



Final Environmental Impact Assessment Report for the Proposed Valleyview Residential Development on Portion 22 of Farm Naauwpoort 335-JS, Mpumalanga Province

MDEDET Ref: 17/2/3N-170

Client: Before the Wind Investment 113 Pty Ltd

Date: June 2014

DOCUMENT DESCRIPTION

Client:

Before the Wind Investments 113 Pty Ltd

Project Name:

Final Environmental Impact Assessment Report for the Proposed Valleyview Residential Development on Portion 22 of Farm Naauwpoort 335-JS, Mpumalanga Province

Royal HaskoningDHV Reference Number:

E02.JNB.001218

Authority Reference Number:

17/2/3N-170

Compiled by:

Sibongile Gumbi

Date:

June 2014

Location:

Witbank

Review and Approval

Paul da Cruz

EXECUTIVE SUMMARY

Introduction and Background

Before the Wind Investments 113 (Pty) Ltd proposes the development of a **mixed-use township development** known as “**Valleyview**” on the property: farm **Naauwpoort 335 JS portion 22** at Emalahleni (Witbank) east, near N12/N4, Mpumalanga Province. The size of the study area is 42ha (forty two) hectares. In addition, the proposed development is located adjacent to the Reyno Ridge suburb, Bankenveld Golf Estate and other planned land-uses (Refer to Figure 1) in Ward 34 of the Emalahleni Local Municipality. On a local scale the proposed site is bounded to the north by Silwer Avenue and to the west by Luna Street. It is adjacent to an attractive high-income neighbourhood that is being developed with a few developments currently being put up. There is also the Bankenveld Golf Estate located to the north of the site just across from Silwer street that is currently undergoing construction.

The property is bordered on the northern side by a local access road and an existing township on the western to north-western side by the existing suburb of Reyno Ridge. The remaining boundary on the eastern side borders into vacant land composed of untransformed grassland that extends down to the Witbank Dam, at a distance of approximately 3 km from the site.

The site for the proposed development is currently vacant, having formerly been farming land. The site includes a drainage line and wetland in its northern part. There is a small dwelling on the south-eastern corner of the site that appears to have been a workers’ dwelling. Various grassed vehicle tracks traverse the site. The site comprises largely of rocky substrates that are not suitable for cultivation.

To ensure compliance with the EIA regulations (2010) promulgated under section 24 (5) of the National Environmental Management Act - NEMA (Act No. 107 of 1998) (as amended) and environmental best practice, *Before the Wind Investments 113 (Pty) Ltd* appointed Royal HaskoningDHV as the independent Environmental Assessment Practitioner (EAP) to conduct the necessary studies in order to obtain Environmental Authorisation for the proposed project.

In light of the above, Royal HaskoningDHV appointed a team of experts that are well known in their respective specialist fields to assess the potential environmental impacts that the proposed development may have on the receiving environment.

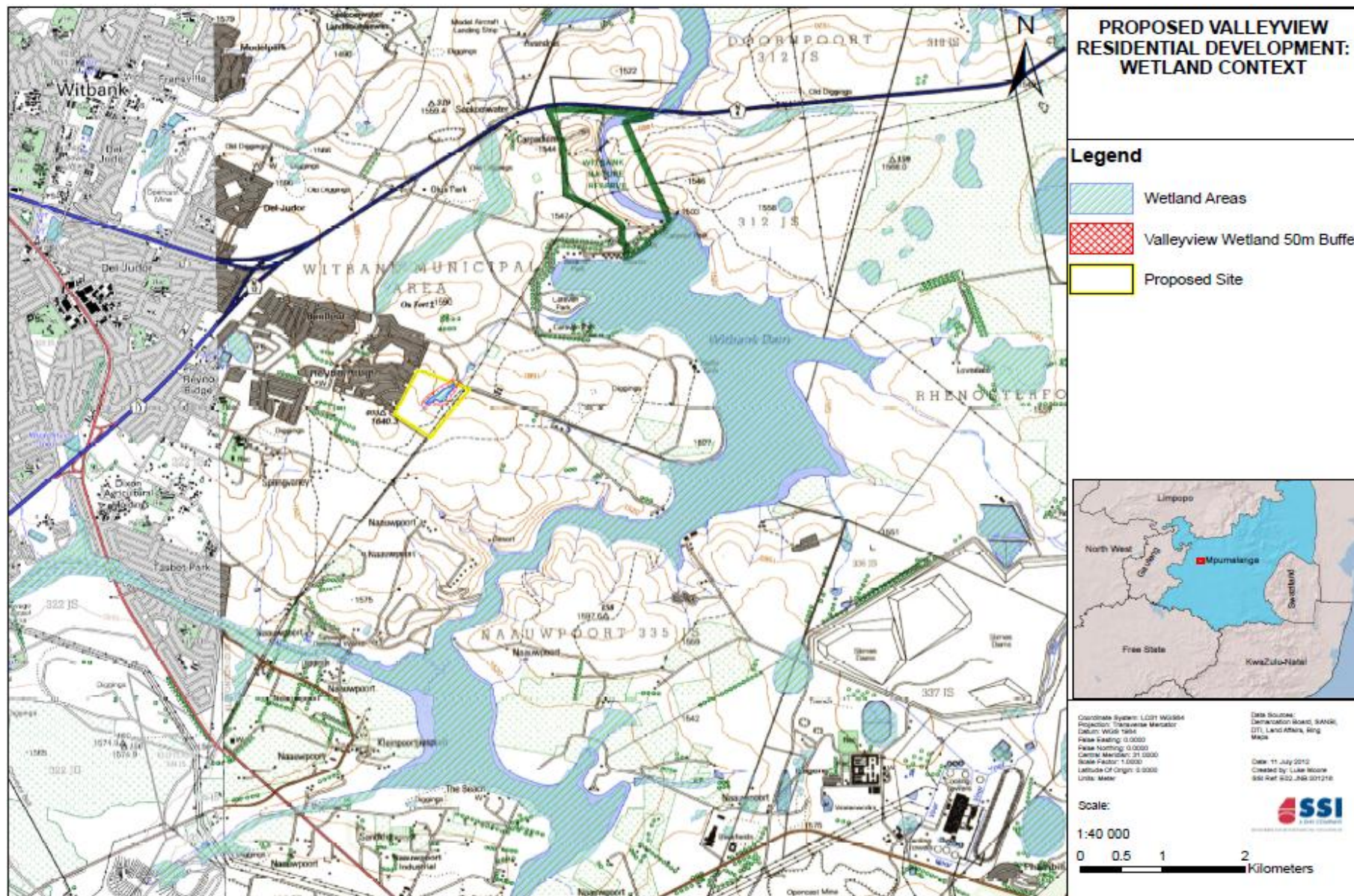


FIGURE 1: LOCALITY MAP

Regulatory Environmental Requirements

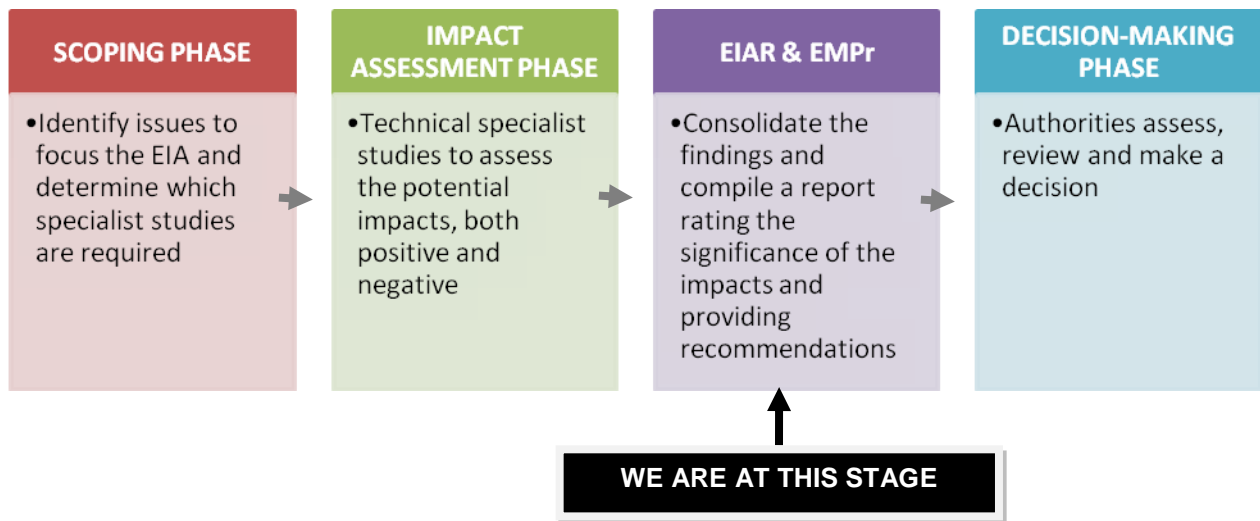
The Mpumalanga Department of Economic Development Environmental and Tourism (MDEDET), is the lead authority carrying out the authorisation process in accordance with the National Environmental Management Act (Act No. 107 of 1998, “NEMA”) (as amended).

The EIA Regulations under the NEMA consist of three categories of activities namely: Listing Notice 1 and 3 Activities (GNR. 544 and GNR 546 of 2010) which require a Basic Assessment Process, and Listing Notice 2 Activities (GNR. 545 of 2010) which require both a Scoping and an EIA Report for authorisation.

The activities associated with the proposed project fall within GNR. 544 and GNR 545 and GNR546, as such have been assessed under the Scoping and EIA process. Acceptance by MDEDET of the Scoping Report and Plan of Study for EIA was received on the **17 September 2013**.

EIA Report

In line with the requirements of the NEMA EIA Regulations, this EIA Report provides a detailed description of the pre-development environment, specifically in terms of the biophysical and socio-economic environment of the study area. Furthermore, the report provides a comprehensive description of the activities as well as numerous specialist studies undertaken for the EIA Phase and Public Participation Process (PPP), as well as the way forward in the form of conclusions, recommendations and a draft Environmental Management Programme (EMPr).



To ensure the completeness of the EIA and Draft EMPr, specialists surveyed the area to identify the potential impacts of the project on the area. The following specialist studies were conducted for the Valleyview Project and are included within the Appendices of this EIA report:

Type of Study	Specialist
Wetland Assessment	Paul da Cruz – RHDHV
Heritage	Dr Julius CC Pistorius
Geotechnical	Engelab CC

Traffic Assessment	Marciana Abavana – RHDHV
Vegetation Assessment (Scoping phase)	De Castro and Brits
Animal Life assessment (Scoping Phase)	Dr Andrew Deacon
Biodiversity Assessment (EIA Phase)	Riaan Robbeson
Visual Assessment (EIA phase)	Paul da Cruz – RHDHV

Alternatives

No off-site or other site alternatives have been investigated due to the fact that this property is owned by the developer, and located with an urban area. However layout design alternatives were assessed with the preferred alternative. The limitations inherent in this scenario are understood. Both layout options were investigated in terms of the layout for the proposed township establishment so as to accommodate the wetland.

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 an urban residential area surrounded by either upcoming or already existing residential communities. By not developing the site, the site will be anomalous in the context of the surrounding urban residential land-uses, and some of the direct and indirect socio-economic benefits (i.e. job creation, housing shortages, provision of further housing aimed at the mature living market, etc.) will not materialise.

From an ecological perspective, the site has a certain degree of ecological sensitivity due to the presence of a wetland and rocky outcrops, however much of the ecological linkages between the site and surrounding natural areas have been lost due to the increase in development around the site. Not developing the site will assist in protecting the natural features on the site, however the development as proposed will maintain the wetland and an associated buffer area as an undeveloped but importantly as an actively managed and controlled area.

Public Participation

Royal HaskoningDHV conducted the Public Participation Process (PPP) for the Valleyview development. During the Scoping Phase there was a participatory approach to this development and the availability of services. It is also noted that engaging stakeholders even before developments are built can achieve the best results. It is for this reason that the PPP forming part of the EIA becomes the basis for the stakeholder engagement process.

For the PPP, the aim was to ensure that the full range of stakeholders was informed about the Valleyview development throughout the period in question. In order to achieve this, a number of key activities have taken place and will continue to take place. These included the following:

- The identification of stakeholders is a key deliverable at the outset, and it is noted that there are different categories of stakeholders that must be engaged, from the different levels and categories of government, to relevant structures in the NGO sector, to the communities adjacent to the Valleyview development;
- The development of a living and dynamic database that captures details of stakeholders from all sectors;
- The convening of focussed and general meetings with stakeholders at different times throughout the EIA process (and beyond);
- The engagement of public leaders to whom the public generally turn for information, keeping such individuals well informed about process and progress;
- The fielding of queries from I&APs and others, and providing appropriate information;
- The convening of specific stakeholder groupings/for or as the need arises;

- The preparation of reports (both baseline and impact assessment) based on information gathered throughout the EIA via the PPP and feeding that into the relevant decision-makers;
- The PPP could include distribution of various types of pamphlets and other information packs; and
- Where appropriate site visits may be organised, as well as targeted coverage by the media.

Environmental Impact Assessment

The impact of the project activities was determined by identifying the environmental aspects and then undertaking an environmental risk assessment to determine the significant environmental aspects.

The environmental impact assessment has considered all phases of the project, namely, construction phase and operational phase. It is not anticipated that the proposed infrastructure will be developed within a short-medium term and thus the date of decommissioning and the potential alternate land-use is unknown. Therefore, the decommissioning impacts have not been considered except from the most general point of view.

The rating system used is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact.

During the EIA, the impact of the Valleyview Residential Development on the biophysical and socio-economic environments was assessed. From the assessment, it was determined which parts of the two environments will be more significantly affected as compared to others. It was this assessment that allowed the EAP to make an informed analysis and provide an opinion of the proposed development.

Conclusion

In line with the requirements of the NEMA EIA Regulations (2010)(as amended), this EIA Report has provided, an explanation of the activities undertaken during the EIA Phase and PPP was also provided. Importantly the report addresses the impacts identified during the scoping phase that were anticipated for the development, as well as providing mitigation measures to ensure for the environmentally sustainable development of Valleyview.

This EIA study has found that the development aims at retaining the wetland; however it would have a significant impact on Biodiversity. The site is located within an urban area, but falls within a Critical Biodiversity Area (designated as “Highly Significant” and also being situated within an Ecological Corridor, thus developments within this category is regarded “Restricted”) as stipulated by the Mpumalanga Biodiversity Conservation Plan. In consultation with the MTPA, a biodiversity offset will however not be required, based on the protection (non-development) of the wetland and rocky outcrops on the site and implementation of associated buffer zones. .

Other impacts identified during the EIA, however deemed to be medium – low in significance is the impact on views and the availability of services. Since the commencement of the Scoping phase the developer has engaged with the Emalahleni Local Municipality and attained approval for the parallel town planning processes. Approval of services is based on the upgrading of the power supply system (see section 3.2.4) and the construction of a dedicated water pipeline to the development (see section 3.2.1). All upgrades would be at the cost of the developer. The visual impact on the neighbouring communities has been addressed as part of section 7.5 of this document with proposed mitigation measures provided.

Should the proposed mitigation measures be implemented correctly, the Valleyview residential development will be a viable development and be able to meet its 'responsibility' in terms local economic development.

The location of the development is in line with the planning intent as the study area is located with a residential area.

The findings conclude that there are no significant environmental fatal flaws that could prevent the proposed Valleyview Residential development from being developed, provided that the recommended mitigation and management measures contained in the EMPr are implemented.

TABLE OF CONTENTS

TABLE OF CONTENTS	VI
GLOSSARY	XI
ACRONYMS	XIV
1 INTRODUCTION	1
1.1 CONTEXT AND BACKGROUND	1
1.2 PROJECT APPLICANT	3
1.3 INDEPENDENT ENVIRONMENTAL ASSESSMENT PRACTITIONER	3
2 LEGAL REQUIREMENTS	5
2.1 THE CONSTITUTION OF SOUTH AFRICA	5
2.2 NATIONAL LEGISLATION AND REGULATIONS	5
2.2.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998)(AS AMENDED)	5
2.2.2 EIA REGULATIONS (2010)	5
2.2.3 NATIONAL WATER ACT (ACT NO. 36 OF 1998)(AS AMENDED)	7
2.2.3.1 Water Use	7
2.2.4 NATIONAL HERITAGE RESOURCES ACT (ACT NO. 25 OF 1999)	8
2.2.5 OCCUPATIONAL HEALTH AND SAFETY ACT (ACT NO. 85 OF 1993)	8
2.2.6 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT NO. 10 OF 2004)	8
2.3 APPROACH TO THE EIA STUDIES	9
2.3.1 ENVIRONMENTAL SCOPING STUDY	9
2.3.2 ENVIRONMENTAL IMPACT ASSESSMENT STUDY	10
2.3.2.1 Environmental Impact Assessment Report	10
2.3.2.2 Environmental Management Programme	11
2.4 STRUCTURE OF THE REPORT	12
3 PROJECT DESCRIPTION	13
3.1 PROJECT LOCATION	13
3.1.1 SURROUNDING DEVELOPMENTS	17
3.1.2 OWNERSHIP	17
3.1.3 ZONING	17
3.1.4 ROADS AND ACCESSIBILITY	17
3.1.5 DEVELOPMENT VISION	18
3.1.6 HEIGHT RESTRICTIONS	19
3.2 ENGINEERING SERVICES	19
3.2.1 BULK SERVICES	19
3.2.2 TELECOMMUNICATION	20
3.2.3 ELECTRICAL	20
3.3 PHASING	20
4 PROJECT NEED AND DESIRABILITY	21
5 PROJECT ALTERNATIVES	23
5.1 DO-NOTHING ALTERNATIVE	23
5.2 LAYOUT ALTERNATIVES	23
5.2.1 PREFERRED LAYOUT	23

5.2.2 ALTERNATIVE TOWNSHIP DEVELOPMENT	24
6 DESCRIPTION OF THE BASELINE ENVIRONMENT	27
6.1 TOPOGRAPHY	27
6.2 GEOLOGY AND SOILS	27
6.3 CLIMATE AND LOCAL WEATHER CONDITIONS	27
6.3.1 TEMPERATURE AND HUMIDITY	27
6.3.2 PRECIPITATION	27
6.4 SOCIAL ENVIRONMENT	27
6.4.1 AGE PROFILE	28
6.4.2 EDUCATION LEVEL	29
6.4.3 AVERAGE ANNUAL HOUSEHOLD INCOME	29
6.4.4 EMPLOYMENT STATUS	30
6.4.4.1 Occupation Profile	30
6.4.5 AVERAGE ANNUAL HOUSEHOLD INCOME	31
6.5 VISUAL ENVIRONMENT	32
6.6 LAND-USE	33
6.7 WATER RESOURCES	33
6.8 WETLAND	34
6.9 HERITAGE	36
6.10 BIODIVERSITY ASSESSMENT	37
6.10.1 FAUNAL ASSESSMENT	41
6.10.2 ECOLOGICAL IMPACT ASSESSMENT	48
6.11 GEOTECHNICAL ASSESSMENT	48
6.11.1 SITE SOILS AND GEOLOGY	49
6.11.2 CONCLUSION	49
6.12 HERITAGE	49
6.12.1 POSSIBLE IMPACT ON REMAINS FROM THE LAST FEW DECADES	50
6.12.2 SIGNIFICANCE OF THE REMAINS FROM THE LAST FEW DECADES	50
6.12.3 SIGNIFICANCE OF THE IMPACT ON REMAINS FROM THE LAST FEW DECADES	50
6.13 TRAFFIC ASSESSMENT	50
6.13.1 ASSESSMENT SCENARIOS	51
6.13.2 EXISTING TRAFFIC (SCENARIO 1)	52
6.13.3 FUTURE TRAFFIC DATA INCLUDING SITE DEVELOPMENT TRAFFIC (SCENARIO 3)	53
6.13.3.1 Trip Generation	53
6.13.4 PUBLIC TRANSPORT	55
6.13.5 DISCUSSION	55
6.13.6 CONCLUSIONS	55
6.13.6.1 Recommendations	55
6.14 VISUAL ASSESSMENT	55
6.14.1 TOPOGRAPHY, VISUAL CHARACTER, AND VISUAL SENSITIVITY OF THE STUDY AREA.	56
6.14.1.1 Topography – Slope and Aspect	56
6.14.1.2 Implications of slope and aspect for the experiencing of views	57
6.14.1.3 Landcover and Vegetation	57
6.14.1.4 Implications of land cover and vegetation for the experiencing of views	58
6.14.1.5 Visual Character and Visual Sensitivity of the area	58
6.14.1.6 Location of Visual Receptors and Key Observation Locations	61
6.14.2 RECOMMENDED MITIGATION MEASURES	65
6.14.3 COMPARISON OF ALTERNATIVE LAYOUTS	65
6.15 WETLAND ASSESSMENT	66
6.15.1 WETLAND HYDROGEOMORPHIC FORMS	66
6.15.1.1 Wetland Hydromorphology (Hydrology and Geomorphological Processes)	67

6.15.2	WETLAND VEGETATIVE CHARACTERISTICS	68
6.15.3	WETLAND SOIL CHARACTERISTICS	69
6.15.4	RESULTS OF IN-FIELD WETLAND DELINEATION AND IMPLICATIONS FOR DEVELOPMENT	72
6.15.5	NATURE OF THE POTENTIAL IMPACTS ON WETLANDS ASSOCIATED WITH THE PROPOSED DEVELOPMENT	74
6.15.6	ASSOCIATED MITIGATION MEASURES	75
6.15.7	CONCLUSIONS	75
7	PUBLIC PARTICIPATION	77
7.1	AUTHORITY CONSULTATION	78
7.2	CONSULTATION WITH OTHER RELEVANT STAKEHOLDERS	78
7.3	OVERVIEW OF THE SCOPING PHASE PPP	80
7.3.1	SITE NOTIFICATION	80
7.3.2	ADVERTISING	82
7.3.3	IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES	82
7.3.4	BRIEFING PAPER	82
7.3.5	ISSUES AND RESPONSE REPORT	82
7.3.6	PUBLIC MEETING	82
7.3.7	PUBLIC REVIEW OF THE DRAFT SCOPING REPORT	82
7.3.8	FINAL ENVIRONMENTAL SCOPING REPORT	83
7.4	OVERVIEW OF THE EIA PHASE PPP	83
7.4.1	SITE NOTICE	83
7.4.2	ADVERTISING	84
7.4.3	PUBLIC REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT	84
7.4.4	PUBLIC MEETING	85
7.4.5	PUBLIC REVIEW OF THE FINAL DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT	85
7.4.6	ISSUES AND RESPONSE REPORT	85
7.5	ENVIRONMENTAL AUTHORISATION	85
8	ENVIRONMENTAL IMPACT ASSESSMENT	86
8.1	INTRODUCTION	86
8.2	METHODOLOGY	86
8.3	GEOLOGY IMPACTS	89
8.4	TOPOGRAPHICAL IMPACTS	90
8.5	HYDROGEOLOGY IMPACTS	91
8.6	HYDROLOGY IMPACTS	93
8.7	SOILS AND AGRICULTURAL IMPACTS	95
8.8	BIODIVERSITY IMPACTS	97
8.9	WETLANDS IMPACTS	100
8.10	WASTE IMPACTS	102
8.11	AIR QUALITY IMPACTS	104
8.12	NOISE IMPACTS	106
8.13	HERITAGE IMPACTS	107
8.14	VISUAL IMPACTS	108
8.15	TRAFFIC IMPACTS	109
8.16	SOCIO-ECONOMIC IMPACTS	111
8.17	COMPARATIVE ASSESSMENT OF ALTERNATIVES	114
9	ENVIRONMENTAL IMPACT STATEMENT	117
9.1	SUMMARY OF KEY FINDINGS	117
9.2	IMPLICATIONS OF THE PROPOSED ACTIVITY	121
10	CONCLUSION AND RECOMMENDATIONS	123

10.1 ASSUMPTIONS, UNCERTAINTIES OR GAPS IN KNOWLEDGE	123
10.1.1 VISUAL SPECIALIST	124
10.1.2 WETLAND SPECIALIST	124
10.1.3 BIODIVERSITY	124
10.2 CONCLUDING REMARKS AND EAP OPINION	125
10.3 CONDITIONS AND FINAL RECOMMENDATIONS	126

LIST OF FIGURES

Figure 1:1: locality map	2
Figure 2:1: environmental studies flowchart	9
Figure 3:1: Proposed Valleyview development – Cadastral context	14
Figure 3:2: Ward map	15
Figure 3:3: Google image of Development Site	16
Figure 3:4: Developments within study area	17
Figure 3:5: proposed access routes	18
Figure 5:1: Preferred alternative	25
Figure 5:2: Alternative layout	26
Figure 6:1: Age Profile for the Emahaleni Municipality	28
Figure 6:2: HIGHEST LEVEL of EDUCATION	29
Figure 6:3: level of Employment WITHIN EMALAHLENI LOCAL MUNICIPALITY in the period prior to 2008	30
Figure 6:4: occupation profile	31
Figure 6:5: Average annual household income	32
Figure 6:6: SURFACE WATER AREAS within THE SURROUNDING AREA	35
Figure 6:7: View of the Valleyhead in which the wetland occurs	36
Figure 6:8: Bucket Pump present on site during the 2006 survey	37
Figure 6:9: land cover categories of the region	39
Figure 6:10: Terrestrial and Biodiversity Conservation (MBCP) categories of the study site	43
Figure 6:11: Rocky grassland habitat	44
Figure 6:12: mesic grasslands, note locally dominant stands of <i>Hyparrhenia hirta</i>	44
Figure 6:13: Development limitations for the study site in terms of the MBCP (Surface Mining)	46
Figure 6:14: Floristic habitat types of the study area	47
Figure 6:15: Location of Traffic Counting Stations	51
Figure 6:16 –nature of topography that slopes down to the north	56
Figure 6:17 – Proposed Land Development Context, as adapted from the eMalahleni SDF Proposed New Land Development Opportunities Map (eMalahleni SDF 2013/14)	58
Figure 6:18 – Portion of the view representative of the view to which properties on the edge of Reyno Ridge are currently exposed	60
FIGURE 6:19 – PROPERTIES ON THE EASTERN EDGE OF REYNO RIDGE WITH VIEWS OVER THE SITE AND SURROUNDS, CLASSIFIED AS KEY OBSERVATION LOCATIONS	63
Figure 6:20 – Properties on the southern boundary of the development site (northern edge of the Ridge Estate) which have been classified as key observation locations	63
FIGURE 6:21 – KEY OBSERVATION LOCATIONS SURROUNDING THE VALLEYVIEW DEVELOPMENT SITE	64
Figure 6:22: View of the Valleyhead in which the wetland occurs	67
Figure 6:23 – Typical wetland vegetation composition at one of the study sites	69
Figure 6:24 – Example of soils from a Soft Plinthic B horizon encountered within the wetland	70
Figure 6:25 Orthic A Horizon (Left) as Compared to an underlying E horizon from the same sample point (Right)	70
Figure 6:26 – ‘Rusty’ markings (iron mottles) within an e horizon on the site	71
Figure 6:27 – Map of Wetland Area and Associated Buffer	73
Figure 7:1: Responsibilities of I&APs in the different stages of the project	77
Figure 7:2: Key phases in the PPP undertaken during the Scoping Phase	80
Figure 7:3: SITE NOTICES PLACED AT THE PROPOSED SITE	81
Figure 7:4: Site NOTices at Bankenveld (2 entrances)	81

Figure 7:5: ppp process in eia phase	83
Figure 7:6: Bankenveld entrance	84
FIGURE 7:7: SAGITTARIUS AVENUE	84
Figure 7:8: LEO AVENUE	84
FIGURE 7:9: MINERVA AVENUE	84

List of Tables

Table 1:1: details of the project applicant	3
Table 1:2: Details of the EAP	3
Table 2:1: Listed activities according to listing notices 1 and 2 of the eia regulations (2010)	6
Table 2:2: GUIDELINES, POLICIES AND ENVIRONMENTAL MANAGEMENT INSTRUMENTS	8
Table 2:3: Specialist studies undertaken as part of the ess and EIA phases	10
Table 2:4: EIAR requirements according to Section 31 of GNR 543	10
Table 2:5: Report structure	12
Table 6:1: level of service definition	52
Table 6:2: Table showing LOS for Scenario 1 for AM, Midday and PM Peak hours	53
Table 6:3: Trip Generation for Retirement village	54
Table 6:4: Trip Generation for Residential Cluster	54
Table 6:5: Total Trips Generated	54
Table 6:6: Table showing LOS for Scenario 3 for AM and PM Peak hours	54
Table 7:1: Key stakeholders contacted as part of the public participation process	79
Table 8:1: Criteria Used for the Rating of Impacts	87
Table 8:2: Criteria for the rating of classified impacts	87
Table 8:3: Comparative assessment of the two site layout options after mitigation	114
Table 10:1: Summary of key findings of the EIA	118
Table 10:2: Comparative assessment of the positive and negative impacts of the project	121

Appendices

APPENDIX A: LOCALITY MAPS
APPENDIX B: MDEDET ACCEPTANCE OF SCOPING REPORT
APPENDIX C: PUBLIC PARTICIPATION DOCUMENTS
APPENDIX D: SPECIALIST REPORTS
APPENDIX E: EMPR

GLOSSARY

Activity (Development)	An action either planned or existing that may result in environmental impacts through pollution or resource use. For the purpose of this report, the terms 'activity' and 'development' are freely interchanged.
Alternatives	Different means of meeting the general purpose and requirements of the activity, which may include site or location alternatives; alternatives to the type of activity being undertaken; the design or layout of the activity; the technology to be used in the activity and the operational aspects of the activity.
Applicant	The project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.
Biodiversity	The diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.
Construction	The building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.
Cumulative impact	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.
Decommissioning	The demolition of a building, facility, structure or infrastructure.
Direct Impact	Impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.
Ecosystem	A dynamic system of plant, animal (including humans) and micro-organism communities and their non-living physical environment interacting as a functional unit. The basic structural unit of the biosphere, ecosystems are characterised by interdependent interaction between the component species and their physical surroundings. Each ecosystem occupies a space in which macro-scale conditions and interactions are relatively homogenous.
Environment	In terms of the National Environmental Management Act (NEMA) (No 107 of 1998)(as amended), "Environment" means the surroundings within which humans exist and that are made up of: a) the land, water and atmosphere of the earth; b) micro-organisms, plants and animal life; c) any part or combination of (i) of (ii) and the interrelationships among and between them; and d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Assessment	The generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.
Environmental Authorisation	An authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.
Environmental Assessment	The individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental

Practitioner (EAP)	instrument introduced through the EIA Regulations.
Environmental Impact	Change to the environment (biophysical, social and/ or economic), whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.
Environmental Impact Assessment (EIA)	In relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application as defined in NEMA.
Environmental Issue	A concern raised by a stakeholder, interested or affected parties about an existing or perceived environmental impact of an activity.
Environmental Management	Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.
Environmental Management Programme (EMPr)	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.
Fatal Flaw	Issue or conflict (real or perceived) that could result in developments being rejected or stopped. In the context of an environmental impact assessment a fatal flaw can be termed as an environmental issue that cannot be mitigated by any means
General Waste	Household water, construction rubble, garden waste and certain dry industrial and commercial waste which does not pose an immediate threat to man or the environment.
Groundwater	Water in the ground that is in the zone of saturation from which wells, springs, and groundwater run-off are supplied.
Hazardous Waste	Waste that may cause ill health or increase mortality in humans, flora and fauna.
Hydrology	The science encompassing the behaviour of water as it occurs in the atmosphere, on the surface of the ground, and underground.
Indirect Impacts	Indirect or induced changes that may occur as a result of the activity. These types of impacts include all of the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
Integrated Environmental Management	A philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at local, national and international level - that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a particular proposal or activity. These may include environmental assessment tools (such as strategic environmental assessment and risk assessment), environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision support systems or advisory councils).
Interested and Affected Party (I&AP)	Any person, group of persons or organisation interested in or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.
Mitigate	The implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.
No-Go Option	In this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.
Overburden	Layers of soil and rock covering a coal seam. In surface mining operations, overburden is removed prior to mining using large equipment. When mining has been

completed, it is either used to backfill the mined areas or is hauled to an external dumping and/or storage site.

Public Participation Process	A process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters.
Rehabilitation	A measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.
Scoping	The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addresses in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.
Sensitive Environments	Any environment identified as being sensitive to the impacts of the development.
Significance	Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. magnitude, intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).
Stakeholder Engagement	The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.
Sustainable Development	Development which meets the needs of current generations without hindering future generations from meeting their own needs.
Watercourse	In terms of the National Water Act (Act 36 of 1998) a watercourse is defined as: a) a river or spring; b) a natural channel or depression in which water flows regularly or intermittently; c) a wetland, lake or dam into which, or from which, water flows; and d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.
Wetland	In terms of the National Water Act (Act 36 of 1998) a wetland is defined as land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

ACRONYMS

DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESS	Environmental Scoping Study
ESR	Environmental Scoping Report
I&AP	Interested and Affected Party
MDEDET	Mpumalanga Department of Economic Development, Environment and Tourism
NEMA	National Environmental Management Act
NGL	Natural Ground Level

1 INTRODUCTION

1.1 Context and Background

Before the Wind Investments 113 (Pty) Ltd proposes the development of a mixed-use township development known as “Valleyview” on the property: farm Naauwpoort 335 JS portion 22 at Emalahleni (Witbank) east, near N12/N4, Mpumalanga Province. The size of the study area is 42ha (forty two) hectares. In addition, the proposed development is located adjacent to the Reyno Ridge suburb, Bankenveld Golf Estate and other planned land-uses (Refer to Figure 1.1) in Ward 34 of the Emalahleni Local Municipality. On a local scale the proposed site is bounded to the north by Silwer Avenue and to the west by Luna Street. It is adjacent to an attractive high-income neighbourhood that is being developed with a few developments currently being put up. There is the Bankenveld Golf Estate located to the north of the site just across from Silwer street that is currently undergoing construction.

The property is bordered on the northern side by a local access road and an existing township on the western to north-western side by the existing suburb of Reyno Ridge. The remaining boundary on the eastern side borders into vacant land composed of untransformed grassland that extends down to the Witbank Dam, at a distance of approximately 3 km from the site.

The site of the proposed development is currently vacant, having formerly been farming land. The site includes a drainage line and wetland in its northern part. There is a small dwelling on the south-eastern corner of the site that appears to have been a workers’ dwelling. Various grassed vehicle tracks traverse the site. The site comprises largely of rocky substrates that are not suitable for cultivation.

To ensure compliance with the EIA regulations (2010) promulgated under section 24 (5) of the National Environmental Management Act - NEMA (Act No. 107 of 1998)(as amended) and environmental best practice, *Before the Wind Investments (Pty) Ltd* appointed Royal HaskoningDHV as the independent Environmental Assessment Practitioner (EAP) to conduct the necessary studies to obtain Environmental Authorisation to undertake the proposed project.

In light of the above Royal HaskoningDHV appointed a team of experts that are well known in their respective specialist fields to assess the potential environmental impacts that the proposed development may have on the receiving environment.

