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## Proposed Avoca South Industrial and Business Estate, Durban North

# Final Environmental Impact Assessment (EIA) Report

Version - Final

13 September 2015

Investec Property Limited



DEDTEA Reference Number: DM/0010/2014

GCS Project Number: 12-634

Submitted on behalf of Investec Properties Ltd  
by GCS Water & Environment (Pty) Ltd  
GCS Project Number: 12-634



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## DOCUMENT ISSUE STATUS

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Author	Karin Fivaz		September 2015
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Director	Pieter Labuschagne		September 2015

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Environmental and social data, as well as the environmental impact assessment provided in this report is based on information supplied by specialists in their respective fields, as well as existing information pertaining to the area in question.

It is assumed that the information provided to GCS is correct as GCS's opinions, conclusions and recommendations are based upon this information.

## PURPOSE OF THIS REPORT

Investec Property (Pty) Ltd (Investec), as authorised by Main Street 57 (Pty) Ltd, which is the registered owner of the property, propose to develop the Avoca South Industrial and Business Estate in Durban North, KwaZulu-Natal for light industrial and business uses. The proposed development site is located between the R102, N2, Curnick Ndlovu Highway and Old North Coast Road and is currently used by Corobrik for the mining of clay and manufacturing of various clay brick and paving products with ancillary sugar cane farming on mined portions of the property.

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended), Investec is required to obtain Environmental Authorisation from the Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) (formerly the Department of Agriculture and Environmental Affairs) through the undertaking of an Environmental Impact Assessment (EIA) process before the proposed development activities can commence. In this regard, GCS Water and Environment (Pty) Ltd (GCS), has been appointed as the independent Environmental Assessment Practitioner (EAP), to conduct the EIA for the proposed Estate.

An EIA has two distinct phases: the Scoping Phase and the Impact Assessment Phase. The Scoping Phase of the process has been concluded with the compilation and submission of a Final Scoping Report to the DEDTEA for acceptance on 17 February 2015. The Scoping Report documents all activities undertaken in the Scoping Phase, the issues and impacts identified by Interested and Affected Parties (I&APs) and professional experience, and the Plan of Study (PoS) for the Impact Assessment. The Final Scoping Report and PoS were accepted by the DEDTEA (17 March 2015), and the Impact Assessment Phase has commenced in accordance with the PoS.

The Impact Assessment Phase was initiated with the acceptance of the Final Scoping Report. The purpose of the Impact Assessment Phase is to assess the direct, indirect, and cumulative environmental impacts associated with a proposed project/activity. The EIA process culminates in the submission of an EIA Report (including an Environmental Management Programme (EMPr)) to the competent authority for decision-making.

The objectives of the Impact Assessment Phase are to:

- Assess alternatives to the proposed activity in a comparative manner.
- Undertake specialist studies required.
- Assess the nature, intensity, magnitude, duration, probability and significance of all of the potential impacts identified in the Scoping Phase.

- Identify feasible and realistic mitigation measures required to avoid and/or minimise the negative environmental impacts resulting from the activity, and combine and present all these measures in the form of a construction and operational EMPr in accordance with NEMA.
- Provide the competent authority with sufficient information in order to make a decision regarding the authorisation of the activity.

The above listed objectives will be achieved by commissioning of all the specialist studies required to evaluate and assess the relevant impacts as per the PoS for EIA as well as addressing all other impacts, issues and concerns that do not require a specialist assessment.

A prescribed Public Participation Process (PPP) runs concurrently with the Scoping and Impact Assessment Phases. All comments received to date in the Scoping Phase have been documented in the Comments and Response Report (CRR) and addressed in the Draft and Final EIA Report (this document).

The Draft EIA Report and associated specialist studies was compiled and circulated for I&AP comment from 2 June 2015 to 12 July 2015 inclusive of a public meeting.

This report therefore represents the Final version of the EIA Report that is inclusive of comments received on the Draft EIA Report and has been submitted to the DEDTEA for consideration in the application for Environmental Authorisation of the proposed project.

## AMENDMENTS TO THE EIA REPORT

Only minor changes have been made to the Draft EIA Report during finalisation. Changes made to the EIA Report are listed below:

- Updating the public meeting information which took place after the Draft EIA Report was released.
- Inclusion of comments received on the Draft EIA Report into the Comments and Response Report with reference in this Final EIA Report.
- Inclusion of the suburb Corovoca in the description of the Socio-economic environment for the project.
- Revision of the dust management section of the EMPr to incorporate measures implemented by Corobrik factory.

## YOUR COMMENT ON THE FINAL EIA REPORT

This Final EIA Report will be submitted to the DEDTEA for consideration in the application for Environmental Authorisation. The document will also be made available for public review and comment for a period of 21 days from 21 September 2015 - 12 October 2015. Registered I&APs will be notified of the availability of the document and will be sent an electronic copy on request. Copies will also be available for download from the GCS website: [http://www.gcs-sa.biz/Documents/12-634 Avoca South EIA](http://www.gcs-sa.biz/Documents/12-634%20Avoca%20South%20EIA). A hard copy will be placed at the KwaMashu and Stonebridge Public Libraries for those I&APs without access to the internet or email.

Any comments on the Final EIA Report must be submitted in writing or email (including any additional supporting material) on or before the closing date for submission of comments directly to the DEDTEA Assessing Officer, with a copy provided to Karin Fivaz of GCS (details below). All comments submitted to the Assessing Officer within the prescribed timeframes will be considered in the DEDTEA's final decision on the application for Environmental Authorisation.

<p>KZN Department of Economic Development, Tourism and Environmental Affairs Assessing Officer</p> <p>Contact Person: Ms Natasha Brijlal Environmental Impact Assessment Environmental Services: eThekweni District Tel: 031 302 2800 Fax: 031 302 2824/66 Email: <a href="mailto:natasha.brijlal@kzndae.gov.za">natasha.brijlal@kzndae.gov.za</a></p> <p>Quote Reference number in communication (Ref: DM/0010/2014)</p>	<p>GCS Water &amp; Environment (Pty) Ltd Environmental Assessment Practitioner</p> <p>Contact Person: Ms Karin Fivaz Tel: 031 764 7130 Fax: 031 764 7140 Email: <a href="mailto:avocasouthf@gcs-sa.biz">avocasouthf@gcs-sa.biz</a> Postal Address: PO Box 819, Gillitts, 3603</p>
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## EXECUTIVE SUMMARY

### Introduction

Investec Property (Pty) Ltd (Investec) proposes to develop the Avoca South Industrial and Business Estate (Avoca South) on the portion of land between the N2, Curnick Ndlovu Highway, Main Road R102 (MR577) and Old North Coast Road, Durban North.

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the proposed development is listed as an activity that may be detrimental to the environment and thus, requires authorisation from the Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) prior to commencement. Investec has appointed GCS as the Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the project.

This report represents the Final Environmental Impact Assessment Report (EIA report) for the proposed project and has been prepared in accordance with the EIA Regulations published in Government Notice No. R543 of 2010 (as amended). These Regulations were published by the national Department of Environmental Affairs under Section 24(5) read with Section 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) to control activities which may have a detrimental effect on the environment.

### Project Description

The proposed development of Avoca South Industrial and Business Estate is to take place on the portion of property between the N2, Curnick Ndlovu Highway (P93) and Main Road R102 (MR577), and Old North Coast Road, Durban North. The site is currently zoned as Extractive Industry and is used by Corobrik to mine clay and manufacture related brick and paving products as well as for sugarcane cultivation. The total area of the site is 157 hectares (ha) of which approximately 90 ha is proposed to become levelled platforms and subdivided for the development of light industrial, general business, warehousing and related uses.

### Scoping Phase

The Environmental Scoping phase has been undertaken in accordance with the requirements of Section 24 of the NEMA, as read with GNR 543 (Regulations 26-29), 544, 545 and 546 of the NEMA and the Integrated Environmental Management (IEM) Information Series published by the Department of Environmental Affairs and Tourism (now DEA) in 2002. The competent authority for this application is the KZN Department of Economic Development, Tourism and Environmental Affairs (DEDTEA), previously known as the Department of Agriculture and Environmental Affairs (DAEA). The scoping activities of this



application included:

- Authority consultations.
- EIA application of proposed project to DEDTEA.
- Public Participation Process comprising:
  - I&AP Identification and Notifications.
  - Distribution of a Background Information Document and street notices.
  - On site notices.
  - Open Day Public Meeting.
  - Compilation of a Comments and Response Report documenting public and authority comments.
- Compilation of the Draft and Final Scoping Reports
- Submission of the Final Scoping Report to the DEDTEA with acceptance on 17 March 2015.

### Environmental Impact Phase

The Impact Assessment Phase comprises the actual assessment of potential impacts and the compilation of a comprehensive EIA Report. In accordance with the requirements of Section 24 of the NEMA, as read with GNR 543 (Regulations 26-29), 544, 545 and 546 of the NEMA and the Integrated Environmental Management (IEM) Information Series published by the Department of Environmental Affairs and Tourism (now DEA) in 2002, the following activities were carried out in compilation of this Final EIA include the following:

- Updating the Comments and Response Report to incorporate comments received from the Final Scoping Report.
- Technical and Specialist Studies were undertaken to assess and mitigate potential environmental impacts.
- Compilation of the Draft EIA Report and EMPr, including findings of the above-mentioned studies, a detailed impact assessment and mitigation measures/recommendations. This report was made available for stakeholder and public review and comment from 2 June 2015 to 12 July 2015 at the following public places:
  - Stonebridge and KwaMashu Public Libraries;
  - GCS Office (Kloof); and
  - GCS Website (electronic copies available upon request).
- A Public Meeting was held on 4 July 2015 at Corovoca Primary School, in order to inform stakeholders of the outcomes of the EIA and provide an opportunity to discuss concerns and submit comments on the Draft EIA Report.

## Alternatives

For this project, land use alternative and layout alternatives have been investigated. Site location alternatives have not been considered by Investec as the proponent was aware of the Corobrik site, its current land uses and possible future land use options and recognised the potential development of the site for a new major industrial, general business, warehousing and related uses node in the eThekweni Metropolitan area. Key factors included:

- Availability of the land for development post mining;
- Demand for such developments in the eThekweni region;
- Its location along and between primary transport routes in the eThekweni Metropolitan area;
- Its location within the Effingham-Avoca area which is located in an existing industrial node catering for light industry and is surrounded by major roads. The proximity to an already developed area provides the opportunity for the development to easily tie into the existing bulk services.
- Its position in terms of proximity to major import and export gateways i.e. the Durban port and King Shaka International Airport and Dube Tradeport;
- The zoning of the land for such uses and related integration of the proposed development within the existing approved strategic and spatial development plans for this region; and
- Integration of the proposed land use with adjacent land uses such as the Riverhorse Valley Logistics and Light Industrial Park.

Considering the above, Investec has not explored or investigated other alternative sites for the proposed development.

## Impact Assessment

Impact significance was determined through considering the probability of the impact occurring, its duration, intensity, frequency, status (positive/negative) and spatial extent (national, regional, local or limited to the site) of the potential impacts. These potential impacts were then rated as either of low, medium and high environmental significance depending on the overall significance points scored. The scoring system was applied to both potential impacts with and without mitigation. Impact ratings are assigned colour codes depending on their significance and status (i.e. positive or negative), as indicated in Table A.

Table A: Impact Rating and Significance Indicators

Significance		
NEGATIVE		
High	Negative long term/permanent change to the natural and social environment	13 - 18
Medium	Medium or long term effects to natural and social environment These effects are real and mitigation is possible, difficult and often costly	7 - 12.9
Low	Short term effects on the natural environment	0 - 6.9
	Effects are not substantial and are often viewed as unimportant	
	Mitigation is cheap, easy, quick or seldom required	
POSITIVE		
Low	No real benefit to the holistic environment	0 - 6.9
Medium	A benefit to the holistic environment	7 - 12.9
	Monitoring is needed	
	Some mitigation is needed	
High	To the greater benefit of the social and/or natural environment	13 - 18

Table B below summarises all the identified impacts and their significance ratings without and with mitigation/enhancement for the preferred alternative.

