fire Risk Assessment will be conducted by a specialist Fire Engineer as part of the Rational Fire Design submission at Site Development Plan approval stage.

Property Attributes			
	Property size:	Erf 1 Erf 2 Total	100 m² 96,640 m² 96,740 m²
	FAR		0.32
	Gross Floor Area	Erf 1 Erf 2 Total	32 m² 30,925 m² 30,957 m²
	Fire risk		Moderate risk
	Impact on Network		Limited
	Pressure measurement		3.5 bar (min) 6.0 bar (max)
	Instantaneous peak factors		4
	Average flow for the development (over 8 hr day)		10 kl/ha/day = 1.12 l/s
	Peak flow for the development		4.47 l/s
	Minimum residual head under instantaneous peak flow		0.8 bar
	Minimum residual head under instantaneous peak flow & fire		1.5 bar
	Maximum residual head under static conditions		9.0 bar
	Fire hydrant spacing		180m
	Fire flow		100 l/s @ 1.5 bar
	Maximum flow velocity for instantaneous peak flow & fire		3.5 m/s
	Minimum pipe cover		800mm
Materials			
	Reticulation pipe material and class		HDPE Class 12
	Minimum pipe diameter		110mm
	Preferred pipe diameters		200mm
	Valves		EMM Specification
	Valve camber		EMM Specification
	Hydrants		EMM Specification
	Erf connections		EMM Specification

2 Sewer Network

Sewer Drainage
An existing 160mm ⌀ sewer main runs along the western verge of Axle Drive, with no existing connection from the proposed development. The nearest existing sewer is located on the western side of Main Street, approximately 530m east of the Proposed Development.

Required Bulk Services
The following Bulk Services will be required:
Outfall Sewer
A bulk outfall sewer will be required from the south-eastern corner of the development, with a sewer servitude registered along Erf 1596 Clayville Extension 11, and connect to the existing sewer main on the western verge of Axle Drive.

Sewer Drainage
The proposed reticulation for the development as shown on the Proposed Services Layout, will be installed by the Developer and the ownership will remain with the Developer, except for connections to bulk services.

Design parameters		
	Outfall Sewer Basin	Estherpark Waste Water Care works
	Average flow for the development	8kl/day/ha
	Peak factors	1.5
	Extraneous flow	0.64 l/s
	Peak flow for the development	2.0 l/s
	Limiting gradients	1:60
	Minimum flow velocity	0.7 m/s
	Maximum manhole spacing	80m
	Erf connection slope	1:60 min
	Minimum percentage draining of stands	100%
	Minimum pipe cover	1400mm
Materials		
	Reticulation pipe material and class	Vitrified clay
	Minimum pipe diameter	100mm
	Preferred pipe diameters	100mm
	Manhole diameter and material	1.05m Precast Concrete
	Manhole cover not subject to traffic loads	Cast Iron
	Manhole cover subject to traffic loads	Cast Iron Heavy Duty

3 Storm water Drainage

A 450mm ⌀ pipe runs from the proposed development along a storm water servitude between stands 1026 and 1027 Clayville Extension 11, draining towards the storm water infrastructure in Axle Drive, and then eastwards. The connection point is close enough to the lowest point of the development to serve as only collection point.

Required Internal Services
Storm water Drainage
The proposed reticulation for the development as shown on the Proposed Services Layout, will be installed by the Developer and the ownership will remain with the Developer, except for connections to bulk services.
Note: The storm water runoff from proposed erf 2 will be channeled to the existing storm water pipe between stands 1026 and 1027 Clayville Extension 11, with overflow to a shaped channel towards K27 reserve.

Design parameters		
	Design flood frequency for minor system	1 in 5 year
	Design flood frequency for major system	1 in 50 year
	Indicative attenuation allowance	350 m³/ha
	Volume of attenutation: Erf 1 Erf 2	0 m³ 3380 m³
	Maximum encroachment of runoff for the minor design storm:	
	Category UD roads (residential and lower order roads)	No kerb over-topping. Flow depth at crown not to exceed 10 mm
	Maximum encroachment of runoff for the major design storm:	
	Category UD and UC roads	No encroachment on properties bordering the road reserve.
	Limiting gradients (pipes and channels)	1: 150 (0,67%)
	Maximum flow velocity in roads and road side channels	3 m/s
	Maximum flow velocity in under ground system (pipes)	5 m/s
	Maximum manhole spacing	100 m
Materials		
	Reticulation pipe material	Concrete
	Minimum pipe diameter and class	450mm / 75D
	Manhole material	Masonry
	Manhole cover not subject to traffic loads	Modified Type 2A
	Manhole cover subject to traffic loads	Type 2A Heavy Duty