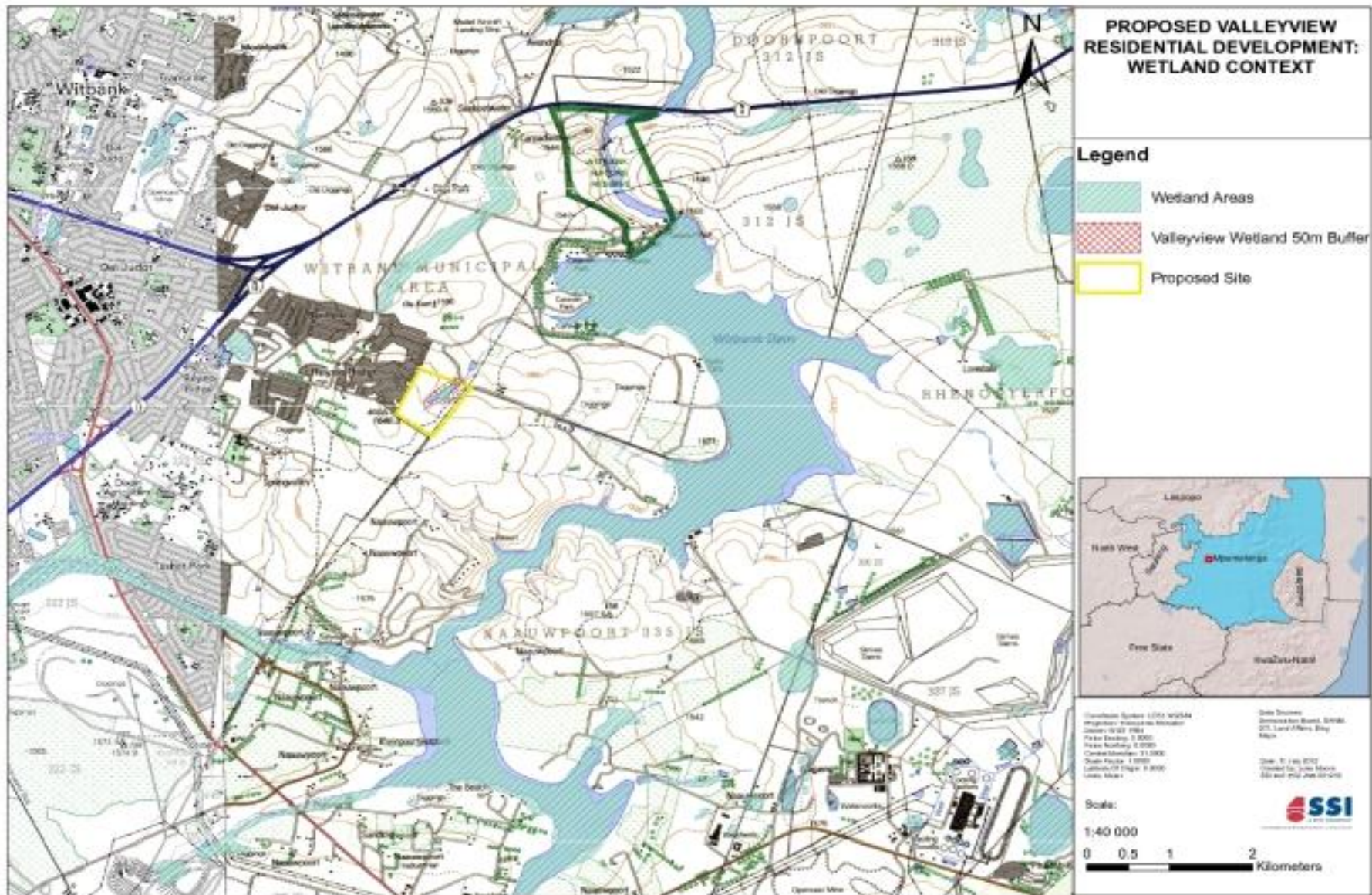


FIGURE 1:1: LOCALITY MAP

1.2 Project applicant

TABLE 1:1: DETAILS OF THE PROJECT APPLICANT

Applicant :	Before the Wind Investments 113 (Pty) Ltd
Representative	Rashid Ahmed Bhamjee
Physical Address	c/o Curtain Dream 5 Paul Kruger Street Witbank
Postal Address	P.O. B 316; Witbank 1035
Telephone Number	013 656 3232
Cell Number	083 415 5166
Fax Number	011 798 6001
Email Address	rabhamjee@mweb.co.za

1.3 Independent Environmental Assessment Practitioner

Before the Wind Investments 113 (Pty) Ltd has appointed Royal HaskoningDHV (RHDHV) formerly known as SSI Engineers and Environmental Consultants as the independent Environmental Assessment Practitioner (EAP) to undertake the Scoping Report, Environmental Impact Assessment (EIA) and Draft Environmental Management Programme (EMPr) for the Valleyview Residential Development in accordance with the requirements of the National Environmental Management Act (No 108 of 1998)(as amended). Table 1.2 indicates the details of the independent EAP.

TABLE 1:2: DETAILS OF THE EAP

Environmental Assessment Practitioner	Royal HaskoningDHV
Representative	Paul da Cruz /Sibongile Gumbi
Physical Address	Building 5, Country Club Estate Woodland Drive Woodmead 2191
Postal Address	Box 867 Gallo Manor 2052
Telephone Number	+27 11 798 6458
Cell Number	+27 79 668 2632
Fax Number	+27 11 798 6005
Email Address	paul.dacruz@rhdhv.com or Sibongile.gumbi@rhdhv.com
Expertise	Paul Da Cruz is an Associate at RHDHV. He has worked on a number of projects, including Strategic Environmental Assessments, Environmental Impact Assessments, Environmental Management Plans, and Environmental Auditing. He performed the role the project manager for a number of large EIAs. Through his consulting work he

Environmental Assessment Practitioner	Royal HaskoningDHV
	<p>gained experience of not only EIA project management, but through experience gained also to offer a rare multi-disciplinary package of specialist skills, including wetland assessment, visual impact assessment, tourism assessment, and avifaunal assessment.</p> <p>Sibongile Gumbi is a Senior Environmental Consultant with experience in various facets of environmental management which includes Environmental Impact Assessments, Environmental Management Planning, Environmental Auditing, Public Participation, Environmental training as well as Environmental Management Frameworks. She holds an Honours degree in Environmental Sciences from the University of South Africa, registered with South African Council for Natural Scientific Professions and has been part of RHDHV for a period of seven years.</p>

2 LEGAL REQUIREMENTS

In order to protect the environment and ensure that the proposed Valleyview Development operates in an environmentally responsible manner, there are a number of significant pieces of environmental legislation that need to be taken into account during this study and these include:

2.1 The Constitution of South Africa

The Bill of Rights, in the Constitution of South Africa (No. 108 of 1996), states that everyone has a right to a non-threatening environment and requires that reasonable measures be applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development. These principles are embraced in NEMA and given further expression.

2.2 National Legislation and Regulations

2.2.1 National Environmental Management Act (Act No. 107 of 1998)(as amended)

The National Environmental Management Act (NEMA) (No. 107 of 1998) (as amended) states that the principles of Integrated Environmental Management (IEM) should be adhered to in order to ensure sustainable development.

A vital fundamental of the IEM procedure is accountability to the various parties that may be interested in or affected by a proposed development. Public participation is a requirement of the IEM procedure, in terms of the identification of potentially significant environmental impacts during the EIA Phase. The IEM procedure aims to ensure that the environmental consequences of development proposals are understood and adequately considered during all stages of the project cycle, and that negative aspects are resolved or mitigated and positive aspects enhanced.

Furthermore, Section 28(1) of the Act states that “every person who causes 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 pollution cannot be prevented then appropriate measures must be taken to minimise or rectify such pollution.

2.2.2 EIA Regulations (2010)

The NEMA EIA Regulations (2010), which replaced the EIA Regulations (2006), were promulgated and came into effect on 02 August 2010. Government Regulation Notice (GNR) 543, regulates the procedure and criteria as contemplated in Chapter 5 of NEMA, relating to the submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities in order to avoid detrimental impacts on the environment, or where it cannot be avoided, ensure mitigation and management of impacts to acceptable levels, and to optimise positive environmental impacts, and for matters pertaining thereto.

The nature of the proposed project includes activities listed in the following Listing Notices – GNR 544 (Listing Notice 1), GNR 545 (Listing Notice 2) and GNR 546 (Listing Notice 3) of the EIA Regulations (2010) – refer to Table 2: 1.

TABLE 2:1: LISTED ACTIVITIES ACCORDING TO LISTING NOTICES 1 AND 2 OF THE EIA REGULATIONS (2010)

LISTED ACTIVITIES	
LISTING NOTICE 1 (GNR 544)	
Activity 9	<p>The construction of facilities or infrastructure exceeding 1000 meters in length for the bulk transportation of water, sewage and storm water –</p> <ul style="list-style-type: none"> (i) with an internal diameter of 0,36 meters or more; or (ii) with a peak throughput of 120 litres per second or more, <p>excluding where:</p> <ul style="list-style-type: none"> a. such facilities or infrastructure are for bulk transportation of water, sewage or stormwater or stormwater drainage inside a road reserve; or b. where such construction will occur in urban areas but further than 32 meters from a watercourse, measured from the edge of the watercourse. <p>Description of Activity: The proposed development will include the installation of new sewer systems, potable water supply systems as well as stormwater systems. The design, operational requirements and management requirements will be discussed within the EIA process and associated reports. <i>We have provided for this activity as all on-site construction activities will be longer than 1km. We have not assessed off-site infrastructure corridors</i></p>
Activity 13	<p>The construction of facilities or infrastructure for the storage, or for the storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic meters;</p> <p>Description of Activity: During the construction phase of the development, the applicant may require the storage and handling of dangerous goods. Based on this assumption this activity may apply.</p>
Activity 24	<p>The transformation of land bigger than 1000 square meters in size, to residential, retail, commercial, industrial or institutional use, where, at the time of the coming into effect of this Schedule or thereafter such land was zoned open space, conservation or had an equivalent zoning.</p> <p>Description of Activity: The applicant is proposing to develop a 42 hectare site into a residential development.</p>
LISTING NOTICE 2 (GNR 545)	
Activity 15	<p>The physical alteration of underdeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed in 20 hectares or more;</p> <p>Except where such physical alteration takes place for:</p> <ul style="list-style-type: none"> (i) linear development activities; or (ii) agriculture or afforestation where activity 16 in this Schedule will apply. <p>Description of Activity: The applicant is proposing to develop a 42 hectare site into a residential development.</p>
LISTING NOTICE 3 (GNR 546)	
Activity 12	<p>The clearance of an area of 300 square meters or more of vegetation where 75 % or more of the vegetative cover constitutes indigenous vegetation</p> <ul style="list-style-type: none"> (a) 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; (b) within critical biodiversity areas identified in bioregional plans;

LISTED ACTIVITIES

- (c) within the littoral active zone or 100 meters inland from the high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line or erven in urban areas

Description of Activity:

The proposed development area is located within a “highly significant” bioregional zone in accordance with the Mpumalanga MBCP Terrestrial Biodiversity Assessment.

2.2.3 National Water Act (Act No. 36 of 1998)(as amended)

The major objectives of the National Water Act are to:

- Aid in providing basic human needs;
- Meet the growing demand of water in a sustainable manner;
- Ensure equal access to water and use of water resources;
- Protect the quality of water of natural resources;
- Ensure integrated management of water resources;
- Foster social and economic development; and
- Conserve aquatic and related ecosystems.

2.2.3.1 Water Use

In terms of section 21, the water uses that are recognised for purposes of the National Water Act and which *may* be relevant to the proposed development include the following:

SECTION 21 WATER USES

- (c) Impeding or diverting the flow of water in a watercourse.
- (i) Altering the bed, banks, course or characteristics of a watercourse.

In terms of the definitions contained in Section 1 of the National Water Act:

- **“water resource”** includes a watercourse, surface water, estuary, or aquifer
- **“Aquifer”** means a geological formation which has structures or textures that hold water or permit appreciable water movement through them.
- **“Watercourse”** means a river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The beds, banks and characteristics of the wetland are not being affected at all, and thus a water use licence is not necessary.

2.2.4 National Heritage Resources Act (Act No. 25 of 1999)

In terms of Section 38 (subject to the provisions of subsections (7), (8) and (9) of the Act), any person who intends to undertake a development categorised as:

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- The construction of a bridge or similar structure exceeding 50 m in length;
- Any development or other activity which will change the character of a site:
 - Exceeding 5 000 m² in extent;
 - Involving three or more existing erven or subdivisions thereof; or
 - Involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- The re-zoning of a site exceeding 10 000 m² in extent; or
 - Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

The developer 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. In addition in line with the National EIA Regulations a Heritage Impact Assessment was undertaken at the proposed site.

2.2.5 Occupational Health and Safety Act (Act No. 85 of 1993)

The Occupational Health and Safety Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work, against hazards to health and safety arising out of or in connection with the activities of persons at work.

2.2.6 National Environmental Management: Biodiversity Act No. 10 of 2004)

The Act protects the species and ecosystems that warrant national protection. It further promotes the sustainable use of indigenous biological resources.

TABLE 2:2: GUIDELINES, POLICIES AND ENVIRONMENTAL MANAGEMENT INSTRUMENTS

OTHER RELEVANT GUIDELINES, DEPARTMENTAL POLICIES, ENVIRONMENTAL MANAGEMENT INSTRUMENTS
South African National Standard SANS 10103:2008 (<i>The Measurement and Rating of Environmental Noise with Respect to Annoyance and Speech Communication</i>)
National Noise Control Regulations (1998)
Mpumalanga Biodiversity Conservation Plan (2006)
Emalahleni Local Municipality Integrated Development Plan 2010/11

2.3 Approach to the EIA Studies

The environmental impacts associated with the proposed project require investigation in compliance with the Environmental Impact Assessment Regulations (2010) published in Government Notice No. R. 543, R. 544, R. 545 and R. 546 read with Section 24 (5) of the National Environmental Management Act (NEMA-Act No 107 of 1998) (as amended).

The required environmental studies include the undertaking of an Environmental Impact Assessment (EIA) process. This process is being undertaken in two phases (Refer to Figure 2.1):

- Phase 1 - Environmental Scoping Study (ESS) including Plan of Study for EIA; and
- Phase 2 - Environmental Impact Assessment (EIA) Study and Environmental Management Programme (EMPr).

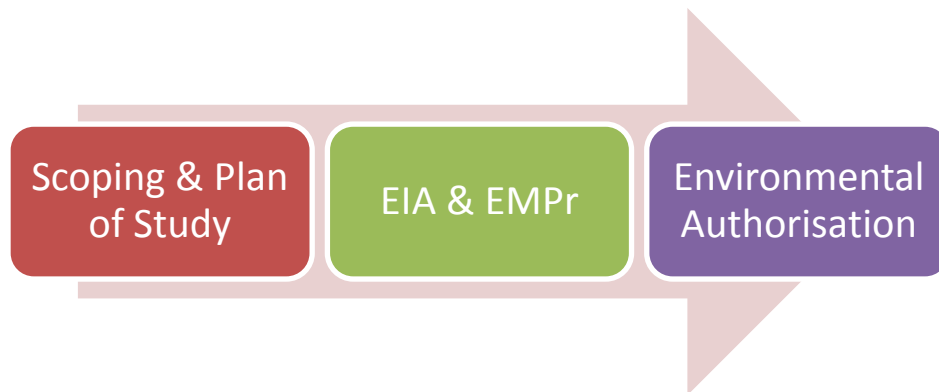


FIGURE 2.1: ENVIRONMENTAL STUDIES FLOWCHART

2.3.1 Environmental Scoping Study

The Environmental Scoping Study (ESS) provided a description of the receiving environment and how the environment may be affected by the development of the proposed project. Desktop studies making use of existing information were used to highlight and assist in the identification of potential significant impacts (both social and biophysical) associated with the proposed project.

Additional issues for consideration were extracted from feedback from the public participation process, which commenced at the beginning of the Scoping Phase, and will continue throughout the duration of the project. All issues identified during this phase of the study were documented within the Environmental Scoping Report (ESR). Thus, the ESR provided a record of all issues identified as well as any fatal flaws, in order to make recommendations regarding the project and further studies required to be undertaken within the EIA phase of the proposed project.

Impacts related to Vegetation and Fauna Heritage, Wetlands, Traffic and Geotechnical conditions have been investigated in the ESS (refer to Table 2.3). Acceptance of the Scoping Report was received on **17 September 2013** from the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET).

TABLE 2:3: SPECIALIST STUDIES UNDERTAKEN AS PART OF THE ESS AND EIA PHASES

SPECIALIST FIELD	SPECIALIST & ORGANISATION
Wetland Assessment	Paul da Cruz - RHDHV
Heritage	Dr Julius CC Pistorius
Geotechnical	Engeolab cc
Traffic Assessment	Marciana Abavana- RHDHV
Vegetation Assessment (Scoping phase)	De Castro and Brits
Animal Life assessment (Scoping Phase)	Dr Andrew Deacon
Biodiversity Assessment (EIA Phase)	Riaan Robbesson
Visual Assessment (EIA phase)	Paul da Cruz- RHDHV

2.3.2 Environmental Impact Assessment Study

2.3.2.1 Environmental Impact Assessment Report

This final Environmental Impact Assessment Report (EIAR) has been compiled in accordance with the accepted Plan of Study and incorporates the findings and recommendations from the Scoping Study as well as specialist studies conducted for the project.

In addition, the final EIAR was compiled according to the guidelines provided in GNR 543 of the EIA Regulations (2010) and contains the following:

TABLE 2:4: EIAR REQUIREMENTS ACCORDING TO SECTION 31 OF GNR 543

EIAR REQUIREMENTS ACCORDING TO SECTION 31 OF GNR 543	SECTION IN REPORT
31(2)(a) Details of - (i) the EAP who compiled the report; and (ii) the expertise of the EAP to carry out an environmental impact assessment	1.5
31(2)(b) A detailed description of the proposed activity	2
31(2)(c) A description of the property on which the activity is to be undertaken and the location of the activity on the property	2.1 & 2.3
31(2)(d) A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity	5
31(2)(e) Details of the public participation process conducted	7
31(2)(f) A description of the need and desirability of the proposed activity	3
31(2)(g) A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	4 & 9.16
31(2)(h) An indication of the methodology used in determining the significance of potential environmental impacts	8
31(2)(i) A description and comparative assessment of all alternatives identified during the environmental impact assessment process	4.5 & 9.16

EIAR REQUIREMENTS ACCORDING TO SECTION 31 OF GNR 543	SECTION IN REPORT
31(2)(j) A summary of the findings and recommendations of any specialist report or report on a specialised process	6
31(2)(k) A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures	9
31(2)(l) An assessment of each identified potentially significant impact, including - (i) cumulative impacts; (ii) the nature of the impact; (iii) the extent and duration of the impact; (iv) the probability of the impact occurring; (v) the degree to which the impact can be reversed; (vi) the degree to which the impact may cause irreplaceable loss of resources; and (vii) the degree to which the impact can be mitigated	9
31(2)(m) A description of any assumptions, uncertainties and gaps in knowledge	8.6
31(2)(n) A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	11.1
31(2)(o) An environmental impact statement which contains - (i) a summary of the key findings of the environmental impact assessment; and (ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives	10
31(2)(p) A draft environmental management programme containing the aspects contemplated in regulation 33	Appendix E
31(2)(q) Copies of any specialist reports and reports on specialised processes complying with regulation 32	Appendix C (C1-C10)
31(2)(r) Any specific information that may be required by the competent authority	<i>Incorporated into the report under various sections</i>
31(2)(s) Any other matters required in terms of sections 24(4)(a) and (b) of the Act	Not applicable

2.3.2.2 Environmental Management Programme

A draft Environmental Management Programme (EMPr) has been compiled for the construction and operational phases for the Valleyview Residential Development. The draft EMPr has been compiled as a stand-alone document from the EIA Report and will be submitted to MDEDET. The draft EMPr has been compiled in accordance with the EIA Regulations (2010). The draft EMPr provides the actions for the management of identified environmental impacts emanating from the project and a detailed outline of the implementation programme to minimise and/or eliminate the anticipated negative environmental impacts. The draft EMPr also provides strategies to be used to address the roles and responsibilities of environmental management personnel on site, and a framework for environmental compliance and monitoring.

The EMPr includes the following:

- Details of the person who prepared the EMPr and the expertise of the person to prepare an EMPr;
- Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in the EIAR, including environmental impacts or objectives in respect of operation or undertaking of the activities, rehabilitation of the environment and closure where relevant;
- A detailed description of the aspects of the activity that are covered by the draft EMPr;
- An identification of the persons who will be responsible for the implementation of the measures;
- Where appropriate, time periods within which the measures contemplated in the draft EMPr must be implemented;

- Proposed mechanisms for monitoring compliance with the EMPr and reporting thereon;
- An environmental awareness plan; and
- Procedures for managing incidents which have occurred as a result of undertaking the activity and rehabilitation measures.

2.4 Structure of the Report

The report has been structured to comply with the format required by the NEMA. The contents are as follows:

TABLE 2:5: REPORT STRUCTURE

CHAPTER	CONTENT
Chapter 1: Introduction	Introduction an overview of the proposed project, the proponent and EAP
Chapter 2: Legal Requirements	Outlines legislative requirements needed to undertake the EIA process
Chapter 3: Project Description	Includes a description of the proposed activities
Chapter 4: Need and Desirability	Outlines the need for and motivation of the proposed project
Chapter 5: Project Alternatives	Consideration of alternatives (design/layout, site and do-nothing) for the project
Chapter 6: General description of the pre-development	A description of the biophysical and social environment
Chapter 7: Specialist Reports	An overview of the findings of the various specialist reports undertaken for this project
Chapter 8: Public Participation Process	Overview of the public participation process conducted to date
Chapter 9: Environmental Impact Assessment Approach	Methodology used in the assessment of significant impacts and a description of the environmental impacts on the biophysical and social environment and a rating of these impacts
Chapter 10: Key Environmental Impacts	Summary of Environmental Impacts
Chapter 11: Conclusions and Recommendations	Conclusions and recommendations of the Environmental Impact Study

3 PROJECT DESCRIPTION

3.1 Project Location

The proposed site is located adjacent to Reyno Ridge, Emalahleni in Witbank, east of the N4/N12 Highway on portion 22 of the Farm Naauwpoort 335 located within the Emalahleni Local Municipality in the Mpumalanga Province as illustrated in Figure 3.1.

On a local scale the proposed site is bounded to the north by Silwer Avenue and to the west by Luna Street. It is adjacent to an attractive high-income neighbourhood that is being developed with a few developments currently being put up. There is the Bankenveld Golf Estate located to the north of the site just across from Silwer street that is currently undergoing construction.

The study area is situated on a 42 ha site within Ward 34 (Figure 3.2) in the south-eastern part of Emalahleni in Mpumalanga adjacent to the existing suburb of Reyno Ridge on the cadastral portion Naauwpoort 335 JS. The property is bordered on the northern side by a local access road and an existing township on the western to north-western side by the existing suburb of Reyno Ridge. The remaining boundary on the eastern side borders onto vacant land untransformed grassland that extends down to the Witbank Dam approximately 3 km from the site. The site of the proposed development is currently vacant, having formerly been farming land. The site consists of a drainage line and wetland in its northern part. There is a small dwelling on the south-eastern corner of the site that appears to have been a workers' dwelling. Various grassed vehicle tracks traverse the site. The site comprises largely of rocky substrates that are not suitable for cultivation.

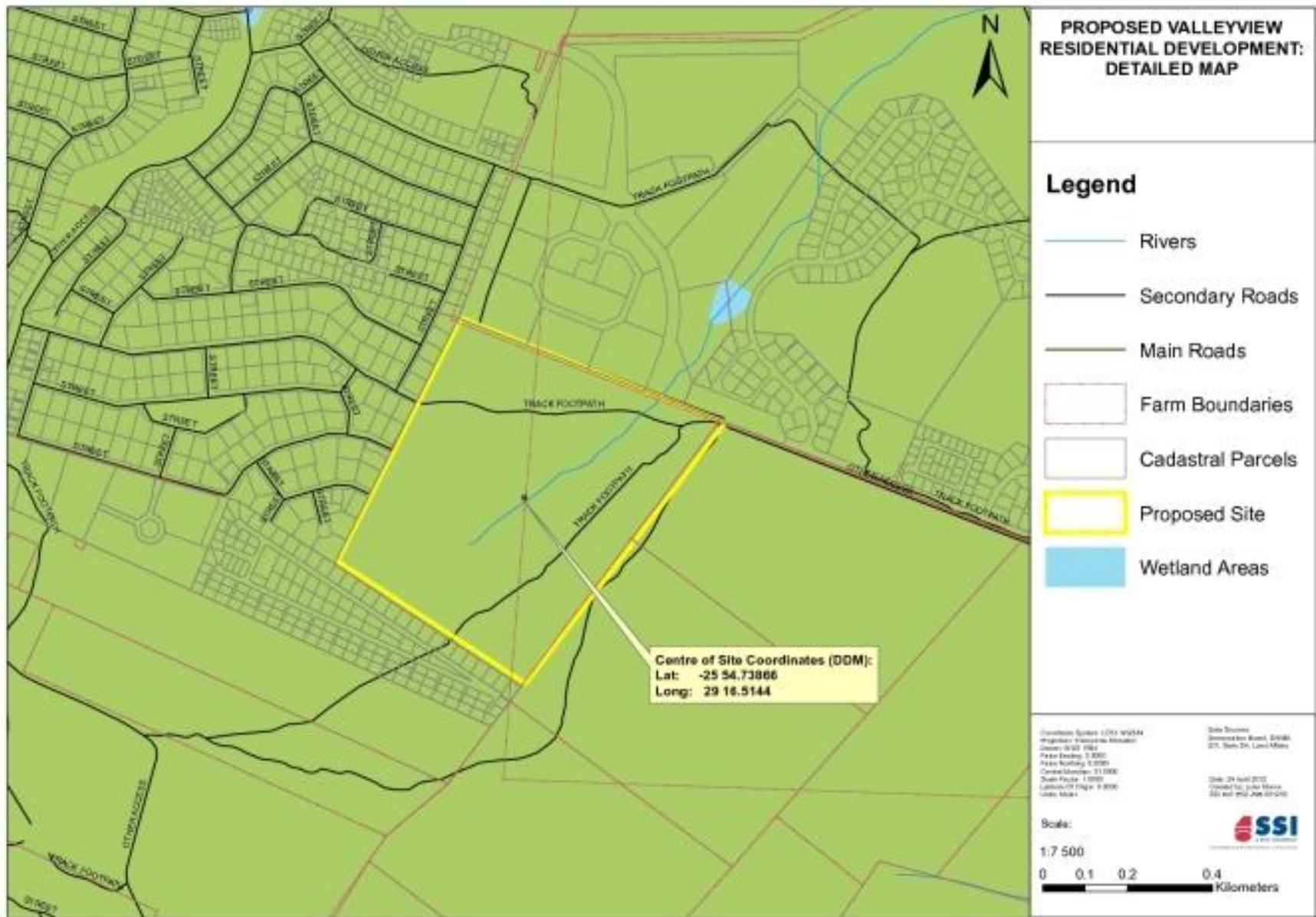


FIGURE 3:1: PROPOSED VALLEYVIEW DEVELOPMENT – CADASTRAL CONTEXT

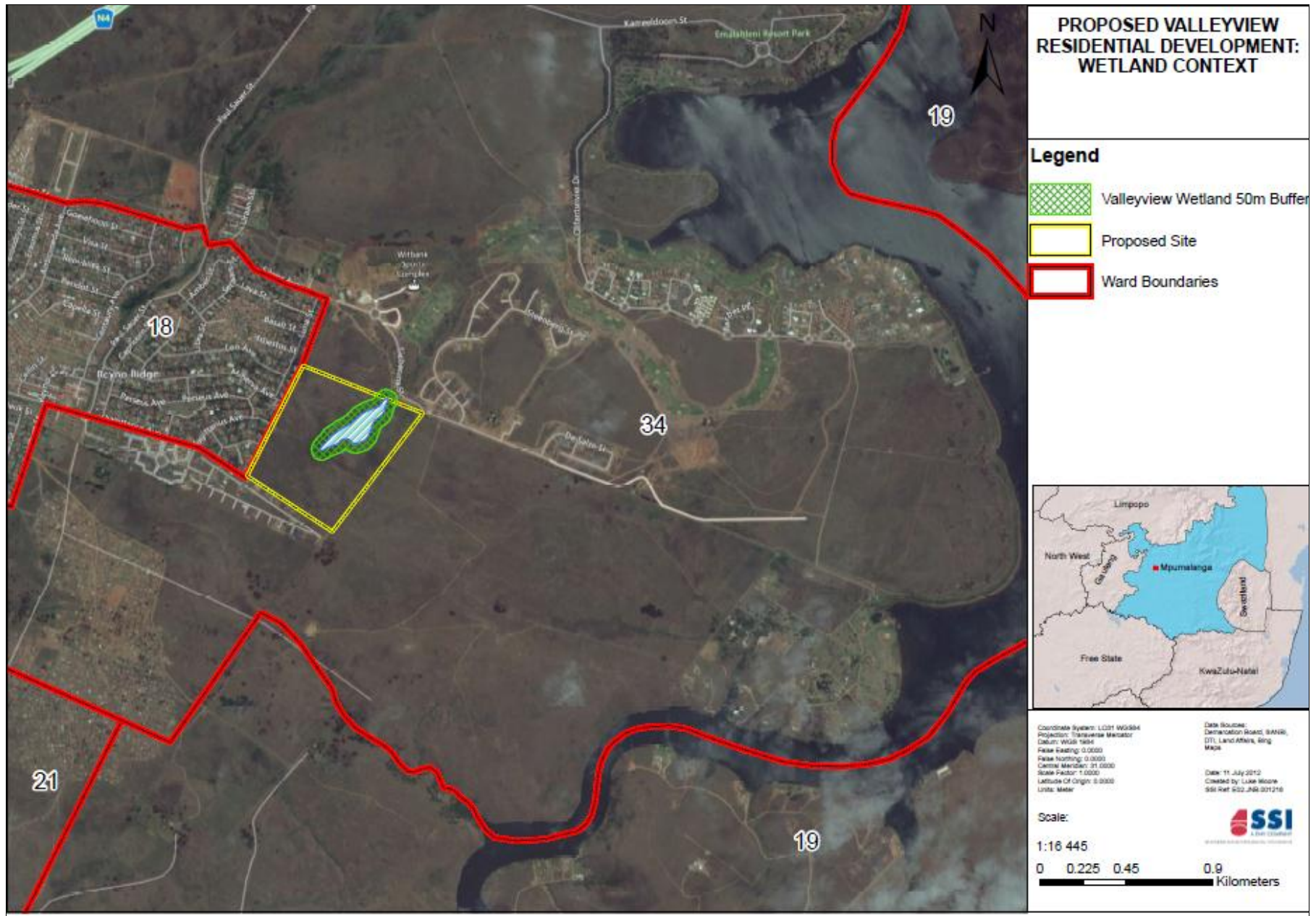


FIGURE 3:2: WARD MAP

3.1.1 Surrounding developments

The latest SDF for the area and land zoning approvals highlight a number of new developments (See Figure 3.4 below) that have been earmarked for development within the next few years. Based on this, the proposed Valleyview development would comply with the general aesthetics of the area.



FIGURE 3:4: DEVELOPMENTS WITHIN STUDY AREA

3.1.2 Ownership

The proposed site would be owned and managed by Before the Wind Investments 113 Pty Ltd during the construction and initial operation. Units would then be sold to mature couples, preparing for retirement.

3.1.3 Zoning

The zoning of the property is classified as “Residential 1- Small residential house” (a minimum stand size of 300m²-350m²).

3.1.4 Roads and Accessibility

The following section briefly describes the main existing road network surrounding the study area.

- N4 Freeway: This class 1 freeway is the national link between Gauteng and Mozambique;
- Mandela Street (previously President Street) is a median separated class 2 dual carriageway road;
- Paul Sauer Street is a class 3 north-south arterial that terminates at the roundabout with Mandela Avenue; and
- Inner road network: These roads can be classified as class 4 and 5.

The total area of the site is 42 ha and it is proposed that a total of 4 accesses routes would be incorporated. The accesses are situated on:

- Saturnus Avenue,
- Sagittarius Avenue,
- Minerva Avenue to the west; and

- Silver Street to the north.

Accesses to the North and South would be considered at a later stage. The accesses are as shown in the figure below.

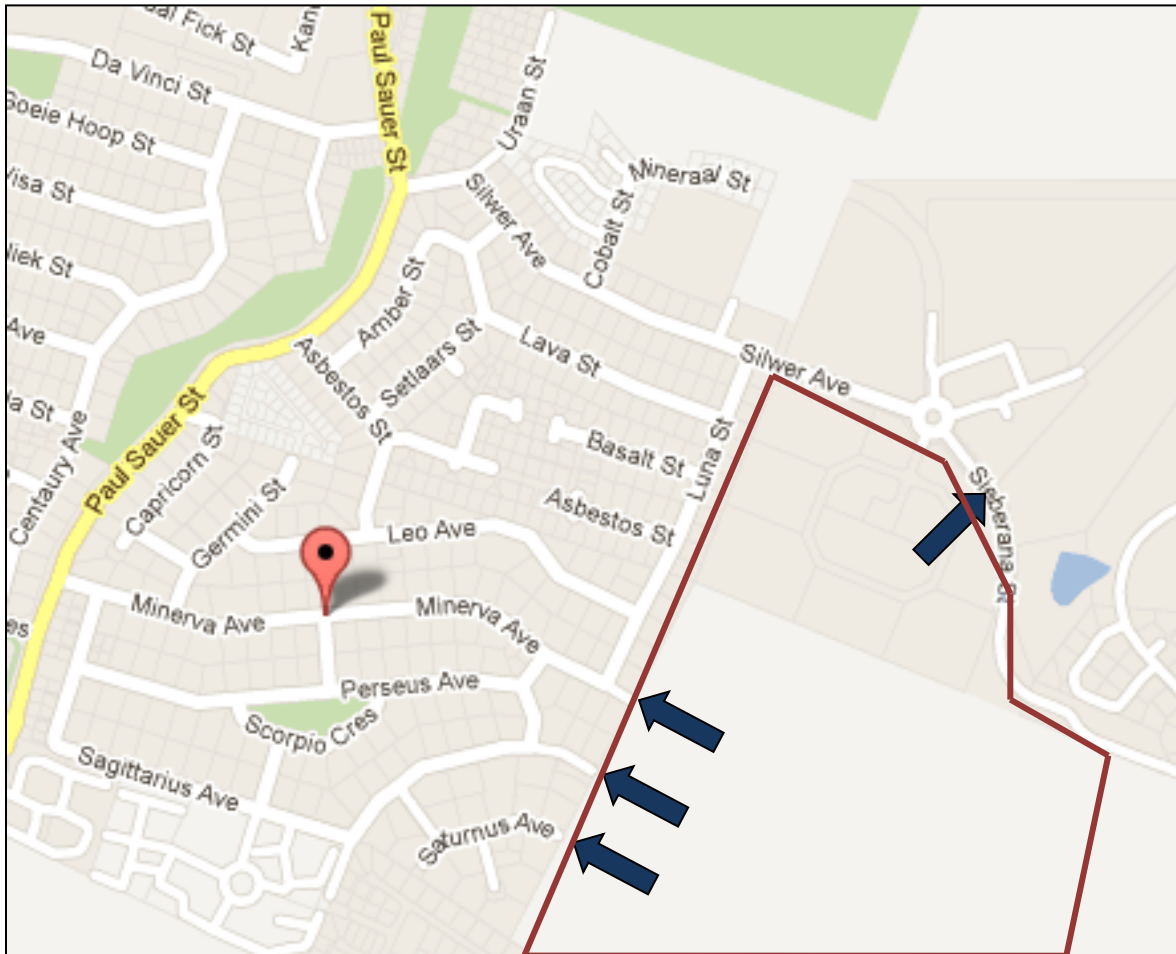


FIGURE 3:5: PROPOSED ACCESS ROUTES

3.1.5 Development Vision

The proposed development is aimed at the establishment of a Mature Lifestyle Estate/ Residential Estate, situated within the Bankenveld area in Witbank. Each stand would range between 300–350 m² in extent.