Table B: Summary of Impact Assessment Matrix

ASPECT	PHASE	SUMMARY OF POTENTIAL IMPACT	Significance Before Mitigation		Significance After Mitigation	
			Total	Rating	Total	Rating
BIOPHYSICAL IMPACTS						
Topographical structure and Landform	Con	Topographical structure and Landform	-12.8	Medium(-)	-11.5	Medium(-)
	Op	Topographical structure and Landform	-12.8	Medium(-)	-11.5	Medium(-)
Soil Management	Con	Soil Erosion and Sedimentation	-7.5	Medium(-)	-5.5	Low(-)
	Op	Soil Erosion and Sedimentation	-9.2	Medium(-)	-6.2	Low(-)
Geological stability	Con	Impacts on Slope Stability	-9.8	Medium(-)	-6.5	Low(-)
Soil, Surface and Groundwater Quality	Con	Contamination of soils, surface or groundwater	-9.8	Medium(-)	-6.8	Low(-)
	Con	Contamination of watercourses / wetlands via sedimentation	-9.8	Medium(-)	-6.8	Low(-)
	Op	Contamination of soils or water by hazardous substances.	-11.2	Medium(-)	-6.2	Low(-)
	Op	Contamination of watercourses / wetlands via sedimentation	-9.2	Medium(-)	-6.2	Low(-)
Groundwater Quantity	Con	Reduction in groundwater baseflow	-7.2	Medium(-)	-4.2	Low(-)
	Op	Reduction in groundwater baseflow	-9.2	Medium(-)	-6.2	Low(-)
Stormwater Management	Con	Alteration of stormwater flow regime	-7.2	Medium(-)	-4.2	Low(-)

	Op	Alteration of stormwater flow regime	-9.2	Medium(-)	-6.2	Low(-)
Noise	Con	Noise disturbance from increased traffic	-7.0	Medium(-)	-6.8	Low(-)
	Con	Noise disturbance from construction activities	-7.0	Medium(-)	-6.8	Low(-)
	Op	Noise disturbance from increased traffic	-8.0	Medium(-)	-6.5	Low(-)
	Op	Noise disturbance from operational activities	-8.0	Medium(-)	-6.5	Low(-)
Air Quality	Con	Dust pollution from earth-moving activities	-7.8	Medium(-)	-5.8	Low(-)
	Con	Air pollution from vehicular emissions	-7.8	Medium(-)	-5.8	Low(-)
	Op	Air pollution from industrial processes	-8.8	Medium(-)	-6.8	Low(-)
	Op	Air pollution from vehicular emissions	-8.8	Medium(-)	-6.8	Low(-)
Waste Management	Con	Pollution arising from poor waste management	-10.0	Medium(-)	-6.0	Low(-)
	Con	Pollution arising from poor management of excess soil	-9.5	Medium(-)	-4.2	Low(-)
	Op	Pollution arising from poor waste management	-12.0	Medium(-)	-8.0	Medium(-)
MHI - Accidental release of natural gas	Con	Safety risk to employees, the public and the pipeline	-9.2	Medium	-7.2	Medium
	Op	Safety risk to employees, the public and the pipeline	-9.2	Medium	-7.2	Medium
<b>ECOLOGICAL IMPACTS</b>						
Vegetation	Con	Loss of ecological habitat and open space	-12.0	Medium(-)	-6.0	Low(-)
	Con	Disturbance or loss of wetland / riparian vegetation	-12.5	Medium(-)	-5.5	Low(-)
	Con	Loss of indigenous and protected species	-12.5	Medium(-)	-6.5	Low(-)
	Con	Loss of vegetation communities	-12.0	Medium(-)	-6.5	Low(-)
	Con	Spread of alien invasive vegetation	-8.5	Medium(-)	-5.2	Low(-)
	Con	Contamination of soil reducing vegetative health	-8.5	Medium(-)	-4.2	Low(-)
	Op	Maintenance of removed alien invasive vegetation	10.5	Medium(+)		
	Op	Maintenance of rehabilitated water course and wetland areas	12.0	Medium(+)		
	Op	Spread of alien invasive vegetation	-9.2	Medium(-)	-5.2	Low(-)
	Op	Contamination of soil reducing vegetative health	-8.2	Medium(-)	-4.2	Low(-)
Fauna	Con	Disturbance to faunal habitat	-8.8	Medium(-)	-7.5	Medium(-)
	Con	Habitat loss	-14.0	High(-)		
	Con	Introduction and spread of alien and domesticated animals and vegetation	-12.2	Medium(-)	-7.2	Medium(-)
	Con	Pollution of faunal habitats	-7.8	Medium(-)	-6.5	Low(-)
	Con	Changes in hydrology	-12.5	Medium(-)	-9.5	Medium(-)

	Op	Disturbance to faunal habitat	-7.8	Medium(-)	-7.5	Medium(-)
	Op	Introduction and spread of alien and domesticated animals and vegetation	-12.2	Medium(-)	-6.2	Low(-)
	Op	Pollution of faunal habitats	-7.8	Medium(-)	-6.5	Low(-)
	Op	Changes in hydrology	-12.5	Medium(-)	-9.5	Medium(-)
	Op	Rehabilitation of wetland habitat in conservation areas	12.2	Medium(+)		
Wetlands and Watercourses	Con	Freshwater habitat destruction and modification impacts		Moderate (-)		Moderate (-)
	Con	Catchment and surrounding terrestrial habitat modification impacts		Moderate (-)		Moderately Low (-)
	Con	Direct flow modification impacts		Moderately Low (-)		Low (-)
	Con	Water pollution impacts		Moderately Low (-)		Low (-)
	Op	Catchment and surrounding terrestrial habitat modification impacts		Moderate (-)		Moderately Low (-)
	Op	<i>Direct flow modification impacts</i>		Moderately Low (-)		Low (-)
	Op	<i>Water pollution impacts</i>		Moderate (-)		Moderately Low (-)
	Op	<i>Rehabilitation and management impacts</i>		Low (-)		Moderately Low (+)
ECONOMIC IMPACTS						
Employment and Business Opportunities	Con	Short-term employment opportunities	12.2	Medium(+)		
	Op	Long-term employment opportunities	15.2	High(+)		
	Op	Local business opportunities	8.2	Medium(+)		
	Op	Local business opportunities	-10.2	Medium(-)		
Public Revenue	Con	Generation of public revenue	11.2	Medium(+)		
Public Revenue	Op	Generation of public revenue	12.8	Medium(+)		
Agricultural	Con	Loss of Agricultural activity	9.2	Medium(+)		
Mining	Con	Loss Clay Mining	-6.2	Low(-)	8.2	Medium(+)
SOCIAL IMPACTS						
Traffic	Con	Traffic congestion	-11.8	Medium(-)	-9.8	Medium(-)
	Con	Increased heavy vehicle traffic	-10.8	Medium(-)	-7.8	Medium(-)
	Op	Traffic congestion	-14.8	High(-)	-11.8	Medium(-)
	Op	Increased heavy vehicle traffic	-14.8	High(-)	-10.8	Medium(-)
Visual and Aesthetic	Con	Change in visual / aesthetic character	-9.0	Medium(-)	-6.0	Low(-)
	Op	Change in visual / aesthetic character	-12.0	Medium(-)	9.0	Medium(+)
Cultural and Heritage Resources	Con	Potential loss of cultural / heritage resources	-15.0	High(-)	-11.0	Medium(-)

Safety	Con	Safety risks to pedestrians and motorists	-9.2	Medium(-)	-6.2	Low(-)
	Con	Potential increase in crime from construction workers.	-9.5	Medium(-)	6.2	Low(+)
	Con	Safety risks to construction workers.	-8.2	Medium(-)	-6.2	Low(-)
	Op	Safety risks to pedestrians and motorists	-12.5	Medium(-)	-8.2	Medium(-)
Quality of Life	Con	Change of sense of place	-8.0	Medium(-)	-5.2	Low(-)
	Con	Enhancement of social and community life	10.0	Medium(+)		
	Op	Change of sense of place	-10.0	Medium(-)	-8.0	Medium(-)
	Op	Enhancement of social and community life	12.0	Medium(+)		
CUMULATIVE IMPACTS						
Cumulative Impacts	Con	Cumulative Noise Impact	-12.0	Medium(-)		
	Con	Cumulative Air Quality Impact	-12.0	Medium(-)		
	Con	Cumulative Economic growth Impact	14.0	High(+)		
	Con	Cumulative Traffic Impact	-12.0	Medium(-)		
	Op	Cumulative Noise Impact	-13.0	High(-)		
	Op	Cumulative Air Quality Impact	-14.0	High(-)		
	Op	Cumulative Economic Impact	16.0	High(+)		
	Op	Cumulative Traffic Impact	-14.0	High(-)		
	Op	Cumulative impact of increased pressure on municipal services	-11.0	Medium(-)		

### Key Findings

The following key findings and conclusions are drawn from the EIA:

- Various layout alternatives were considered and assessed, and the option which accommodates both the development needs and the environmental restrictions best was found to be Option 5.
- The specialist studies commissioned for the project identified the following key aspects of the site:
  - A number of wetlands units were identified on site however these areas have proven to have very poor present ecological state and importance and sensitivity.
  - The development has the potential to have a positive residual impact on local freshwater habitat conservation through sound mitigation and wetland rehabilitation.
  - With the effective implementation of the recommended mitigation in this report, the significance of all of the negative Impacts can be reduced to

acceptable levels while the significance of the positive rehabilitation impact could feasibly be increased to moderately-low

- If riverine and wetland rehabilitation is undertaken as per the recommendations, and the Rehabilitation and Conservation Management Plan implemented, an average 2.71ha gain in water quality enhancement functional equivalents could be achieved. Removal of alien vegetation as part of the rehabilitation will further improve the ecological value of the site.
  - With the inclusion of the proposed onsite wetland rehabilitation into the proposed development plan, the net gain in wetland functional and habitat equivalents would more than compensate for anticipated negative impacts to water.
  - As a result of the net positive gains in wetland function associated with the proposed rehabilitation, no offset mitigation would be required under this post-rehabilitation scenario.
  - The bulk infrastructure services are adequate to supply the required demands generated by the development.
  - There are no threatened plant species on site and most of the vegetation is of low conservation value. The small minority of plant species that has conservation value can be relocated successfully.
  - The faunal biodiversity on the site is of low value and the proposed development will not negatively affect the terrestrial vertebrate fauna.
  - The stone artifacts found on site have little heritage value and have been rated as of low significance. The Corobrik buildings on site are younger than 60 years and therefore have no heritage significance.
  - The likely public economic benefits of the proposed development including job opportunities and national taxes outweigh any potential costs of the proposed development.
  - The surrounding road network of the proposed site is already experiencing increased traffic congestion thus multiple intersection upgrades are required to ensure that the road infrastructure can handle the increased anticipated increased traffic volumes in the construction and operational phases of the development.
  - It was found that there are no environmental fatal flaws to the proposed development due to the poor ecological state of the proposed site.
- Majority biophysical impacts identified for the proposed development were found to be of medium significance and after mitigation measures are applied would have a low significance.
  - The majority potential ecological impacts identified were of medium significance. Ecological impacts are more challenging to mitigate and application of mitigation

measures can reduce the impact significances from Medium to Low in most instances.