- Storm water to be collected in a flow constricted collection structure and discharged via underground pipes. Overtopping via a spillway to the nearest road reserve.
- A 450mm dia pipe must be laid from the attenuation structure on erf 2, to connect to existing storm water structures from a collection pit in the attenuation structure. The collection pit must be sized to discharge the correct attenuated flow only.

4 Electricity

An existing overhead high voltage electricity distribution lines are located in a servitude along the eastern boundary of the development.
The duct requirements for the City Power will be ascertained and these will be indicated on the construction drawings for installation during the way-leave application process.

5 Roads

The development is bordering on the K27 Road Reserve to the west, although no access is possible to this route. No other existing provincial or municipal roads border the development directly. A right-of-way road servitude is proposed as part of the proposed Clayville Extension 58 to the north of the property.

Access Road

Access will be provided via the proposed road reserve through the proposed Clayville Extension 58, as indicated on the attached layouts. The road width should be a minimum of 7.4m wide, or as required by Council. If the proposed Clayville Extension 58 is developed prior to this development, no access road will be necessary, as it will have been constructed already.

Internal Roads

Access and utilization of the existing road infrastructure is subject to the Traffic Impact Assessment, submitted separately. Access details to comply with this report. The proposed development will be for commercial use, thus internal circulation will be through paved parking areas, to be determined during site development planning stage. All paved areas to be constructed using council approved standards.

6 Summary

The report proposes the installation of the following:
Internal Civil Services:
- The installation of 10m HDPE Class 12 water reticulation with a bulk water meter and meters to erf 2 only.
- The installation of sewer connection to the bulk service of erf 2.
- The installation of 123m Concrete Class 75D storm water reticulation.
- Construction of a storm water attenuation structure to Ekurhuleni Metropolitan Municipality standards.

Link and Bulk Civil Services:
- Extension of the existing 250mm water main in Baksteen road, to the entrance of proposed Clayville Extension 58.
- Installation of a 200mm dia water main along the right of way servitude of proposed Clayville Extension 58.
- Installation of a 160mm dia sewer line from the preferred connection point, to the existing sewer service in Axle Drive.

Note:
The City Planning Department of Ekurhuleni Metropolitan Municipality confirmed that application for the Township establishment: Clayville Ext 59, has been approved by the Head of Department: City Planning Department on 3 July 2015. The service contributions in respect for roads and storm water drainage, water, sewerage, and electricity has been stipulated by the City Planning Department.

12.5 Storm water Management Report

Triple Three Engineering Solutions compiled a report titled *"Storm water Management Report*" dated November 2012. Refer to Appendix G.

The main objective of the storm water management plan is to ensure that the difference in flow between the pre development and post development storm water run-off, for both the 1:5 and 1:25 year return period storms is absorbed in attenuation basins. Other objectives include proposals for multiple land uses of attenuation areas, suggested maintenance plans and safety precautions, evaluation of the existing (receiving) storm water system and optimization of the storm water management system.

Management Scheme
Description of proposed scheme

1 Storm water Drainage

External Storm Water
A 450mm pipe runs from the proposed development along a storm water servitude between stands1026 and 1027 Clayville Extension 11, draining towards the storm water infrastructure in Axle Drive, and then eastwards. The connection point is close enough to the lowest point of the development to serve as only collection point.
Internal Storm Water
The internal sealed piped storm water drainage system will be towards an attenuation pond which will be located in the southern corner of the township as detailed on the attached storm water layout. The Internal underground system has been designed to cater for the 1:5 year return period event, where after storm water will be managed overland. The attenuation pond will be of adequate size to retain the additional flow due to development for both the 1:5 year and 1:25 year return period scenarios. On completion, the Owners will take over the internal

storm water system and associated attenuation pond.

2 Effectiveness of the scheme

The system exceeds the JRA management objective by 35,3% and 22,7% for the 5 year and 25 year recurrence intervals respectively. If one considers the general rule of 350cubic meters per hectare, then the attenuation requirement is still over achieved by 8,6%.