The proposed development would be established into two (2) phases:

- Phase 1: 314 Units; and
- Phase 2: 286 Units (this phase will only commence within 2 years of development of phase 1).

Three access points located on the West of the site, namely Sagittarius Avenue and Minerva Avenue will be considered as entrance and exit points. In addition an access on the North East corner of the development from Sieberana Street will be considered during Phase 2 of the development.

Clinic

A health care facility located on the North western portion of the property would be incorporated into the design. This facility would be aimed only at providing medical assistance and the issuing of prescription medication to the residents within the property. Ambulances would only be required in the case of an emergency.

3.1.6 Height Restrictions

The proposed development will be guided by the Architectural guidelines and town planning scheme for Witbank for the area. Based on these guidelines *all town planning regulations must be in accordance to the current Town Planning scheme. Natural Ground Level (NGL) shall be deemed to be the level as determined by a registered land surveyor.*

- 1 – 3 storey structures are being considered; and
- The height of any part of the structure, excluding chimney stacks shall not exceed 8.5m (max) measured vertically above the NGL.

3.2 Engineering Services

The proponent is proposing the establishment of a “mature lifestyle” estate, as detailed below. The proposed development of 600 residential stands, private and public roads, access buildings and security buildings fulfils a market need for this type of housing in the study area.

Blasting

Open blasting would be required during the construction phase of the development. This however would be confined to specific areas and kept to a low intensity. In the case of sensitive areas, gas blasting will be considered as a safer alternative.

3.2.1 Bulk Services

Prior to the commencement of the EIA process, the development team has engaged in numerous consultation meetings between themselves and the Emalahleni Local Municipality to determine the availability of services and their possible linking to the system. The Municipality is currently in favour of the proposed project and will continue to engage with the team to ensure that the services are managed correctly.

Water

The bulk water supply will be obtained from Reservoir Complex C situated on Hans Strydom Avenue. According to the latest Emalahleni Water Services Master plan (2007), the total storage capacity available is 68MI, whereas the annual average daily usage is approximately 10 MI/day. Based on these figures, there is sufficient bulk storage for the proposed development.

The high level storage is currently 3MI, whereas the annual average daily demand is 6.7 MI. The pumps however have a greater capacity than the fire plus peak flow, making the capacity adequate under these circumstances. The only factor limiting the condition of the pumps is the provision of an auxiliary power supply for the booster pumps which would be considered for the development. This would in turn also be of benefit to all users in the area.

A dedicated supply line will be installed from Reservoir C to the development, and thus no additional load will be placed on the existing reticulation. *This is off site and that it would form part of a separate authorisation process.*

Sewer

Two sewer network possibilities are being investigated for the supply of the proposed development. The preferred alternative would be based on the requirements of the Emalahleni Local Municipality.

The developer would prefer to connect to the existing system in Reyno Ridge and possibly Ben Fleur which feeds into the Riverview sewer purification works. This alternative is preferred due the system being gravity fed, which simplifies operating conditions. In addition this system excludes the Bankenveld development which no longer feeds into the Riverview wastewater treatment plant, freeing up capacity.

The alternative option considered is to pump the effluent up to the watershed on the Southern boundary of the development, and then to gravitate down to the Naauwpoort wastewater treatment works. This is not technically preferred as it is an extremely expensive option and has more risks within regard to pump failure and resultant spillage into Witbank Dam. It would also require a separate environmental authorisation process.

3.2.2 Telecommunication

Telkom's current policy is that, provided that there is a demand which produces sufficient revenue to cover the capital expenditure, Telkom will provide the necessary infrastructure which may even require a new telephone exchange(s).

3.2.3 Electrical

Before the Wind investments have attained approval from the Emalahleni Municipality, for the supply of 2116kV to the proposed development; the approval is for connection to the Eskom Grid.

The approval is subject to the developer providing the following:

- 22kV panels in Paul Sauer Substation to be replaced;
- The appropriate cables to the proposed development;
- A new mini substation
- The meters for all households within the development area; and
- An approved amount of streetlights on the main road and smaller streets within the area.

3.3 Phasing

The Valleyview Residential development is expected to be take place in 2 phases over a period of 5 years. The initial development would consist of 314 residential units. Thereafter phase 2 of the development would commence with an additional 286 units.

4 PROJECT NEED AND DESIRABILITY

Emalahleni (Witbank) is situated east of Pretoria on the Mpumalanga Highveld and was established in the 1890s. The estimated population of Witbank today is currently 61 093 people as per the 2011 census (database of GeoNames) and is growing considerably. Based on the current IDP 2011- 2012¹ the Emalahleni Municipality is confronted with a huge housing backlog (\pm 40 000 units as per housing plan) as a result of a continuous influx of people (i.e. job seekers) into the area.

There is a need to prevent the development of social imbalances and extensive conditions of poverty, lack of services, unemployment and lack of infrastructure. It should be noted, however that the majority of the housing need is for low income housing, while the proposed development is aimed at the higher income end of the market. In spite of this, the development is expected to tie into one of the current IDP objectives: "To facilitate the development of sustainable and viable settlements within the municipality" (IDP 2011- 2012)

A market study was conducted for a new residential development on the site in 2008². It is important to note that this study was conducted just prior to the onset of the global financial crisis that began in 2008, and thus certain of the growth projections as reported have not materialised as South Africa has experienced the effects of the ensuing global economic recession. Nonetheless much of the report is relevant in terms of the expected growth of the local economy, as driven by factors such as the need to develop more coal mines due to local and international demand for coal. In addition, the findings of the study with respect to the market of the study area being characterised by:

- High education levels (34% of the population have achieved a tertiary level of education);
- Predominantly middle-wage occupations with some higher wage occupations;
- A consumer market characterised by middle to high income households; and
- A population of which a high proportion (72.2%) is considered to be part of the economically active population are all likely to be relevant at the present time.

Based on the Market Study, the national population density, especially in the metropolitan areas, increased significantly over the past seven (7) years, mainly driven by the process of urbanisation. Additionally, formal sector employment increased by 1.4 million workers, or 16.5%, from 2000 to 2006. The average annual growth in real household disposable income was about 4.7% in the period between 2000 and 2006. Real economic growth averaged about 4% per annum between 2000 and 2006. This growth performance contributed to the abovementioned growth in formal employment and disposable income which supported the expansion of the housing market and the increasing demand for land for residential development. Although growth in the years since the market study was done has slowed, based on the above it is clear that the need for residential developments has increased, in particular mature living residential housing is required.

The Valleyview estate will fulfil a much needed gap in the area providing a safe and friendly estate that would cater for older and retired people. Over the years the need for this facility has increased since the traditional old age homes did not fully cater to the needs of the elderly.

A clear need exist within Emalahleni for the establishment of proper care and housing facilities for people over the age of 60. According to the Integrated Development Plan of Emalahleni, 2011 a total number of 12 264 household

¹ 2011- 2012 Emalahleni Local Municipality: Final Integrated Development Plan

² Demacon Market Study: Valley View Market Study: Research and Recommendations. (February 2008) (Source: Registered NPO's in Mpumalanga)

heads over the age of 60 is currently residing within Emalahleni. Most of these households currently do own a property within Emalahleni; this development will thus cater for existing residents in Emalahleni.

There are currently five (5) established retirement homes within the whole of Emalahleni:

- Immergroen Retirement Home (Lukin Street);
- Ever Green Retirement Home (Lukin Street);
- Witbank Society for the Aged (Theunis Janson Street); and
- Huis Betsie Louw (Denise Street).

The above establishments consist of a total number of 12 264 households of which have reached capacity or nearing capacity. It is thus clear that a need exists for the development of more luxury mature life style estates within Emalahleni. The Edenpark / Witbank society for the aged in particular is currently at capacity with indefinite waiting lists for residents waiting for accommodation.

The development as proposed fits in with the findings of the study that residential demand in the area for entry level economic freestanding / group (at the lower end) to freestanding full title homes (at the higher end).

The desirability of the proposed development needs to be investigated in the context of the area in which it is located. The proposed township extensions are situated within an urban area of Emalahleni between Reyno Ridge and the Bankenveld estate described in chapter 7.4 and 7.6 in this report, the study area consists of a mix of established urban-residential land-uses, and vacant areas that are, or were formerly farming areas.

Much of the study area has undergone land-use changes in the recent past from farming areas to areas of new residential development on the outskirts of Emalahleni. The development of the site in question to residential use from its current vacant state is in keeping with this trend, and the development will not be incongruous in terms of its surrounds. The site is bordered on three sides (west, south and north) by existing residential developments; these existing residential areas are middle to high income residences.

Concerns have been expressed by certain of the residences on the immediate boundary of the site in terms of the potential of the development to block existing views from these households. In this respect the development may bring in an element of undesirability; this issue will be further assessed through the conducting of a visual study in the impact phase of the project.

Concerns have also been raised by certain residents in the surrounding area regarding the impact of a further development on the bulk services (sewerage, electricity provision and water supply) to the area that are already under stress and unreliable. This aspect of the development will be further examined in the impact phase of the report.

Lastly, the density and layout of the proposed development can be examined the context of its desirability. The total development site is 42 ha in size, of which approximately 30.7 ha is proposed to be developed. The wetland / drainage area situated in the central / northern part of the site will be kept free from development with an accompanying buffer area, thus this ecologically important part of the site will be protected from development and transformation. Thus in the context of its surrounds and layout, the proposed development conforms to its surrounds.

5 PROJECT ALTERNATIVES

In terms of the EIA Regulations, feasible alternatives are required to be considered as part of the environmental investigations. An alternative in relation to a proposed activity refers to the different means of meeting the general purpose and requirements of the activity (as defined in GNR 543 of the EIA Regulations, 2010), which may include alternatives to:

- The property on which or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity; and
- The operational aspects of the activity.

All identified feasible alternatives are required to be evaluated in terms of social, biophysical, economic and technical factors.

5.1 Do-nothing Alternative

The do-nothing 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 an urban residential area surrounded by either upcoming or already existing residential communities.

By not developing the site, the site will be anomalous in the context of the surrounding urban residential land-uses, and some of the direct and indirect socio-economic benefits (i.e. job creation, housing shortages, provision of further housing aimed at the mature living market, etc.) will not materialise.

From an ecological perspective, the site has a certain degree of ecological sensitivity due to the presence of a wetland and rocky outcrops, however much of the ecological linkages between the site and surrounding natural areas have been lost due to the increase in development around the site. Not developing the site will assist in protecting the natural features on the site, however the development as proposed will maintain the wetland and an associated buffer area as an undeveloped area.

5.2 Layout Alternatives

Two layout alternatives have been investigated and assessed within the Environmental Impact Assessment Phase. These are detailed in the report as the *Preferred Layout* (Figure 5.1) with the *Alternative Layout* (Figure 5.2) being the second option. Both options were investigated in terms of the layout for the proposed township establishment to accommodate the wetland.

Due to the surrounding access roads and the lack of entrances to the proposed development, the alternative (non-preferred) layout it is less preferred.

5.2.1 Preferred layout

The preferred layout for the proposed township establishment will consist of two security-controlled access points during Phase 1. This option is preferred in terms of cost, access to services and road access. This option is more cost effective than the alternative as no panhandles are included in the layout (Figure 5.1), thus connecting and aligning the portions of the development, making it easier to service. This option accommodates smoother traffic

flow and takes into consideration the surrounding area and access points especially with regard to the access point to the north of the proposed layout that connects with the Bankenveld development (this access point was not taken into consideration in the alternative township layout).

5.2.2 *Alternative township development*

The proposed alternative (Figure 5.2) was submitted and approved by the Emalahleni Local Municipality on 15/07/2009 by a different applicant. At a later stage (2011), the proposed property was purchased by another development company and the plans were re-investigated. This alternative only accommodates 346 Units, thus not satisfying the current developers design needs As well as economic feasibility requirements.



FIGURE 5:1: PREFERRED ALTERNATIVE

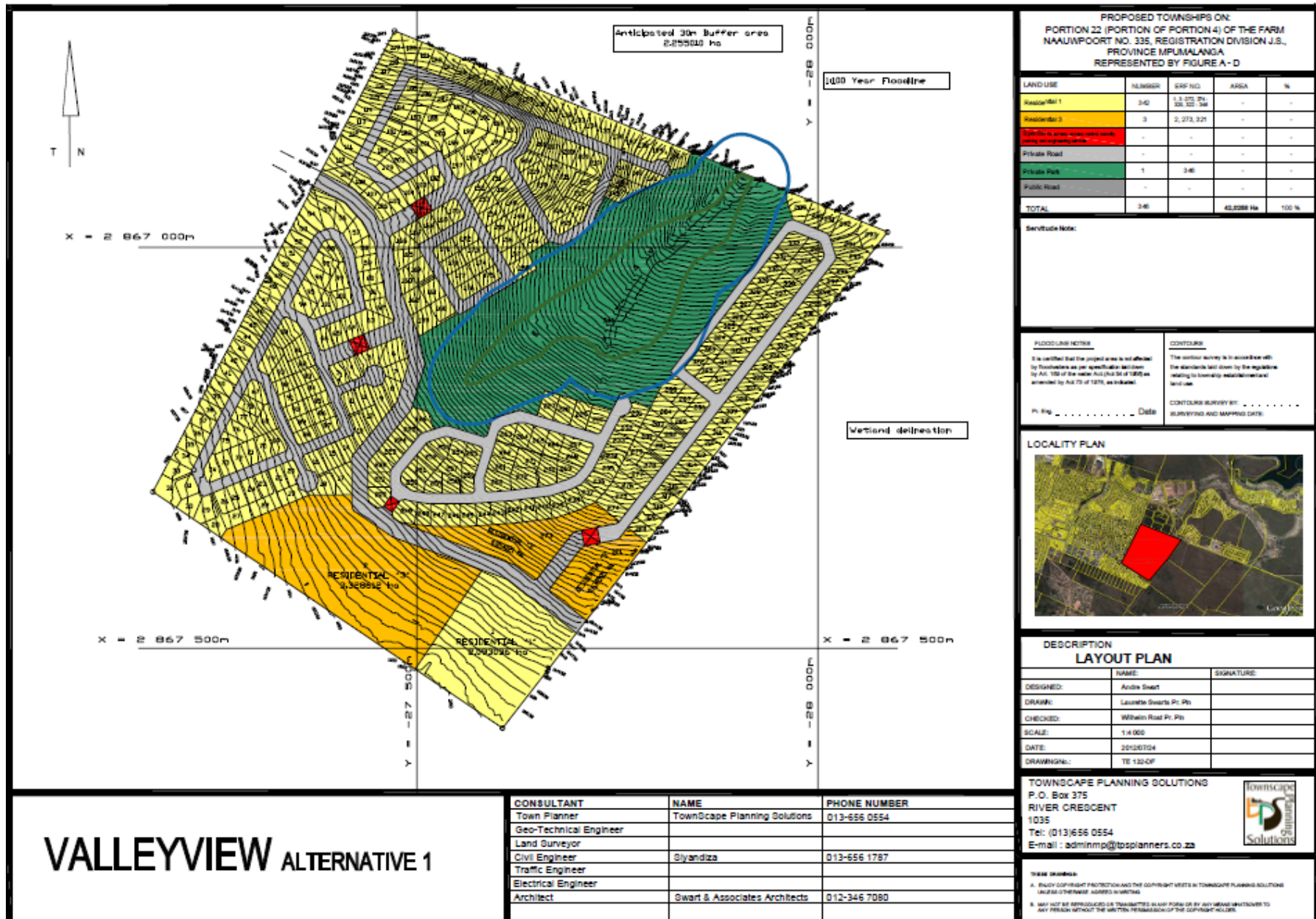


FIGURE 5:2: ALTERNATIVE LAYOUT

6 DESCRIPTION OF THE BASELINE ENVIRONMENT

6.1 Topography

The topography of the study area is moderately to strongly undulating. The site exists on ground that slopes down to the north from a flat area in the southern part of the site. A shallow valley runs through the central northern part of the site in a north-easterly direction. The altitude varies from 1640 m.a.s.l. (mean altitude above sea level) at the top of the site to 1590 m.a.s.l. on the lower side where the drainage line exits the site.

6.2 Geology and Soils

The geology of the study area is Selons River Formation consisting primarily of rhyolite, a rock type that is the extrusive equivalent of granite. In this area this rock type has also been referred to as felcite. This geology gives rise to shallow loamy sand soils, predominantly of the Mispah soil form. The drainage line contains deeper, finer grained soils that contain hydric indicators within 1 m of the surface and permanent ground water within this depth range. The land type of the study area, which is an area with largely uniform soils, topography and climate, is the Fa land type (Land Type Survey Staff, 1987), a land type that is generally associated with rocky areas and shallow soils.

6.3 Climate and Local Weather Conditions

6.3.1 Temperature and Humidity

The area typically experiences mild summer temperatures, whilst winters are generally cold with a very high incidence of frost (Mucina & Rutherford, 2006³).

6.3.2 Precipitation

The study site lies in the western part of the Mpumalanga Province, being situated on the eastern Highveld where the Grassland Biome occurs. The climate is highly seasonal in terms of precipitation with rainfall mainly occurring in the summer months. The mean annual precipitation for the site is in the vicinity of 690 mm (South Africa Rain Atlas: <http://134.76.173.220/rainfall/index.html>).

6.4 Social Environment

The study area is located in the south-eastern part of Emalahleni (Witbank), in an area into which the town is rapidly expanding. The proposed development site is thus located in an urban context with a remnant rural component in the form of vestiges of open space. The site is bounded to the west and the south by suburbia. To the east and north-east, the site is bounded by the Bankenveld Golf Estate, which offers low density housing. The Emalahleni Local Municipality (ELM) is situated on the Highveld of Mpumalanga and is approximately 2,677 square kilometres in size. The Municipality consists of a number of small settlements including Balmoral, Kendal, Kriel, Kwaguqa and Ogies.

³ MUCINA, L. AND RUTHERFORD, M.C. (editors) in press. Vegetation map of South Africa, Lesotho and Swaziland: an illustrated guide. *Strelitzia* xx, South African National Biodiversity Institute, Pretoria.

Emalaheni is one of the major urban concentrations in the Nkangala District Municipality and within Mpumalanga as a whole. Emalaheni is located relatively close to Gauteng, adjacent to the N4 and N12 National Roads, which serve as important transport linkages.

Based on the Market Study undertaken by Demacon⁴ the following key factors of the social environment determine the need for a residential development, and are thus reported on in this section:

- Age profile (% economically active);
- Level of education;
- Average annual household income; and
- Employment status.

6.4.1 Age Profile

The age distribution of a specific area serves as an important indicator, with reference to residential demand. The age profile is also indicative of the life stages present within the market, which also reflects the anticipation of specific commercial and residential behaviour. Figure 6.1 below indicates the age distribution within the market.

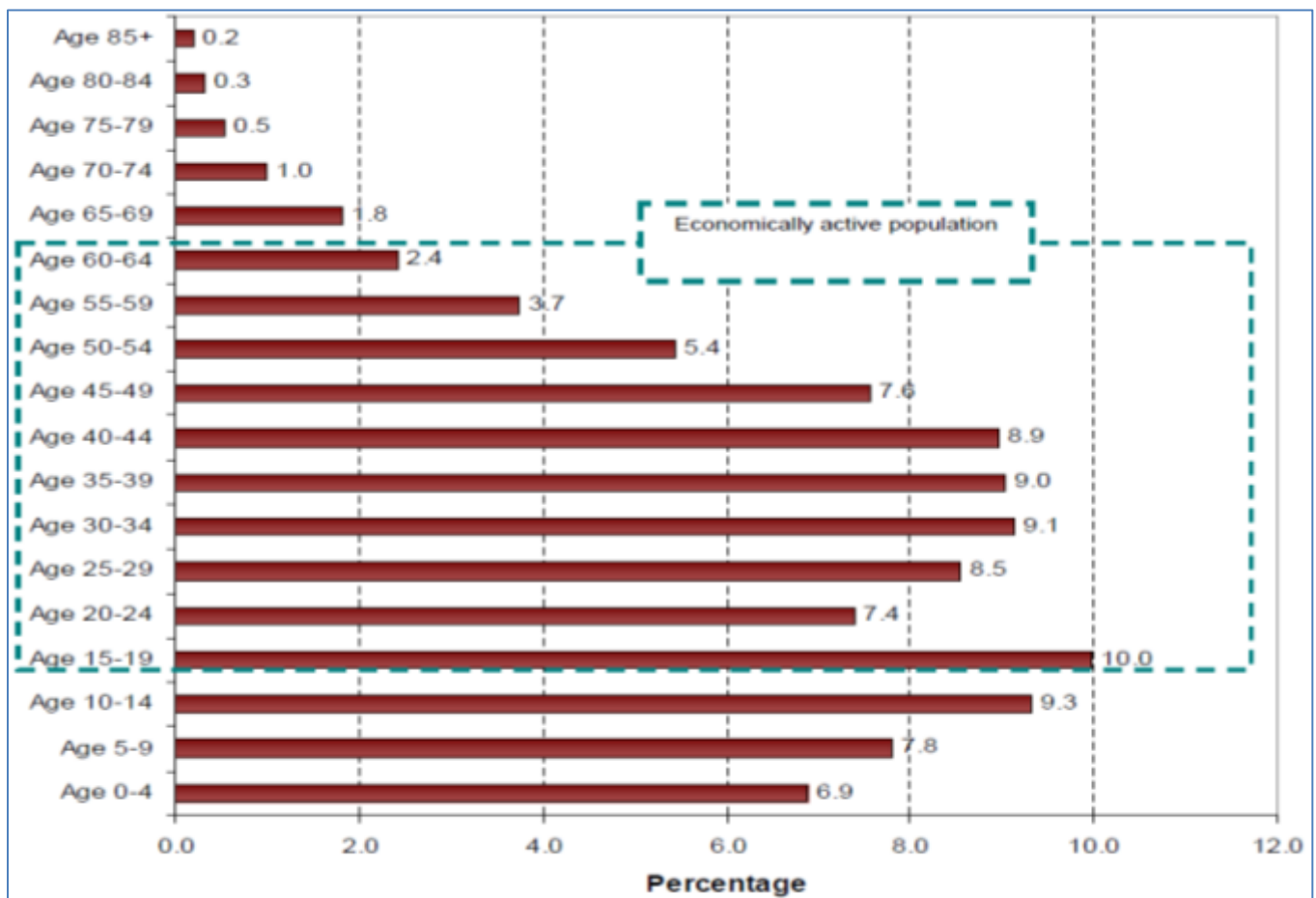


FIGURE 6:1: AGE PROFILE FOR THE EMAHALENI MUNICIPALITY⁴

The market area is characterised by a relative young and emerging population grouping with around 34% between the ages of 20 and 39 years.

⁴ DEMACON MARKET STUDIES: Valley View Market Study: Research and Recommendations. (February 2008)

- A large youthful component (10 to 19 years) is present within the market area, 19.3%;
- 14.7% of the population represents children under the age of nine;
- 72.2% of the trade area is considered to be part of the economically active population; and
- (15 to 64 years).

6.4.2 Education Level

The highest level of education achieved by the population is indicative of the level of human development. Furthermore it serves as a proxy for the ability of the proposed development to be absorbed in the local economy.

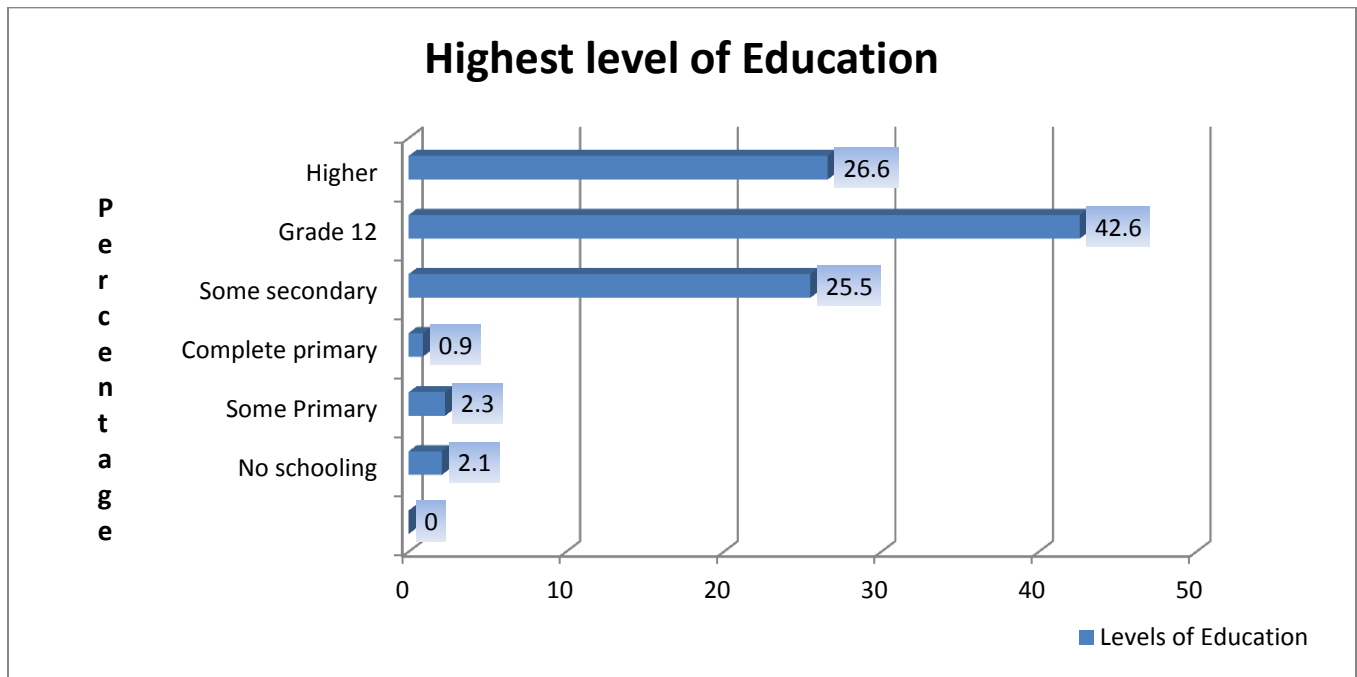


FIGURE 6:2: HIGHEST LEVEL OF EDUCATION⁵

- 69.2% of the market population has at least Grade 12 (42.6%) or has higher education (26.6%);
- A share of 25.5% of the market population has at least some secondary level of education;
- 0.9% of the market population completed their primary education and 2.3% of the population has some form of primary education; and
- A mere 2.1% of the population has no form of education.

6.4.3 Average Annual Household Income

In summary the income profile reflects a consumer market characterised by middle to high income households. The income of a household also impacts on the general living standard enjoyed, in the sense that income impacts on asset ownership.

- A share of 3.5% of households within the market area earns no income at all;
- 32.2% of the households receive between R105 217 and R210 433 per annum;
- 62.6% receives more than R105 217; and

⁵ DEMACON MARKET STUDIES: Valley View Market Study: Research and Recommendations. (February 2008)

- The weighted average annual household income within the primary market area is R218 718 per annum or R18 227 per month (2008).

6.4.4 Employment Status

Figure 6.3 indicates the employment and unemployment status of the trade area which impacts on disposable income patterns. It also indicates the percentage of the trade area population not economically active. Level of employment, coupled to household size is also indicative of dependency ratios. (Valleyview Market Study: Research and Recommendations. February 2008).

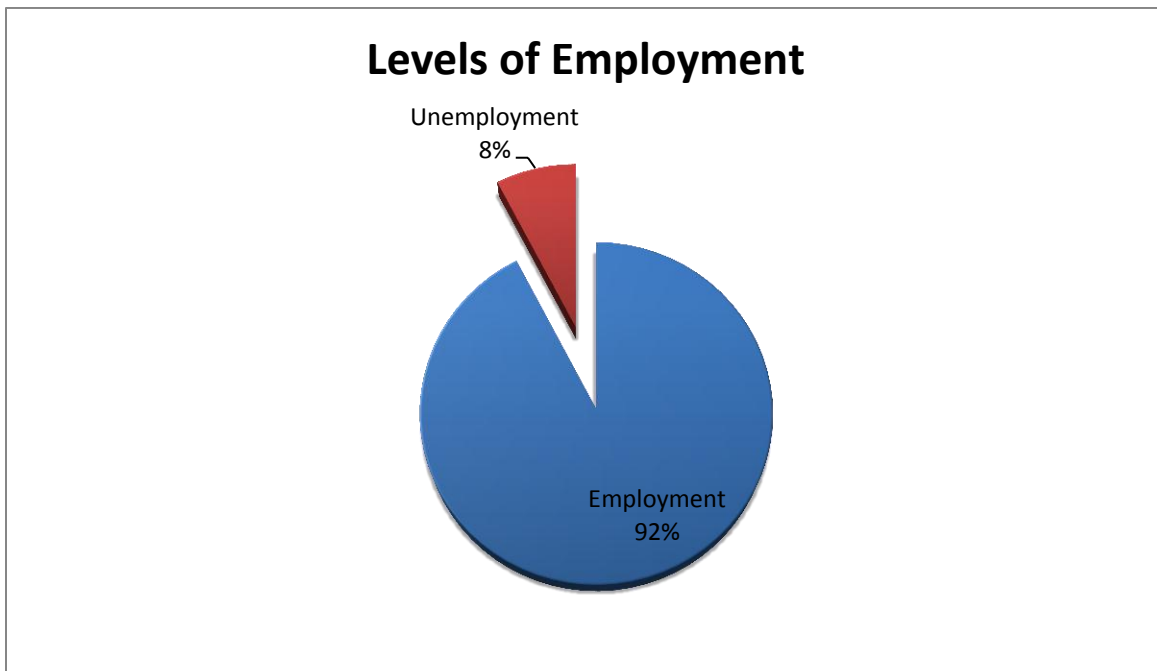


FIGURE 6.3: LEVEL OF EMPLOYMENT WITHIN EMALAHLENI LOCAL MUNICIPALITY IN THE PERIOD PRIOR TO 2008⁶

The above figure details the following:

- The largest segment of the economically active workforce is economically active (64.9%);
- Approximately 92% of the market population is employed; and
- 8% of the market population is unemployed, which suggests a relatively low dependency ratio.

6.4.4.1 Occupation Profile

The occupation profile is an important indicator of anticipated community income, serving as proxy for the level of community wealth and stability. The presence of white and blue collar occupations serves as indication of a higher income profile or lower income profile consumer market. Figure 6.4 indicates the occupation profile of the consumer market.

⁶ DEMACON MARKET STUDIES: Valley View Market Study: Research and Recommendations. (February 2008)

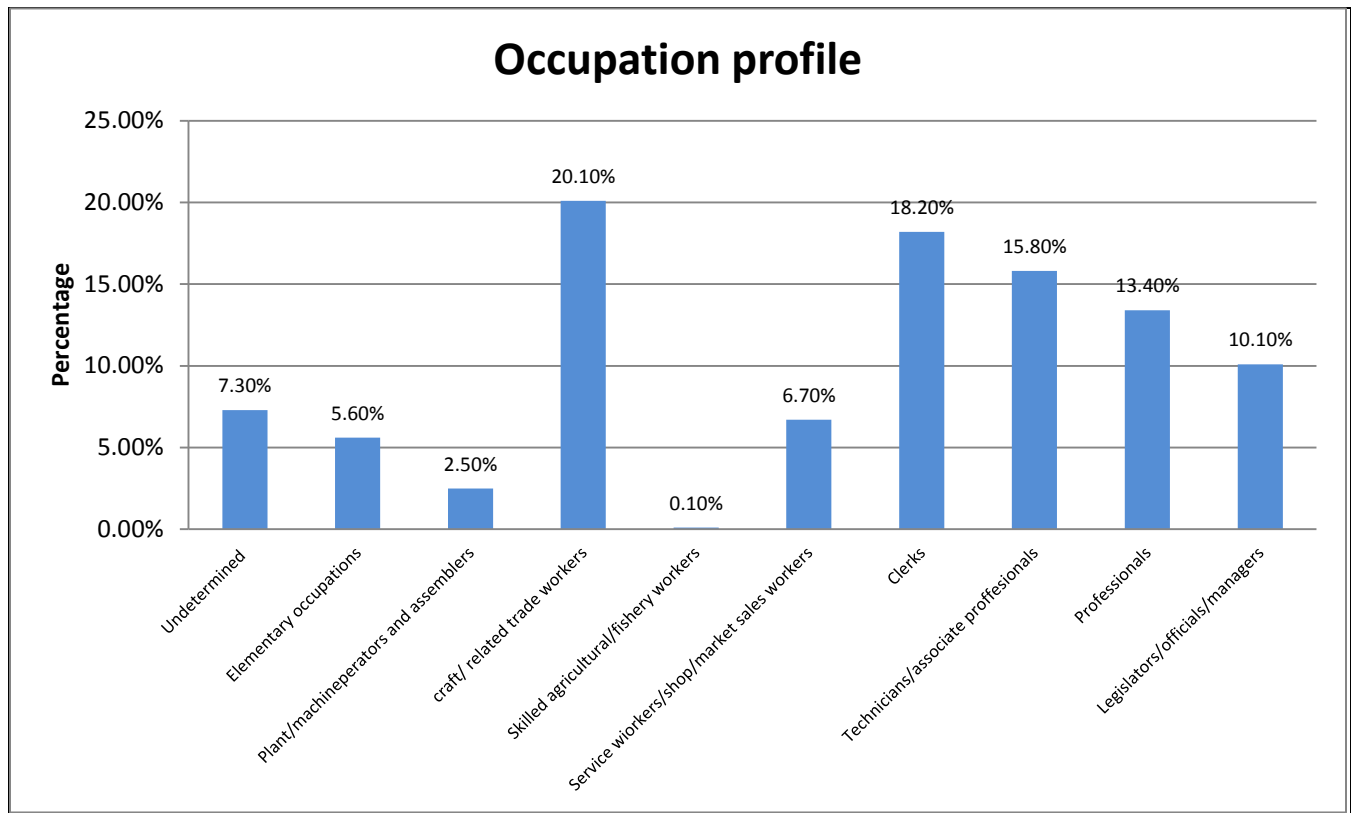


FIGURE 6:4: OCCUPATION PROFILE⁷

- The number of craft / related trades workers (20.1%) is notable within the market area; and
- Other dominant occupations within the market area include:
 - Clerks (18.2%);
 - Technicians / Associate professionals (15.8%); and
 - Professionals (13.4%).

The occupation profile reflects a diverse market segment. It is evident that the most dominant component of the economically active consumer market is found in middle wage occupations with some higher wage occupations. This indicates a market area with middle to high income occupations.

6.4.5 Average Annual Household Income

The annual household income is indicated in Figure 6.5 below.