- The only potential ecological impact rated as High was faunal habitat loss.
- Additional potential impacts that were rated as High without mitigation are:
  - Traffic congestion and increased heavy vehicle traffic (Operational Phase).
  - Potential loss of cultural and heritage resources (Construction Phase).
  - Increases in cumulative operational noise.
  - Increases in cumulative operational air quality.
  - Increases in cumulative traffic.
- All of the above impacts except the cumulative impacts can be reduced to a Medium significance if mitigation measures are applied.
- Mitigation measures could be applied to the majority of identified impacts in the construction and operational phases (Refer to Table 6-1).
- A number of positive impacts are associated with the development, namely:
  - Maintenance of alien vegetation removal (Operational phase).
  - Rehabilitation and maintenance of water course and wetland areas (Operational phase).
  - Short-term employment opportunities (Construction phase).
  - Long-term employment opportunities (Operational phase).
  - Local business opportunities (Operational phase).
  - Generation of public revenue (Construction phase).
  - Loss of Agricultural activity (Construction phase).

### Key Recommendations

The following are key recommendations:

#### General

- The EMP, along with the array of management plans proposed such as the Stormwater Management Plan, Rehabilitation and Conservation Management Plan, and guidelines provided, must be implemented effectively to ensure the envisaged positive impacts are realized.
- It is recommended that a suitably experienced independent Environmental Control Officer (ECO) is appointed by the developer to perform audits during the construction phase of the project. It is recommended that the ECO should do a site visit once weekly in the initial phases of construction. However the ECO should be present daily on site when earthworks take place near the north-western watercourse that is identified for rehabilitation.
- It is recommended that the Glen Anil Stream running along the northern boundary of the site be sampled on a quarterly basis upstream of the site and at the downstream area where it leaves the site for a period of 2 years post construction of the



platform construction particularly of Platforms 2 and 9. If any water quality issues are identified as a result of sampling, it is suggested that a ground water quality monitoring programme is established.

- It is recommended that monitoring should take place to ensure compliance to the Environmental Authorisation.
- It is recommended that skills development and entrepreneurial programmes are developed by the Estate Owners Association for the adjacent local communities from whom it is assumed that unskilled labour will be sourced. This initiative will enable this development to be socially and environmentally responsible and so strengthen the potential positive impact of economic upliftment.

### Ecological

- It is recommended that buffer zones (inclusive of a 5m stormwater dissipation zone) of 20m minimum between the outer edges of the wetland/riparian areas and the toe of the platform embankments are created and that fill embankments are not considered part of the buffer zone.
- Protected plant species on site (*Eulophia speciose*, *Kniphofia* species and *Scadoxus piniceus*) may not be damaged or destroyed without permit authorization from Ezemvelo KZN Wildlife. These species should be relocated to other suitable habitat on site. This must be done in consultation with a Vegetation Specialist prior to the commencement of earth-moving activities.
- Any control of alien vegetation, which must be implemented in line with recommendations of the Rehabilitation and Conservation Management Plan compiled by Themtek Environmental Consultancy (2015).
- Faunal and floral rescues must take place prior to the destruction of the central drainage line.

### Economic

- The developer should endeavour to employ local labour in the construction phase as far as possible.

### Social

- The installation of a secure boundary fence and access control to the site is recommended to prevent crime from happening in and around the site during the construction phase.
- A surface collection of the archaeological stone tools discovered on site must be made, under the auspices of Amafa, prior to any construction activities.
- The traffic infrastructure required to service the property and surrounding area, as detailed in the TIA, must be implemented to ensure the road network maintains its

carrying capacity.

- Investec must develop a “Green Sustainability Policy” for the estate and undertake to ensure the development during both construction and operation maximises opportunities to optimise energy use, manage waste effectively and improve sustainability of the development in the long term.

## Conclusion

GCS conducted a comprehensive impact assessment to identify potential impacts triggered by the proposed development of the Avoca South Industrial and Business Estate. From this assessment it is expected that the development will bring much needed economic upliftment to the region and that the various potential negative impacts can be reduced in significance to acceptable limits, through the implementation of recommendations, mitigation procedures and the EMPr provided in this report.

With sound mitigation and wetland rehabilitation, the proposed development was assessed as also having a positive residual impact on local freshwater habitat conservation. While an estimated 2.08ha of wetland and riparian habitat will be destroyed by the proposed development, significant improvements in vegetation condition are expected within areas targeted for rehabilitation. Under this scenario, the development has the potential to result in a gain of 2.71ha of freshwater habitat equivalents.

Based on the conclusion that no environmental fatal flaw was found, that all negative impacts can be effectively mitigated to acceptable levels, and that the proposed development is anticipated to create some positive impacts on the natural and socio-economic environments, GCS recommends that Environmental Authorisation be granted for the Avoca South Industrial and Business Estate provided the rehabilitation measures and all other mitigation measures are implemented and the recommendations are considered.

## Way Forward

The Final Scoping Report was submitted to DEDTEA and accepted by the Department. All comments received from I&APs on the Final SR and Draft EIA Report have been incorporated in the Final EIA Report and included in the Comments and Response Report.

This Final EIA Report will be submitted to the DEDTEA for consideration in the application for Environmental Authorisation. This Report will also be made available in hard copy for public review at the Stonebridge and KwaMashu Libraries for a period of 21 days. Electronic versions of the report will also be available on CD on request or can be downloaded from the GCS website ([www.gcs-sa.biz/Documents](http://www.gcs-sa.biz/Documents)). All registered I&APs will be informed of the availability of the Final EIA Report for review.

All comments received on this Final EIA Report must be submitted directly to the DEDTEA Assessing Officer, with a copy provided to the EAP (GCS). All registered I&APs will be informed of the DEDTEA's decision on the application and provided with details should they wish to appeal the decision or part thereof.

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## ACRONYMS AND ABBREVIATIONS

AMAFA	Amafa aKwaZulu-Natali
a.s.l.	above sea level
BID	Background Information Document
CRR	Comments and Response Report
DEDTEA	KwaZulu-Natal Department of Agriculture and Environmental Affairs
DAFF	Department of Agriculture, Fisheries and Forestry
DDI	Diverging Diamond Interchange
DEA	Department of Environmental Affairs
Draft EIAR	Draft Environmental Impact Report
DM	District Municipality
DMA	Demarcated Management Area
DMOSS	Durban Metro Open Space Systems
DMR	Department of Mineral Resources
DOT	National Department of Transport
Draft SR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECA	Environmental Conservation Act
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EKZNW	Ezemvelo KZN Wildlife
EMP	Environmental Management Programme
EPTLS	Electrical Power Transmission Line Servitude
Final EIAR	Final Environmental Impact Report
Final SR	Final Scoping Report
GNR	Government Notice Regulations
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IMP	Integrated Management Plan
KZN	KwaZulu-Natal
LM	Local Municipality
MHI	Major Hazard Installation
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NEM:BA	National Environmental Management: Biodiversity Act
NEM:WA	National Environmental Management: Waste Act



NHRA	National Heritage Resources Act
NWA	National Water Act
POS	Plan of Study
PPP	Public Participation Programme
ROD	Record of Decision
SANRAL	South African National Roads Agency Limited
SAHRA	South African Heritage Resource Agency
STEP	Subtropical Thicket Ecosystem Plan
TOR	Terms of Reference
VIA	Visual Impact Assessment
WWTWs	Waste water treatment works

**COMPLIANCE WITH THE EIA REGULATION REQUIREMENTS  
FOR COMPILATION OF AN ENVIRONMENTAL IMPACT REPORT**

The contents of an Environmental Impact Assessment Report are required to contain information as outlined in Table C as regulated under Regulation 31 of GNR 543 (EIA Regulations).

**Table C: Contents of Final EIA Report**

REGULATION REQUIREMENT	SECTION IN THIS REPORT
Details of the EAP who prepared this report, and the expertise of the EAP to carry out environmental impact assessment	Section 1.4
A description of the proposed activity	Section 2
A description of the property on which the activity is to be undertaken and the location of the activity on the property	Section 2
A description of the environment that may be affected by the activity and the manner in which the activity may be affected by the environment	Section 4
Details of the public participation process conducted in terms of subregulation (1), including steps undertaken in accordance with the plan of study	Section 1.6
A list of persons, organisations and organs of state that were registered as interested and affected parties	Appendix C
A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments	Appendix E
Copies of any representations and comments received from registered interested and affected parties	Appendix F
A description of the need and desirability of the proposed activity	Section 2.3
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	Section 3
An indication of the methodology used in determining the significance of potential environmental impacts	Section 5.2
A description and comparative assessment of all alternatives identified during the environmental impact assessment process	Section 3
A summary of the findings and recommendations of any specialist report or report on a specialised process	Section 4
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	Section 5
An assessment of each identified potentially significant impact, including cumulative impacts, the nature of the impact, the extent and duration of the impact, the probability of the impact occurring, the degree to which the impact can be reversed, the degree to which the impact may cause irreplaceable loss of resources and the degree to which the impact can be mitigated	Section 5
A description of any assumptions, uncertainties and gaps in knowledge	Section 6
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	Section 6.7
An environmental impact statement which contains- a summary of the key findings of the environmental impact assessment, a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives, a draft environmental management programme and copies of any specialist reports	Section 6

# 1 INTRODUCTION

## 1.1 Overview and Background

The applicant, Investec Property (Pty) Ltd (hereafter referred to as 'Investec') as authorised by Main Street 57 (Pty) Ltd, being the registered owner of the property, propose to develop the Avoca South Industrial and Business Estate on the portion of property between the N2, Curnick Ndlovu Highway (P93) and Main Road R102 (MR577), and Old North Coast Road, Durban North (Figure 1-1 and Figure 1-2). The site is currently zoned as 'Extractive Industry' and is used by Corobrik to mine clay and manufacture related brick and paving products as well as for sugarcane cultivation.

The total area of the site is 157 hectares (ha) of which approximately 90 ha is proposed to become levelled platforms and subdivided for the development of light industrial, general business, warehousing and related uses. The preferred layout of the site is detailed in RKA's Conceptual Layout Drawing No. 1223/WD28 (Layout Option 5) (Figure 1-3). The remainder of the site will be zoned as open space or conservation areas and roads. The proposed development falls within the eThekweni Municipality and will include provincial road upgrades, bulk service infrastructural upgrades for water, sewer and electricity. The site is likely to include the stockpiling of 500 000m<sup>3</sup> of clay reserves until such time as the clay is used and the brick making operation ceases as development demands for the proposed uses arise.

Investec, as the project proponent, has appointed GCS Water and Environment (Pty) Ltd ('GCS') as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed development of the Avoca South Industrial and Business Estate.

This report constitutes a record of the EIA Phase of the Environmental Authorization process, which describes the proposed project and alternatives, and identifies, assesses and mitigates all potential environmental impacts related to the proposed project through professional specialist assessment, government requirements and authority and public involvement.

The following chapter provides background to the proposed project and associated EIA process, outlines the purpose and structure of the EIA Report, and details of the EIA application and the project team.