3 Capacity of receiving system

The difference in flow due to the development will be absorbed in the attenuation pond as discussed in the report, and the authors deem the receiving system's capacity to be adequate.

4 Multiple land use within detention basins

Due to the fact that the area is underlain by dolomite, the attenuation pond area had to be designed as a sealed unit; not allowing any ingress of water into the sub-soils. As a result, the pond area can not be used as a park, however with the introduction of a few benches and some softening effects it can still be used as a public open space area. Therefore, the low flow channel had been designed to run along the side of the pond, in order to maximise the potential for a secondary use of this area.

5 Maintenance issues

The Attenuation pond and storm water pipes are to be cleaned and de-slugged at the beginning of the raining season, at least once a month during the raining season and at the end of the raining season. No shrubs or other elements that occupy a large volume (whether organic or inorganic) are to be placed within the attenuation pond enclosure.

6 Safety and hazards

- Appropriate signage to be erected on site by the developer.
- Pond area to be fenced in.
- Pipe inlet (at the tower spillway) to be protected by a grid to prevent a vortex from forming.
- Tower spillway to be fitted with access steps / step irons on the inside.
- The pond is not deemed as a dam with a safety risk as it's wall is lower than 5m.

12.6 Waste Management

The collection of solid waste should be carried out by the Ekurhuleni Metropolitan Municipality. A refuse area will be accommodated on site and waste will be disposed of at the municipal dumping site according to the requirements of the Municipal Health Bylaws.

12.7 Traffic Impact Management

Corli Havenga Transportation Engineers compiled a Traffic Impact report dated 23 February 2012. Refer to Appendix G.

The site is located along the northern side of the R562. Access will be obtained off a new street (through Clayville Extension 58) off Baksteen Road, and no access will be provided to the R562.

The proposed development is expected to generate 237 weekday peak hour trips with a 75:25 split.

The results of the capacity analyses indicate the following at the various intersections analysed:

1. **Intersection: DM Marokane and R562**
   The signalised intersection operates at acceptable levels of service in all four design scenarios. The signal timing and cycle length need to be adjusted in design Scenarios 2 and 4.
2. **Intersection: R562 and Link Road**
   The intersection requires signalisation. This is already required and is one of the signals that EMM needs to implement. Additional lanes are required on Link Road; this is a geometric requirement to accommodate the high volume of heavy vehicles.
   The 60m right-turn lane on R562 eastern approach needs to be lengthened to 90m to accommodate an annual growth rate of 5% over the next 5 years.
3. **Intersection: Link Road and Axle Drive**
   Additional lanes are required on Link Road; this is a geometric requirement to accommodate the high volume of heavy vehicles.
4. **Intersection: Baksteen Road and Axle Drive**
   This 4-way stop-controlled intersection operates at acceptable levels of service in all four design scenarios and no road upgrades are proposed.

The proposed development is supported from a traffic flow point of view. It is further recommended that:

1. Access be obtained off the new cul-de-sac through Extension 58;
2. If access control is implemented, the following is proposed:
   - Incoming lanes: 1 x 4,5m
     1 x 3,5m
   - Outgoing lane: 1 x 4,5m
   - Minimum stacking: 25m from the side of the cul-de-sac
   - Pedestrian gate
3. The developer to implement the following road upgrades:
   - Intersection: R562 and Link Road
   - An additional lane in both directions along the Link Road.

13 IMPACT ASSESSMENT

The impacts that may result from the planning and design, construction, operational, decommissioning and closure phases as well as proposed management of identified impacts and proposed mitigation measures have been addressed in the Basic Assessment Report.

14 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

An Environmental Management Programme was prepared to detail a plan of action to ensure that recommendations for preventing the negative environmental impacts (and where possible improving the environment) are implemented during the life-cycle of the project.

15 CONCLUSION

In summary the following is recommended for authorisation:

The maps attached in Appendix A indicates/highlights the whole area that was investigated to inform GDARD on the area that is part of the authorisation. The wider area that was investigated will allow future potential amendments to the EA should it be necessary (at a later stage). Should small changes be done to the layout of the site after authorisation it will not be considered crucial and will not warrant a new application.

The Proposed Layout Alternative is recommended for authorisation of the proposed development.

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