⁷ DEMACON MARKET STUDIES: Valley View Market Study: Research and Recommendations. (February 2008)

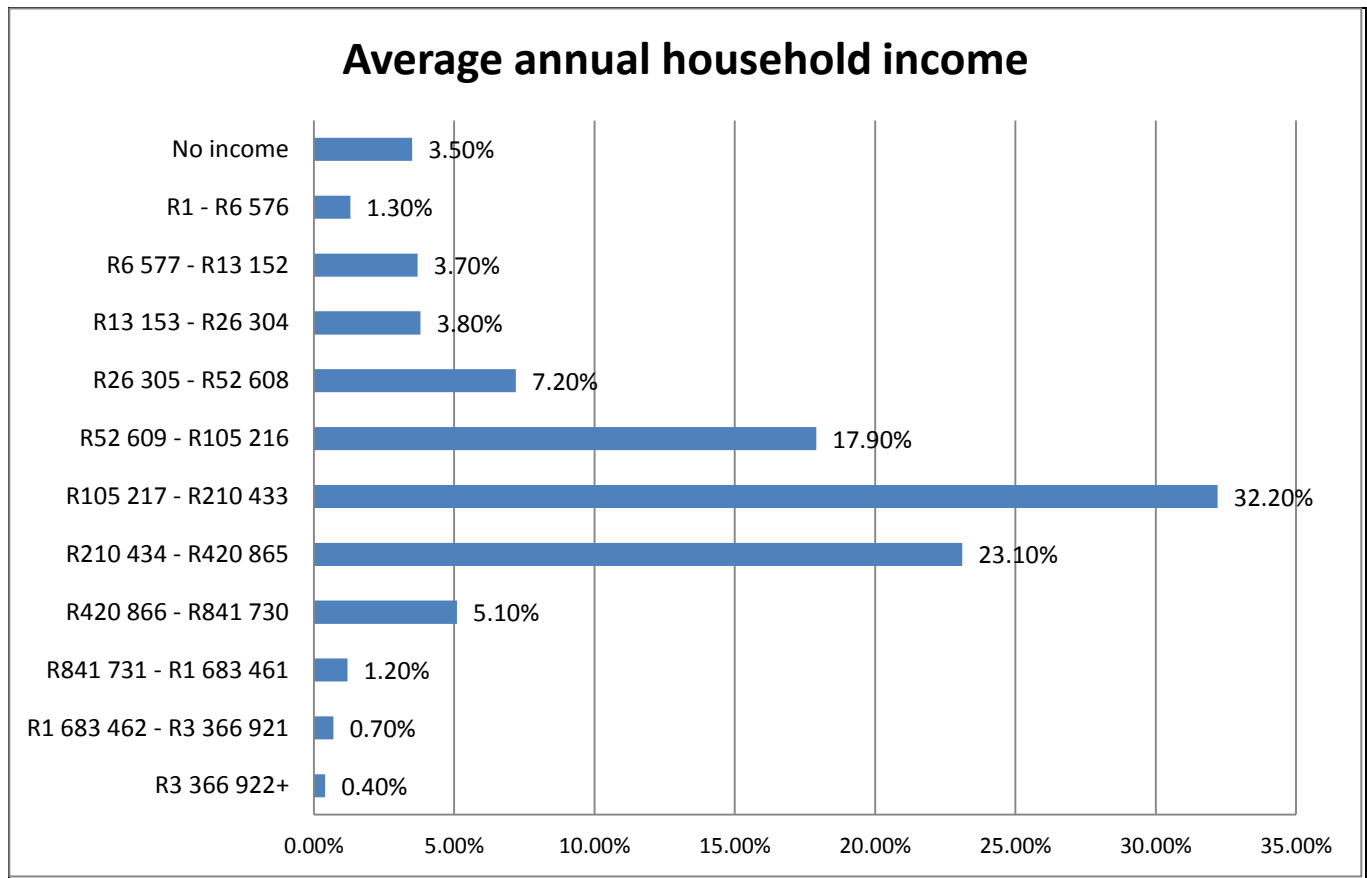


FIGURE 6:5: AVERAGE ANNUAL HOUSEHOLD INCOME⁸

In summary the income profile reflects a consumer market characterised by middle to high income households. The income of a household also impacts on the general living standard enjoyed, in the sense that income impacts on asset ownership.

- A share of 3.5% of households within the market area earns no income at all;
- 32.2% of the households receive between R105 217 and R210 433 per annum;
- 62.6% receives more than R105 217; and
- The weighted average annual household income within the primary market area is R218 718 per annum or R18 227 per month (2008).

6.5 Visual Environment

The visual environment of the wider area in which the development is proposed consists of a mix of natural and anthropogenic components which means that the area will be likely to be visually influenced by differing visual factors. As described above the site is currently vacant, consisting of natural grassland, but is surrounded by a number of existing and developing residential developments. The visual character of the wider area to the west can thus be described as largely urban in nature, but this reflects a recently changing baseline from a much more rural visual character that previously existed in the area.

⁸ DEMACON MARKET STUDIES: Valley View Market Study: Research and Recommendations. (February 2008)

The visual character of the area surrounding the site has changed in the last decade as the suburbs of Witbank have extended into this area with the growth of the town. This factor is important as described below. The landscape has not completely changed, however, and there are significant parts of the landscape in the vicinity of the site that are natural in character – i.e. open grasslands typical of this part of the Mpumalanga Highveld.

A large part of the landscape to the north-east (across from the Witbank Dam) forms part of the Witbank Nature Reserve, and thus has been (and will continue to be) preserved in its natural form. A portion of areas to the east and north-east of the site are still undeveloped, engendering the area with a partly natural visual component. This natural component to the landscape is enhanced by the presence of the Witbank Dam to the north, a very large open water body which can be considered to be a scenic component within the landscape.

The nearby Duvha Power Station and associated cooling towers are a prominent feature within the landscape which engenders an industrial component to the landscape.

The terrain in the wider study area is undulating in nature, consisting of broad valleys. The presence of sloping ground typically entails that aspect is important in determining the viewshed that is visible to a viewer located at a certain point within the landscape.

In the context of the development site, it is located within the southern side of the Klein Olifants River valley, and is thus located on sloping ground with a north-facing aspect. The views from the northern part of the development site are thus typically focussed to the north and north-east, with the surrounding higher lying ground to the south and west 'enclosing' or restricting the viewshed. The southern part of the development site is located on flatter, higher-lying ground, and thus enjoys a wider panorama of views. Importantly the neighbouring residences bordering the development site to the south and west of the development are located on this higher-lying ground and currently are presented with views to the north and north-east over the development site. These views are considered to be important, as a number of such owners of these residences have expressed in writing the value placed in these views over the area to the north and the east, both in terms of the sense of place, but also in terms of property value.

6.6 Land-use

The site is untransformed and, although it was previously used as rangeland, it is not currently being utilised. The site comprises largely of rocky substrates that are not suitable for cultivation, hence the site was only suitable to be used for grazing. All properties surrounding the area are used for residential purposes. A school is located in close proximity to the site as well.

6.7 Water Resources

The site is located within the wider Olifants River catchment. The upper Olifants River flows through the wider study area, being dammed as part of the Witbank Dam; much of the wider reach of the Olifants River that occurs within this quaternary catchment forms part of this impoundment.

The site falls within the quaternary catchment B11G, one of the upper catchments of the wider river system, located downstream of the confluence with the Steenkoolspruit and Tweefonteinspruit tributaries.

The wetland on the site is located close to the northern (downstream) end of the quaternary catchment. From the northern boundary at which the wetland exits the site, the wetland flows north into the Witbank Dam.

6.8 Wetland

A wetland has been identified on the site of the proposed development and is thus a critical aspect of the proposed development. Wetlands can be found all across a landscape. The landscape can be divided up into a number of units, each of which can contain wetlands. Wetlands occurring on these different terrain units typically differ in terms of their formative processes and hydrological inputs, and thus differ in terms of their functionality. The wetland hydrogeomorphic (HGM) approach to wetland classification which uses hydrological and geomorphological characteristics to distinguish primary wetland units has been used to classify wetland types in South Africa (Kotze et al, 2005; SANBI, 2009). This approach has been used, and the classification system has been recently updated as part of the National Wetland Classification System for South Africa (SANBI, 2009⁹).

Under this classification system the wetland type occurring on the site is the **valleyhead seep**. The valleyhead seep wetland typically occurs at the head of valley bottoms where the terrain typically becomes steeper, rising out of the valley bottom. There is thus an important seepage component to the hydrological input to this type of wetland, but hydrological inputs also originate from runoff generated from the surrounding local catchment during rainfall events.

⁹ SANBI, 2009, Further Development of a Proposed National Wetland Classification System for South Africa, Primary Project Report. Prepared by the Freshwater Consulting Group (FCG) for the South African National Biodiversity Institute (SANBI).

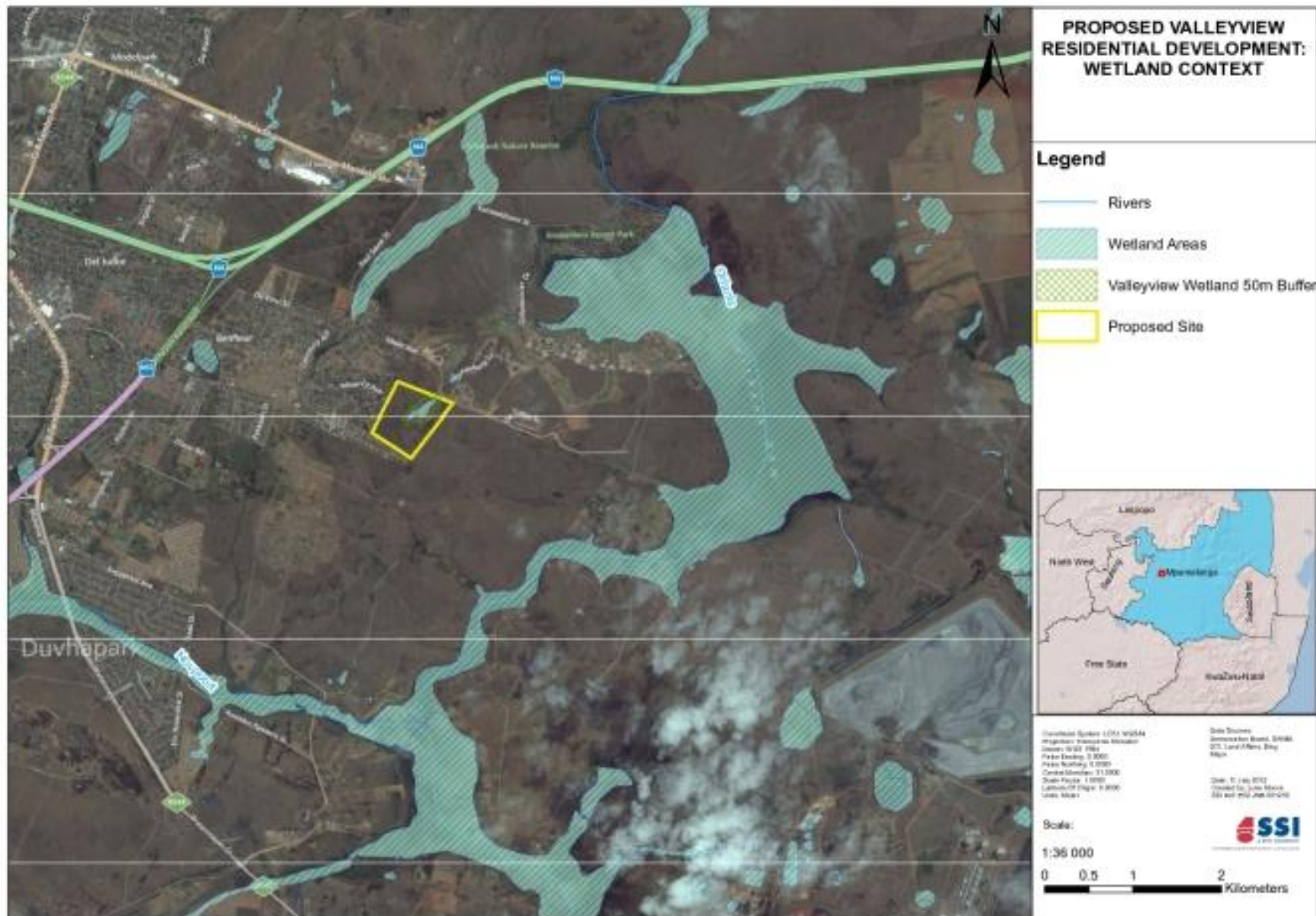


FIGURE 6:6: SURFACE WATER AREAS WITHIN THE SURROUNDING AREA



FIGURE 6:7: VIEW OF THE VALLEYHEAD IN WHICH THE WETLAND OCCURS

The presence of sloping terrain and groundwater seepage within the wetland on the site entails that colluvial processes (i.e. processes driven by gravitational forces), rather than fluvial deposition (which are dominant in valley bottom wetlands), are the main drivers of wetland formation on this site.

The dynamics of groundwater seepage on the site are not properly known, but it is possible that groundwater discharge is related to the presence of the outcropping of bedrock in the western part of the site. An area in which groundwater seepage is likely to be concentrated is found at the head of the wetland. This is evident by a slightly different vegetation composition to the downstream wetland and the presence of an old shallow well that was presumably dug by the previous farmers to abstract this shallow groundwater.

Downstream of this flatter area at the very head of the valley, surface water drainage is concentrated in a poorly defined valley floor, which gradually becomes more defined at the northern end of the site where the wetland begins to change in form to a channelled valley bottom, as evident by the presence of a channel at the northern end of the site.

The study area lies in the western part of the Mpumalanga Highveld where the grassland biome is predominant. Grassveld vegetation thus characterises the entire study area. The development site and the study area falls within the Rand Highveld Grassland vegetation type (Mucina & Rutherford, 2006¹⁰), and as such naturally consists of undulating grasslands. The wetland on the study site shares these vegetation characteristics and is largely grass dominated.

6.9 Heritage

The Phase I Heritage Impact Assessment (HIA) study for the proposed new residential development revealed the remains from the last few decades have no historical or cultural significance. There is consequently no reason

¹⁰ MUCINA, L., RUTHERFORD, M.C. & POWRIE, L.W. (editors) 2005. Vegetation map of South Africa, Lesotho and Swaziland. South African National Biodiversity Institute, Pretoria. ISBN 1-919976-22-1

from a heritage point of view why the implementation of either Alternative 01 or Alternative 02 for the proposed Valleyview residential development therefore cannot proceed.

A water buck pump which used to exist in the Project Area could not be located and was probably removed since the last survey was done in 2006.



FIGURE 6:8: BUCKET PUMP PRESENT ON STE DURING THE 2006 SURVEY

6.10 Biodiversity assessment

The following information has been extracted from the Biodiversity report undertaken by Riaan Robbeson of Bathusi Environmental Consulting.

The study site corresponds to the Grassland Biome, more specifically the Mesic Highveld Grassland as defined by Mucina & Rutherford (VegMap, 2006). The study site comprehends an ecological type known as the Rand Highveld Grassland, which is currently afforded an “**Endangered**” conservation status as it is poorly conserved in statutory reserves and in private reserves.

Information obtained from the SANBI database (POSA, 2012) indicates the known presence of approximately 490 plant species within the ¼-degree grid that is sympatric to the study site (2529CD). The high floristic diversity of the region reflects the regional diversity context of the Grassland Biome.

A total of 198 plant species were recorded during the survey period. A basic synopsis of the growth forms recorded in the study site reflects the major physiognomic variations that are present in the study site, being dominated by a species rich herb layer and grass ward.

A total of 48 grass species (24.2%) were recorded while the herbaceous comprises of 96 herbs and forbs (48.5%).

The diversity of plants within the study site represents 45 plant families, typically dominated by Poaceae (graminoids), comprising 50 species (25.3%) and Asteraceae (Daisy family, 34 species, 17.2%).

A total of 48 plant species of conservation importance are known to persist in the immediate region (Refer to Figure 7.1); four (4) conservation important plant taxa were recorded during the survey period, namely:

- *Boophone disticha*;
- *Gladiolus ecklonii*;
- *Gladiolus vinosomaculatus*; and
- *Watsonia* species.

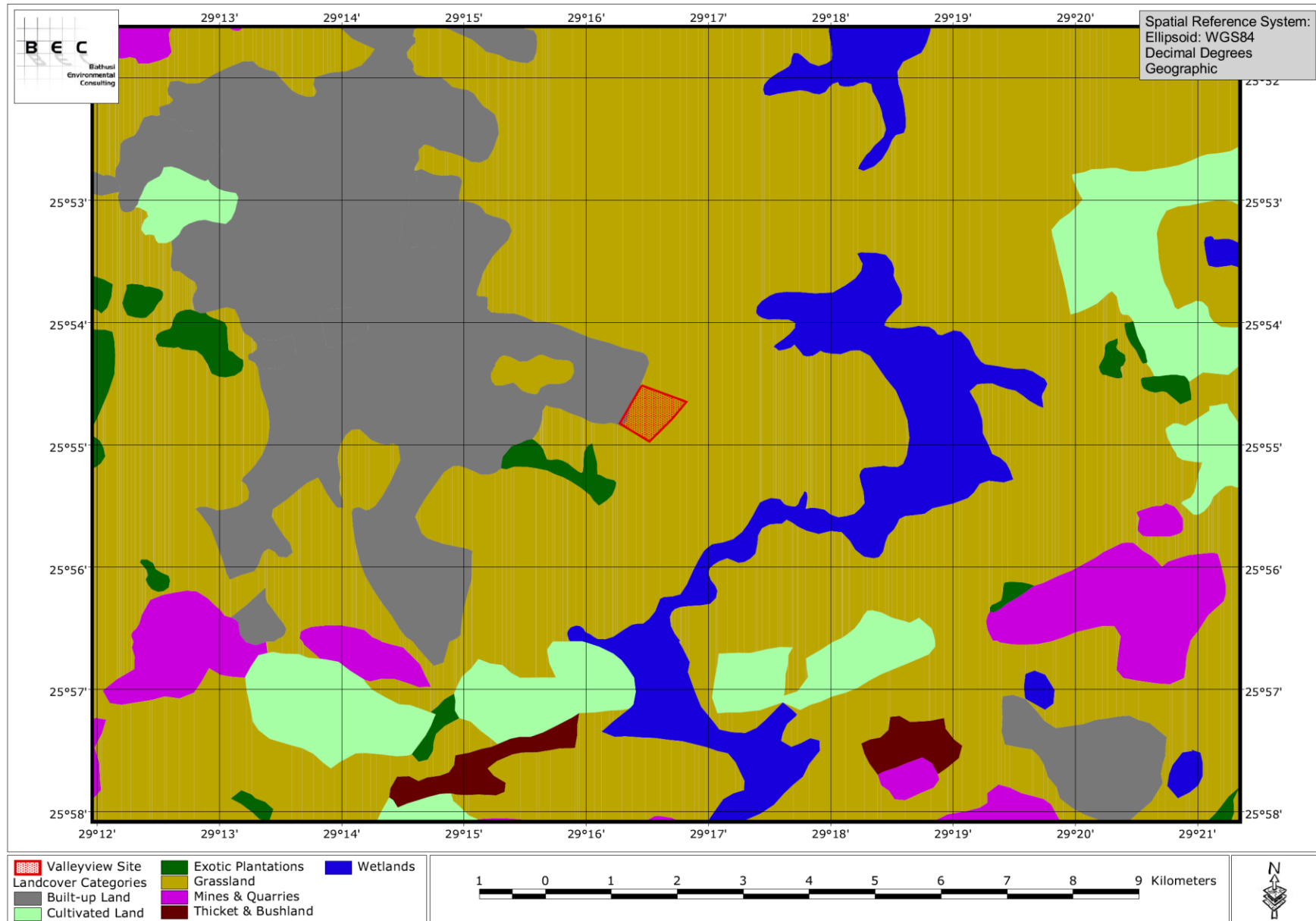


FIGURE 6:9: LAND COVER CATEGORIES OF THE REGION

The number of conservation important species recorded within the study site during the relatively brief survey period, is a reflection of the pristine nature of most of the vegetation encountered in the study site. It also reflects the pristine nature of the vegetation on a larger (local and regional scale), as well as the sensitivity of the regional vegetation type (Rand Highveld Grassland, Endangered). Considering the brief nature of the survey, the pristine nature of the vegetation and the number of conservation important species that are known to occur in the general region, it is highly likely that additional conservation important species will be recorded in the study site should subsequent surveys be conducted.

Results of the photo analysis and site observations revealed the presence of the following macro habitat types, communities and variations (with floristic sensitivities):

- Degraded & Transformed Areas, including:
 - Degraded Grassland (medium floristic sensitivity);
 - Transformed Habitat (low floristic sensitivity); and
- Wetland Habitat, including:
 - Channelled Valley Bottoms (high floristic sensitivity);
 - Mesic Grasslands (high floristic sensitivity); and
- Rocky Grassland (high floristic sensitivity).
 - In spite of high level of transformation and degradation of the immediate surrounds (urban development), the vegetation of this portion of grassland exhibits significant and pristine attributes of the endangered Rand Highveld Grassland. Characteristics of the vegetation include a high diversity of plants, particularly those that are normally associated with pristine Highveld grassland ecotypes, presence of conservation important taxa and the absence of poor status and degraded vegetation.
 - Habitat types identified on this site conforms to the natural types of the grassland; terrestrial grasslands typified by a high degree of rockiness, mesic grasslands that are inundated periodically during the raining season and wetland habitat that contains a high degree of obligate wetland taxa. Limited portions of degraded grassland reveal the effect of historic agricultural attempts and recent anthropogenic impacts, but have since reverted to secondary climax grassland. This portion of grassland, in spite of surrounding transformation and development pressures, is functioning ecologically effective, performing critical supporting roles for adjacent (continuous) natural habitat.
 - A high conservation status is consequently ascribed to this portion of land, not only because of the pristine nature of the vegetation persisting on the site, but also because of sustained pressure from surrounding development and activities that results in habitat loss and transformation on a local and regional scale. The implications of this high conservation status for the site are discussed further in section 7.2 below.
- Ensuring sufficient connectivity with adjacent natural habitat in order to ensure ecological functionality; and
- Implementing a conservation and management strategy in order to ensure the longevity of the ecological characteristics on this site.

Importantly, the Mpumalanga Biodiversity Conservation Plan categorised this portion of land as “**Highly Significant**” (also situated within an Ecological Corridor), and developments within this category is regarded “**Restricted**”.

This land should ideally be included in local and regional conservation efforts, such as the Bankenveld Proposed Conservancy and Witbank Nature Reserve, Bankenveld Conservancy, providing the land with a declared conservation status.

6.10.1 Faunal Assessment

Biological diversity everywhere is at great risk as a direct result of an ever-expanding human population and its associated needs for energy, water, food and minerals. Landscape transformation that is needed to accommodate these activities inevitably leads to habitat loss and habitat fragmentation, resulting in the mosaical appearance of undisturbed habitat within a matrix of transformed areas (see Figure 7.2). These remaining areas of natural habitat are frequently too small to support the biodiversity that previously occupied the area and the region loses its ecological integrity (Kamffer 2004).

Animals known to be present in the ¼-degree grid 2529CD were considered potential inhabitants of the study site (all species known from Mpumalanga were included in the assessment to limit the known effects of sampling bias, except for birds which have been sampled extensively and the data for the Q-grid is accepted as accurate).

The presence of 59 animal taxa was confirmed during the November 2012 investigation by means of visual sightings, tracks, scats, burrows and species-specific calls as well as camera and small mammal trapping.

The following results were recorded:

- 21 invertebrates;
- 1 frog species;
- 1 reptile species;
- 36 bird species; and
- 4 mammals.

The diversity of animals recorded in the study site included four Alien and/or Invasive species, namely:

- Spotted Maize Beetle (*Astylus atomaculatus*);
- Common Pigeon (*Columba livia*);
- Common Myna (*Acridotheres tristis*); and
- Feral Domestic Cat (*Felis catus*).

No provincially protected or alien and invasive fauna taxa were recorded in the study site during the survey period.

A total of 112 Red Data animals are known to occur in Mpumalanga (butterflies, frogs, reptiles and mammals) and in the ¼-degree grid 2529CD (birds). An assessment of the probability of occurrence (PoC) for these animals yielded the following probabilities:

- 94 species have a low PoC;
- 12 species have a moderate-low PoC;
- 5 species have a moderate PoC; and
- 1 species has a high PoC.

The “Vulnerable” butterfly *Metisella meninx* (Marsh Sylph – Hesperiiidae) is a likely inhabitant of the study site as the presence of medium to large stands of the wetland grass *Leersia hexandra* was noted, which is an important larval host plant for this butterfly. Records of its presence were collected in similar habitat types in the surrounding region (pers. obs.).

In addition to the above-mentioned Red Data species of Mpumalanga, 31 animal taxa (some overlap does occur) have protected status (NEMBA) within Mpumalanga (www.speciesstatus.sanbi.org). The estimated PoC for these species are as follows:

- 28 species have a low PoC;
- 1 species has a moderate-low PoC; and
- 2 species have a moderate PoC.

None of these species was recorded during the survey period, but some species are likely to persist in the immediate region.

Plant communities or macro habitat types are regarded as representative of the faunal habitats within the study site (See Figure 7.3) for the purposes of this EIA assessment; the following faunal sensitivities were estimated for these habitat types:

- Transformed Habitat (low faunal sensitivity);
- Grassland Habitat, including:
 - Degraded Grassland (medium faunal sensitivity);
 - Rocky Grassland (See Figure 7.3) (high faunal sensitivity);
- Wetland Habitat and including:
 - Channelled Valley Bottoms (high faunal sensitivity);
 - Mesic Grasslands (See Figure 7.4) (high faunal sensitivity).

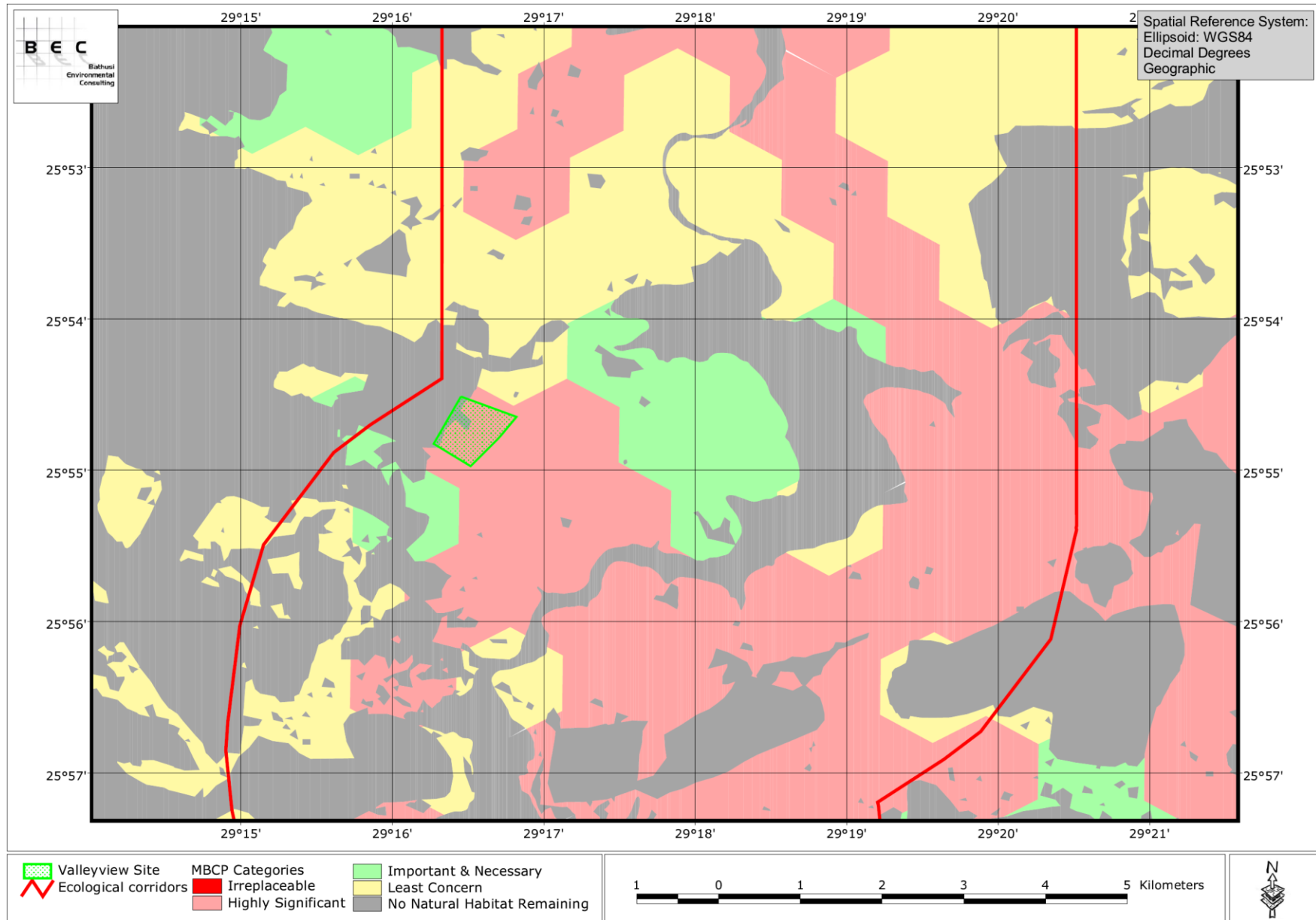


FIGURE 6:10: TERRESTRIAL AND BIODIVERSITY CONSERVATION (MBCP) CATEGORIES OF THE STUDY SITE



FIGURE 6:11: ROCKY GRASSLAND HABITAT



FIGURE 6:12: MESIC GRASSLANDS, NOTE LOCALLY DOMINANT STANDS OF *HYPARRHENIA HIRTA*

Despite the small size and spatial presence of the study site in a landscape characterised by urban development, remaining natural habitat of the site is regarded pristine, comprising rocky grassland and wetland habitat. The status of these remaining natural habitats is highly representative of typical (pristine) faunal habitats of the grasslands and wetlands of the Rand Highveld Grassland ecological type.

Although no Red Data species were recorded in the study site during the brief field investigation, natural rocky grassland, mesic grassland and channelled valley bottom habitats of the study site are considered to be of high biodiversity values, exhibiting high faunal sensitivities pertaining to activities that may lead to degradation and/or transformation of these habitats. These habitats are currently under significant threat in the region (Mesic Highveld Bioregion of Mpumalanga) – a fact confirmed by the Mpumalanga Biodiversity Plan (the area is categorised as „Highly Significant“ and falls within an Ecological Corridor).

Connectivity with other natural faunal habitats (both terrestrial and wetland) of this site is high, increasing the biodiversity value and sensitivity of the study site. Important, connectivity with the Olifants River – Witbank Dam wetland system is also established and the site will undoubtedly provide valuable sink habitats for some of the wetland species persisting in this system.

Data and visual observations indicate that remaining natural habitat (regional) are characterised by severe degradation and transformation, with high levels of habitat fragmentation and isolation. Habitat of this pristine nature (site) is therefore not abundantly encountered in the region.

The inclusion of this portion of pristine grassland in adjacent areas of conservation will therefore be regarded a positive contribution towards conservation efforts on a local scale. Potential and likely impacts of development of these portions of natural habitat are regarded significant and severe on a local scale.

Impacts are also regarded significant on a larger scale, considering the proximity of conservation important areas.