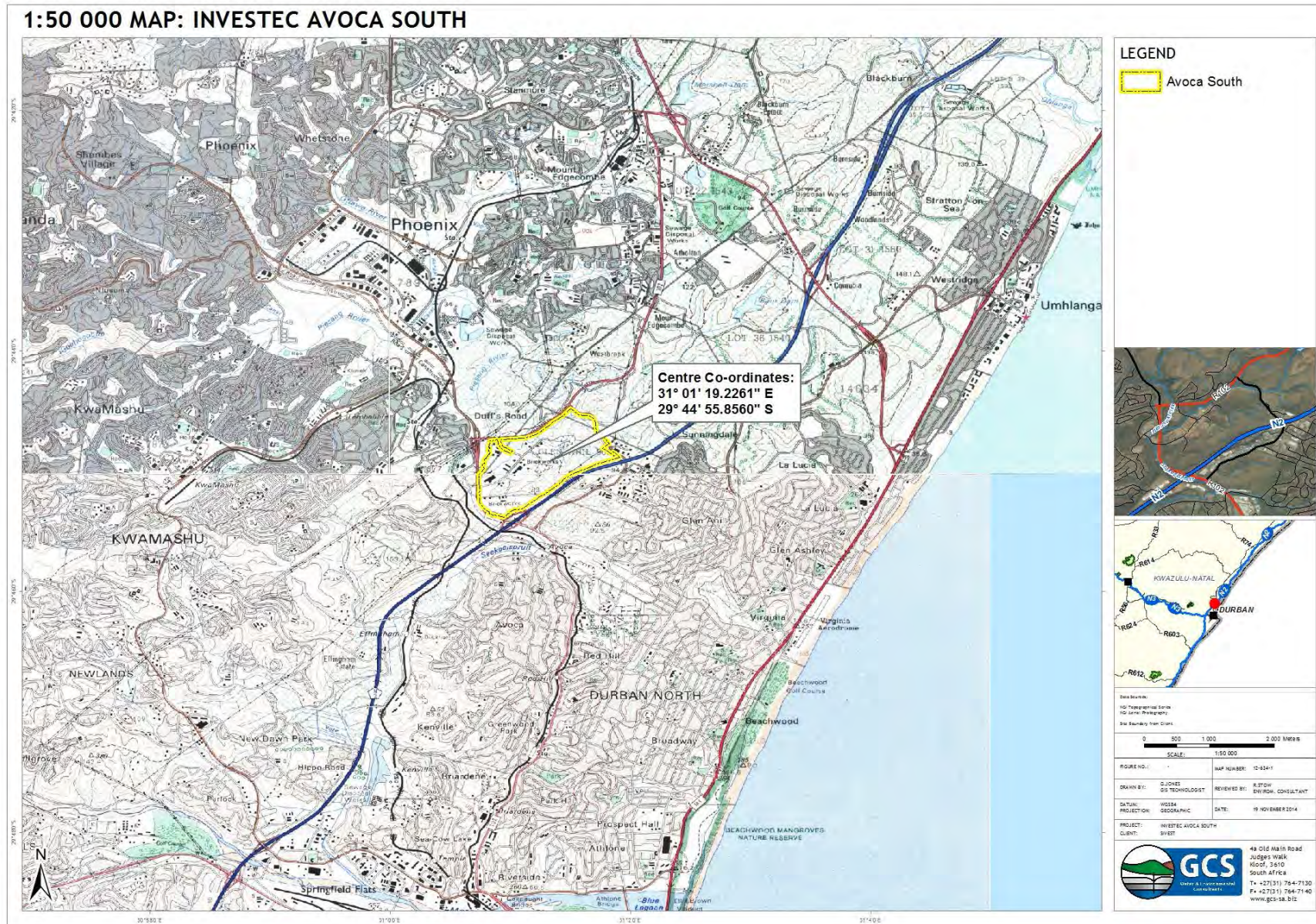


Figure 1-1: 1:50 000 Topographical Map

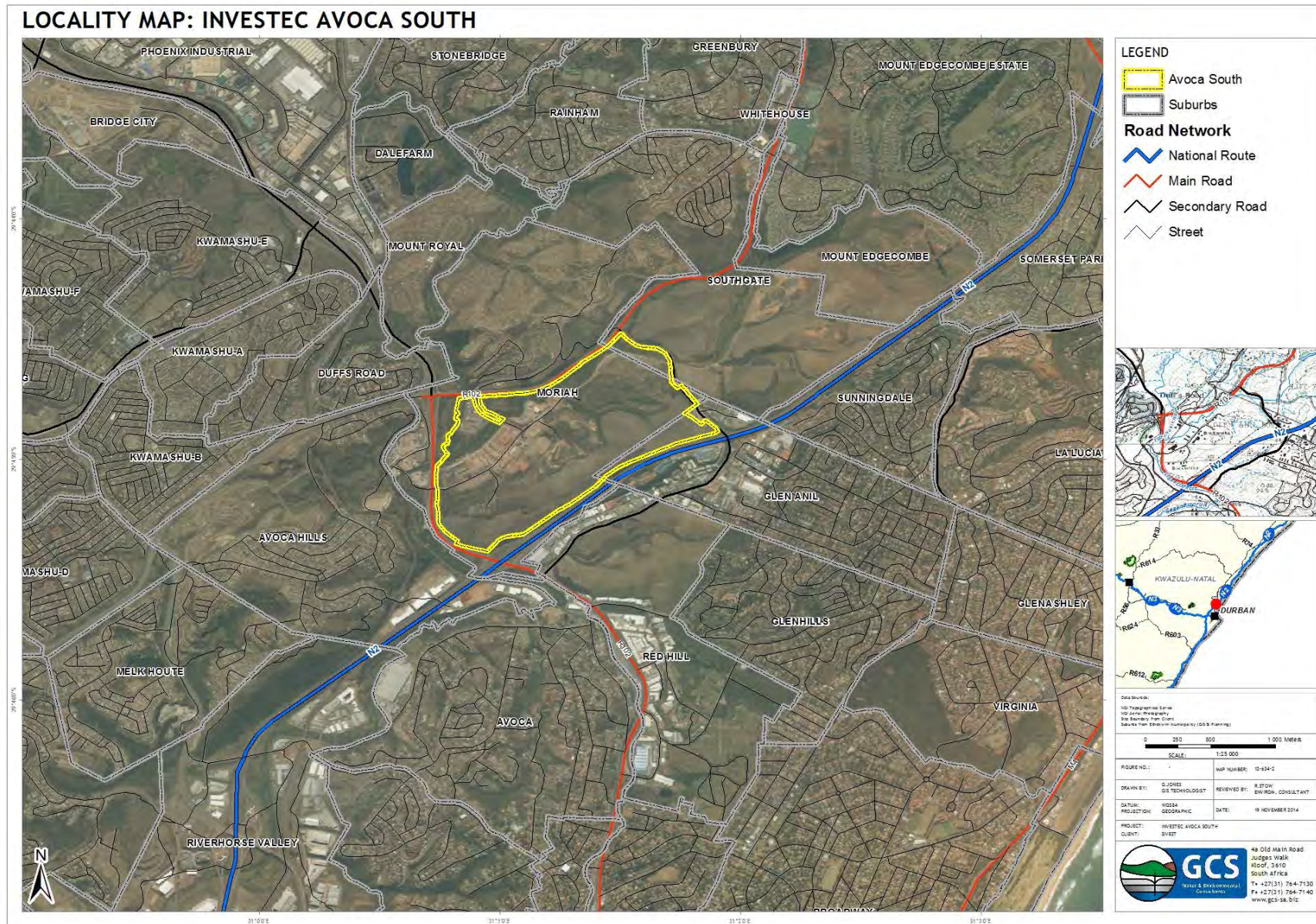


Figure 1-2: Locality Map

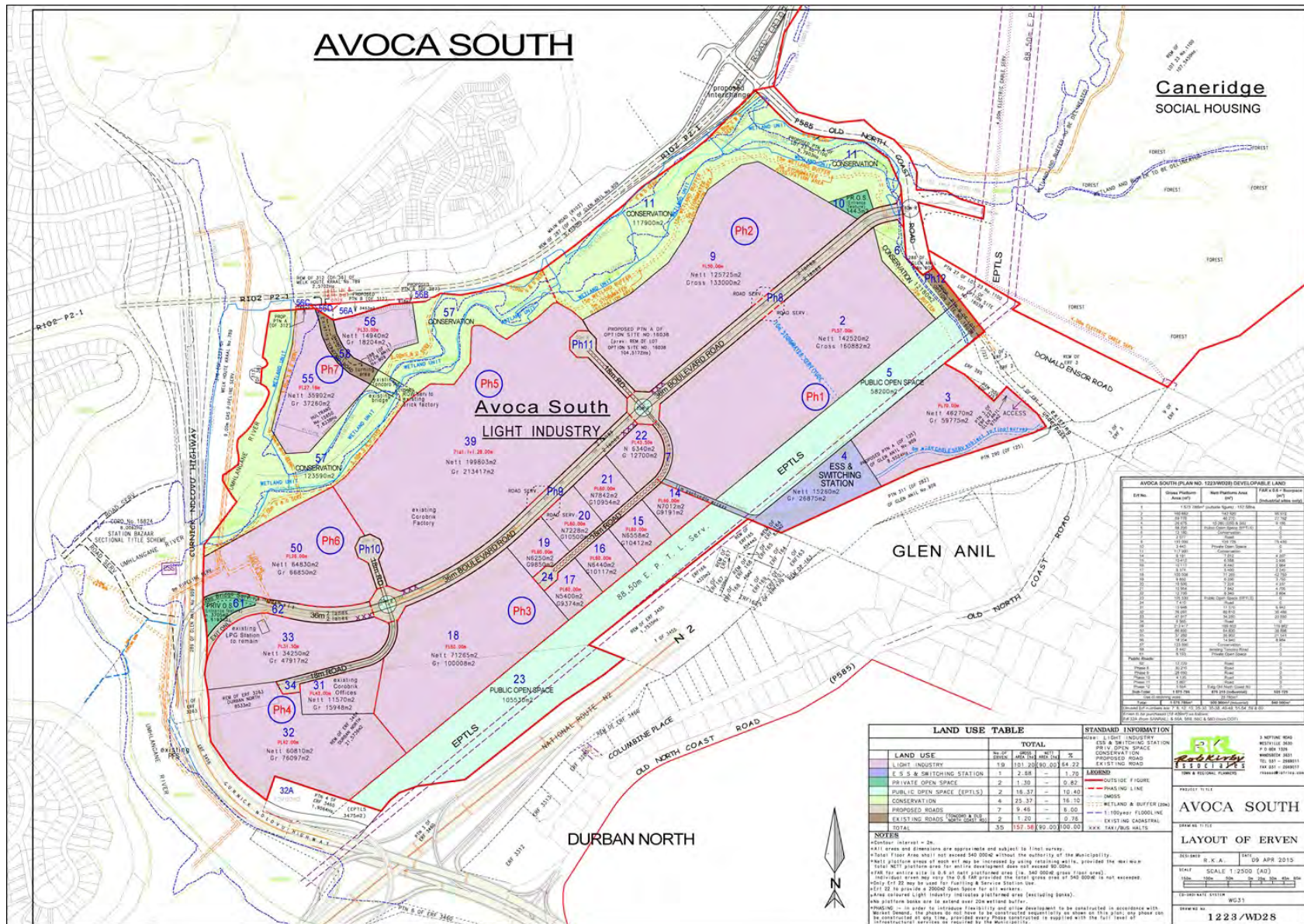


Figure 1-3: Proposed Layout Option 5 - Drawing No. 1223/W28

## 1.2 Legislative Context and Requirements

This report represents the Final EIA Report for the proposed development of the Avoca South Industrial and Business Estate which has been prepared in accordance with the EIA Regulations published in Government Notice No. R543 of 2010. These Regulations were published by the Department of Environmental Affairs (DEA) under Section 24(5) read with Section 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) (as amended) to control activities which may have a detrimental effect on the environment.

Activities listed under Government Notice No. R544 require a Basic Assessment process to be undertaken while those listed under Government Notice No. R545 require a full Environmental Impact Assessment process. The activities detailed in Table 1-1, as listed in Government Notice No. R544 and 545 (December 2010 EIA Regulations) (as amended), have relevance to the proposed project.