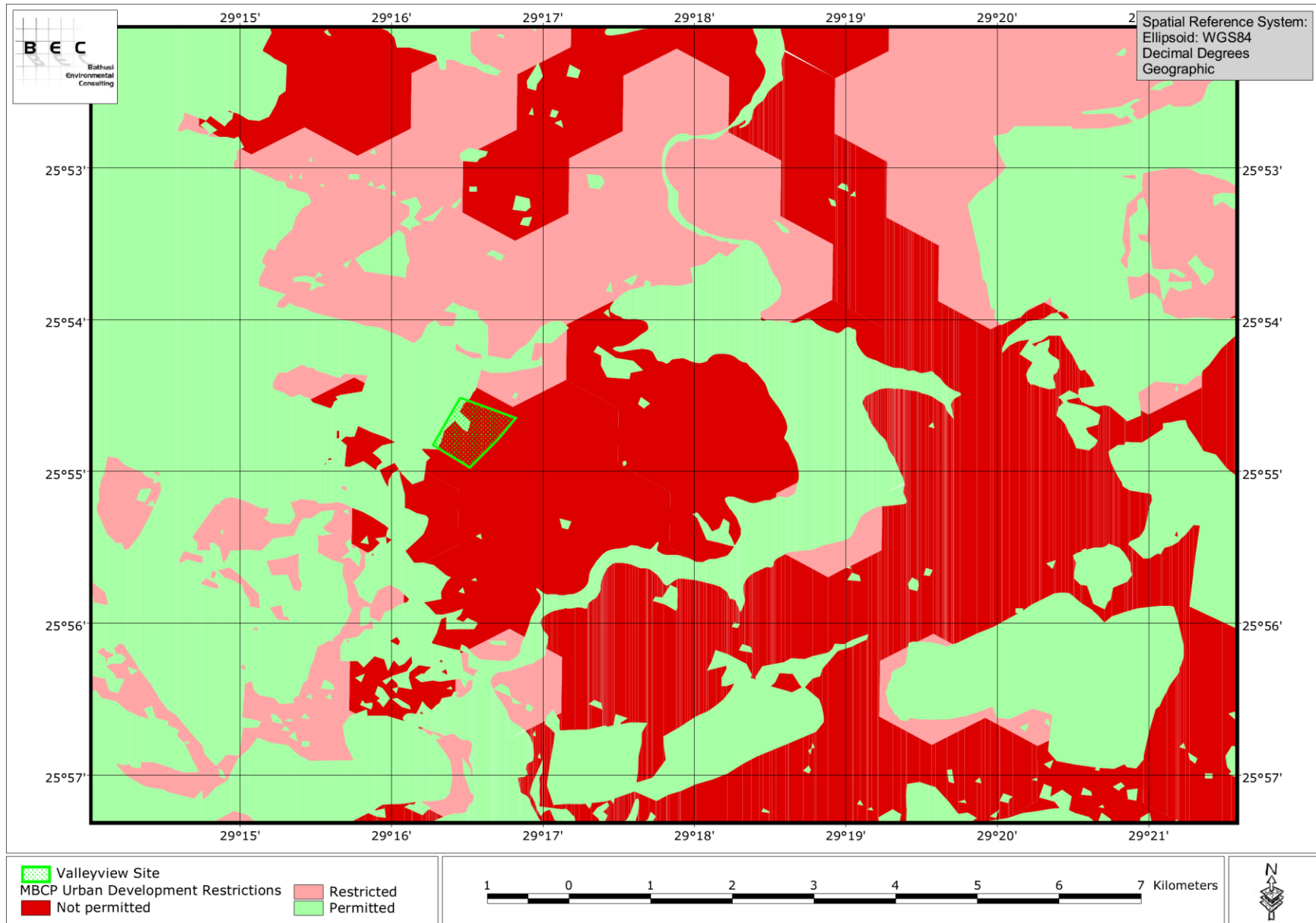


FIGURE 6:13: DEVELOPMENT LIMITATIONS FOR THE STUDY SITE IN TERMS OF THE MBCP (SURFACE MINING)

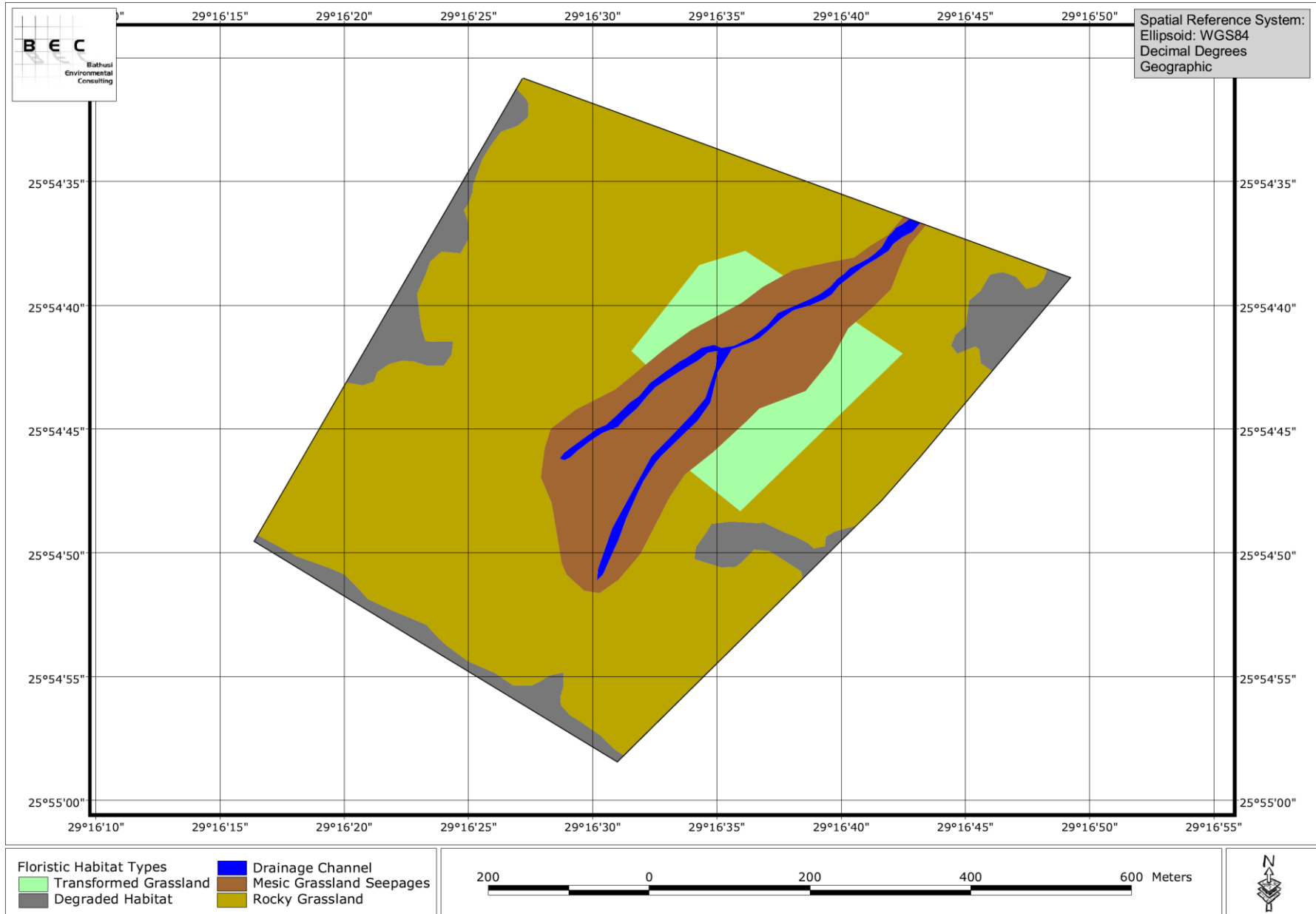


FIGURE 6:14: FLORISTIC HABITAT TYPES OF THE STUDY AREA

6.10.2 Ecological Impact Assessment

The impact assessment was aimed at presenting a description of the nature and extent of identified impacts on the ecological environment. Direct or primary impacts from proposed development will result from any activity that involves land clearance.

Direct impacts are usually readily identifiable, while indirect or secondary impacts can result from social or environmental changes induced by mining operations and are often harder to identify and assess.

Cumulative impacts occur where projects take place in landscapes that are already influenced by other habitat transformation activities.

No impacts were identified that could lead to a beneficial impact on the ecological environment of the study site since the proposed development is largely destructive, involving the alteration of natural habitat or degradation of habitat that is currently in a climax status.

The following impacts are relevant to this particular type of development (with estimated significance):

- Impacts on flora species of conservation importance (**HIGH significance**);
- Impacts on fauna species of conservation importance (**HIGH significance**);
- Impacts on/ loss/ degradation of natural/ sensitive/ protected habitat types (**HIGH significance**);
- Displacement of fauna species, human-animal conflicts & interactions (**HIGH significance**);
- Impacts on ecological connectivity and ecosystem functioning (**HIGH significance**);
- Indirect impacts on surrounding habitat (**MEDIUM significance**);
- Cumulative impacts on conservation obligations & targets (national and regional) (**HIGH significance**);
- Cumulative increase in local and regional fragmentation/ isolation of habitat (**HIGH significance**); and
- Cumulative increase in environmental degradation, pollution (**MEDIUM significance**).

The severity of impacts associated with the proposed development on biodiversity attributes of this portion of land is evident from the generally high significance ratings estimated for the respective impact types. The pristine status of habitat of the study site warrants the high significance ratings, particularly in view of the proximity of areas of conservation. Cognisance of the degraded state of much of the remaining surrounding grasslands (on a regional scale) is also taken in the assessment.

The inclusion of this portion of land in the adjacent (existing) areas of conservation will benefit conservation efforts on a local scale.

6.11 Geotechnical Assessment

The following information has been extracted from the Geotechnical report undertaken by PG Hansmeyer of Engeolab CC.

The objectives of the Geo-technical investigation were to:

- Determine the soil and rock profile across the site and evaluate its engineering properties and influence on the design of light single storey structures.
- Establish depth to bedrock where not exposed.
- Evaluate the workability of the site materials with regards to their excavatability and compact ability.
- Comment on predicted safe bearing capacity values, expected heave and settlement of the different potential founding horizons and recommended founding depths.

- Assess the groundwater conditions, including surface run-off, ponding seepage and perched or permanent water tables.
- Demarcate the site in terms of various geo-technical zones with applicable NHBRC site classes and building procedures.

6.11.1 Site soils and geology

The site is underlain by rhyolite (commercially known as “felsite”) – a fine grained volcanic rock of granitic composition of the Selonsrivier Formation, Rooiberg Group, Bushveld Complex.

In some exposures the rhyolite is clearly flo-banded while in others massive with a typical “whale back” appearance especially on eroded side slopes with a thin soil cover whilst other areas are characterised by it boulder appearance . The rhyolite strikes east- west and dips with a shallow angle of 15⁰ in a northerly direction.

Owing to the large amount of free silica in the rock, coupled by its fine grained texture, the rhyolites are resistant to chemical decomposition in its zone of weathering and the residual soils are rather thin- that is 0.6 m to 1.8 m. The soil and bedrock profile generally comprise of a colluvial layer of loose sand (often with angular and flaky rhyolite graves), residual sandy silt mixed with sub- angular gravels and boulders. The gravely residuum, gradually becoming less weathered and weathered bedrock characterised by soft to intermediate excavatable material with wider spaced stained fractures and eventually followed by hard rock with a typical pink colour.

A distinctive weathering pattern was observed on site and areas with shallow ($\leq 0.6 \text{ m} \leq 1.8 \text{ m}$) founding conditions were identified- see the Foundation depth Plan.

The transported cover soils are subsequentially underlain by silty ad sandy residuum derived from in situ decomposed rhyolite with the exception of superficial pedocrete which was recorded in TP 6 only at a depth of 0.4 m. Superficial ferruginous deposits usually form on rhyolitic parent materials as weathering residues of by replacement and or cementation of pre-existing soils by various antigenic minerals from the soil water.

6.11.2 Conclusion

Significant bearing capacity and heave problems are not anticipated on this site. In zone 2A – collapsible and compressible soils, foundations need to be founded at approximately 0.4 m below surface on compacted fill and lightly reinforced to minimize settlement. Foundation excavations should be checked by an engineer, or engineer geologist before casting, to ensure that they are founded in accordance with the recommendations of this report.

It is recommended that the excavations deeper than 1.5 m be cut back to not more than 75% from horizontal and that the deep ingress of water in and around any excavations be prevented.

Good quality general fill is available on site and care should be taken when specifying engineering fills that the required strengths are attainable without recourse to importing fills, or additional of lime, or cement.

6.12 Heritage

The following information has been extracted from the Archaeological report undertaken by Dr Julius CC Pistorius.

The Phase I HIA study for the proposed new residential development revealed the following types and ranges of heritage resources (as outlined in Section 3 of the National Heritage Resources Act (Act No. 25 of 1999) in the Project Area:

- Remains which do not hold any cultural historical significance.

(A water buck pump which used to exist in the Project Area could not be located and was probably removed since the last survey was done in 2006).

6.12.1 Possible impact on remains from the last few decades

It is highly likely that all the remains which date from the last few decades will be affected (destroyed) when either Alternative 01 or Alternative 02 for the proposed Valleyview residential development is implemented.

6.12.2 Significance of the remains from the last few decades

The remains from the last few decades have no cultural or historical significance as these remains date from the recent past.

6.12.3 Significance of the impact on remains from the last few decades

The significance of the impact on the remains from the recent past was determined using a ranking scale based on various criteria.

The significance of the impact on the remains from the past few decades is very low.

6.13 Traffic Assessment

The traffic impact study focuses on the surrounding intersections and the impact the traffic generated will have on these intersections. The report specifically addresses the following issues:

- Analysis of surrounding and affected intersections; and
- Assessment of site access.

The following intersections would be impacted by the proposed development and are all currently stop controlled (un-signalised);

- Intersection of Silwer Avenue and Luna Street;
- Intersection of Lava Street and Luna Street;
- Intersection of Basalt Street and Luna Street;
- Intersection of Silwer Avenue and Setlaars Street;
- Intersection of Silwer Avenue and Uraan Street;
- Intersection of Paul Sauer Street and Silwer Avenue;
- Intersection of Paul Sauer Street and Asbestos Street;
- Intersection of Paul Sauer Street and Minerva Avenue;
- Intersection of Minerva Avenue and Gemini Street;
- Intersection of Libra Street and Leo Avenue;
- Intersection of Minerva Avenue and Luna Street; and
- Intersection of Leo Avenue and Luna Street.

These intersections define the study area and are indicated in Figure 7.7 below. The detailed turning movement traffic counts were undertaken at these intersections on a typical weekday during the school term.

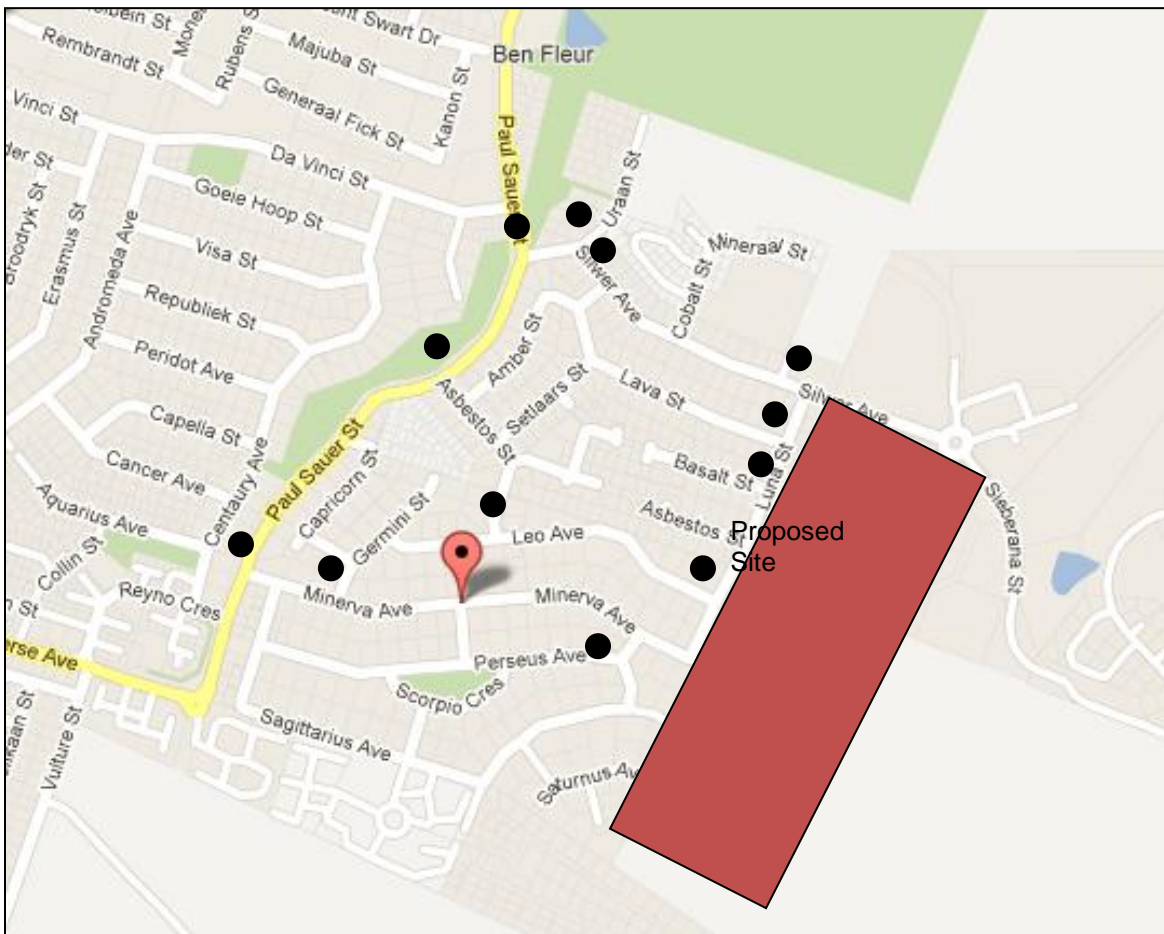


FIGURE 6:15: LOCATION OF TRAFFIC COUNTING STATIONS

6.13.1 Assessment Scenarios

The intersections were analyzed using a traffic analysis software package, SIDRA Intersection Version 5.1. This software was used to determine the Levels of Service (LOS) and delays for the following three scenarios:

- **Scenario 1 (Existing situation):**
 - Existing background traffic without proposed development to determine current LOS
- **Scenario 2 (Future situation without proposed site development)**
 - Existing background traffic increased at an annual growth rate of 3.5% per annum for 5 years to determine the future background traffic (2017) – to determine the impact of the traffic growth without site development
- **Scenario 3 (Future situation with proposed site development)**
 - Predicted future background traffic (2017) including traffic generated by the completed site development – to determine the predicted full impact of the proposed development on the surrounding road network.

The intersection capacity analysis was undertaken at all the intersections listed above for the AM, Midday and PM Peak hour periods.

6.13.2 Existing Traffic (Scenario 1)

A 12hr manual traffic count survey was conducted at the pre-selected intersections on the 8th May, 2012 by Traffic Engineering Services (TES). The data collected was analysed to produce the peak hours of the existing traffic volume movements, further analysis was done with SIDRA to determine the Level of Service (LOS) at which the intersections are currently operating. The results of the SIDRA analysis are as shown in the table below.

The traffic data collected showed that the AM Peak hour was from 06.45 to 07.45, the Midday Peak hour was from 13.30 to 14.30 and the PM Peak hour was from 16.45 to 17.45. The data from the traffic survey are in Appendix D of the Traffic Report.

TABLE 6:1: LEVEL OF SERVICE DEFINITION

Level of Service	Control Delay per vehicle (Sec/ vehicles)	Definition
A	≤ 10	Describes operations with very low control delay, up to 10 sec/veh <ul style="list-style-type: none"> • Occurs when progression is extremely favorable; • When most cars arrive during the green; • Most vehicles do not stop at all; • Short cycle lengths may also contribute to low delay
B	>10 and ≤20	Describes operations with control delay > 10 and up to 20 sec/veh <ul style="list-style-type: none"> • Occurs with good progression, short cycle lengths or both; • More vehicles stop than with LOS A; • Causing higher levels of average delay.
C	>20 and ≤35	Describes operations with control delay greater than 20 and up to 35 sec/veh <ul style="list-style-type: none"> • Fair progression, longer cycle lengths, or both; • Individual cycle failures may begin to appear at this level; • No. of vehicles stopping is significant; • Many still pass without stopping.
D	>35 and ≤55	Describes operations with control delay > 35 and up to 55 sec/veh <ul style="list-style-type: none"> • Influence of congestion becomes more noticeable; • Longer delays result; • Unfavorable progression; • Long cycle lengths; • High v/c ratios; • Many vehicles stop; • Proportion of vehicles not stopping declines; • Individual cycle failures are noticeable.
E	>55 and ≤80	Describes operations with delay > 55 and up to 80 sec/veh <ul style="list-style-type: none"> • The limit of acceptable delay; • Indicate poor progression, long cycle lengths and high v/c ratios; • Individual cycle failures are frequent occurrences.
F	> 80	Describes operations with delay > 80 sec/veh <ul style="list-style-type: none"> • Considered unacceptable to most drivers; • Occurs with oversaturation;

Level of Service	Control Delay per vehicle (Sec/ vehicles)	Definition
		<ul style="list-style-type: none"> • When arrival flow rates exceed the capacity of the intersection; • Occurs at high v/c ratios below 1.0 with many individual cycle failures; • Poor progression and long cycle lengths may also contribute.

TABLE 6:2: TABLE SHOWING LOS FOR SCENARIO 1 FOR AM, MIDDAY AND PM PEAK HOURS

Intersection No.	Intersection	Existing 2012 Traffic		
		AM Peak	Midday Peak	PM Peak
1	Intersection of Silwer Avenue and Luna Street	C	C	C
2	Intersection of Lava Street and Luna Street	B#	B#	B#
3	Intersection of Basalt Street and Luna Street	B#	B#	B#
4	Intersection of Silwer Avenue and Setlaars Street	B#	B#	B#
5	Intersection of Silwer Avenue and Uraan Street	C#	B#	C#
6	Intersection of Paul Sauer Street and Silwer Ave	D	C	F
7	Intersection of Paul Sauer Street and Asbestos Street	C#	B#	C#
8	Intersection of Paul Sauer Street and Minerva Ave	A	A	A
9	Intersection of Minerva Avenue and Gemini Street	B#	B#	B#
10	Intersection of Libra Street and Leo Avenue	B#	B#	B#
11	Intersection of Minerva Avenue and Luna Street	B#	B#	B#
12	Intersection of Leo Avenue and Luna Street	B#	B#	B#

indicates worst level of service for intersection where the main road / street has priority

NOTE: SIDRA does not give an overall intersection LOS for intersections that have free flow legs (priority) and stop controlled side streets. It just gives LOS for the individual approaches to the intersections instead. As such some of the results show the LOS for the worst leg in the intersection.

The results from the SIDRA analysis showed that 11 out of the 12 intersections are operating at acceptable levels of service (LOS A-C). The intersection of Paul Sauer and Silwer Aves is currently operating at an LOS of D and F during the AM and PM peak periods respectively.

6.13.3 Future Traffic Data including site development traffic (Scenario 3)

Trip generation rates associated with the proposed development were used to calculate the amount of traffic that will be generated by the proposed development. The generated development traffic was distributed and added to the predicted future background traffic. This is done to determine the predicted full impact of the proposed development on the surrounding road network.

6.13.3.1 Trip Generation

The proposed development is expected to have 600 stands with a split of 315 retirement village and 285 residential units. The draft “South African Trip Data Manual” prepared by the local Committee of Transport Officials (COTO) states a trip rate of 0.3/erven and 0.35/erven during the AM and PM peak hours respectively for retirement homes. This version was used since it is more current and has trip rates for retirement homes. The South African Trip Generation Rates states a trip rate of 1.1 for both AM and PM peak hours for a residential

cluster development. A split of 50:50 was used to calculate the peak trips directions of the retirement village and a split of 75:25 was used for the residential units.

TABLE 6:3: TRIP GENERATION FOR RETIREMENT VILLAGE

	Trip rate	No. Erven	Trips	Trips In	Trips Out
AM Peak	0.3	315	95	47	48
PM Peak	0.35	315	110	55	55

TABLE 6:4: TRIP GENERATION FOR RESIDENTIAL CLUSTER

	Trip rate	No. Erven	Trips	Trips In	Trips Out
AM Peak	1.1	285	314	78	236
PM Peak	1.1	285	314	236	78

TABLE 6:5: TOTAL TRIPS GENERATED

	Total Trips In	Total Trips Out
AM Peak	125	284
PM Peak	291	133

The generated traffic was then added to the intersections that were expected to be impacted by the increase in car traffic. These intersections were identified using the current traffic flows and deducing where the main streams of traffic are. This generated traffic was added to the future 2017 traffic volumes (Scenario 2) and was analyzed with SIDRA to determine the LOS.

TABLE 6:6: TABLE SHOWING LOS FOR SCENARIO 3 FOR AM AND PM PEAK HOURS

Intersection No.	Intersection	Future 2017 (with development)	
		AM Peak	PM Peak
1	Intersection of Silwer Avenue and Luna Street	D	C
2	Intersection of Lava Street and Luna Street	B#	B#
3	Intersection of Basalt Street and Luna Street	B#	B#
4	Intersection of Silwer Avenue and Setlaars Street	B#	C#
5	Intersection of Silwer Avenue and Uraan Street	D#	C#
6	Intersection of Paul Sauer Street and Silwer Ave	F	F
7	Intersection of Paul Sauer Street and Asbestos Street	C#	C#
8	Intersection of Paul Sauer Street and Minerva Ave	A	B
9	Intersection of Minerva Avenue and Gemini Street	C#	B#
10	Intersection of Libra Street and Leo Avenue	B#	B#
11	Intersection of Minerva Avenue and Luna Street	B#	B#
12	Intersection of Leo Avenue and Luna Street	B#	B#

indicates approach with the worst level of service

The results show that when the generated trips are added onto the future road network volumes the intersection of Paul Sauer and Silwer Aves will operate at LOS of F. The remaining intersections analysed will operate at acceptable LOS.

6.13.4 Public Transport

The development will attract trips by public transport vehicles which will not be allowed inside the development. These vehicles can be catered for at the north access as this is closest to Silwer Avenue. Silwer Avenue feeds into Paul Sauer Street which is a Class 3 road.

6.13.5 Discussion

The intersection that will be adversely affected by this development is Paul Sauer and Silwer Avenue which currently operates at LOS of F. To improve the LOS of Paul Sauer and Silwer Avenue it needs to be upgraded. The upgrades that can be implemented are traffic signals or intersection design upgrades. If the intersection is signalized, it will improve the LOS from F to B. If it is upgraded to a traffic circle, the LOS will improve from F to A. The supporting SIDRA output is included in Annexure C. The EIA public consultation informed that the residents of that area are opposed to the idea of a traffic circle and as such it is proposed that the intersection of Paul Sauer and Silwer Avenue should be signalized.

The comments submitted by I&APs during the review of the draft EIA Report are provided below.

A concern was raised about traffic near Checkers in particular at the traffic close by and the assessment of other intersection leading to Saturnus Avenue given the importance of the road. There is no direct access from Luna Street to the proposed Valleyview and proposed access using Lava Street is not possible due to the existing houses. The traffic study was conducted in 2012, and should be amended to assess the traffic impacts of recent developments of the area as well as possible future impacts.

The traffic study will be evaluated by the Emalahleni Local Municipality together with the application submitted by the project applicant (Before the Wind Investments 133 Pty Ltd and the issues raised by the I&AP will be addressed by the project applicant prior project implementation).

6.13.6 Conclusions

The proposed residential development will generate a total of 408 trips during the AM peak and 424 trips during the PM peak hours. The intersection that will be affected by this development is the intersection of Paul Sauer & Silwer Avenue. The rest of the identified intersections will operate at acceptable LOS.

6.13.6.1 Recommendations

The following recommendation is proposed;

- The intersection of Paul Sauer & Silwer Avenue should be signalised.

However since compilation of this report a signal has been added at the mall on Paul Sauer road at the Ben Fleur Mall. The feasibility of another signal will need to be re-investigated at a later stage.

6.14 Visual Assessment

The inputs received from a number of Interested and Affected Parties all relate to the potential obstruction / removal of the views of the site and surrounding landscape from their properties.

The I&APs who have raised visual issues are all owners of properties that are located immediately adjacent to the development site. Certain responses state that the view from the property of the surrounding landscape, in particular of the Witbank Dam adds (economic) value to the property, and state that if this view is blocked by the new development that the property value will be devalued.

Another response stresses the benefit of being located on the edge of the existing town, and that this has been perceived to add value to the property.

Responses also highlight that the dwellings on these properties adjoining the site have been designed and constructed in such a way to enjoy the view of the surrounding landscape.

It is important to characterise the visual environment surrounding the site in terms of its physical components and landuse in order to understand its visual character and associated visual sensitivity of the wider area. This is undertaken below.

6.14.1 Topography, Visual Character, and Visual Sensitivity of the study area.

6.14.1.1 Topography – Slope and Aspect

Topographically the wider area in which the development site is located is relatively undulating, comprising of a number of valleys and higher lying areas on the crests / interfluvies. The Olifants River which runs through the area and which has been dammed to form the Witbank Dam drains a relatively wide, incised valley (as illustrated by the valley into which one drops and rises out of when travelling east along the N4 highway from Emalahleni towards Middelburg). The area is thus characterised by slopes of slight to moderate steepness.

The site is located on the southern side of the Olifants River valley, and thus the slopes on the site have a northern-facing aspect towards the wider valley bottom to the north.



FIGURE 6:16 –NATURE OF TOPOGRAPHY THAT SLOPES DOWN TO THE NORTH

The ground on the site is moderately steeply sloping, as the terrain slopes down from the southern part of the site into a shallow valleyhead that is drained by a wetland. The ground on the south-western and southern peripheries of the site (adjacent to the existing residential areas) is relatively flat and higher-lying than the rest of the site, but the slopes increase in steepness as one moves eastwards or northwards into the shallow valley head.

The sloping ground in the north-western parts of the site forms rocky outcrops where the bedrock has been exposed by the slope; these outcrops form a poorly defined ridge, below which the ground slopes more steeply down to the valley bottom and behind which the slope is much flatter.

6.14.1.2 Implications of slope and aspect for the experiencing of views

Slope and aspect are very important in the context of views as, as described further on the impact assessment section of this report. Topography, expressed in the form of slope and aspect can perform an important role in limiting views or 'focussing' views in a certain direction. Viewers located within an enclosed valley would have a limited visual envelope or viewshed, as the rising topography around them would prevent wider views of the surrounding terrain. Similarly an object placed lower down in such an enclosed valley would have a limited viewshed, being shielded or partly shielded by the terrain surrounding it. This is true of the development site as the lower end of the site (the northern end of the drainage line / wetland as it drains off the site) cannot be viewed from large parts of the southern and south-western parts of the site.

The topographical context – i.e. terrain that slopes down to the north and the north-facing aspect of the area immediately adjacent to the development site entails that the houses on the peripheries of the site are naturally exposed a view of a limited area to the north (into the Olifants River valley) and to the east (towards the higher-lying ground east of the development site).

The limited visual envelope (view) from these properties, and the location of the development site in relation to these views is important, as the development site is in the foreground of the area able to be viewed, and lies in between the properties and the area further afield onto which these properties look. This entails that houses or other structures on the development site could block these views to the wider area, as explored further below.

6.14.1.3 Landcover and Vegetation

The natural landcover / vegetation cover in the study area is open grassland, due to the climatic conditions and the natural prevalence of fire that limits the growth of woody vegetation on the Highveld. However as the study area falls within the margins of an urban area, much of the natural landcover has been transformed. The development site is surrounded on three sides by existing residential development, with the suburbs adjacent to the development site being middle to high income areas. The Bankenveld Estate located to the north-east of the development site is a low density golf estate, with clusters of housing and intervening areas of open space. The remainder of the area, including the development site itself, and the property to the east is comprised of residual natural grassland vegetation.

It is important to note that the vacant properties adjacent to the site have been approved for development, and are thus likely to be transformed to urban development in the near future. The property immediately to the north of the development site (between the development site and Silwer / Sieberana Avenues) forms part of the Bankenveld Estate, and the property immediately to the east of the site is listed in the latest Emalahleni SDF as being zoned for urban infill development, and has been approved for development.

Much of the area to the north and north-east of the site is comprised of the Bankenveld Conservancy and the Witbank (Emalahleni) Nature Reserve, and thus much of the natural land cover has been retained as the aim of these areas has been to preserve the natural grassland vegetation. Further afield, much of the area surrounding Emalahleni consists of mining activities, as well as the presence of coal-fired power stations. Although none of these land uses are located close to the site, these presence of the Duvha Power Station is visible as its stacks and cooling towers are visible above the eastern horizon when viewed from the peripheries of the site.

The natural grass cover is a relatively low sward that is about 30cm to knee-height in height. There are a few scattered clumps of exotic trees (wattles and eucalyptus) in the vacant areas surrounding the development site, but these are not extensive in spatial extent.

It should be noted that the Witbank Dam is a relatively large water body, occupying much of the Olifants River valley. It occupies part of the area that is visible to the north-east of the site.

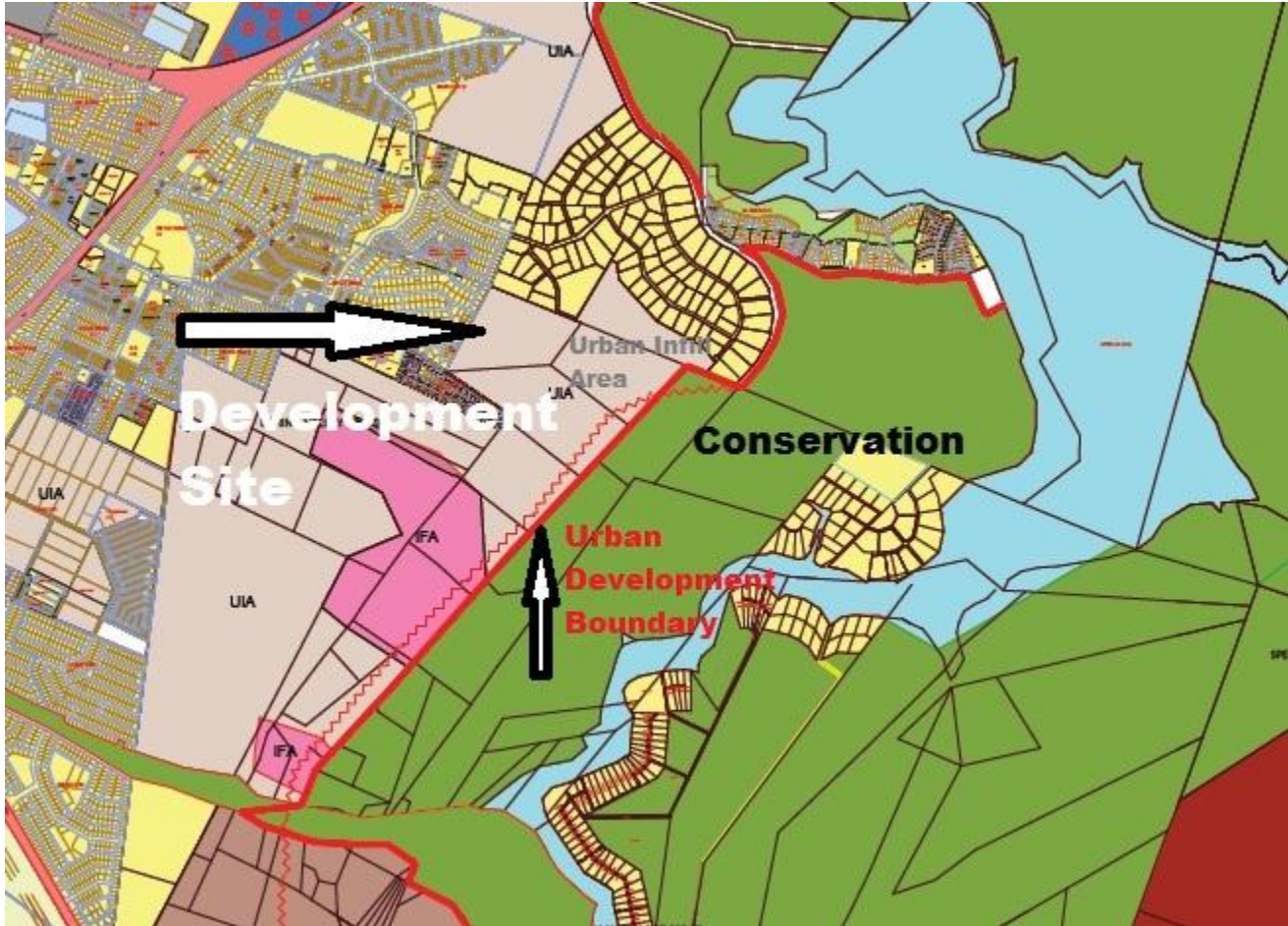


FIGURE 6:17 – PROPOSED LAND DEVELOPMENT CONTEXT, AS ADAPTED FROM THE EMALAHLENI SDF PROPOSED NEW LAND DEVELOPMENT OPPORTUNITIES MAP (EMALAHLENI SDF 2013/14)

6.14.1.4 Implications of land cover and vegetation for the experiencing of views

Where the natural grassland vegetation cover still exists, this does not hinder views in any way due to the open nature of the vegetation, thus the primary driving factor in the experiencing of views is topography, as described above.

Views from built up residential areas are typically limited by the adjacent properties, thus it is important to note that only properties on the margins of the existing residential areas immediately adjacent to the development site would be exposed to views of the site and its surrounds. Where such views exist, the residual grassy vegetation on the site does not restrict views in any way.

Although there are a few trees on the peripheries of the properties on the established western side of the development site, woody vegetation is not typically a significant factor in limiting views from these properties

6.14.1.5 Visual Character and Visual Sensitivity of the area

The above structural and natural features of the environment engender the study area with a certain visual character. Visual character is partly related to the level of change of a landscape / area from a natural condition, and is also related to aesthetic features of the environment.

As detailed above, the development site exists on the peripheries of the Emalahleni urban area, and is located in a spatial development context of gradual expansion of the suburbs in the south-eastern part of the town into former rural or agricultural areas beyond the existing urban edge. The area beyond the boundaries of the development site thus consists of a matrix of both developed areas and currently vacant areas consisting of natural vegetation. Part of the latter area consists of the Witbank Dam Nature Reserve and Bankenveld Conservancy and is thus unlikely to be developed or subject to high density development.

The location of the development on the periphery of the urban area of Emalahleni is confirmed by the latest SDF for the ELM (Emalahleni Draft SDF 2013/14) which indicates that the urban development boundary is located close to the site, on the eastern periphery of the site located immediately to the east of the development site. Importantly as discussed further below, the properties to the east of the urban edge are earmarked for conservation (Emalahleni Draft SDF 2013/14) – refer to Figure 3 above.

The stacks and cooling towers of the Duvha Power Station are a structural intrusion on the eastern horizon as viewed from the eastern peripheries of the Reyno Ridge residential area. The presence of these large structures introduces an element of industry to the visual character of the area, but they are sufficiently distant and thus of sufficiently limited spatial extent on the horizon to not exert a significant impact on the study area's visual character.