Table 1-1: Identified Listed Activities

Relevant Notice	Activity No	Listed Activity	Description of the Activity
GNR 544	9	<p><i>The construction of facilities or infrastructure exceeding 1000 meters in length for the bulk transportation of water, sewage or storm water -</i></p> <p>(i) <i>With an internal diameter of 0,36 metres or more; or</i></p> <p>(ii) <i>With a peak throughput of 120 litres per second or more,</i></p> <p><i>Excluding where:</i></p> <p>a) <i>Such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or</i></p> <p>b) <i>Where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.</i></p>	<p>The infrastructure for the transportation of water, sewage and storm water will have a minimum internal diameter of 0,375m or a have a peak throughput of 120 litres per second. Even though the development falls within an urban area, the pipelines will cross one watercourse and are positioned within 32m of various watercourses.</p>
GNR 544	11	<p><i>The construction of</i></p> <p>(i) <i>Canals;</i></p> <p>(ii) <i>Channels;</i></p> <p>(iii) <i>Bridges</i></p> <p>(iv) <i>Dams;</i></p> <p>(v) <i>Weirs;</i></p> <p>(vi) <i>Bulk storm water outlet structures;</i></p> <p>(x) <i>Building exceeding 50 square metres in size; or</i></p> <p>(xi) <i>Infrastructure or structures covering 50 square metres in size</i></p> <p><i>Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</i></p>	<p>The conceptual development plan proposed for the site development requires certain drainage lines to be infilled and for others to be positioned within 32m of certain watercourses. Certain roads and bridges will also cross or impact on watercourses. In addition, civil infrastructure for sewage, storm water and water which is greater the 50m<sup>2</sup> in size will be constructed within 32m of some of the watercourses.</p>
GNR 544	18	<p><i>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from:</i></p> <p>(i) <i>A watercourse</i></p> <p><i>But excluding where such infilling, depositing, dredging, excavation, removal or moving:</i></p> <p>(a) <i>Is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority or</i></p> <p>(b) <i>Occurs behind the development setback line</i></p>	<p>During the construction phase more the 5m<sup>3</sup> of material will be deposited and/or excavated from the watercourses. In addition, certain water and wetland systems are likely to be in-filled to allow for platforming. Other wetland systems will be rehabilitated as a form of offsetting.</p>
	37	<p><i>The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where:</i></p> <p>(a) <i>the facility or infrastructure is expanded by more than 1000 metres in length; or</i></p> <p>(b) <i>where the throughput capacity of the facility or infrastructure will be increased</i></p>	<p>Municipal infrastructure will be expanded for the bulk transportation of water, sewage or storm water where this infrastructure may be constructed within 32m of a watercourse.</p>



		<p><i>by 10% or more-</i></p> <p><i>excluding where such expansion:</i></p> <p>(i) <i>relates to transportation of water, sewage or storm water within a road reserve;</i></p> <p>(ii) <i>Where such expansion will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.</i></p>	
GNR 544	56	<p><i>Phased activities for all activities listed in this Schedule, which commenced on or after the effective date of this Schedule, where anyone phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.</i></p>	<p>The development is likely to be divided into phases and thus all phases will be taken into account when determining whether the activity is greater than the threshold.</p>
GNR 545	5	<p><i>The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.</i></p>	<p>Construction of the proposed development will require a Water Use Licence in terms of the National Water Act (Act No 36 of 1998) from the Department of Water and Sanitation for all activities within 32m of a watercourse.</p>
GNR 545	15	<p><i>Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more;</i></p> <p><i>Except where such physical alteration takes place for:</i></p> <p>(i) <i>Linear development activities; or</i></p> <p>(ii) <i>Agricultural or afforestation where activity 16 in this Schedule will apply.</i></p>	<p>Corobrik is currently using the property on for clay mining and brick making. The land is zoned as 'extractive industry'. The property size is approximately 157ha, of which 90ha of the land is proposed to be levelled platforms and subdivided to form light industrial, general business and warehousing platforms while the remainder of the site will be zoned as open space or conservation and roads. Thus the size of the property to be developed is greater than 20ha.</p>
GNR 545	18	<p><i>The route determination of roads and design of associated physical infrastructure including roads that have not yet been built for which routes have been determined before 03 July 2006 and which have not been authorised by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 or 2009, made under section 24(5) of the Act and published in Government Notice No. R. 385 of 2006,-</i></p> <p>(i) <i>It is a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);</i></p> <p>(ii) <i>It is a road administered by a provincial authority;</i></p> <p>(iii) <i>The road reserve is wider than 30 metres; or</i></p> <p>(iv) <i>The road will cater for more than one lane of traffic in both directions.</i></p>	<p>The development will require the construction of new roads and may require that certain intersections be upgraded to cater for the increase in traffic flow..</p>

The proposed project constitutes activities under both GNR 544 requiring a Basic Assessment and GNR 545, requiring a full Scoping and Environmental Impact Assessment Process. However, the EIA Regulations (GNR 543) stipulate that where any activity associated with a proposed development is listed within GNR 545, a full Scoping and EIA Process must be followed, regardless of whether additional activities are identified in GNR 544 for Basic Assessments. Hence, a full Scoping and EIA Process were undertaken for the proposed Avoca South Industrial and Business Estate. The competent authority to review the application for Environmental Authorisation (EA) is the Department of Economic Development, Tourism and Environmental Affairs (DEDTEA).

A detailed description of the applicable legislation is attached in Appendix A which aims to provide a review of relevant national and provincial legislation and regulations and policy documents, which are applicable to, or have implications for, the proposed Avoca South Industrial and Business Estate.

### 1.3 Responsible Parties

Table 1-2: Responsible Parties

DEDTEA ASSESSING OFFICER	PROPONENT
Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) Environmental Management Unit Ms Yugesni Govender Assistant Manager Impact Assessment  Eagle Building, 357 West Street, 3000  Tel: 031 302 2868 Fax: 031 302 2824 Email: Yugesni.Govender@kzndae.gov.za	Investec Property Limited Mr John Rosmarin  PO Box 78949 Sandton, 2146  Tel: 011 291 3135 Fax: 011 291 1630 Email : john.rosmarin@investec.co.za
PROJECT ENGINEER AND PROJECT MANAGER	ENVIRONMENTAL ASSESSMENT PRACTITIONER
SiVEST Mr Gary Visser Divisional Manager SiVEST Engineering Division  P.O. Box 1899 Umhlanga Rocks, 4320  Tel: 031 581 1500 Fax : 031 566 2371 Email : garyv@sivest.co.za	GCS Mr Russell Stow Environmental Scientist Principal Environmental Scientist  P.O. Box 819 Gillits, 3603  Tel: 031 764 7130 Fax: 031 764 7140 Email: russells@gcs-sa.biz
TOWNPLANNER	
Rob Kirby & Associates Mr Rob Kirby Director P O Box 1326 Wandsbeck, 3631	

Tel : 031 266 9011 Fax: 031 266 9017 Email: rkassoc@iafrica.com	
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## 1.4 GCS Project Team

### 1.4.1 Background

GCS was established in 1987 as an independent consultancy providing expertise in groundwater related fields. Since then, GCS' professional services have evolved to include earth sciences, environmental, GIS and water resources management (hydrology, hydrogeology, water use). The various disciplines are managed as units.

GCS has always endeavoured to provide professional and cost-effective consulting services to clients. The company's vision is to grow and develop into a consultancy and employer of choice, servicing the global market.

The Environmental Unit at GCS Durban has been involved in environmental authorisation processes and related work for the past 10 years. The unit members of the Durban team, specifically Mr Labuschagne and Mr Stow, have a wide range of environmental management skills and have been involved in the application for authorisation for a number of large scale developments and multi-discipline projects for the past 15 years. The environmental services that the unit has been involved in include the following:

- Environmental Applications in terms of the NEMA;
- Mining Right Applications in terms of the MPRDA;
- Waste Licenses in terms of the NEM:WA;
- Water Use License Applications in terms of the NWA;
- Public Participation Process in terms of the NEMA and associated Guidelines;
- Integrated Water and Waste Management Plans in terms of the NWA;
- Environmental Planning;
- Environmental Due Diligence Assessments;
- Environmental Site Selection Assessments;
- Performance Assessments and Audits in terms of the MPRDA, NEMA and NWA;
- Implementation of Environmental Management Programmes; and
- Environmental Legal Reviews.

### 1.4.2 Our Professional Affiliations

GCS and its employees are members of relevant professional associations. The value of academic development and the professional standards that these associations represent are recognised by the company. The professional associations include, but are not limited to:

1. South African Council of Natural Scientific Professionals (SACNASP - Pr.Sci.Nat.);
2. Environmental Assessment Practitioners of South Africa (EAPSA);

3. International Association for Impact Assessment - South Africa (IAIAsa); and
4. Environmental Law Association (ELA).

#### 1.4.3 GCS Project Team

The GCS EIA project team comprises the members detailed in Table 1-3.

Table 1-3: GCS EIA Team Members

NAME	ROLE
Pieter Labuschagne	Project Director
Russell Stow	Project Leader and Principal Environmental Scientist
Karin Fivaz	Project Environmental Scientist

Detailed CVs of the GCS project team as well as the company profile are attached under Appendix B.

### 1.5 Approach to the EIA

#### 1.5.1 Purpose of the EIA

The EIA Regulations of 2010 dictates an EIA process which involves the identification and assessment of direct, indirect and cumulative environmental impacts, associated with a proposed project/activity and provides mitigation measures and recommendations to reduce, minimise, and/or negate the negative impacts and promote the positive impacts. The EIA process encompasses two phases: i.e. Scoping Phase and Impact Assessment Phase. The first phase consists of the submission of a Scoping Report and associated Plan of Study (PoS) for the Impact Assessment Phase and approval by the competent authority. This is then followed by the second phase - the 'Impact Assessment Phase' which culminates in the submission of an EIA Report (including an Environmental Management Programme (EMPr) to the competent authority for decision-making.

##### 1.5.1.1 Scoping Phase

The aim of the Scoping Phase is to inform Interested and Affected Parties (I&APs) of the proposed project, identify issues and concerns, scope potential impacts, and plan investigative specialist studies to research and accurately assess potentially significant impacts. The objectives of the Scoping Phase are to:

- Identify all potential environmental (biophysical and social) issues and impacts, negative and positive, resulting from and/or associated with all phases of the proposed development (i.e. design, construction, operation and decommissioning) through consultation with key stakeholders, the public and existing baseline data.
- Clarify the reasonable and feasible project-specific alternatives to be considered through the EIA process, including the "no go" option.

- Identify and flag potentially sensitive environmental features on the site to inform the preliminary design process of the facility.
- Conduct an open, participatory, and transparent public involvement process and facilitate the inclusion of stakeholders' concerns regarding the proposed project into the decision-making process.
- Compile a 'roadmap' or Plan of Study for the EIA Phase to address each of the issues and impacts as identified in the Scoping Phase.
- Define the scope of the specialist studies to be undertaken to assess the significance of the impacts during the EIA phase.
- Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as the scope and extent of specialist studies that will be undertaken as part of the EIA Phase of the process.

#### *1.5.1.2 Impact Assessment Phase*

The Impact Assessment Phase comprises the actual assessment of potential impacts and the compilation of a comprehensive EIA Report. The objectives of the Impact Assessment Phase are listed below:

- Assess alternatives to the proposed activity in a comparative manner.
- Undertake specialist studies required.
- Formally assess the nature, intensity, magnitude, duration, probability and significance of all of the potential impacts identified in the Scoping Phase.
- Identify feasible and realistic mitigation measures required to avoid and/or minimise the negative environmental impacts resulting from the activity and combine and present all these measures in the form of a construction and operational EMPr in accordance with NEMA.
- Provide the competent authority with sufficient information in order to make a decision regarding the authorisation of the activity.

#### *1.5.1.3 Environmental Management Programme (EMPr - NEMA)*

The EMPr associated with the NEMA EIA process outlines the mitigation measures and plans that need to be implemented and adhered to by the applicant in order to ensure that the impacts resulting from the proposed development are minimised. The EMPr includes all the mitigation requirements recommended and required for each of the potential impacts identified and assessed in the EIA. The EMPr will be a legally binding document and the applicant will be required to meet the requirements specified in the document. The EMPr will be submitted to the competent authority for approval with the EIA Report. The EMPr is a 'living' document that can be amended to suit changing project development requirements on approval by the competent authority.

### 1.5.2 Public Participation

The NEMA EIA Regulations (GNR 543) specify that a Public Participation Process (PPP) must be conducted as an integral part of the EIA and in accordance with Sections 54 of the Regulations and associated guidelines.

#### 1.5.2.1 Objectives of Public Participation

The procedures followed during the PPP for the proposed project must adhere to the NEMA principle whereby the participation of all I&APs in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured [NEMA, Section 2(1)(f)].

The main objectives of the PPP are to:

- Identify key stakeholders (i.e. NGOs, municipalities, government departments, traditional authorities) and I&APs (i.e. surrounding businesses, residents, landowners, interested members of the public).
- Inform I&APs about the proposed project and the Scoping and EIA Process.
- Establish lines of communication between I&APs and the project team to deal with potentially contentious issues.
- Provide ample opportunity to all parties to exchange information and express their views and raise issues and concerns.
- Obtain contributions of I&APs and ensure that all issues, concerns and queries raised are fully documented and assessed as part of the Scoping and EIA process.

#### 1.5.2.2 NEMA Requirements for Public Participation

Regulation 54 of the NEMA EIA Regulations outlines the requirements for the notification and involvement of all potential I&APs. These requirements are summarized as follows:

- Fix a notice board at a conspicuous place on all alternative sites.
- Give written notice to:
  - The landowners and occupiers of the sites and those within 100 m of the alternative sites or those directly influenced by the activity under consideration.
  - The municipality which has jurisdiction in the area.
  - Ward councilors, traditional authorities and ratepayers associations.
  - Any organs of state having jurisdiction in respect of any aspect of the activity.
- Place an advertisement in a local newspaper or official Gazette.
- Place an advertisement in a regional and provincial and or national newspaper if

the impact extends beyond 'local' boundaries.

- Make information containing all relevant facts in respect of the application available to potential I&APs.
- Facilitate participation by potential I&APs in such a manner that all potential I&APs are provided with a reasonable opportunity to comment on the application.

## 1.6 Scoping Phase Activities

The Environmental Scoping and Impact Assessment Phases have been undertaken in accordance with the requirements of Section 24 of the NEMA, as read with GNR 543 (Regulations 26-29), 544, 545 and 546 of the NEMA and the Integrated Environmental Management (IEM) Information Series published by the Department of Environmental Affairs and Tourism (now DEA) in 2002. The approach is aimed at promoting accountable and informed decision-making.

The competent authority for this application is the KZN Department of Economic Development, Tourism and Environmental Affairs (DEDTEA), previously known as the Department of Agriculture and Environmental Affairs (DAEA).

Activities that have been carried out as part of the Scoping Phase are summarized in the sub-sections that follow.

### 1.6.1 *Competent Authority Consultation*

- A pre-application meeting was held with Ms Yugesni Govender of the then Department of Agriculture and Environmental Affairs (DAEA) now DEDTEA on 02 March 2013 and again on 17 March 2014. A record of correspondence with the competent authority is included in Appendix H of this document.

### 1.6.2 *I&AP Identification and Notification*

- Key stakeholders were identified for inclusion in the PPP, such as municipal authorities, government departments and environmental groups that have jurisdiction over, or potential interest in, the activity. The key organisations and stakeholders identified include:
  - eThekweni Municipality;
  - Local Ward 102 Councilor;
  - Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) (formerly the Department of Agriculture and Environmental Affairs - DAEA);
  - AMAFA - KwaZulu-Natal Heritage;
  - Department of Water and Sanitation (DWS);

- Ezemvelo KZN Wildlife (EKZNW);
- Wildlife and Environment Society of South Africa (WESSA) - KZN Region;
- Department of Agriculture, Forestry and Fisheries (DAFF); and
- Department of Transport (DOT).
- An electronic I&AP database was developed, which is maintained and updated throughout the project. Appendix C contains a copy of the latest I&APs register as at 10 July 2015 (Note that the register includes role players and stakeholders).
- An invitation for the registration and participation of I&APs was placed in the Ilanga, Izolezwe and Mercury newspapers on 13-15 February 2014. Refer to Appendix D for copies of media notices.
- More than twelve (12) notice boards providing information on the project and the Scoping and EIA Process, as well as inviting I&APs to register with the project, were strategically placed in prominent community areas surrounding the site (Appendix D). All notice boards were designed to the specifications of Section 54 (3) of the NEMA EIA Regulations.
- Notification of key stakeholders through letters, email and telephonic discussions between 10 February 2014 to 16 February 2015. Refer to Appendix D for copies of I&AP notification letters.

#### 1.6.3 *Background Information Document*

- The Background Information Document (BID), compiled in English and Zulu, introduced the proposed project and contained background information on the project, the proponent, consultants and the proposed Scoping and EIA process and associated PPP to be followed. It also included an invitation to I&APs to register and submit any comments to GCS in writing as well as providing a locality map (see Appendix D). Over 1200 BIDs were hand-delivered to the surrounding communities.

#### 1.6.4 *Public Meeting*

- A Scoping Phase Public Meeting was held on 10 January 2015 at Mt Royal Combined School (Appendix D). The meeting took place after the Draft SR had been in circulation for at least 2 weeks. The meeting was not attended by any of the registered I&APs, nor by any other public members.
- A second public meeting in the Impact Assessment Phase was coordinated on 4 July 2015 once the Draft EIA was made available for public comment.

#### 1.6.5 *EIA Application*

- The EIA application to undertake the listed activities was submitted to the DAEA on 26 October 2012. GCS received the acknowledgement of the application form and authorisation to proceed on 29 October 2012. The project was allocated reference number DM/0010/2014. A copy of the application forms is included in Appendix H.



### *1.6.6 Comments and Response Report*

- Copies of all comments and issues raised during the PPP have been consolidated into the Comments and Response Report (CRR) (Appendix E), which summarises each comment/issue received and provides a response. Copies of the submissions received from I&APs and key stakeholders are included in Appendix F.

### *1.6.7 Draft Scoping Report*

- All I&AP and Stakeholder comments and issues were recorded and all written comments received were included in the Draft Scoping Report (SR).
- The Draft SR was made available for public comment for 30 days and all registered I&APs were informed of the availability of the Draft SR for public review. The Draft SR was submitted for public review from 21 November to 10 January 2015. This period was considerate of the festive holiday season and the EIA Regulation Guidelines public participation exclusion period (15 December to 2 January). The report was made available for review at the following venues:
  - Stonebridge Public Library.
  - KwaMashu Public Library.
  - GCS Office (Kloof).
- The full document was also loaded onto the GCS Website and soft copies on CD were also made available.

### *1.6.8 Final Scoping Report*

- Comments received from Stakeholders in response to the review of the Draft SR were collated, documented and responded to in the CRR and Final Scoping Report (SR) where appropriate.
- The Final SR was made available for public comment from 16 February to 18 March 2015 (30 days), and all registered I&APs were informed of the availability of the Final SR for public review at the same venues.
- The Scoping Phase of the EIA was concluded with the compilation and submission of a Scoping Report and PoS to the DEDTEA for acceptance on 17 February 2015. All I&AP and Stakeholder comments submitted in response to the review of the Final SR were submitted directly to the DEDTEA Assessing Officer.
- The Final Scoping Report and PoS were accepted by the DEDTEA on 17 March 2015. A record of correspondence with the competent authority is included in Appendix H.

## 1.7 Impact Assessment Phase Activities

Activities carried out in preparation of this Final EIA Report include the following:

### 1.7.1 Draft EIA Report

- The compilation of the Draft EIA Report commenced with the appointment of technical and specialist studies, as per the terms of reference included in the PoS for EIA.
- All I&AP and Stakeholder comments submitted in response to the review of the FSR were collated, documented and responded to in the updated CRR where appropriate (Appendices E).
- Compilation of the Draft EIA Report and EMPr, including findings of the above-mentioned studies, a detailed impact assessment and mitigation measures/recommendations.
- Distribution of the Draft EIA Report and EMPr to key stakeholders, government departments and availability of the Report for I&AP review at public venues for a 40 day comment period (2 June 2015 to 12 July 2015).

### 1.7.2 Public Meeting

- A Public Meeting was held on 4 July 2015 at the Corovoca Primary School to inform stakeholders of the project and provide an opportunity to discuss concerns and submit comments on the Draft EIA Report.

### 1.7.3 Technical and Specialist Studies

- The list of technical and specialist studies included in this Final EIA Report is as follows:
  - Engineering Services Report (Appendix K1);
  - Stormwater Management Plan (Appendix K2);
  - Traffic Impact Assessment (Appendix K3).
  - Geotechnical Assessment (Appendix K4).
  - Major Hazardous Installation Assessment (Appendix K5);
  - Vegetation Assessment (Appendix K6);
  - Faunal Assessment (Appendix K7);
  - Freshwater Habitat Impact Assessment & Conceptual Rehabilitation Plan (Appendix K8);
  - Socio-Economic Impact Assessment (Appendix K9);
  - Heritage Impact Assessment (Appendix K10);
  - Wetland delineation Report (Appendix K11);
  - Rehabilitation and Conservation Management Plan (Appendix K12) and
  - Landscaping Plan (Appendix K13).

#### 1.7.4 *Compilation and Submission of Final EIA Report*

- All I&AP and Stakeholder comments submitted in response to the review of the Draft EIA Report were collated, documented and responded to, where appropriate, in the updated CRR (Appendix E).
- The Final EIA Report and EMPr will be submitted to the DEDTEA for consideration in the decision on Environmental Authorisation.
- The Report will be made available for I&AP review at public venues for a 21 day comment period.

### 1.8 Structure of this Report

#### Chapter 1: Introduction

Provides an introduction to the proposed development, summarises the details of the applicant and the EAP, describes the applicable environmental legislation, details the approach to the EIA and summarises activities undertaken to date.

#### Chapter 2: Description of the Proposed Development

Describes the proposed project in detail. This includes the project location, the motivation for the project and infrastructural requirements.

#### Chapter 3: Assessment of Alternatives

A description of the assessment of alternatives of the project is provided.

#### Chapter 4: Description of the Project Environment

Summarises the *status quo* of the project site and surrounding biophysical and socio-economic receiving environments to be considered as a baseline in the environmental impact assessment.

#### Chapter 5: Assessment of Environmental Impacts

Environmental impacts associated with the proposed development are identified and assessed. Issues communicated during the PPP, findings of specialist studies and recommended mitigation measures are also presented.

#### Chapter 6: Environmental Impact Statement

Concludes the Final EIA Report and gives a summary of key findings and recommendations.

#### Chapter 7: Way Forward

Details the way forward in the EIA process in terms of the submission to DEDTEA, availability for final public comment and any additional information requirements.

#### Chapter 8: References

Lists the references used in compilation of the Final EIA Report.

## 2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

### 2.1 Proposed Development of an Industrial and Business Estate

Investec proposes to develop the Avoca South Industrial and Business Estate comprising light industry, business parks and warehousing built on platforms on the existing 157.6 hectare land parcel between the N2, Curnick Ndlovu Highway (P93), Main Road R102 and Old North Coast Road (MR585). Hydrologically, the site is bounded along its northern and western boundary by the Glen Anil Stream which converges with the uMhlangane River which flows to the south of the site on the opposite side of the P93.