Due to this mix of landuses, the wider area beyond the boundaries of the development site has a partly urban, partly rural (or part-natural) visual character. The presence of currently vacant properties consisting of natural grassland, as well as the presence of conserved parcels of land in the landscape accounts for the rural / part-natural component to the landscape visual character. The presence of the Witbank Dam within the views from the area surrounding the site enhances this natural component, as although the dam itself is not a natural surface water feature (being the result of impoundment of the Olifants River), it is likely that the dam is perceived as a natural feature rather than an artificial feature by residents, particularly as it is surrounded by a nature reserve and conservancy.

It should be noted however that due to the approved developments to the east of the site, this landscape character is likely to be altered in the near future, and much of the near ground as viewed from the western and southern peripheries of the development site will be altered from natural grassland to urban residential landcover, thus increasing the developed component of the landscape as visible from this area. The development of the site (if the proposed development was approved) would further alter parts of the immediate landscape to an urban residential landcover.



FIGURE 6:18 – PORTION OF THE VIEW REPRESENTATIVE OF THE VIEW TO WHICH PROPERTIES ON THE EDGE OF REYNO RIDGE ARE CURRENTLY EXPOSED

It is important to note that the presence of natural / perceived natural and rural elements or areas within the landscape as viewed from the surrounds of the site can engender perceptions of aesthetic quality or value to the landscape. Many studies of landscape conservation have highlighted the value placed by people in rural or natural landscapes. In this context it is worthwhile to briefly explore how landscape, and particularly rural landscapes, are valued in order to contextualise and understand responses to the proposed development that stress the potential impact of the proposed development on the surrounding landscape and views of it.

A rural landscape can be defined as an where an interaction between humans and nature over time has led to the development of a landscape that has its own characteristics, and which is a middle ground between an urban landscape and wilderness, consisting of human activities that are related to the natural environment, such as agriculture and pastoral activities (Mazehan et al, 2013).

Placing value in a landscape is a psychological and cultural practice; values and meanings are not intrinsic to the landscape, but rather they are phenomena created by humans through their cultural practices (Pun, 2004). It is thus important to note that perceptions of landscape may not be universally shared and different individuals or groups of people may perceive or treat the same landscape differently, in turn ascribing different values and meanings to it (Pun, 2004). Values and meanings ascribed by local people may not be evident to an outsider. Indeed, differing values may be in competition among themselves (Pun, 2004).

There are different types of values that can be placed on a landscape; i.e. economic values (e.g. the relevancy of the landscape for business enterprises, or the market possibility of products from landscape), amenity values (values related to the non-material benefits associated with it) and security values (Pun, 2004). Amenity values can be subdivided into different sub-categories; “intrinsic” ecological value, scientific and educational value, aesthetical and recreational value, and orientational and identity value. Landscapes and the viewing of

landscapes has also been shown to have positive psychological and health benefits; Velarde et al (2007), have shown through an examination of various environmental psychology studies that visual exposure to natural landscapes (e.g. by means of viewing natural landscapes during a walk, or viewing from a window) generally has a beneficial impact on human health (e.g. reduced stress, facilitating recovery from illness, and behavioural changes that improve mood and general well-being). Landscape as a source of beauty is prevalent within the arts, is strong draw card for recreational activities. In addition, landscape is an element in the ability of people to orient themselves, and is strongly related to people's cultural identity and sense of place. It is in this context that value is placed in natural or rural landscapes, and it follows that such value would be placed on views from an urban area into surrounding areas of rural or natural character.

The above values can be interlinked, but can also be conflicting, e.g. amenity values associated with a landscape held by a certain group of people as described above may conflict with economic values associated with the market or development possibility of the landscape that are held by others. It is in this context that visual impact associated with a potential development often arises as an issue in environmental impact assessments.

The latter three sub-categories of amenity value described above – aesthetic, identity and psychological health value are typically involved in the perception of visual impact, as development within a landscape can change the landscape to the degree to which the amenity value associated with a landscape is degraded or no present.

In the context of the present study, the responses of a number of residents (four formal comment submissions to the scoping-phase public participation for the project) of properties surrounding the site to the public participation process being undertaken for the EIA studies indicate that there are individuals or a group of people who place value in the natural elements and rural landscape elements that are present within the views of the development site and its surrounds. These values are both amenity values, and have an economic element in that the perception that property value is enhanced by the presence of a view of the surrounding landscape (in particular of the Witbank Dam) has been raised.

It is in this context of the existence of amenity values associated with the landscape as visible from the areas immediately adjacent to the development site that the visual sensitivity of the study area can be defined. The feedback expressed by a number of property owners indicates that value is placed in the natural elements of the landscape as currently visible, indicating a sensitivity to change within the landscape that may be caused by development of housing on the site, as proposed and sensitivity to the potential removal of the ability to view the landscape. This can be termed as visual sensitivity associated with the study area.

This visual sensitivity accords with the presence of parts of the surrounds that are earmarked for conservation (Emalaheni SDF 2013/14), although it should be noted that part of this adjacent area earmarked for conservation and no development is not visible from the site or its immediate surrounds due to topography. This degree of visual sensitivity may not be universally shared by all inhabitants, as those not exposed to such views of the landscape may not share these perceptions. Nonetheless this aspect of the visual sensitivity of the area needs to be taken into account in this visual impact assessment study.

6.14.1.6 Location of Visual Receptors and Key Observation Locations

Visual Impact is related to the presence of human receptors / viewers, thus visual impact is typically experienced from locations inhabited by humans. Accordingly an understanding of the areas inhabited / occupied by humans (even transiently) is important in the classification of potential visual impacts.

Sites of human habitation (e.g. residential areas, farmsteads and homesteads) typically make up the bulk of the receptor locations within an area. However lodges and other accommodation facilities, as well as recreational sites are other static locations that are typically considered receptor locations. However not only 'static' locations

can be termed as receptor areas; areas or routes of human movement such as roads can also be considered to be receptor locations, as well as wider areas in which certain activities that would be considered visually sensitive are practiced. This could include areas where tourism activities such as hiking trails or 4X4 routes, or hunting are practiced.

The development site is surrounded on two sides by existing residential development (with development rights having been granted for the properties immediately to the north and east of the development site). This means that residential properties are located immediately adjacent to the development site on its western and southern sides (with the development site likely to be completely surrounded by developed areas at some point in the future). However at the present time the properties immediately adjacent to the development site are exposed to views of the site and the (mostly undeveloped) surrounding landscape to the east and north. These properties are the key receptor locations in the context of the present study as certain these properties (where the view is not blocked by surrounding walls or vegetation) are exposed to uninterrupted views across the site and to areas further afield. The properties behind the outer line of properties are not considered receptor locations as generally these properties are not exposed to views of the site and the surrounding area to the north and the east.

Certain properties within the Bankenveld Estate to the north of the site are able to view the development site. These properties are also receptor locations. There are currently no receptor locations on the property to the south-east of the site as this property is currently vacant.

From these receptor locations a number of key observation locations can be identified. The residential properties immediately adjacent to the site on its western and southern boundaries are located on higher ground compared to most of the site and the surrounds and are thus exposed to a wide view of the site and the areas further afield. The ground slopes up from the north-western corner of the site as one moves southwards, thus a number of properties on the western boundary of the site, especially those that have a second floor or raised balcony are exposed to uninterrupted views across the site and of the area further afield (to the north).

It should be noted that only certain properties on the margins of the site (with a clear view of the site and surrounds) have been identified as key observation locations (as indicated in the map below). The northern-most houses of the Ridge Estate on the southern boundary of the site are also located higher than most of the site, and the presence of a palisade fence allows uninterrupted views of parts of the site and the surrounds. Most of the above-mentioned properties are north-facing, thus the site and surrounds forms part of the vista onto which they are oriented. The properties on the western and southern boundaries of the site are thus considered key observation locations, and have been assessed below using the visual contrast methodology.

The properties in the southern part of the Bankenveld Estate will have views of the site, as discussed above. However the housing units on the estate are likely to be mostly north-facing (away from the site), to take advantage of the views towards the Witbank Dam, and the golf course that is located closer to the shores of the dam. Views to the west and south-west across the development site present the site as a vacant area of natural vegetation, with the line of properties and associated vegetation (trees) on the western and southern boundary of the site forming the horizon. As certain properties on the southern edge of the Bankenveld Estate will have a view of the site, these are thus also considered as key observation locations.



FIGURE 6:19 – PROPERTIES ON THE EASTERN EDGE OF REYNO RIDGE WITH VIEWS OVER THE SITE AND SURROUNDS, CLASSIFIED AS KEY OBSERVATION LOCATIONS



Figure 6:20 – Properties on the southern boundary of the development site (northern edge of the Ridge Estate) which have been classified as key observation locations

The map below indicates the key observation locations in the study area in relation to the site of the proposed development.



FIGURE 6:21 – KEY OBSERVATION LOCATIONS SURROUNDING THE VALLEYVIEW DEVELOPMENT SITE

6.14.2 Recommended Mitigation Measures

The topographical nature of the development site entails that the terrain slopes away from both the western and southern boundaries of the development site. This means that structures placed at an increasing distance away from either the western or southern boundary would be located lower in relation to the boundary of the site. This has implications for the blocking of views from these areas by houses on the development site, as houses placed at increasing distances away from the site will be effectively appear lower and lower in the landscape, blocking a decreasing area of the surrounding landscape from view.

Analysis conducted in Google Earth indicates that at 50m from the south-western boundary of the development, a 3m-high structure at 50m from the site boundary will leave a relatively large part of the landscape around the horizon visible. At 100m, a much greater portion of the landscape will be visible. This effect of the terrain in reducing the effective height of structures from the southern boundary of the site (moving northwards) is much less pronounced, as the terrain slopes down more gently in a northward direction away from the boundary. From the southern boundary a 3m-high structure at 50m would block the view when viewed from ground level, while at 100m a structure would leave part of the wider landscape (around the horizon) visible. This is viewed from ground level – views from first storey structures will be exposed to wider views.

Should structures within 100m of the boundaries on the development site be limited to a single storey, this would assist in the maintenance of views from the existing properties on the boundaries of the site, and would thus ameliorate the potential visual intrusion factor associated with the structures of the proposed development, as part of the existing landscape to the north-east would still be visible. This mitigation measure from a visual perspective can be considered for the development, but needs to be weighed against other environmental priorities for the site. It is recognised that the applicant has committed to retaining a portion of the site as undeveloped in order to protect a wetland on the site and an associated buffer area. In this context the applicant has stated that the proposed development would not be economically viable if a restriction on the height of development within a buffer zone was imposed in addition to the restriction of development within the wetland area and associated buffer. The restriction of building heights within 100m of the southern and western boundaries of the site would be preferable from a visual perspective, but needs to be weighed up against the right of the developers to construct double-storied housing on the site (as permitted in terms of the zoning for the site), and the absence of the legal basis for protection of the views. The context of the wider area entails that it is not unreasonable that urban infill development in the areas to the east of the current periphery of the suburbs of Emalahleni will result in a changing landscape as viewed from these areas and alteration of the visual context. Although the restriction of building heights on the periphery on the development would be ideal from a purely visual perspective, this mitigation measure may need to be considered less of a priority than other environmental mitigation measures (especially retaining a wetland exclusion area) identified through the EIA process, in the context of sustainable development that allows development in line with the zoning of the site, and which protects environmentally sensitive features of the site.

6.14.3 Comparison of Alternative Layouts

Two layouts have been provided for comparative assessment by the proponent, and specialists are required to comparatively assess these.

The preferred and alternative layout differ in terms of the number of accesses, and the layout of the internal road pattern, rather than the coverage or spatial distribution of housing on the site, which is very similar for both layouts. Both layouts show a very high degree of coverage of the site, with the only vacant area being the wetland and its associated buffer area. Alternative 1 shows a vacant area in the south-western corner of the site, which at face value would be significant from a visual perspective if left open, as it would be a mitigating measure in assisting the retention or partial retention of views for certain properties on the boundary of the proposed development to the south of Saturnus Avenue, an area in which a number of key observation locations are located. However it is understood from the applicant that this area is earmarked for a future medical care facility, and would not be retained as a vacant area on the site.

Under both layouts, housing would be constructed up to the western and southern boundaries of the site, and thus neither layout is optimal in terms of mitigating visual intrusion for receptor locations on the southern and western boundaries. Due to the above reasons, there is no preference in terms of either of the alternatives from a visual perspective.

6.15 Wetland Assessment

The physical characteristics of the wetland, in terms of its, hydrology, vegetation and soil characteristics are discussed below.

6.15.1 Wetland Hydrogeomorphic Forms

Wetlands can be found all across a landscape. The landscape can be divided up into a number of units (refer to the figure below), each of which can contain wetlands. Wetlands occurring on these different terrain units typically differ in terms of their formative processes and hydrological inputs, and thus differ in terms of their functionality.

The wetland hydrogeomorphic (HGM) approach to wetland classification which uses hydrological and geomorphological characteristics to distinguish primary wetland units has been used to classify wetland types in South Africa (Kotze et al, 2005; SANBI, 2009). This approach has been used, and the classification system has been recently updated as part of the National Wetland Classification System for South Africa (SANBI, 2009).

Under this classification system the wetland type occurring on the site is the **valleyhead seep**. The valleyhead seep wetland typically occurs at the head of valley bottoms where the terrain typically becomes steeper, rising out of the valley bottom. There is thus an important seepage component to the hydrological input to this type of wetland, but hydrological inputs also originate from runoff generated from the surrounding local catchment during rainfall events.



FIGURE 6:22: VIEW OF THE VALLEYHEAD IN WHICH THE WETLAND OCCURS

6.15.1.1 Wetland Hydromorphology (Hydrology and Geomorphological Processes)

Wetlands are typically dynamic features of the natural environment, especially as they are associated with the movement of water which is a very important formative factor in a macro- or micro-landscape context. The geomorphology and more specifically, the hydromorphology (i.e. geomorphology as it relates to hydrological processes) of wetlands is thus a critical aspect of their physical characteristics. As described by the different hydrogeomorphic forms, different wetlands have different hydrological regimes.

The wetland on site is a seepage wetland at valley head. The presence of sloping terrain and groundwater seepage entails that colluvial processes (i.e. processes driven by gravitational forces), rather than fluvial deposition (which are dominant in valley bottom wetlands), are the main drivers of wetland formation on this site. The dynamics of groundwater seepage on the site are not properly known, but it is possible that groundwater discharge is related to the presence of the outcropping of bedrock in the western part of the site.

An area in which groundwater seepage is likely to be concentrated is found at the head of the wetland. This is evidenced by a slightly different vegetation composition to the downstream wetland and the presence of an old shallow well that was presumably dug by the previous farmers to abstract this shallow groundwater. Downstream of this flatter area at the very head of the valley, surface water drainage is concentrated in a poorly defined valley floor, which gradually becomes more defined at the northern end of the site where the wetland begins to change in form to a channelled valley bottom, as evidenced by the presence of a channel at the northern end of the site.

Most of the upper parts of the wetland upstream of this transition point are un-channelled. What appears to be a ditch or drain is located at the upper end of the wetland. Drains were historically dug in wetlands to lower the

water table in that part of the wetland and to drain the water away from that area, thus drying it up. The presence of the drain suggests that the water table was naturally close to, or at the surface of the wetland. As described below, a soft plinthic B horizon was found in a number of points sampled in the wetland. The presence of plinthic strata is usually an indication of rising and falling groundwater tables that result in seasonal saturation of the soils; a further indication of the presence of shallow groundwater being responsible for the development of hydromorphic soils.

6.15.2 Wetland Vegetative Characteristics¹¹

The Study Area lies in the western part of the Mpumalanga Highveld where the grassland biome is predominant. Grassveld vegetation thus characterises the entire Study Area. The development site and the Study area falls within the Rand Highveld Grassland vegetation type (Mucina & Rutherford, 2006), and as such naturally consists of undulating grasslands. No naturally-occurring trees occur in the Study Area, except along drainage lines (which offer a higher soil moisture content and some protection from fire) probably due to the presence of fire as a driver of vegetation, entailing that grassland is the climax vegetation,

The wetland on the Study Site shares these vegetation characteristics and is largely grass dominated. The hydrological transition from the wetland's catchment into the wetland itself (where seepage or a shallow water table occurs) appears to be indicated by a change in vegetative composition. Within the immediate catchment of the wetland, the sward is dominated by *Hyparrhenia hirta*, possibly an indication of previous agricultural disturbance. Areas of rocky outcropping display grass species such as *Perotis patens*, *Melinis repens* and *Monocymbium ceresiforme*.

A transition is visible at the boundary of the wetland, with the emergence of a much greater density of *Hyparrhenia filipendula* and *Sporobolus africanus*, both species being facultative wetland grasses in being able to tolerate wet soil conditions. A species of helichrysum (thought to be *Helichrysum splendidum*), typically occurring on the slightly drier margins of many Highveld wetlands, was noted to occur extensively on the margins of the wetland in this area of vegetative transition. In the wettest parts of the wetland - areas where seepage is thought to occur, the grass species *Setaria sphacelata* var. *torta*, a typical wetland grass tends to occur, along with sedges (*Schoenoplectus* sp.). True hydrophitic grass species such as *Imperata cylindrica* were not noted, but the time of year of the survey made it difficult to accurately identify all grass species within the wetland. At the bottom end of the wetland near the boundary of the site, the only shrubs on the site are located on the boundary of the wetland. These shrubs, *Diospyros lycoides* and *Rhus pyroides* are typical shrub species that naturally occur in riparian zones (river banks) in the study area.

11 - Note the field survey was undertaken at the end of April, outside of the growing season. This reduces the confidence factor in the assessment of wetland vegetative features as many grass species were no longer flowering, and other geophytes occurring on the site were no longer visible.

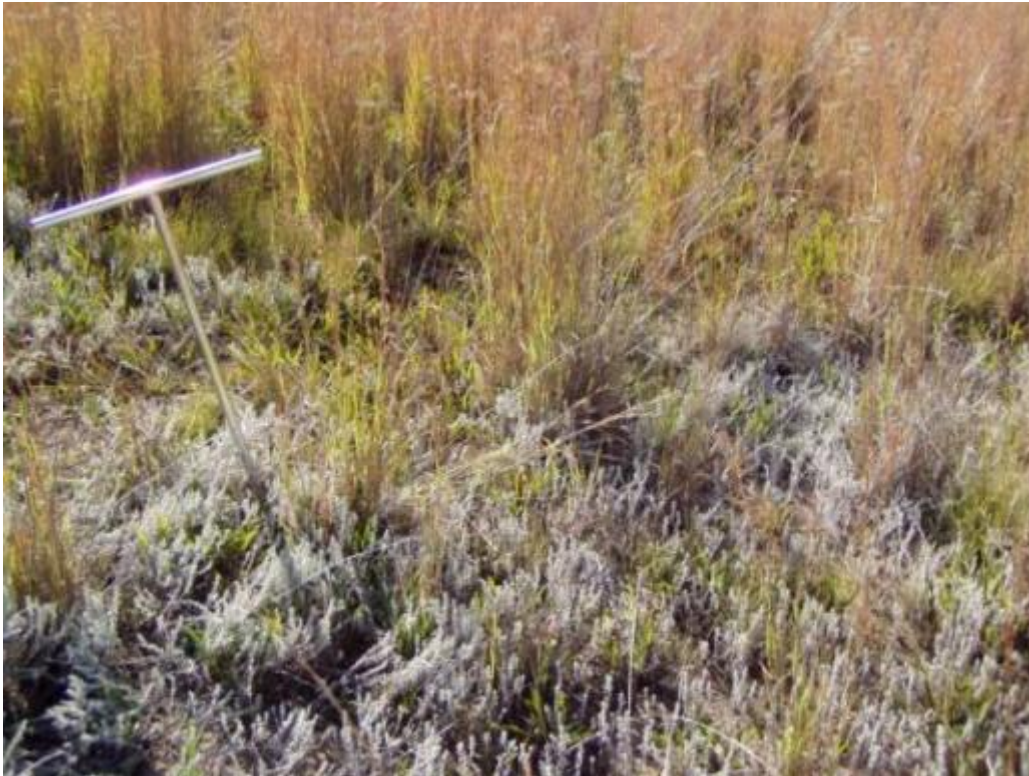


FIGURE 6:23 – TYPICAL WETLAND VEGETATION COMPOSITION AT ONE OF THE STUDY SITES

6.15.3 Wetland Soil Characteristics

When undertaking soil investigations for wetland delineation, diagnostic wetland horizons are sought, this confirms the presence of hydric soils. Wetland soils, as defined by the DWA wetland delineation guidelines typically contain one or more horizons that are distinctive in terms of indicating the presence of ‘hydromorphism’ in the soils.

In the context of the site, the primary distinctive soil horizon that was encountered at most sampling points was a soft plinthic B horizon. This horizon is a secondary or lower horizon underlying the topsoil, and is typified by an accumulation of iron and manganese oxides and hydroxides in the form of extensive mottling. The horizon is associated with long periods of saturation, typically associated with a rising and falling groundwater table. The soft plinthic horizon was either overlain by an Orthic A (topsoil) horizon, or by an E horizon, which itself was located below the A horizon.



FIGURE 6:24 – EXAMPLE OF SOILS FROM A SOFT PLINTHIC B HORIZON ENCOUNTERED WITHIN THE WETLAND

The presence of an E horizon in parts of the wetland, is in itself distinctive; and E horizon is typically paler or lighter in colour than the overlying horizon, or that horizon which is found below it. The process of reduction, along with the lateral movement of water through the horizon has resulting in the leaching of materials that would otherwise ‘colour’ the soil, as well as clay particles.

In the case where E horizons were found to overlie a soft plinthic B horizon, the lateral movement of water in the part of the profile immediately above the less permeable soft plinthic B is thought to have caused this leaching.

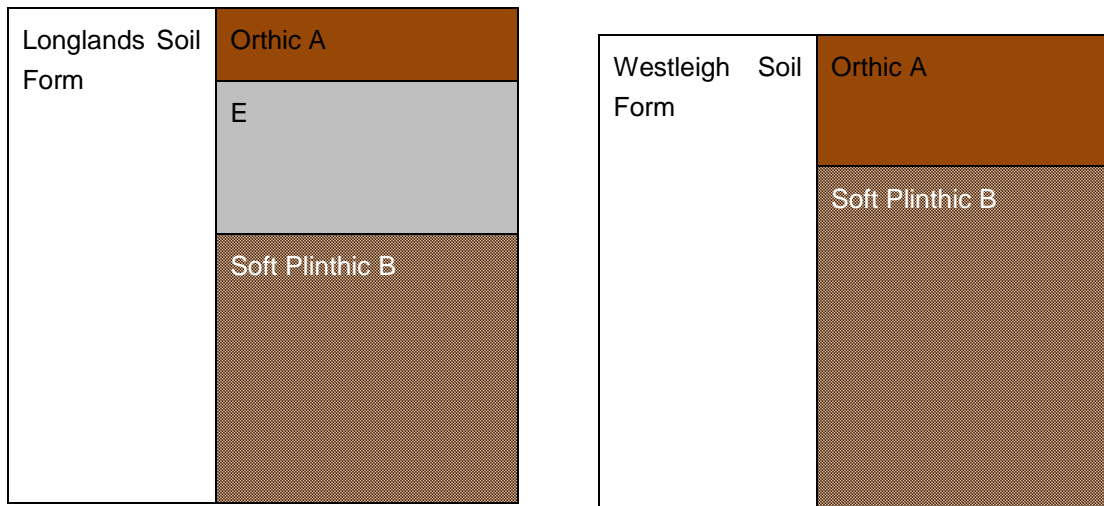


FIGURE 6:25 ORTHIC A HORIZON (LEFT) AS COMPARED TO AN UNDERLYING E HORIZON FROM THE SAME SAMPLE POINT (RIGHT)



FIGURE 6:26 – ‘RUSTY’ MARKINGS (IRON MOTTLES) WITHIN AN E HORIZON ON THE SITE

In terms of wetland soil forms the two primary soil forms encountered on the site were the following:



In some areas of the wetland a hard substrate was noted at shallow depth - ~ 30cm bgl. This could be indicative of the presence of a hard plinthic layer, or be associated with areas of shallow bedrock outcropping.

Soils were typically sandy in nature, with a relatively sandy topsoil and E horizon where it occurred. The presence of clay within the soil tended to increase with depth, with an accumulation of clay occurring in the lower soft plinthic B horizon. Redoximorphic features within these wetland horizons consisted mainly of iron and manganese mottles and concretions, that occurred throughout the soil profile, but in particular within the softy plinthic B horizon. Redox depletions, occurring within a reduced-oxidised matrix were also noted. In the E horizon, a lighter colour, typically indicative of gleying was the primary redoximorphic feature.

6.15.4 Results of In-field Wetland Delineation and implications for development

The map below indicates the location of the wetland as delineated in the context of the site, as well as an associated 50m buffer. The creation of buffers and their maintenance as development exclusion zones is a critical management tool in the context of a development as is proposed here.

The Department of Water Affairs recommends that an appropriate buffer zone to protect wetlands should be delineated (DWAf, 2005). Buffer zones outside the boundary of surface water features are typically required to ensure that the ecotones between aquatic and terrestrial environments are protected.

Ecotones are transitions in the landscape between two environments. Ecotones are ecologically significant especially for species that utilise contrasting habitats for different stages of their lifecycle. In this context, buffer zones are necessary where developments would transform elements of the landscape from the natural state.

The buffer as proposed would encompass parts of the rocky area of bedrock outcropping in the northern part of the site, and maintaining a linkage between the wetland and this rocky area is likely to be ecologically important.

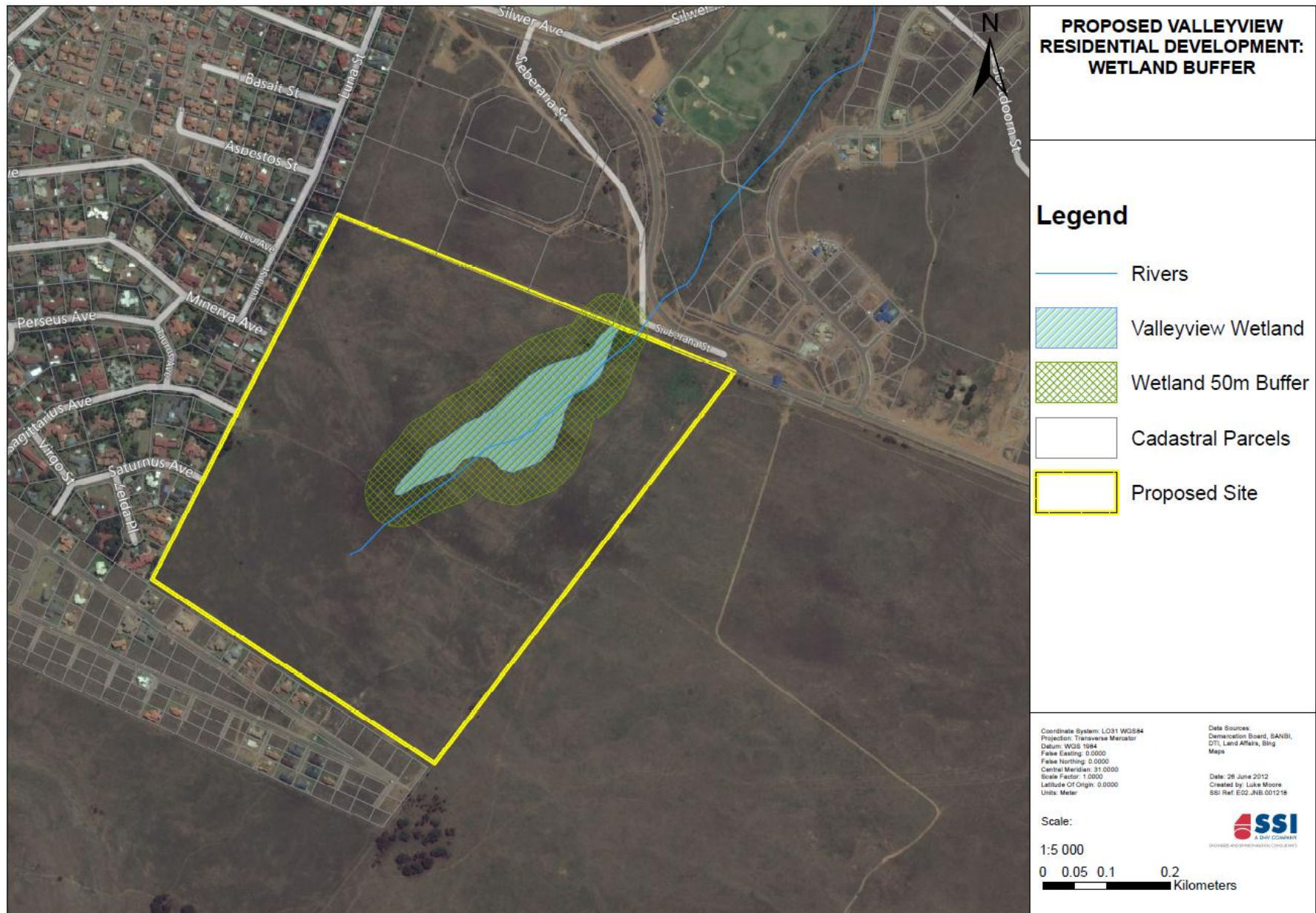


FIGURE 6:27 – MAP OF WETLAND AREA AND ASSOCIATED BUFFER

In the case of the proposed housing development, there would be a significant loss of natural grassland habitat in the developed areas, as it is likely that all available space for development would be fully utilised. This would create a physical continuous boundary between the non-developed parts of the site and the remaining open areas. In addition the permeability and associated runoff character of the wetland's immediate catchment would be drastically altered, with the creation of a much greater area of impermeable surface characteristic. The buffer area is necessary to mitigate the potential impact of this increased runoff from affecting the wetland, although as discussed below, a properly designed stormwater system is required.

At present there are no official requirements for buffer zones in the Mpumalanga Province. A buffer of 50m around all wetlands on the site has been recommended. Concerns have been raised by certain I&APs that this buffer is not sufficient to protect the wetland. Although the development is not located in Gauteng Province, Gauteng Provincial Guidelines stipulate the maintenance of a 32m buffer for wetlands within the urban edge, and a 50m buffer for wetlands located outside of wetland areas. The buffer stipulated for this urban wetland is wider than the accepted buffer width for urban wetlands in Gauteng. The 50m buffer has been stipulated in combination with the stipulation that stormwater attenuation measures be implemented based on the principles of 'soft engineering' (see below) to ensure that stormwater ingress into the wetland does not alter its hydrological characteristics or overall state.

In terms of the management of this buffer, no structures or other physical disturbances must be located within this buffer zone. This includes associated infrastructure, such as cable trenches, roads and power lines be kept out of these buffers.

6.15.5 Nature of the Potential Impacts on Wetlands Associated with the Proposed Development

The development as proposed is not planned to physically affect any wetland area on the site, thus no area of wetland will be physically disturbed. This exclusion must apply to all ancillary infrastructures such as roads, as well as all underground services. No direct loss of wetland habitat will thus result from the development.

The development is expected to be fully serviced with municipal bulk sewage system, so no soak-aways that could be a source of pollutants into the wetland are likely to be a factor.

The most significant potential impact associated with the proposed development is an indirect impact related to stormwater discharge into the wetland from the new development. As described above, most of the catchment of the wetland is currently in a largely natural state, comprising of grassland vegetation. This will change significantly if the proposed development is approved and developed, as most of the wetland's immediate catchment will be transformed to comprise of hard, impermeable surfaces that will generate much greater runoff than the natural grassland.

Depending on where this stormwater runoff is discharged, and how it is discharged into the wetland area is important in determining the potential impact on the wetland. Increased volumes of surface water discharge into the wetland could alter its hydrology. If the stormwater discharge is concentrated to one or a few point-specific discharges, this could result in channelisation of flow within the wetland and the development of gully erosion. This could in return result in loss of wetland habitat, as the current hydrological regime of primarily diffuse flow within the wetland would be altered to one of channelled flow. The result of channelisation is the lowering of the water table in the area adjacent to the channel that desiccates the wetland. This has spin-off effects in changing the vegetative composition of the wetland, with the replacement of hydrophytes with dry land pioneers, and the concomitant loss of resource quality.

Stormwater discharge could also carry potential pollutants into the wetland, such as hydrocarbons (e.g. oil from road surfaces), as well as silt. These pollutants could equally adversely affect the resource quality of the wetland.

The last indirect hydrological impact is more difficult to quantify; this relates to the potential alteration of sub-surface water inputs to the wetland. In Highveld landscape settings such as the one in which the development site occurs, much water input into wetlands is via shallow sub-surface flow that moves through the upper part of the soil profile. Runoff typically infiltrates the uppermost soil strata, and move within the soil in the direction of the topography – i.e. into valley bottoms or valley heads. With the development (transformation) of the wetland's catchment, much of this shallow sub-surface input is likely to be lost due to the increased impermeability of the catchment. The loss of this sub-surface flow may be replaced with stormwater inputs, but the way in which stormwater is discharged into the wetland will determine the degree and intensity of impact.

The potential loss of deeper groundwater inputs – i.e. those inputs into the area of groundwater discharge at the top of the wetland are more difficult to quantify, as the drivers of groundwater flow are not known. If the groundwater emanates from a slightly deeper aquifer, the proposed development is unlikely to affect these as the foundations of houses are unlikely to be very deep.

6.15.6 Associated Mitigation Measures

The primary mitigation measures, apart from the maintaining of the wetland and buffer zone as an exclusion area, relate to stormwater control. Stormwater measures need to be incorporated into the design of the development, and the manner in which stormwater is discharged will influence the degree of impact.

It is strongly recommended that 'soft engineering' measures be incorporated into stormwater design. Soft engineering can be defined as the incorporation of ecological principles into engineering design and the incorporation of natural features and not just the sole use of artificial materials that are typically used (e.g. concrete). In the context of stormwater control this would entail the use of grassy swales, or depressions filled with reeds or similar natural vegetation species into which stormwater could be discharged. These areas would act as temporary detention areas from which stormwater could gradually flow into the wetland. Where the substrate allows (in areas of rocky outcropping at the surface the use of swales and wetlands may not be possible), it is recommended that soft stormwater design features be established within the wetland buffer (as close as possible to the outer edge of the buffer), and that they be designed to discharge stormwater into the wetland buffer in a diffuse manner. These features could be incorporated as part of the landscaping of the proposed development.

The use of swales or reedbeds would serve a further purpose, by acting to remove potential pollutants such as suspended silts from the stormwater by deposition and by performing a certain filtering function. By encouraging the gradual infiltration of stormwater into the ground, this will mimic to some degree the natural shallow sub-surface hydrological input to the wetland and will be effective in mitigating against the hardening of surfaces in the wetland's catchment.

Under no circumstances should any stormwater be channelled directly into the wetland, and it is recommended that stormwater outlets and the above-mentioned 'soft' detention features be spread all around the edge of the wetland buffer.

6.15.7 Conclusions

A valley head seep has been identified on the site of the proposed Valleyview housing development. The wetland occupies a part of the northern area on the site. The presence of the wetland is important for the development, as

the wetland must not be affected in any way by the development. The wetland area and associated buffer must be kept free from all development, including linear developments (i.e. roads) and underground services.

The most important potential impacts that the proposed development could exert on the wetland relate to the (indirect) impact of stormwater discharge. It is important that stormwater from the surrounding development be discharged in such a way as to not affect the hydrological or morphological state of the wetland.

The undertaking of 'soft' engineering in the stormwater design is strongly recommended, as these will likely prevent most of the impacts associated with the stormwater discharge.

7 PUBLIC PARTICIPATION

Public participation is a process that is designed to enable all I&APs to voice their opinion and/ or concerns which enables the practitioner to evaluate all aspects of the proposed development, with the objective of improving the project by maximising its benefits while minimising its adverse effects. I&APs include all interested stakeholders, technical specialists, and the various relevant organs of state who work together to produce better decisions.

The primary aims of the public participation process are:

- To inform I&APs and key stakeholders of the proposed application and environmental studies;
- To initiate meaningful and timeous participation of I&APs;
- To identify issues and concerns of key stakeholders and I&APs with regards to the application for the development (i.e. focus on important issues);
- To promote transparency and an understanding of the project and its potential environmental (social and biophysical) impacts (both positive and negative);
- To provide information used for decision-making;
- To provide a structure for liaison and communication with I&APs and key stakeholders;
- To ensure inclusivity (the needs, interests and values of I&APs must be considered in the decision-making process);
- To focus on issues relevant to the project, and issues considered important by I&APs and key stakeholders; and
- To provide responses to I&AP queries.

The public participation process must adhere to the requirements of Regulations (GNR 543) under the NEMA. The public participation process for the Valleyview Development EIA process was undertaken according to the stages outlined below.



FIGURE 7:1: RESPONSIBILITIES OF I&APs IN THE DIFFERENT STAGES OF THE PROJECT

During the EIA Phase there has been a participatory approach to this development and the availability of services. It is also noted that engaging stakeholders even before developments are built can achieve the positive impacts. It is for this reason that the PPP, which forms part of the EIA becomes the basis for stakeholder engagement process.

For the purposes of the EIA phase, the PPP aimed to ensure that the full range of stakeholders is informed about the Valleyview development throughout the period in question. In order to achieve this, a number of key activities have taken place and will continue to take place. These included the following:

- The identification of stakeholders is a key deliverable at the outset, and it is noted that there are different categories of stakeholders that must be engaged, from the different levels and categories of government, to relevant structures in the NGO sector, to the communities adjacent to the Valleyview development;
- The development of a living and dynamic database that captures details of stakeholders from all sectors;
- The convening of focussed and general meetings with stakeholders at different times throughout the EIA process (and beyond);
- The engagement of public leaders to whom the public generally turn for information, keeping such individuals well informed about process and progress;
- The fielding of queries from I&APs and others, and providing appropriate information;
- The convening of specific stakeholder groupings/for or as the need arises;
- The preparation of reports (both baseline and impact assessment) based on information gathered throughout the EIA via the PPP and feeding that into the relevant decision-makers;
- The PPP could include distribution of various types of pamphlets and other information packs; and
- Where appropriate site visits may be organised, as well as targeted coverage by the media.

The PPP specifically undertaken for the valleyview development has entailed the following activities.

7.1 Authority Consultation

The competent authority which is the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) is required to provide an environmental authorisation (whether positive or negative) for the project. MDEDET was consulted from the outset of this study, and has been engaged throughout the project process.

Authority consultation included the following activities:

- Submission of an application for environmental authorisation in terms of Section 26 of the EIA Regulations **(2010) on 30 May 2012;**
- Approval of the application documentation by MDEDET was received on **11 June 2012** with the following reference number **17/2/3N-170** and Martha Seshweni being the assigned Case Officer.
- Submission of a final ESR to MDEDET on **26 May 2013**.
- Acceptance of the final ESR by the MDEDET was received on **17 September 2013**.

7.2 Consultation with Other Relevant Stakeholders

Consultation with other relevant key stakeholders were and will continue to be undertaken through telephone calls and written correspondence in order to actively engage these stakeholders and to provide background information about the project.

TABLE 7:1: KEY STAKEHOLDERS CONTACTED AS PART OF THE PUBLIC PARTICIPATION PROCESS

CONTACT PERSON	ORGANISATION
No-Governmental Organisations (NGO's)	
Andrew Roszaak	WESSA: Regional Chairperson
Eben van Wyk	Landowners Association- Witbank
PROVINCIAL GOVERNMENT Provincial Government	
Mr Norman Mokoena	Department of Public Works, Roads and Transport
Ms B M Mojapelo (Chief Director: Housing and Technical)	Department of Human Settlements
Dr Garth Batchelor	MDEDET: Mpumalanga Department of Economic Development Environment and Tourism
Mr Frans Krige	Mpumalanga Tourism and Parks Agency (MTPA)
Ningi Mlangeni	Department of Social Development
Wilson Makaringa	Mpumalanga Parks and Tourism Agency
Elliot Matsebula	Mpumalanga Provincial Heritage Resource agency
N.T.P. Nhleko	Department of Labour
Dr. L. Cele	Department of Agriculture, Rural Development and Land Administration
Mish Khoza	Department of Agriculture, Rural Development and Land Administration
N. Machete	SAHRA
Allan Zimbwa	Nkangala District Municipality
Mr F Guma	Department of Water Affairs
District and Local Government (EMalahleni Local Municipality)	
Tebogo Matoane	Municipal Manager
Cllr. L. Malatjie	Mayor
Chris Voigt	Environment Department
Botha Kleynhans	Environment Department
S.S.Leffi	Community Safety, Security & Liaison
Ward Councilors	
Henro Kruger	Ward 18 (surrounding)
Bongane Nkosi	Ward 19 (Surrounding)
Beauty Shabangu	Ward 21(Surrounding)
Anita Botes	Ward 34
Lizelle Styne	
Adjacent Land Owners	
All adjacent landowners were provided a hand delivered Background information document. Notices were left with the security guard at the Bankenveld Estate.	
Other Stakeholders	
Des Farley	Eskom Holdings

7.3 Overview of the Scoping Phase PPP

The PPP undertaken during the Scoping Phase is presented in Figure 7.2.

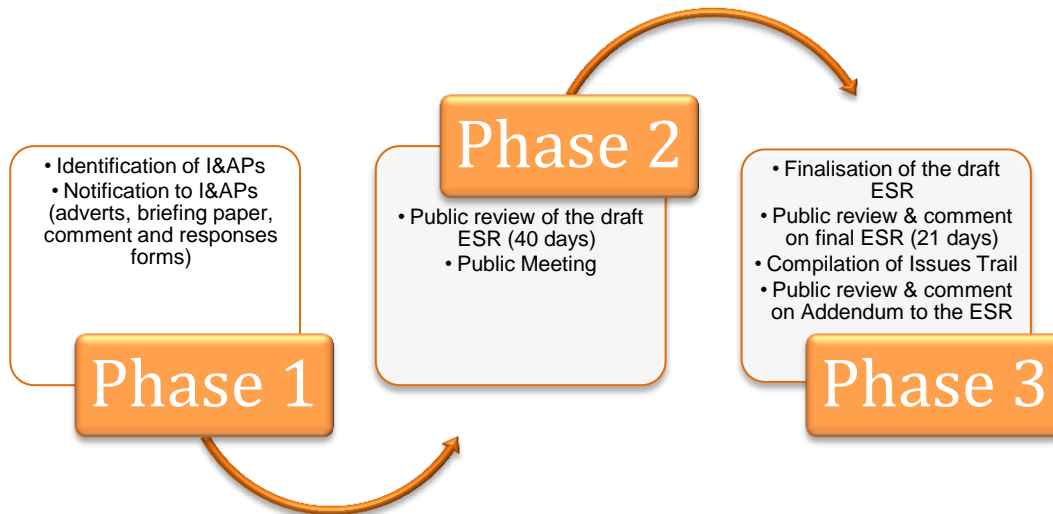


FIGURE 7.2: KEY PHASES IN THE PPP UNDERTAKEN DURING THE SCOPING PHASE

7.3.1 Site Notification

The NEMA EIA Regulations require that a site notice be fixed at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is to be undertaken and on any alternative sites. The purpose of this is to notify the public of the project and to invite the public to register as stakeholders and inform them of the PP Process.

RHDHV erected site notices at various noticeable locations around the perimeter of the site. A2 size site notices in English were placed at the boundaries of the site, surroundings streets and areas, advertising the EIA process for the project (See Figure 7.3 and 7.5 below).



FIGURE 7:3: SITE NOTICES PLACED AT THE PROPOSED SITE



FIGURE 7:4: SITE NOTICES AT BANKENVELD (2 ENTRANCES)

7.3.2 Advertising

In compliance with the EIA Regulations (2010), notification of the commencement of the EIA process for the project was advertised in a local newspaper, namely the **Witbank News** newspaper on **23 August 2012** (refer to **Appendix C1**). I&APs were requested to register their interest in the project and become involved in the EIA process. The primary aim of these advertisements was to ensure that the widest group of I&APs possible was informed and invited to provide input and questions and comments on the project.

7.3.3 Identification of Interested and Affected Parties

I&APs were identified primarily through a knock and drop process and through liaising with the Landowners association. Background Information Documents (BIDs) were hand delivered to all I&APs at all homes adjacent to the proposed site. All registered I&APs were thereafter sent a letter informing them of the availability of the draft Environmental Scoping Report (ESR) for review and indicating how they could become involved in the project. The contact details of all identified I&APs are updated on the project database. This database was updated on an on-going basis throughout the EIA process (refer to **Appendices C2 and C9**).

7.3.4 Briefing Paper

A Background Information Documents (BID) for the project was compiled in English. The aim of this document is to provide a brief outline of the application and the nature of the development. It is also aimed at providing preliminary details regarding the EIA process, and explains how I&APs could become involved in the project. The briefing paper was distributed to all identified I&APs and stakeholders, together with a registration/comment sheet inviting I&APs to submit details of any issues, concerns or inputs they might have with regards to the project.

7.3.5 Issues and Response Report

Issues and concerns raised in the public participation process during the EIA process will be compiled into an issues and response report. This issues and response report reflects the issues raised by I&APs and stakeholders during consultation process and provides an indication of particular areas within which concerns were underscored refer to (**Appendix C6**).

7.3.6 Public Meeting

The primary aim of the public meeting was to:

- provide I&APs and stakeholders with information regarding the proposed project and associated infrastructure;
- provide I&APs and stakeholders with information regarding the EIA process;
- provide an opportunity for I&APs and stakeholders to seek clarity on the project;
- record issues and concerns raised; and
- provide a forum for interaction with the project team.

A public meeting was held on the **06 September 2012 at 18h00** at the Emalahleni Civic Centre (refer to **Appendix C5**).

7.3.7 Public Review of the Draft Scoping Report

An advert was placed in the **Witbank News** newspaper informing I&APs of the application and the availability of the draft ESR and Plan of Study for EIA for review and comment. The advert appeared on **03 August 2012**. Additionally, all registered I&APs were notified of the availability of the report in writing (refer to **Appendix C1**).

The draft ESR, together with the Plan of Study for EIA was made available for authority and public review for a period of **40 days** from **23 August 2012** to **02 October 2012**. In addition, the report was made available at the following public locations within the study area, which are all readily accessible to I&APs:

- Emalahleni Municipal Library;
- Offices of Emalahleni Local Municipality;
- Offices of Royal HaskoningDHV (Building 5, Country Club Estate, Woodlands Drive); and
- RHDHV website (www.rhdhv.co.za).

7.3.8 Final Environmental Scoping Report

The final stage in the Environmental Scoping Study entailed the capturing of responses and comments from I&APs on the draft ESR in order to refine the ESR, and ensure that all issues of significance are addressed. The final ESR was then submitted to MDEDET for review and decision-making.

7.4 Overview of the EIA Phase PPP

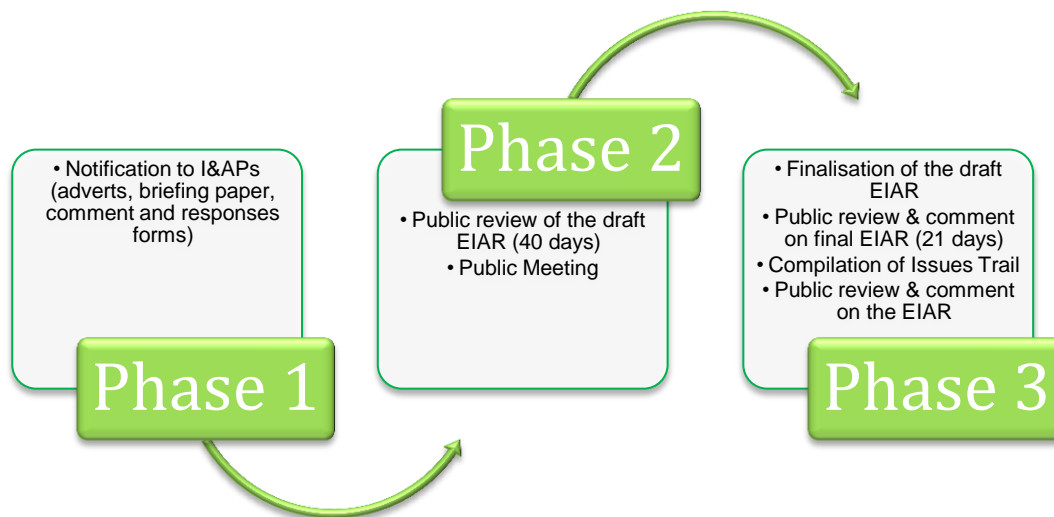


FIGURE 7.5: PPP PROCESS IN EIA PHASE

7.4.1 Site Notice

RHDHV erected site notices at various noticeable locations around the perimeter of the site. A2 size site notices in English were placed at the boundaries of the site, surroundings streets and areas, advertising the EIA process for the project (See Figure 7.6 and 7.8 below).



FIGURE 7:6: BANKENVELD ENTRANCE



FIGURE 7:7: SAGITTARIUS AVENUE



FIGURE 7:8: LEO AVENUE



FIGURE 7:9: MINERVA AVENUE

7.4.2 Advertising

In compliance with the EIA Regulations (2010), notification of the EIA Phase public meeting and availability of the draft EIAR was advertised in a local newspaper, namely the **Witbank News** newspaper on **07 March 2014** (refer to **Appendix C1**).

7.4.3 Public Review of the Draft Environmental Impact Assessment Report

The draft EIAR was made available for authority and public review for a period of **40 days** from **07 March 2014** to **15 April 2014**. In addition, the report was made available at the following public locations within the study area, which are all readily accessible to I&APs:

- Emalahleni Municipal Library;
- Offices of Royal HaskoningDHV (Building 5, Country Club Estate, Woodlands Drive); and
- RHDHV website (www.rhdhv.co.za).

7.4.4 Public Meeting

The primary aim of the public meeting was to:

- Provide I&APs and stakeholders with information regarding the proposed project and associated infrastructure;
- Provide I&APs and stakeholders with information regarding the EIA process;
- Provide an opportunity for I&APs and stakeholders to seek clarity on the project;
- Record issues and concerns raised; and
- Provide a forum for interaction with the project team.

A public meeting was held on the **18 March 2014** at **17h00** at the Emalahleni Civic Centre

7.4.5 Public Review of the Final Draft Environmental Impact Assessment Report

The final draft EIAR was made available for an additional public review for a period of 21 days from **26 May 2014** until **17 June 2014**. This was done to allow the public to provide additional comments as well as to view whether the comments provided in the initial 40 day review period have been addressed accordingly. The report was placed at the same venues throughout the project.

7.4.6 Issues and Response Report

Issues and concerns raised by I&APs during the EIA phase were incorporated into an issues and response report that is attached in this report (refer to **Appendix C6**).

7.5 Environmental Authorisation

On receipt of environmental authorisation (positive or negative) for the project, stakeholders and I&APs registered on the project database will be informed of this authorisation and its associated terms and conditions by letters, emails and advertisement.

8 ENVIRONMENTAL IMPACT ASSESSMENT

8.1 Introduction

The EIA of the project activities is determined by identifying the environmental aspects and then undertaking an environmental risk assessment to determine the significant environmental aspects. The environmental impact assessment has included all phases of the project namely:

- Construction Phase; and
- Operational Phase.

NB: due to the nature of the development it is anticipated that the infrastructure would be permanent, thus not requiring decommissioning or rehabilitation. Maintenance of infrastructure will be addressed under the operational phase. Furthermore, design has not been finalised as this has been intensively workshopped by the project team and stakeholders during the development of the Valleyview Framework and Phase 1 planning.

8.2 Methodology

The potential environmental impacts associated with the project will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts, whereby:

- **Nature:** A brief written statement of the environmental aspect being impacted upon by a particular action or activity.
- **Extent:** The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a local scale, but low at a regional scale;
- **Duration:** Indicates what the lifetime of the impact will be;
- **Intensity:** Describes whether an impact is destructive or benign;
- **Probability:** Describes the likelihood of an impact actually occurring; and
- **Cumulative:** In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

TABLE 8:1: CRITERIA USED FOR THE RATING OF IMPACTS

CRITERIA	DESCRIPTION			
	National (4)	Regional (3)	Local (2)	Site (1)
EXTENT	The whole of South Africa	Provincial and parts of neighbouring provinces	Within a radius of 2 km of the construction site	Within the construction site
DURATION	Permanent (4) Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient	Long-term (3) The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter. The only class of impact which will be non-transitory	Medium-term (2) The impact will last for the period of the construction phase, where after it will be entirely negated	Short-term (1) The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase
INTENSITY	Very High (4) Natural, cultural and social functions and processes are altered to extent that they permanently cease	High (3) Natural, cultural and social functions and processes are altered to extent that they temporarily cease	Moderate (2) Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way	Low (1) Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected
PROBABILTY OF OCCURANCE	Definite (4) Impact will certainly occur	Highly Probable (3) Most likely that the impact will occur	Possible (2) The impact may occur	Improbable (1) Likelihood of the impact materialising is very low

Significance is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

TABLE 8:2: CRITERIA FOR THE RATING OF CLASSIFIED IMPACTS

Low impact (4 -6 points)	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.
Medium impact (7 -9 points)	Mitigation is possible with additional design and construction inputs.
High impact (10 -12 points)	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
Very high impact (13 - 20 points)	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw.
Status	Denotes the perceived effect of the impact on the affected area.
Positive (+)	Beneficial impact.
Negative (-)	Deleterious or adverse impact.
Neutral (/)	Impact is neither beneficial nor adverse.
It is important to note that the status of an impact is assigned based on the status quo – i.e. should the project not proceed. Therefore not all negative impacts are equally significant.	

The suitability and feasibility of all proposed mitigation measures is included in the assessment of significant impacts. This was achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented. Mitigation measures identified as necessary have been included in an EMPr.

8.3 Geology Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Disturbance of surface geology for development foundations.	1	2	1	2	Negative Low (-6)	<ul style="list-style-type: none"> Significant bearing capacity and heave problems are not anticipated on this site. In Zone 2A-Collapsible and compressible soils, foundations need to be founded at approximately 0.4 m below surface on compacted fill and lightly reinforced to minimize settlement. Foundation excavations should be checked by an engineer or engineering geologist before casting to ensure that they are founded according to the recommendations of the geology report. Excavations deeper than 1.5 m be cut back to not more than 75° of horizontal and that the ingress of water in and around any excavations be prevented. Good quality general fill is available on site and care should be taken when specifying engineered fills, that the required strengths are attainable without recourse to imported fills, or addition of lime or cement. 	1	2	1	2	Negative Low (-6)
Gully or donga erosion by concentrated, uncontrolled water-flow.	1	2	2	2	Negative Medium (-7)	<ul style="list-style-type: none"> Provide adequate storm water surface drainage as per the storm water management plan as part of the infra structural development of the area. 	1	1	1	1	Negative Low (-4)

8.4 Topographical Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Alteration of topography due to stockpiling of soil, building material and debris and waste material on site.	1	3	2	3	Negative Medium (-9)	<ul style="list-style-type: none"> All stockpiles must be restricted to designated areas and are not to exceed a height of 2 metres. Stockpiles created during the construction phase are not to remain during the operational phase. The contractor must be limited to clearly defined access routes to ensure that sensitive and undisturbed areas are not disturbed. 	1	2	1	3	Negative Medium (-7)

8.5 Hydrogeology Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Shallow groundwater contamination: <ul style="list-style-type: none"> Spillage of fuels, lubricants and other chemicals. Construction equipment, vehicles, workshop and wash bay areas will be a likely source of pollution as a non-point source. Lack of provision of ablutions that may lead to the creation of informal ablutions. 	1	2	2	2	Negative Medium (-7)	<ul style="list-style-type: none"> All hazardous substances must be stored on an impervious surface in a designated bunded area, able to contain 110% of the total volume of materials stored at any given time. Material safety data sheets (MSDSs) are to be clearly displayed for all hazardous materials. The integrity of the impervious surface and bunded area must be inspected regularly and any maintenance work conducted must be recorded in a maintenance report. Employees should be provided with absorbent spill kits and disposal containers to handle spillages. Train employees and contractors on the correct handling of spillages and precautionary measures that need to be implemented to minimise potential spillages. All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. No repairs may be undertaken beyond the contractor laydown area. Employees should record and report any spillages to the responsible person. An Emergency Preparedness and Response Plan will 	1	2	1	2	Negative Low (-6)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
						be developed and implemented should and incident occur. <ul style="list-style-type: none"> • Access to storage areas on site must be restricted to authorised employees only. • Contractors will be held liable for any environmental damages caused by spillages. • Adequate provision of ablutions for construction employees. 					
The consumption of groundwater can lead to the depletion of a natural resource.	1	3	3	2	Negative Medium (-9)	<ul style="list-style-type: none"> • No unauthorised extraction from boreholes (if any) for the proposed development will be permitted. • No new boreholes may be installed for extraction and consumption purposes without an appropriate water use licence. 	1	2	1	1	Negative Low (-5)
OPERATIONAL											
Leaks of untreated water from pipelines may occur and impact on the shallow groundwater quality.	2	1	1	2	Negative Low (-6)	<ul style="list-style-type: none"> • Any leaks should be fixed immediately and areas rehabilitated as needed. 	2	1	1	1	Negative Low (-5)

8.6 Hydrology Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Consumption and use of surface water for construction purposes (i.e. water tankers for dust suppression).	2	2	3	3	Negative High (-10)	<ul style="list-style-type: none"> DWA to comment and advice on surface water availability and integrity. If they propose to use surface water for construction, a separate Section 21(a) WULA needs to be done. 	2	2	3	3	Negative High (-10)
Contaminated run-off: <ul style="list-style-type: none"> Spillage of fuels, lubricants and other chemicals; Inadequate stormwater management around the site; the dumping of construction material, including fill or excavated material into, or close to surface water features that may then be washed into these features; Construction-related activities such as cement batching; Construction equipment, vehicles and workshop areas will be a likely source of pollution as a non-point source; and Lack of provision of ablutions that may lead to the creation of 'informal ablutions' within or close to a surface water resource. 	2	2	2	1	Negative Medium (-7)	<ul style="list-style-type: none"> Bunded areas should be used to store chemicals. Clean-up of spills as soon as they occur. Keep construction activities away from the surface water resources. Adequate provision of ablutions for construction employees. Wastewater must not be allowed to come into direct contact with exposed soils or run across the site. Vehicles and machinery may not be washed on site. All wastewater must be collected in a sealed container and disposed of by an approved waste contractor. Waybills must be retained for inspection. 	2	1	1	1	Negative Low (-5)
Increased urban run-off.	2	2	2	1	Negative	<ul style="list-style-type: none"> Land disturbance must be minimized in order to 	2	1	1	1	Negative Low

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
					Medium (-7)	prevent erosion and run-off - this includes leaving exposed soils open for a prolonged period of time. As soon as vegetation is cleared (including alien) the area must be re-vegetated if it is not to be developed on in future.					(-5)
OPERATIONAL											
Increased urban run-off from urban infrastructure and roads.	2	2	2	3	Negative Medium (-9)	• The stormwater management plan must be implemented.	2	1	1	2	Negative Low (-6)
Leaks from pipelines – leaks of untreated water from pipelines may occur.	2	1	1	2	Negative Low (-6)	• Any leaks should be fixed immediately and areas rehabilitated as needed.	1	1	1	2	Negative Low (-5)

8.7 Soils and Agricultural Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Removal and compaction of soil during construction activities.	1	2	2	4	Negative Medium (-9)	<ul style="list-style-type: none"> Strip topsoil prior to any construction activities. Reuse topsoil to rehabilitate disturbed areas. Topsoil must be kept separate from overburden and must not be used for building purposes or maintenance or access roads. 	1	1	2	3	Negative Medium (-7)
Disturbance of soils and/or land use potential due to location of construction camp and associated infrastructure.	1	2	2	3	Negative Medium (-8)	<ul style="list-style-type: none"> The contractor laydown area must be placed in an area where erven will be developed and not in an area that will be utilised in future as an open space or commercial. The contractor laydown area may not be placed in or in close proximity to the wetland habitat on site. No material may be stored or equipment repaired beyond the boundaries of the contractor laydown area. 	1	1	1	2	Negative Low (-5)
Erosion, degradation and loss of topsoil due to construction activities as well surface and stormwater run-off.	1	3	2	3	Negative Medium (-9)	<ul style="list-style-type: none"> Minimise the clearance of vegetation to avoid exposure of soil. Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater run-off control management measures as per the EMPr to prevent the loss of topsoil. Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and run-off. 	1	2	2	2	Negative Medium (-7)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
Degradation of soil due to exposed areas and roads.	2	3	2	3	Negative High (-10)	<ul style="list-style-type: none"> The temporary access roads that will no longer be used must be ripped or ploughed and if necessary, appropriately prepared to ensure the re-growth of vegetation. Any materials that may hamper regrowth of vegetation must be removed prior to rehabilitation and disposed of at and appropriate site. 	2	2	2	2	Negative Medium (-8)

8.8 Biodiversity Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Impacts on flora species of conservation importance (including suitable habitat)	3	4	4	4	Negative Very High (-15)	<ul style="list-style-type: none"> Conduct a search and rescue operation for all conservation important plants on the site. This operation should be conducted during the austral summer period when vegetative and reproductive growth is evident; Appoint an Environmental Control Officer (ECO) prior to commencement of construction phase. Responsibilities should include, but not necessarily be limited to, ensuring adherence to EMP guidelines, guidance of activities, planning, reporting to authorities, etc.; Compile and implement environmental monitoring programme, the aim of which should be ensuring long-term success of rehabilitation and prevention of environmental degradation. Biodiversity monitoring should be conducted at least twice per year (Summer, Winter) in order to assess the status of natural habitat and effects of the development on the natural environment; 	1	4	3	4	Negative Very High (-12)
Impacts on fauna species of conservation importance (including suitable habitat)	3	4	4	4	Negative Very High (-15)	<ul style="list-style-type: none"> Conduct a search and rescue operation for all conservation important plants on the site. This operation should be conducted during the austral summer period when vegetative and reproductive growth is evident; Appoint an Environmental Control Officer (ECO) prior to commencement of construction phase. Responsibilities should include, but not necessarily be limited to, ensuring adherence to EMP guidelines, guidance of activities, planning, reporting to authorities, etc.; Compile and implement environmental monitoring programme, the aim of which should be ensuring 	1	1	1	2	Negative Low (-5)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
						long-term success of rehabilitation and prevention of environmental degradation. <ul style="list-style-type: none"> Biodiversity monitoring should be conducted at least twice per year (Summer, Winter) in order to assess the status of natural habitat and effects of the development on the natural environment; 					
Impacts on/ loss/ degradation of natural/ sensitive/ protected habitat types <ul style="list-style-type: none"> Disruption of nutrient-flow dynamics; Introduction of chemicals into the ground- and surface water through leaching; Impedance of movement of material or water; Habitat fragmentation; Changes to abiotic environmental conditions; Changes to disturbance regimes, e.g. increased or decreased incidence of fire; Changes to successional processes; Effects on pollinators; and Increased invasion by plants and animals not endemic to the area. 	3	4	3	4	Negative Very High (-14)	<ul style="list-style-type: none"> Conduct a search and rescue operation for all conservation important plants on the site. This operation should be conducted during the austral summer period when vegetative and reproductive growth is evident; Appoint an Environmental Control Officer (ECO) prior to commencement of construction phase. Responsibilities should include, but not necessarily be limited to, ensuring adherence to EMP guidelines, guidance of activities, planning, reporting to authorities, etc.; Compile and implement environmental monitoring programme, the aim of which should be ensuring long-term success of rehabilitation and prevention of environmental degradation. Biodiversity monitoring should be conducted at least twice per year (Summer, Winter) in order to assess the status of natural habitat and effects of the development on the natural environment; The landowner must immediately take steps to remove alien vegetation as per Conservation of Agricultural Resource Act. This should be done based on an alien invasive management strategy that should be compiled by a suitable ecologist. The plan must make reference to:prooting, felling or cutting; 	1	1	2	2	Negative Low (-6)
Displacement of fauna species, human-animal conflicts & interactions	3	4	3	4	Negative Very High (-14)	<ul style="list-style-type: none"> Conduct a search and rescue operation for all conservation important plants on the site. This operation should be conducted during the austral summer period when vegetative and reproductive growth is evident; Provide an opportunity for local 'muthi' collectors to remove plants of medicinal value 	2	2	1	1	Negative Low (-6)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
						<ul style="list-style-type: none"> from the site prior to vegetation clearance; 					
Impacts on ecological connectivity & ecosystem functioning	3	4	2	4	Negative Very High (-14)	<ul style="list-style-type: none"> Conduct a search and rescue operation for all conservation important plants on the site. This operation should be conducted during the austral summer period when vegetative and reproductive growth is evident; Provide an opportunity for local 'muthi' collectors to remove plants of medicinal value from the site prior to vegetation clearance; 	3	2	1	1	Negative Low (-7)
Impact on riparian zones.	1	2	4	4	Negative High (-11)	<ul style="list-style-type: none"> Exclude all wetland related habitat and required buffer zones from the proposed development (as per guidelines and recommendations included in the wetland ecological report); 	1	2	4	4	Negative High (-11)
Removal and use of local flora for firewood.	1	2	2	1	Negative Low (-6)	<ul style="list-style-type: none"> No cutting down of trees for firewood. Utilise commercially sold wood or other sources of energy. Training of contractors on environmental awareness and the importance of flora. 	1	1	1	1	Negative Low (-4)
OPERATIONAL/ CUMULATIVE											
Conservation obligations & targets (including national & regional)	3	4	3	4	Negative Very High (-14)	<ul style="list-style-type: none"> Prevent contamination of natural wetland habitat as well as adjacent terrestrial grassland habitat from any source of pollution, effluent, etc. 	2	4	3	4	Negative Very High (-13)
Increase in Environmental Degradation & Pollution	3	4	3	4	Negative Very High (-14)	<ul style="list-style-type: none"> Prevent any influx of run-off water (from residences) or effluent into wetland habitat. Run-off water from gardens typically contains seeds of exotic and garden-variety plants that pose a threat to wetland vegetation and ecology. Run-off water should be diverted to storm water management services and infrastructures; 	2	4	3	4	Negative Very High (-13)

8.9 Wetlands Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Destruction of wetland during construction	2	4	2	4	Negative Very High (-12)	<ul style="list-style-type: none"> The development as proposed is not planned to physically affect any wetland area on the site, thus no area of wetland will be physically disturbed. This exclusion must apply to all ancillary infrastructure such as roads, as well as all underground services. No direct loss of wetland habitat will thus result from the development. The development is expected to be fully serviced with municipal bulk sewage system, so no soak-aways that could be a source of pollutants into the wetland are likely to be a factor. 	2	2	2	2	Negative Medium (-8)
Erosion of wetland soils as a result of uncontrolled stormwater run-off generated from the construction sites	2	4	2	2	Negative High (-10)	<ul style="list-style-type: none"> Stormwater run-off should be appropriately managed so as not to alter the timing and intensity of flows entering the wetland under the natural condition. This will include the use of temporary attenuation ponds and temporary berms or furrows to direct flows to less sensitive areas. A natural vegetation buffer of 50 m wide should be maintained around the site. 	2	2	1	2	Negative Medium (-7)
Deposition of excess sediment in wetland system as a result of erosion in the catchment caused by improper stormwater management during	2	4	2	3	Negative High (-11)	<ul style="list-style-type: none"> Stormwater run-off should be appropriately managed so as not to alter the timing and intensity of flows entering the wetland under the natural condition. This will include the use of temporary attenuation ponds 	2	2	1	2	Negative Medium (-7)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
earthworks						and temporary berms or furrows to direct flows to less sensitive areas. <ul style="list-style-type: none"> It is assumed that if stormwater is properly managed in the catchment during construction, erosion will not become a major problem. In addition to properly managing stormwater, methods to prevent and contain erosion such as geo-textiles and silt fences should be used on exposed slopes. 					
Decrease in water quality as a result of contamination of run-off from construction site	2	4	2	3	Negative High (-11)	<ul style="list-style-type: none"> Care should be taken at construction sites to store hazardous substances, such as fuel, and oil appropriately, not allowing these substances to enter watercourses. Stormwater run-off should be appropriately managed so as not to alter the timing and intensity of flows entering the wetland under the natural condition. This will include the use of temporary attenuation ponds and temporary berms or furrows to direct flows to less sensitive areas. It is assumed that if stormwater is properly managed in the catchment during construction, erosion will not become a major problem. In addition to properly managing stormwater, methods to prevent and contain erosion such as geo-textiles and silt fences should be used on exposed slopes. 	2	2	1	2	Negative Medium (-7)
Direct disturbances to the wetland as a result of the establishment of the sewer pipe crossing	2	4	2	4	Negative Very High (-12)	<ul style="list-style-type: none"> No pipeline must be construction in or within 50 meters of the wetland. The wetland area must be demarcated and must be considered no-go areas. 	2	2	2	2	Negative Medium (-8)

8.10 Waste Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Contamination of the surface and site with general waste. General waste produced on site includes: <ul style="list-style-type: none"> • Office waste (e.g. food waste, paper, plastic); • Operational waste (clean steel, wood, glass); and • General domestic waste (food, cardboards, paper, bottles, tins). 	1	2	2	3	Negative Medium (-8)	<ul style="list-style-type: none"> • An adequate number of general waste receptacles, including bins must be arranged around the site to collect all domestic refuse, and to minimise littering. • Bins must be provided on site for use by employees. • Bins should be clearly marked and lined for efficient control and safe disposal of waste. • Different waste bins, for different waste streams must be provided to ensure correct waste separation. • A fenced area must be allocated for waste sorting and disposal on the site. • General waste produced on site is to be collected in skips for disposal at the local municipal waste site. Hazardous waste is not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site. • Under no circumstances is waste to be burnt or buried on site. • Waste bins should be cleaned out on a regular basis to prevent any windblown waste and/or visual disturbance. • All general waste must be removed from the site at regular intervals and disposed of in suitable waste receptacle. 	1	2	1	2	Negative Low (-6)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
Contamination of the surface and site with general and hazardous waste. Hazardous waste produced on site includes:						<ul style="list-style-type: none"> Hazardous waste is to be disposed at a Permitted Hazardous Waste Landfill Site. The Environmental Manager must have as part of his/her records the waste manifest for each batch based disposal. Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid). A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. In the case of a spill of hydrocarbons, chemicals or bituminous, the spill should be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk. 					
<ul style="list-style-type: none"> Oil and other lubricants, diesel, paints, solvent; Containers that contained chemicals, oils or greases; and Equipment, steel, other material (rags), soils, gravel and water contaminated by hazardous substances (oil, fuel, grease, chemicals or bitumen). 	1	2	3	3	Negative Medium (-9)		1	1	2	2	Negative Low (-6)
Generation and disposal of sewage waste of temporary construction toilets.	1	2	3	2	Negative Medium (-8)	<ul style="list-style-type: none"> On-site chemical toilets will be provided for domestic purposes during construction phase. The contractors will be responsible for the maintenance of the chemical toilets. Should any spills or incidents occur; the material will be cleaned up immediately and disposed off appropriately. All incidents must be reported to the responsible site officer as soon as it occurs. 	1	2	2	2	Negative Medium (-7)
OPERATIONAL											
Generation and disposal of domestic waste by the proposed development.	2	3	3	3	Negative High (-11)	<ul style="list-style-type: none"> Waste will be collected by an accredited waste 	1	3	2	2	Negative Medium (-8)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
						company and disposed of at an appropriate and licensed waste disposal facility.					
Generation and disposal of sewage waste by the proposed development.	2	3	3	3	Negative High (-11)	<ul style="list-style-type: none"> All sewage will be sent through to the Emalahleni Treatment works. 	1	3	2	2	Negative Low (-8)