The site is situated on various plots including Lot Option Site 16038, Rem of Erf 3263, Rem of Erf 3454, Hultrans no. 15650 and Proposed PTN A (of 125) of Glen Anil no. 909. The site is currently zoned as Extractive Industry (85%) and Special Residential 600 (15%).

The proposed development will involve the platforming and development of approximately 90ha of the 157ha site ( $\pm 540\,000\text{m}^2$  floor space) subdivided to form light industrial, general business and warehousing property portions ranging in size from  $119\,882\text{m}^2$  down to  $3\,240\text{m}^2$  in floor area. In total, the park is planned to have  $525\,729\text{m}^2$  of floor area for light industrial use, with a permissible maximum of  $540\,000\text{m}^2$ . The open space and conservation area will cover an area of approximately  $43\,000\text{m}^2$  (27%), as reflected in RKA's Conceptual Layout Drawing No. 1223/WD28 (Layout Option 5) (Figure 1 3) shown above and attached under Layouts.

The proposed development will include provincial road upgrades and improvements, and service infrastructural upgrades and improvements for water, sewer and electricity. The site is also likely to include the stockpiling of  $500\,000\text{m}^3$  of clay reserves in the short term.

Avoca South will ultimately become one of the biggest industrial parks in the Durban North region. Inherently, the construction timeline for Avoca South will primarily be driven by market forces and maximum flexibility should be targeted in this regard. As such, the site will be developed in a phased approach, comprising seven (7) phases over an estimated 20 year period whereby sections of the site will be sequentially released for development while others are being prepared and serviced. In this way, the site is developed based on the market demand and funding.

The approach is also considerate of Corobrik's short to medium term operational plan to operate the brick making factory on the site for the next approximately 15 years. Phases 1 and 2 are proposed for the upper section of the site on either side of the boulevard. Phase 3 and 4 continue development down the eastern side of the boulevard towards the bottom

south-eastern corner, while the western-central area will be developed as Phases 5 and 6, with Phase 7 and 8 comprising the area of the brick factory and will thus be the last portions of the site developed.

## 2.2 Project Locality, Current Land Use and Development Context

### 2.2.1 Project Locality

The site is bordered by roads on all sides: MR577 (North) Old North Coast Road (East), N2 Highway (South) and the Curnick Ndlovu Highway (West) (Figure 1-2). The residential areas of Mount Moriah lie to the north of the site, while Corovoca Township and Avoca Hills lie to the west. Furthermore, a number of industrial estates are interspersed in the area adjacent to the N2 Highway along with areas of undeveloped land and sugarcane plantations. The proposed Rohill Industrial and Business Estate site and the residential areas of Glen Anil and Glen Hills are situated east across the N2 Highway from the proposed site. North-east of the site lie further sugarcane plantations and vacant land, which have been identified for the construction of industrial estates or low cost housing depending on the needs of eThekweni Municipality.

The Glen Anil Stream forms the northern boundary of the site. This is a perennial river and drains a substantial area of Inanda, KwaMashu and Ntuzuma. The river is in a poor ecological state and is under pressure from suburban activities. The Stream flows into the uMhlangane River at the North-western corner underneath the Curnick Ndlovu Highway which forms the southwestern boundary of the property.

### 2.2.2 Regional Context

The eThekweni Municipality Integrated Development Plan (IDP) 2014, notes that the eThekweni Municipal Area (EMA) is situated at the centre of the Maputaland-Pondoland-Albany Region, an area described by Conservation International as a “Biodiversity Hotspot”, one of only 34 in the world.

The EMA is characterised by diverse topography, from steep escarpments in the west to a relatively flat coastal plain in the east. The landform incorporates 98 km of coastline, 18 major catchments and 16 estuaries, 4 000 km of river, covering a geographical area of 2 292km<sup>2</sup> with nearly 75 000 ha of land identified as part of the Durban Metropolitan Open Space System (D'MOSS) (adopted December 2010).

The D'MOSS areas around the Avoca South site include the Glen Anil Stream, uMhlangane Vlei, uMhlangane River and associated floodplains (Figure 2-1). Currently the site is being mined for clay deposits by Corobrik to be used for brickmaking at the factory on site and the remaining vacant and mined land is leased by Tongaat Hulett for sugarcane cultivation.



Figure 2-1: Durban Metropolitan Open Space System (D'MOSS) areas in the vicinity of the Avoca South site.

The municipality consists of 103 wards with the proposed development site falling with Ward 102- Mount Edgecombe. Effingham-Avoca is an industrial node catering to light industry as well as meeting residential demand situated on the northern side of central Durban. Residential areas around the development site include Avoca Hills, Corovoca and Mount Moriah Township.

The major transport routes in close proximity to the site include Chris Hani Road (formerly North Coast Road) which extends from the Umgeni River inland past the site after it becomes Curnick Ndlovu Highway (KwaMashu Highway) at the N2 interchange. The MR577 which forms the northern boundary of the site is intended to become a major north-south transport route linkage in the province once complete as it will connect Pinetown/New Germany with the northern suburbs of Phoenix and Umhlanga. Furthermore, rail access into the centre of Durban from Phoenix, KwaMashu, Ntuzuma and Inanda is already present.

The Dube Trade Port and King Shaka International Airport are also situated just 20 km north of the site, while the Port of Durban is situated 25 km to the south. All allow for the rapid movement of goods and people to and from the proposed site making it ideally located for a development of this nature.

### 2.3 Motivation for the Project

Investec Property, a division of Investec Bank (Pty) Ltd, is one of South Africa's best recognised property operations and has built strong portfolios within the specialist areas of:

- Developments - developing and refurbishing within the office, retail, mixed use and industrial sectors;
- Trading and acquisitions - sourcing buildings or land opportunities with the intention of unlocking value and ultimately trading the assets in order to maximize return; and
- Land conversion - sourcing land opportunities within the industrial, office and residential, mixed use and industrial sectors with the intention of zoning or re-zoning including establishing a township providing services and obtaining the necessary approval and township proclamation in order to sell or develop the stands.

The Industrial Development Unit of Investec has had extensive experience in developing large tracts of land from having no rights or services to establishing and installing the necessary engineering services in the township and thereafter in many cases developing the top structures. The majority of these developments in recent years have been related to the Distribution and Logistics field.

The Investec Industrial Unit managing the project has, to date, successfully completed many industrial buildings and distribution centres and regards itself as one of the most experienced and knowledgeable industrial and commercial property developers in South Africa. It has identified a need in the eThekweni metropolitan area for a new major industrial and logistics node and identified the Corobrik property as the optimum site due to:

- Availability of the land for development post mining;
- Demand for such developments in the Durban region;
- Its location along and between primary transport routes in the Durban Metropolitan area;
- Its position in terms of proximity to major import and export gateways i.e. the Durban port and King Shaka International Airport and Dube Tradeport;
- The zoning of the land for such uses and related integration of the proposed development with strategic and spatial development plans for this region; and
- Integration of the proposed land use with adjacent land uses such as the Riverhorse Valley Logistics and Light Industrial Park.

The proposed Industrial and Business Estate is ideally located within the Effingham-Avoca area which is already an existing industrial node catering for light industry and residential services. The proximity to an already developed area provides the opportunity for the development to easily tie into the existing bulk services.

The development of the site for business/industrial use is also in line with that proposed in the Spatial Development Framework (SDF) prepared by the eThekweni Municipality and approved by the general public on three (3) separate occasions (1998, 2004 and 2012).

The proposed Avoca South Industrial and Business Estate will:

- Provide industrial/logistics, clean manufacturing, business park and associated office opportunities in close proximity to the King Shaka International Airport and with good accessibility to major routes;
- Contribute towards positioning eThekweni as an industrial, logistics and business hub;
- Create an opportunity to improve the road network;
- Significantly increase job opportunities; and
- Generate revenue for the city through municipal rates.

The necessary research has been undertaken by Investec and they have determined that the site is viable for the development of an industrial and logistics node. Substantial



interest has already been shown by national and international companies in potentially locating on the site.

The Avoca Hills, Corovoca Township and Mount Moriah area will be improved in terms of appearance as the developers propose to create an architecturally sound development park with indigenous landscaping and urban greening. In addition, a number of green zones around the site will be rehabilitated to improve the biodiversity links in the area. The development design will be prepared taking into consideration the concerns from the surrounding landowners, I&APs and key stakeholders.

### *2.3.1 Investec Property development proposals*

Investec Property is the sole developer of the Avoca South Industrial and Business Estate. They are responsible to undertake all the necessary planning and environmental authorisation applications.

Investec Property intends to develop warehousing structures on as many of the stands themselves in a phased approach. This will, however, be dependent on market demand and commercial viability. The development will consist of a combination of larger and smaller stands and Investec Property will by preference, seek opportunities where they could develop the larger stands. Even though Investec Property may ultimately not be the only developer for all the stands they will ensure that the entire estate is developed in a co-ordinated and integrated manner while taking cognisance of the need to include sustainable development practices within the development. They are committed to undertake environmental rehabilitation works as per specification of environmental authorisation.

It is also the responsibility of Investec Property to undertake planning, installation and construction of all the engineering services. This will include both internal as well as external bulk engineering services and a pro rata contribution towards the upgrading of the external road and electricity network.

Once the development is fully completed, Investec Property will not retain ownership. The completed developments will be sold to either the Investec Property Fund, or similar fund, or to the tenant for whom the building was constructed. The entire business estate will be managed by a not for profit Estate Owners Association and membership will be compulsory to all land owners.

### *2.3.2 Socio-Economic Development Statistics*

Rob Kirby and Associates, the project's town planner, has commissioned a socio-economic analysis of the proposed 90ha nett developable land of Avoca South Industrial Park based on traffic modelling predictions, property values and rates, building construction costs and

infrastructural costs. The following statistics were generated:

- A maximum of 540 000m<sup>2</sup> of building floor space will be created;
- Approximately 10 800 jobs will be created during the infrastructure and building construction phase. If 1 000 jobs are added to construct the infrastructural services a total of 1 800 jobs will be created over a 10-15 year building and construction period;
- Approximately 18 000 jobs will be created during the operational phase. If additional jobs are added for security staff, Home Owners Association, administrative and maintenance staff, 21 000 full time permanent jobs are likely to be created on site;
- Approximately 28 000 permanent jobs are likely to be created from the Avoca South development in terms of downstream “spin-off jobs” in the local and KZN building supplies sector and the more general local retail and service industry economy;
- The total number of jobs directly and indirectly created during construction and the operational phase of the Avoca South development is calculated at approximately 41 000 jobs;
- The total monetary value to be injected into the local economy arising from the project is anticipated to be at least approximately R 4.15 billion. If an approximate one-third downstream ripple effect is included it would not be inappropriate to predict an overall injection of approximately R 5.5 billion into the local Durban Metro economy; and
- It is estimated the eThekweni Municipality will accrue up to R 100 million per annum in rates when the project is complete.

## 2.4 Platforming and Associated Earthworks

At this stage the preliminary civil engineering layout aims to maximise the available platform area taking into account the following constraints:

- The presence and position of the clay brick factory and the associated mining operations which Corobrik intend to operate for the foreseeable future until demand for the new uses places pressure on the factory to re-locate;
- Preservation of as much of the watercourse and associated D'MOSS area that makes up the north-western boundary of the site, along the R102, including a buffer zone. This buffer zone will also act to shield the river system from the impacts of the project over the extended development duration and its proximity to the river system;
- Exclusion of unstable geological areas;
- Location of access points while minimising traffic related impacts;

- The centrally located degraded drainage lines which need to be in-filled in order to optimise the potential developable area; and
- The Glen Anil Stream situated on the northern boundary between North Coast Road and Curnick Ndlovu Highway of the site will be rehabilitated as part of the offset for the loss of the central drainage lines.