8.11 Air Quality Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Dust and emissions during construction generated by debris handling and debris piles, truck transport, bulldozing, general construction.	1	2	2	3	Negative Medium (-8)	<ul style="list-style-type: none"> Dust must be suppressed on the construction site and during the transportation of material during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off. Loads could be covered to avoid loss of material in transport, especially if material is transported off site. Dust and mud should be controlled at vehicle exit and entry points to prevent the dispersion of dust and mud beyond the site boundary. Facilities for the washing of vehicles should be provided at the entry and exit points. A speed limit of 40 km/hr should be set for all vehicles travelling over exposed areas. During the transfer of materials, drop heights should 	2	1	1	2	Negative Low (-6)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
						be minimised to control the dispersion of mater being transferred. • The height of all stockpiles on site should be a maximum of 2m. Use of dust retardant road surfacing if made necessary due to the exceedance of Air Quality Guidelines.					
Generation of fumes from vehicle emissions may pollute the air.	1	2	2	3	Negative Medium (-8)	• All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability in order to prevent smoke emissions	2	1	1	2	Negative Low (-6)
Release of odours as a result of the chemical toilets on site.	1	2	3	2	Negative Medium (-8)	• Chemical toilets must be provided and cleaned on a regular (weekly) basis.	1	1	1	2	Negative Low (-5)

8.12 Noise Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
During the construction phase there is likely to be an increase in noise pollution from construction vehicles and construction staff.	1	2	3	4	Negative High (-10)	<ul style="list-style-type: none"> All construction activities should be undertaken according to daylight working hours between the hours of 07:00 – 17:00 on weekdays and 7:30 – 13:00 on Saturdays. No construction activities may be undertaken on Sunday. Provide all equipment with standard silencers. Maintain silencer units in vehicles and equipment in good working order. All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. Construction staff working in area where the 8-hour ambient noise levels exceed 60 dBA must have the appropriate Personal Protective Equipment (PPE). All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993). 	1	2	2	3	Negative Medium (-8)

8.13 Heritage Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Disturbance of sites of archaeological, historical and cultural significance.	1	1	1	1	Negative Low (-4)	<ul style="list-style-type: none"> There were no sites or objects of archaeological, historical and cultural significance identified, however, if during construction any possible finds are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on: <ul style="list-style-type: none"> Heritage; Graves; Archaeological finds; and Historical Structures. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures. 	1	1	1	1	Negative Low (-4)

8.14 Visual Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
<ul style="list-style-type: none"> Site clearing and removal of vegetation could partially alter the landscape as viewed from the surrounds of the site, with the emergence of exposed areas of bare soil. Construction equipment such as cranes could be visually intrusive, albeit for a short time period 	2	1	1	2	Negative Low (-6)	<ul style="list-style-type: none"> Phased, rather than indiscriminate clearing of the site to be undertaken. 	2	1	1	1	Negative Low (-5)
OPERATIONS											
Double-storied structures developed on the southern and western boundaries of the site could be highly visually intrusive, and would block views to the surrounding landscape from most of the properties surrounding the site on its southern and western boundaries	2	3	3	3	Negative Low (-11)	<ul style="list-style-type: none"> Maintenance of buffers / housing exclusion zones beyond the southern and western boundaries of the site Alteration of the development layout to shift housing clusters away from the southern and western parts of the site to the eastern and northern parts Development of single-storied housing units outside of the housing exclusion buffer and within 200m of the boundary 	2	3	2	2	Negative Low (-9)
CUMULATIVE											
The development of the site would contribute to the cumulative effects of the gradual transformation of the area from an area with rural / part-natural landscape components to						Refer to activity / phase specific mitigation measures above					

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
an area dominated by urban development. It should be noted that this cumulative visual change in the landscape is not necessarily negative as the area is located on the margins of a large urban area, however this may be perceived as detracting from the aesthetics of the area in which rural / part-natural components of the landscape (including water bodies and conserved areas are visible)											

8.15 Traffic Impacts

Preferred Alternative 2

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
During the construction and decommissioning phases there is likely to be an increase in traffic from construction vehicles.	1	2	2	3	Negative Medium (-8)	<ul style="list-style-type: none"> Construction vehicles are to avoid main roads during peak traffic hours. All vehicles entering the Site are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 	1	1	1	2	Negative Low (-5)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
	OPERATIONAL										
Traffic within the Paul Sauer and Asbestos Street and Paul Sauer to Silwer Avenue will increase.	2	3	4	4	Negative Very High (-13)	<ul style="list-style-type: none"> Paul Sauer and Silwer Avenue would need to be upgraded. The upgrades that can be implemented are traffic signals, traffic circle or intersection design upgrades. It is proposed that a total of 4 accesses should be incorporated. The accesses should be on Saturnus Ave, Sagittarius Ave, and to the west of Minerva Ave and on the north of Silwer Avenue. 	2	1	1	1	Negative Low (-5)
CUMULATIVE											
Traffic within the Paul Sauer and Asbestos Street will increase.	2	3	4	4	Negative Very High (-13)	<ul style="list-style-type: none"> All future proposals for road networks as outlined in the TIA must be implanted for existing and new roads. 	2	1	1	1	Negative Low (-5)

Alternative 1

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
	CONSTRUCTION										
Due to the surrounding access roads and the lack of entrances to the proposed development, alternative 1 (non-preferred) layout will result in significant impacts for the proposed facility due to cost and limited access points.	4	4	4	4	Negative Medium (-16)	The use of this alternative is not recommended	4	4	4	4	Negative Low (-16)

8.16 Socio-economic Impacts

(Alternative 1 and 2)

Where **E** = Extent, **D** = Duration, **I** = Intensity and **P** = Probability of occurrence.

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
CONSTRUCTION											
Employment											
The development will result in job creation and provision of employment.	1	3	3	3	Positive High (+10)	<ul style="list-style-type: none"> All labour (skilled and unskilled) and contractors should be sourced locally where possible. A labour and recruitment policy must be developed, displayed and implemented by the contractor. Recruitment at the construction site will not be allowed. Where possible, labour intensive practices (as opposed to mechanised) should be practiced. The principles of equality, BEE, gender equality and non-discrimination will be implemented. 	2	4	4	4	Positive Very High (+14)
Population Change											
Job creation during the construction phase could result in the influx of people to the area.	2	2	2	2	Negative Medium (-8)	<ul style="list-style-type: none"> If possible all labour should be sourced locally. Contractors and their families may not stay on site. No informal settlements will be allowed. 	2	1	1	1	Negative Low (-5)
Security and Social Life											
Contractors, the influx of people and potential job creation will result in the proliferation of social ills and issues such as crime, prostitution, the spread of HIV/AIDS, informal settlements etc.	2	4	3	2	Negative High (-11)	<ul style="list-style-type: none"> The developers need to be actively involved in the prevention of social ills associated with contractors. If possible all labour should be sourced locally. Contractors and their families may not stay on site. No informal settlements will be allowed. Contractors must be educated about the risk of 	2	3	2	2	Negative Medium (-9)

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
						prostitution and spread of HIV and AIDS. <ul style="list-style-type: none"> • Strict penalties will be built into tenders to deal with issues such as petty crime, stock theft, fence cutting, trespassing etc. • No poaching of wildlife or selling of firewood will be allowed. 					
Safety											
Public safety during construction.	1	2	2	2	Negative Medium (-7)	<ul style="list-style-type: none"> • Members of the public adjacent to the construction site should be notified of construction activities in order to limit unnecessary disturbance or interference. • Construction activities will be undertaken during daylight hours and not on Sundays. 	1	2	1	1	Negative Low (-5)
Construction staff safety during construction.	1	2	2	3	Negative Medium (-8)	<ul style="list-style-type: none"> • Ensure the appointment of a Safety Officer to continuously monitor the safety conditions during construction. • All construction staff must have the appropriate PPE. • The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents. • Report and record any environmental, health and safety incidents to the responsible person. 	1	2	2	1	Negative Low (-6)
OPERATIONAL											
Employment											
The development will result in job creation and	2	3	3	4	Positive Very	<ul style="list-style-type: none"> • The principles of gender equality, maximising local 	2	3	3	4	Positive Very

POTENTIAL ASPECT AND/OR IMPACT	BEFORE MITIGATION				SIGNIFICANCE RATING (BEFORE MITIGATION)	MITIGATION AND MANAGEMENT MEASURES	AFTER MITIGATION				SIGNIFICANCE RATING (AFTER MITIGATION)
	E	D	I	P			E	D	I	P	
provision of employment.					High (+12)	employment should be implemented in the provision and establishment of jobs. <ul style="list-style-type: none"> Jobs for the maintenance of infrastructure and services will be created following the completion of the development. These jobs might be made available to existing labour there creating long term employment. Service contractors could have access to other developments or projects in the area thereby creating long term employment. 					High (+12)
Energy											
Energy consumption.	2	3	3	3	Negative High (-11)	<ul style="list-style-type: none"> It is recommended that renewable energy options and/or alternative energy sources be listed as the preferred options under the conditions of establishment. 	2	2	2	2	Negative Medium (-8)

8.17 Comparative Assessment of Alternatives

Table 8.3 provides a comparative assessment of the two site layout options i.e. layout including detailing 600 units (Phase 1) the Alternative layout detailing 600 Units. A description of these alternatives is provided in Section 5.

For many of the specialist fields, the potential impacts for the different project phases (construction and operations) for the two site layout options are relatively the same and have been combined to prevent repetition.

The comparative assessment below takes into account the impact assessment provided in Section 9.1 to Section 9.17.

TABLE 8:3: COMPARATIVE ASSESSMENT OF THE TWO SITE LAYOUT OPTIONS AFTER MITIGATION

	PREFERRED ALTERNATIVE 2 (Mature living- 600 residential cluster units)	ALTERNATIVE 1 (Matured living 600 residential cluster units)
Geology - Construction	-5	-5
	Developing either site will result in disturbance to surface geology for development foundations and the potential of gully erosion and dongas exists for both alternatives. The geological impacts before mitigation for both sites are of a medium significance and the post mitigation significance is low .	
Topography - Construction	-7	-7
	Developing either site will result in disturbance to topography which is similar for both alternatives. The potential impacts before mitigation for both sites are of a medium significance and the post mitigation significance is also medium .	
Hydrogeology - Construction	-6	-6
	Shallow groundwater contamination through the spillage of fuels, lubricants, lack of provision of ablutions and other aspects such as construction equipment, vehicles and workshop and wash bay areas – for both site options exist and the mitigation measures listed in the EMP, needs to be complied with to reduce this impact from a medium to a low rating.	
Hydrogeology - Operations	-5	-5
	Leaks of untreated water from pipelines may occur and impact on the shallow groundwater quality. Fixing of the leaks should be executed immediately and affected areas need to be rehabilitated. The significance of this impact before mitigation is medium and after mitigation is low .	
Hydrology – Construction	-5	-5
	The spillage of fuels, lubricants and other chemical, cement batching activities may lead to contaminated run-off entering surface water bodies. For both options the mitigation measures listed in the EMP, needs to be complied with to reduce this impact from a medium significance to low for the preferred and retains it a medium for the alternative. This is due to the fact that the proposed access road for the alternative crosses over surface hydrology increases the potential for contamination.	
	-10	-10
	In addition, water abstraction from surface water resources may be necessary for both options and the necessary licenses/permits if required must be obtained for this. The impact before and after mitigation is high for this impact.	
Hydrology -	-6	-6

	PREFERRED ALTERNATIVE 2 (Mature living- 600 residential cluster units)	ALTERNATIVE 1 (Matured living 600 residential cluster units)
Operations	Run-off from urban infrastructure is likely to constitute low significance impact pre-mitigation. It is imperative that there is adequate stormwater management around the site.	
	-5	-5
	Leaks of untreated water from pipelines may occur and impact on the surface water resources. Fixing of the leaks should be executed immediately and affected areas need to be rehabilitated. The significance of this impacts medium before and low after mitigation.	
Agriculture and Soils - Construction	-7	-7
	Vehicle operation on site could potentially result in the spillage of lubricants and petroleum products into the soil. Machinery and vehicles must be kept in good working order. Depending on the nature of spills, contaminated soil must be treated or disposed of at a licensed hazardous landfill site. Soil disturbance, erosion and degradation are further potential impacts which must be mitigated against as outlined in the EMP. The average significance of the impacts post-mitigation is medium . The significance is the same for the alternate option - the surface area is less for the Retail Park site and therefore, less soil will be exposed during construction, however, a temporary access road will be required which negates this resulting in the same impact rating. The agricultural land capability of the Valleyview Project area can be classed as good land for agriculture. Despite this, the impact significance for loss of agricultural land is medium . However the development is in keeping with the land classification of the area for residential use	
Vegetation – Construction	-7	-7
	There will be a significant loss of natural grassland areas for both alternatives which have a significance rating of high.	
Vegetation – Operations/Cumulative	+13	+13
	In consultation with the MTPA, a biodiversity offset will however not be required, based on the protection (non-development) of the wetland and rocky outcrops on the site and implementation of associated buffer zones.	
Wetlands – Construction	-7	-7
	The wetland is expected to be retained and used as a bird sanctuary for avifaunal life. Thus little to no impact is expected to within the wetland	
Wetlands – Operations	-8	-8
	Increased run-off into remaining wetland units within the catchment due to hardened surfaces. The post-mitigation significance is medium .	
Wetlands - Cumulative	-8	-9
	Impacts on the wetland from the overall development could result in an important cumulative impact on the wetland habitat.	
Waste – Construction	-6	-6
	During construction, impacts such as contamination of the surface and site with general and hazardous waste are applicable to both alternatives. The same is for sewerage. The mitigation measures included in the EMP must be complied with to achieve the post-mitigation significance rating of medium .	
Waste - Operations	-8	-8
	The quantities of general waste and sewerage created during operations are the same for both alternatives. The post-mitigation significance rating is medium .	
Air Quality and Odour – Construction	-6	-6
	Dust and emissions during construction generated by debris handling and debris piles, truck transport, bulldozing and general construction will exist regardless of the site alternatives. The post-mitigation significance rating is medium . There is the potential of the release of odours as a result of the chemical toilets on site	

	PREFERRED ALTERNATIVE 2 (Mature living- 600 residential cluster units)	ALTERNATIVE 1 (Matured living 600 residential cluster units)
	regardless of the locations of the site. The post-mitigation significance rating is low.	
Noise - Construction	-8	-8
	During the construction phase there is likely to be an increase in noise pollution from construction vehicles and construction staff. The post-mitigation significance rating is medium .	
Heritage - Construction	-4	-4
	The heritage pump found on site would be required to be relocated to a national museum. A permit is required for this removal and relocation. The significance rating is medium .	
Visual - Operations	-5	-5
	Double-storied structures developed on the southern and western boundaries of the site could be highly visually intrusive, and would block views to the surrounding landscape from most of the properties surrounding the site on its southern and western boundaries.	
Traffic – Construction	-5	-16
	During the construction and decommissioning phases there is likely to be an increase in traffic from construction vehicles. Construction vehicles are to avoid main roads during peak traffic hours and mitigation measures outlined in the EMP are to be implemented. The post mitigation significance is low .	
Traffic – Operations	-5	-6
	Traffic within the Paul Sauer and Asbestos Street and Paul Sauer to Silver Avenue will increase.	
Traffic - Cumulative	-5	-16
	Traffic in the region will increase as the development progresses. All future proposals for road networks as outlined in the TIA must be implemented for existing and new roads to reduce the significance from high to low .	
Socio-economic – Construction	+14	+12
	The development will result in a significant number of construction phase jobs for the local people. As there will be a greater developable area for the preferred site, it is anticipated that there will be more labourers. The significance rating is very high .	
	-7	-7
	As could be expected, the construction phase is characterised by a number of negative social impacts (viz. arrival of construction workers; inflow of job seekers, additional demand on services) which is mainly due to the nature of the activities that take place during this phase. Although the expected social impacts associated with the construction phase are mostly negative, these impacts are for the most part only temporary in nature and as such are expected to only last over the construction period. The significance rating is medium .	
Socio-economic - Operations	+10	+10
	The development will result in permanent employment opportunities. The significance rating is very high .	
TOTAL	-182	-204

9 ENVIRONMENTAL IMPACT STATEMENT

9.1 Summary of Key Findings

During the EIA, the impact of the Valleyview development on the biophysical and social environments was assessed. From the assessment, it was determined which aspects of the environment will be more significantly affected as compared to others. Below is a summary of the main findings of the EIA.

TABLE 9:1: SUMMARY OF KEY FINDINGS OF THE EIA

FINDINGS		RECOMMENDATIONS
Visual	<p>The visual contrast rating methodology has concluded that the development of clusters of housing units on the development site will not necessarily be associated with a visual impact for the key observation locations located to the north of the site, as parts of the site would be retained as vacant areas of natural grassland, and as the development would represent a partial extension of the existing residential areas surrounding the site. Nonetheless the proposed development could result in a significant degree of visual intrusion if double-storied housing units (as proposed in the preferred development layout) were constructed immediately adjacent to the southern and western boundaries of the site. The height of such buildings would effectively block views from a number of properties on these boundaries to the surrounding landscape, in particular to the Witbank Dam and areas surrounding the dam. This has been determined to be contradictory to the visual change objective and associated visual tolerance level for the area from the key observation locations, which stresses the maintenance of areas of rural / part-natural character in the landscape and the visibility of this landscape from the peripheries of the town.</p>	<p>Although it is recognised that owners of existing properties have not legal rights in the context of South African common law to protect existing views, a number of mitigation measures can be contemplated in order to minimise the potential visual intrusion and visual impact associated with the proposed development on certain of the key observation locations.</p> <p>The degree of visual intrusion would be significantly minimised if the layout of the development was altered to shift housing away from the southern and western boundaries of the site into the eastern and northern parts of the site, along with the recommended creation of a housing exclusion area / buffer beyond the southern and western boundaries of the site in order to maintain views, and to take advantage of the effect of the drop in terrain beyond this buffer area that would allow housing structures to be built that would not significantly obstruct views. As such these, and a number of other mitigation measures have been recommended.</p>
Traffic	<p>The intersection that will be adversely affected by this development is Paul Sauer and Silwer Avenue which currently operates at Level of Service (LoS) of F.</p> <p>To improve the LOS of Paul Sauer and Silwer Avenue it needs to be upgraded. The upgrades that can be implemented are traffic signals or intersection design upgrades. If the intersection is signalized, it will improve the LOS from F to B. If it is upgraded to a traffic circle, the LOS will improve from F to A.</p> <p>Due to construction activities there is the possibility of disruptions to traffic flow in the area. Furthermore, the proposed development will see an increase in traffic in an already congested area. The proposed road upgrades as part of the development proposal will alleviate this problem.</p>	<p>The EIA public consultation process highlighted that the residents of that area are opposed to the idea of a traffic circle and as such it is proposed that the intersection of Paul Sauer and Silwer Avenue should be signalized.</p> <p>It is recommended that 4 access roads be considered to reduce traffic flow.</p>
Vegetation	<p>No impacts were identified that could lead to a beneficial impact on the ecological environment of the study site since the proposed development is largely destructive,</p>	<p>No mitigation proposed.</p>

FINDINGS		RECOMMENDATIONS
	involving the alteration of natural habitat or degradation of habitat that is currently in a climax status	
Wetlands	In the case of the proposed housing development, the loss of natural grassland habitat in the developed areas would be complete, as it is likely that all available space for development would be fully utilised. This would create a physical continuous boundary between the non-developed parts of the site and the remaining open areas. In addition the permeability and associated runoff character of the wetland"s immediate catchment would be drastically altered, with the creation of a much greater area of impermeable surface characteristic. The buffer area is necessary to mitigate the potential impact of this increased runoff from affecting the wetland, although as discussed below, a properly designed stormwater system is required	At present there are no official requirements for buffer zones in the Mpumalanga Province. A buffer of 50m around all wetlands on the site has been recommended. In terms of the management of this buffer, no structures or other physical disturbances must be located within this buffer zone. This includes associated infrastructure, such as cable trenches, roads and power lines be kept out of these buffers.
Waste	The potential waste streams for the project were identified as domestic, hazardous, building and sewerage waste. The impact of the waste streams would be minimised by the rigorous mitigation measures that have been developed.	Waste collection will be undertaken by Emalaheni LM and sent through to a licensed waste disposal facility. All sewerage waste will be sent through to a licensed treatment facility.
Air Quality	During construction and decommissioning, the pollutants likely to be emitted are particulate matter generated by vehicle movement and exposed soil to wind erosion. This is most likely to be a nuisance. Odours from chemical toilets on site for construction staff is a possibility.	Dust suppression activities (e.g. wet suppression with water) must be implemented during construction and decommissioning activities. The potential for odour will be minimised by ensuring that the toilets are cleaned and maintained on a weekly basis.
Noise	The construction and decommissioning phases will see an increase in noise in the study area.	Impacts relating to noise can be effectively managed with the implementation of the EMPr.
Heritage	A bucket-pump that was used to pump drinking water from a bore hole was found on site. A heritage permit for removal and relocation would need to be obtained	A license must be obtained from Mpumalanga Provincial Heritage Authority (MPHRA)
Socio-economic	As could be expected, the construction phase is characterised by a number of negative social impacts (viz. arrival of construction workers; inflow of job seekers, additional demand on services) which is mainly due to the nature of the activities that take place during this phase. Although the expected social impacts associated with the construction phase are mostly negative, these impacts are for the most part only temporary in nature and as such are expected to only last over the construction period. Even though all of the	The principles of gender equality, maximising local employment should be implemented in the provision and establishment of jobs. Jobs for the maintenance of infrastructure and services will be created following the completion of the development. These jobs might be made available to existing labour there creating long term employment.

	FINDINGS	RECOMMENDATIONS
	<p>identified social impacts can be mitigated or enhanced successfully, it can only be done if THD, or its appointed contractor(s), commit to the responsibility of ensuring that the level of disturbance brought about to the social environment by the more negative aspects of the project, is minimised as far as possible.</p> <p>From an economic viewpoint, commercial developments often contribute indirectly to the regional and national economy by improving infrastructure, adding to the country's productive capacity, contributing to the country's capital goods and enabling economic growth. In the case of this project, job creation will be a significant impact.</p>	

9.2 Implications of the Proposed Activity

Based on the Impact Assessment and comparative assessment of the two options/ alternatives, a number of potentially negative and a few positive impacts have been identified and assessed across the life-cycle of the project.

TABLE 9:2: COMPARATIVE ASSESSMENT OF THE POSITIVE AND NEGATIVE IMPACTS OF THE PROJECT

POSITIVE FINDINGS	NEGATIVE FINDINGS
Biophysical Environment	
<p>No impacts were identified that could lead to a beneficial impact on the ecological environment of the study site since the proposed development is largely destructive, involving the alteration of natural habitat or degradation of habitat that is currently in a climax status. Impacts resulting from the proposed development on floristic and faunal attributes of the study site are largely restricted to the physical effects of habitat clearance loss of habitat. Direct impacts include any effect on populations of individual species of conservation importance and on overall species richness. This includes impacts on genetic variability, population dynamics, overall species existence or health and on habitats important for species of concern. In addition, impacts on sensitive or protected habitat are included in this category, but only on a local scale. These impacts are mostly measurable and easy to assess, as the effects thereof are immediately visible and can be determined to an acceptable level of certainty.</p>	
<p>The design and layout of the proposed development has taken into consideration and integrated the ecological, topography, and hydrological constraints that have been identified.</p>	<p>There will be permanent alteration of the biophysical environment should the specified mitigation measures not be implemented.</p>
<p>The development plans on maintaining the wetland and prevent storm water discharge</p>	<p>A valley head seep has been identified on the site of the proposed Valleyview housing development. The wetland occupies a part of the northern area on the site. The presence of the wetland is important for the development, as the wetland must not be affected in any way by the development. The wetland area and associated buffer must be kept free from all development, including linear developments (i.e. roads) and underground services.</p> <p>The most important potential impacts that the proposed development could exert on the wetland relate to the (indirect) impact of stormwater discharge. It is important that stormwater from the surrounding development be discharged in such a way as to not affect the hydrological or morphological state of the wetland. The undertaking of "soft" engineering in the stormwater design is strongly recommended, as these will likely prevent most of the impacts associated with the stormwater discharge. A stormwater management plan must be developed and submitted to the MDEDET for approval.</p>

POSITIVE FINDINGS	NEGATIVE FINDINGS
Socio-economic Environment	
<p>The creation of substantial employment opportunities during the construction of the project and the creation of substantial economic and employment opportunities on completion of the project. It is expected that the majority of labour and contractors will be sourced locally.</p>	<p>This could lead to the influx of people into the area seeking employment which could place a strain on the existing infrastructure, available housing and the potential development of uncontrolled settlements. In general, there are social ills such as crime, the spread of HIV/AIDS etc. that could take place.</p>
Visual	
<p>The proposed development could result in a significant degree of visual intrusion if double-storied housing units (as proposed in the preferred development layout) were constructed immediately adjacent to the southern and western boundaries of the site. The height of such buildings would effectively block views from a number of properties on these boundaries to the surrounding landscape, in particular to the Witbank Dam and areas surrounding the dam. This has been determined to be contradictory to the visual change objective and associated visual tolerance level for the area from the key observation locations, which stresses the maintenance of areas of rural / part-natural character in the landscape and the visibility of this landscape from the peripheries of the town</p>	

10 CONCLUSION AND RECOMMENDATIONS

The Environmental Impact Assessment (EIA) process for the Valleyview development has been undertaken in accordance with the EIA Regulations published in Government Notice No. R. 543 of 2010 in terms of Section 24 (5) of the National Environmental Management Act (Act No 107 of 1998) (as amended).

In order to protect the environment and ensure that the Valleyview development is constructed and operate in an environmentally responsible manner, there are a number of significant pieces of environmental legislation that have been taken into account during this study. These include:

APPLICABLE NATIONAL LEGISLATION
The Constitution of South Africa (No. 108 of 1996)
National Environmental Management Act (Act No. 107 of 1998)(as amended)
National Environmental Management: Waste Act (No. 59 of 2008)(as amended)
National Water Act (Act No. 36 of 1998)(as amended)
Mpumalanga Nature Conservation Act (Act 10 of 1998)
Conservation of Agricultural Resources Act (Act No.43 of 1983)
National Environmental Management Biodiversity Act (Act No. 10 of 2004)
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
National Heritage Resources Act (No. 25 of 1999)
National Environmental Management: Air Quality Act (No. 39 of 2004)
National Veld and Forest Act (Act 101 of 1998)
Hazardous Substance Act (No. 15 of 1973) and Regulations
National Building Regulations and Building Standards Act (Act No. 103 of 1997)
Occupational Health and Safety Act (No. 85 of 1993)

The above relevant legislation has informed the identification and development of appropriate management and mitigation measures that should be implemented in order to minimise potentially significant impacts associated with the project.

The conclusions of this final EIAR, including comments and concerns from Interested and Affected Parties (I&APs), are as a result of a comprehensive EIA study undertaken. These studies are based on issues identified in the Environmental Scoping Study and the parallel process of public participation through to the EIA phase.

The public consultation process has been inclusive, and every effort has been made to include representatives of all stakeholders within the process.

10.1 Assumptions, Uncertainties or Gaps in Knowledge

- All information provided by **Before the Wind Investments 113 Pty Ltd** and their specialist consultants to the EAP was correct and valid at the time it was provided;
- The EAP does not accept any responsibility in the event that additional information comes to light at a later stage of the process;
- All data from an unpublished research is valid and accurate; and
- The scope of this investigation is limited to assessing the potential environmental impacts associated with the Valleyview development.

In addition to the assumptions above, the following assumptions and limitations were noted by the specialists:

10.1.1 Visual Specialist

- It should be noted that the 'experiencing' of visual impacts is subjective and largely based on the perception of the viewer or receptor. The presence of a receptor in an area potentially affected by the proposed housing development does not thus necessarily mean that a visual impact would be experienced.
- It should be noted that budgetary limitations have entailed that no visualisation modelling has been able to be undertaken as part of this visual assessment. Google Earth has been utilised to analyse the potential for structures placed in different parts of the development site to block views to the surrounding landscape from key observation locations.
- Two layouts have been presented for comparative analysis. The analysis in this report has been based on the preferred layout as presented, and has not taken into account subsequent phases. Should subsequent phases introduce increased areas of development on the site, these will need to be assessed separately as part of an addendum to this report or as part of a different report.
- The impacts identified, described and assessed are based on the engineering layout provided in Appendix A of the Report, the sewer alignment provided as shown, and the assumption that generic practices regarding stormwater management and sewer pipe construction will take place.
- In addition, the post-mitigation significance scores are based on the mitigation measures provided in this report being strictly adhered to. If any one or more of these mitigation measures cannot be adhered to, the post-mitigation significance of the impacts will need to be re-assessed.

10.1.2 Wetland specialist

- Only wetlands within the boundaries of the Study Site were assessed as part of this study, and no downstream or upstream wetlands were assessed / delineated.
- The wetland survey was undertaken in the autumn (late April). This entails that the wetland was not assessed during the summer growing season. Although this has lowered the confidence of the vegetative component of the assessment, this did not affect the overall confidence in the delineation as the wetland delineation is based primarily on analysis of soil-based indicators.
- The predominantly grassy vegetation still displayed sufficient inflorescences in order to broadly identify the vegetative composition within the wetland, although conditions for identifying vegetation were not ideal.

10.1.3 Biodiversity

- Findings, results, observations, conclusions and recommendations presented in this report are based on the authors' best scientific and professional knowledge as well as the interpretation of information available to them at the time of compiling this report.
- Due care and diligence is exercised by the authors, consultants and/or specialist investigators in rendering services and preparing this document. BEC, the consultants and/or specialist investigators accepts no liability for conclusions, suggestions, limitations and recommendations made in good faith, based on available information, or based on data that was obtained from surveys.
- The client, by accepting this document, indemnifies BEC, its members, consultants and/or specialist investigators against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by BEC and by the use of the information contained in this document.

- Results presented in this report are based on a snapshot investigation of the study site and not on detailed and long-term investigations of all environmental attributes and the varying degrees of biological diversity that may be present in the study site.
- This report is based on surveys that were conducted during a time that reflects an early summer period; although vegetation was found to be in a vegetative state, many plants could not be identified accurately due to the lack of reproductive material.
- Rare and endemic species normally do not occur in great densities and, because of customary limitations in the search and identification of Red Listed species, the detailed investigation of these species was not possible. Results are ultimately based on estimations and specialist interpretation of imperfect data.
- It is emphasised that information, as presented in this document, only have bearing on the site as indicated on accompanying maps. This information cannot be applied to any other area, however similar in appearance or any other aspect, without proper investigation.
- Furthermore, additional information may become known during a later stage of the process or development. The authors therefore reserve the right to modify aspects of the report including the recommendations should new information may become available from ongoing research or additional work in this particular area, or pertaining to this investigation.
- This report should always be considered as a whole. Reading and representing portions of the report in isolation could lead to incorrect conclusions and assumptions. In case of any uncertainty, the authors should be contacted to clarify any viewpoints, recommendations and/or results.

10.2 Concluding Remarks and EAP Opinion

This final EIAR provides an assessment of both the benefits and potential negative impacts anticipated as a result of the project. It further provides a description of the affected environment and alternatives proposed for the Valleyview development.

Based on the comparative assessment of the two site options and the impact identification and assessment, it is evident that there is a difference in the impacts for the preferred and alternative sites (-182 for the preferred site compared to -204 for the alternative site).

The majority of the impacts which have contributed to the greater impact rating score for the alternative site pertain to the fact that the proposed alternative would not be restricted to a mature age group, this option would require additional access points and have a severe impact on traffic congestion.

It is noted that the Valleyview development is considered agricultural land, but would be re-classified for residential use since it is located with an urban area.

From a biodiversity point of view, there will be impact on indigenous vegetation located on the property. Should the proposed mitigation measures be implemented correctly, the Valleyview residential development will be a viable and sustainable development. The findings conclude that there are no significant environmental fatal flaws that could prevent the proposed Valleyview Development and that the recommended mitigation and management measures contained in the preceding chapter and Environmental Management Programme are implemented.

From the outcomes of this assessment it is also the view of the EAP that this project will have a positive social and economic contribution. It has been acknowledged that there will be impacts on the potential biophysical environment; however with the implementation of the mitigation measures outlined in this report and the EMPr as well as through adequate environmental monitoring and enforcement those impacts can be successfully

mitigated. This will in turn enable the development proposal to take place in an appropriate and sustainable manner.

Thus, from all the findings of this report, it is recommended that the development be **authorised**. It is further recommended that due to the greater significance ratings for the alternative option that the **preferred layout** be authorised.

10.3 Conditions and Final Recommendations

In order to achieve appropriate environmental management standards and ensure that the findings of the environmental studies are implemented through practical measures, the recommendations from this EIA study are included within an EMPr.

The EMPr must be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for the life cycle phases of the project is considered to be vital in achieving the appropriate environmental management standards as detailed for this project.

In addition, the following key conditions should be included as part of the authorisation:

- a) The proponent is not negated from complying with any other statutory requirements that is applicable to the undertaking of the activity. Relevant key legislation that must be complied with by the proponent includes *inter alia*:
 - Provisions of the National Environmental Management Waste Act (No. 59 of 2008);
 - Provisions of the National Water Act, 1998 (Act No 36 of 1998)(as amended);
 - Provisions of the National Forests Act (Act No 84 of 1998); and
 - Provisions of the National Heritage Resources Act, 1999 (Act No. 25 of 1999).
- b) The proponent must appoint a suitably experienced (independent) Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation / rehabilitation measures and recommendations are implemented and to ensure compliance with the provisions of the EMPr.
- c) The Stormwater Management Plan must be developed, approved by MDEDET and complied with.
- d) The Wetland must be protected at all times, during both construction and operation. In this regard it is strongly recommended that the wetland area be fenced off and access restricted
- e) A phase 2 HIA must be undertaken prior to construction

APPENDIX A:
LOCALITY MAPS

APPENDIX B

MDEDET APPROVAL OF SCOPING REPORT

APPENDIX C

PUBLIC PARTICIPATION DOCUMENTS

APPENDIX D

SPECIALIST REPORTS

APPENDIX E

DRAFT EMPR