It is the objective of Investec Property to maximise the area for development while still taking into account environmental, hydrological and geotechnical constraints.

## 2.5 Infrastructure Availability and Requirements

The following section summarises findings of the Engineering Services Report (Appendix K1), the Stormwater Management Plan (Appendix K2) and the Traffic Impact Assessment (Appendix K3).

### 2.5.1 Water Supply

#### 2.5.1.1 Availability

The water supply authority for the area is eThekweni Municipality. The eThekweni Water and Sanitation Unit have confirmed that, at present, there is bulk capacity available for the development (refer to the Engineering Services Report - Appendix K1).

#### 2.5.1.2 Requirements

The estimated water demand for the proposed development will be 10800kl/day with a 75 litres per second (ℓ/s) peak flow. Potable water reticulation to the individual internal sites will be via buried underground piping laid within road reserves and suitably designed to account for flows and pressure. Each site will have its own individual water meter.

The potable water supply reticulation will also be designed to cater for the firefighting water requirements and hydrants and other control fittings will be suitably positioned. The geometric design of the roads will cater for a range of emergency response vehicles.

### 2.5.2 Sewage

#### 2.5.2.1 Availability

The eThekweni Municipality is the responsible authority for the provision of bulk sewage disposal. The eThekweni Water and Sanitation Unit has confirmed that, at present, there is bulk capacity of approximately 10ML/day available at the Northern Treatment Works (refer to the Engineering Services Report - Appendix K1). This capacity is, however, not reserved and is available on a 'first come first served basis'. If capacity should not be available at the time of construction then it would be the eThekweni Municipality's responsibility to

upgrade the bulk sewage system.

#### *2.5.2.2 Requirements*

The estimated daily sewer demand for Avoca South Industrial and Business Estate development will be 1242 kl/day. The proposed development will be serviced with a piped waterborne reticulation network. All sewage will be gravity fed to various low points where it will be connected to the bulk outfall lines that traverse the site. There is no requirement for pumping. The eThekweni Water and Sanitation Unit have undertaken an in-house capacity investigation on the outfall link sewer system and they have confirmed that there is sufficient capacity in this system to handle the expected yields.

### **2.5.3 Solid Waste**

#### *2.5.3.1 Availability*

Most solid waste generated from the development will fall within the business and commercial and non-hazardous industrial waste categories. eThekweni Municipality services will dispose of all waste at a registered licenced municipal waste site. Small quantities of hazardous waste may be generated due to maintenance of equipment or accidental spills of fuels or oils. It is required that hazardous waste is stored separately in sealed containers, on a bunded impermeable surface, and collected by a hazardous waste service provider for safe disposal or recovery at a suitable registered landfill site.

#### *2.5.3.2 Requirements*

Solid waste volumes are expected to be low. The solid waste will be stored in suitably designed bin areas on each internal individual site from where it will be collected at an agreed cost and at agreed fixed time intervals by the municipality. The frequency of collection, once a week or twice a week, is still to be finalised. The geometry of all roads will be more than adequate to cater for the waste collection vehicles.

### **2.5.4 Electricity Supply**

#### *2.5.4.1 Availability*

Electrical power to the site will be supplied to by the eThekweni Municipality Electricity Department which receives its power from Eskom. It has been established that the capacity of the bulk electrical infrastructure is limited and eThekweni Electricity have confirmed that, without the construction of a new major substation, there is insufficient power available in the current network to supply the proposed developmental needs for the Avoca South Industrial and Business Estate development.

#### *2.5.4.2 Requirements*

It has been proposed to build a new 60MVA substation to accommodate the demand of 16.2 MVA for the proposed development. This will also provide additional capacity for

surrounding developments (Rohill Business Estate) and municipal area. The approved site for the new substation is on the Avoca South site adjacent to the existing transmission lines. The required application (application number E0385203) has been submitted to eThekweni Municipality Electricity Unit for approval. However the construction period for a substation of this size is estimated to take between 3-5 years to be in operation.

Currently there is no actual short term bulk electricity available and the municipality maintains that there is only 1.5 MVA available which is being allocated on a 'first come first served' basis.

## *2.5.5 Stormwater Management*

### *2.5.5.1 Availability*

The only stormwater drainage located on the site at present is at the Corobrik factory and it exits into the Glen Anil Stream<sup>1</sup>, which runs along the northern border of the site. The proposed development of the site will take place in phases and will involve extensive modification, including the demolition of the Corobrik factory, to allow for the construction of level platforms. With majority of the site being developed, the increase in hardened surfaces is significant to the total development area. This will reduce natural rainfall infiltration and increase stormwater run-off which will have to be managed correctly to prevent potential downstream damage.

### *2.5.5.2 Requirements*

A Stormwater Management Plan (SWMP) has been produced for the proposed development (Appendix K2) where the planned stormwater systems have been divided into two main groups; the major systems and the minor systems.

The major systems are those drainage control elements that will be installed under the bulk earthworks and infrastructure construction phase and these include major culverts, roads and their associated drainage measures. The major system will be integrated with the existing natural drainage routes and the northern watercourses (Glen Anil Stream) and consist of a combination of engineered and natural features. The engineered features include the following: major culverts, roadways and their associated drainage networks, bulk attenuation structures if required, constructed for the control of peak run-off, as well as erosion and siltation control structures where necessary. The natural features will include discharge at regular intervals where practical to the drainage line to allow the spread of the discharge load. This will be done via outlet headwalls suitably designed to ensure that their impact on the natural environment is minimal. Furthermore, additional erosion protection in the form of reno mattresses, gabion baskets or other structures must

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<sup>1</sup> 1 NOTE: The Stormwater Management Plan refers to the Glen Anil Stream as the uMhlangane River. The stream is referenced differently in various historical and current documents and maps.

be incorporated.

Collection of large amounts of stormwater runoff will take place through the road network on site. This run-off should be directed at regular intervals into the piped stormwater system via suitably designed catch pits which are to be sized and positioned at intervals along the roads that allow for the efficient removal of the surface water without the danger of flooding.

Attenuation of stormwater for this development will be fundamental due to the majority of the site being modified to hardened surfaces and to prevent flood peaks. Outflow from the attenuation facilities must be limited to the pre-development scenarios for the following range of design storms: 5, 10 and 50 year. All attenuation within the development will be done on the individual platform sites and the total attenuation requirements and maximum allowable peak discharge rates per individual site have been pre-determined and are stipulated in SWMP (Appendix K2). The detailed mechanism of on-site stormwater attenuation is left to the discretion of each individual lot owner, provided that the maximum allowable discharge per site is not exceeded.

The minor systems are those disposal measures that will be installed for/or by the individual lot owners on each of the individual properties. The minor systems will link into the major systems. Attenuation of stormwater will take place at each individual site as discussed above. This design results in a significant cumulative influence on the total attenuation requirements for the full development.

Guidelines will be provided to assist the developers, owners and their professional teams with the planning of individual site stormwater layouts.

The main objectives of the Stormwater Management Plan are to provide guidelines whereby the following are achieved:

- To prevent down-stream flooding due to a change in catchment characteristics.
- To protect property and life from damage by caused by stormwater and floods.
- To prevent soil erosion and consequential down-stream damage.
- To prevent pollution of the water resources.
- To provide for the safe efficient removal of stormwater run-off from the various sites.

The Stormwater Management Philosophy is to compel the developer, the professional teams, contractors, property owners and the general public to:

- Reduce post development peak stormwater flows by the effective use of on-site

attenuation devices.

- Where practical, make use of rainwater harvesting techniques for the conservation and reuse of stormwater runoff.
- Prevent concentration of stormwater at points that are susceptible to erosion.
- Manage and contain potential soil erosion problem areas, particularly during the construction phase.
- Maintain adequate ground cover, particular to those areas disturbed during construction.
- Ensure that natural and artificial slopes do not become saturated and unstable.
- Ensure that the receiving environment can accommodate the increased flow.
- Ensure all stormwater control works are constructed in a safe and aesthetic manner in keeping with the overall Architectural theme for the Development.

## 2.5.6 Roads and Access

### 2.5.6.1 Availability

The existing roads around the Avoca site are the N2, a national route, along its eastern boundary. The N2 is a dual carriage freeway with 3 to 4 lanes, in each direction past the site. Old North Coast Road is located on the northern boundary of Avoca South and is a 2 lane single carriageway. Donald Ensor Road is an access road off Old North Coast Road that serves a small industrial development. Old North Coast Road meets up with the R102 at the north-eastern corner of the site. The R102 is located along the western (R102/MR2) and southern (R102/P93) boundaries of the site and meet the MR 577 at the R102 / P93 diamond Interchange, which is on the south-western corner of Avoca South. Access roads diverging off the R102/MR2 are; Mount Moriah Drive, extending westwards from the R102/MR2 and serves the Mount Moriah residential suburb and Toncoro Road, an existing access road serving the existing Corobrik facility and it extends eastwards from the R102/M2 opposite Mount Moriah Drive.

The MR577 is currently undergoing completion and subsequent upgrades and it will serve as a direct route between the R102 at Avoca and Pinetown/New Germany, west of Durban. Lark Road is an access road off MR 577, serving both the existing Corobrik facility, south of the R102 and the small residential suburb located on the south-western side of the R102 / MR577 diamond interchange. The KwaMashu Diverging Diamond Interchange (DDI) located along the R102 is located at the south-east corner of the site.

### 2.5.6.2 Requirements

The capacity of the surrounding road infrastructure to the proposed Avoca South Industrial and Business Estate is limited and will not be able to handle all the traffic generated from without some form of upgrading. There are also two other land parcels in the vicinity that

are earmarked for development within a similar timeframe as the proposed Avoca South Industrial area. These are “Rohill Business Estate” which will be another light industrial node and “Caneridge (Avoca North)”, which is earmarked for an eThekweni residential project. These three developments would essentially use the same road network and cumulative effects are expected in the volumes of traffic generated by each individual development.

#### *2.5.6.3 External Access Roads*

SANRAL has plans to upgrade the KwaMashu interchange in the long term but does not foresee the need to do so for the next eight years.

The main access to the proposed new development will be via a proposed 2 lane directional ramp off the Curnick Ndlovu Highway (P93) westbound carriageway, which will join onto a new undivided 4 lane main road (Boulevard Road) that will run in the middle of the site. Boulevard Road will intersect with Old North Coast Road and the proposed access road to Avoca North on the northern boundary. The existing one lane Corobrik exit ramp onto R102 in the south will be upgraded to two full-length lanes which will eventually be a left in and left out only directional movement (Refer to Appendix K3).

A new diamond interchange at the intersection of R102/MR2 and Old North Coast Road in the north-west of the development will be constructed to further improve access and manage traffic flow to the proposed development and surrounding area.

A secondary access to the proposed development will be off the R102/MR2 via the existing Toncoro Road. By 2030, both Toncoro Road and Mount Moriah Drive will be converted to left-in left-out access roads due to their close proximity to the R102/MR577 diamond interchange.

#### *2.5.6.4 Development phases*

The proposed development will be done in phases and Phase 1 will commence in 2017. It is assumed that the construction of Avoca South will extend beyond 10 years of Phase 1 and therefore it was necessary to extend the traffic impact assessment beyond the normal 10 year horizon in order to do a traffic analysis for the full Avoca South development. Therefore, in the case of the proposed Avoca South development, an assessment of the 10 year horizon (Phase 2) and 15 year horizon (Phase 3) will follow Phase 1.

The required road upgrades for Phase 1 in 2020 before any development has taken place includes the upgrade of:

- Chris Hani and Old North Coast road intersection.
- KwaMashu Interchange - Eastern Terminal Intersection.



- Lark Road and MR577 Intersection.
- R102 / MR577 Diamond Interchange - Southern Terminal Intersection.
- R102, Mount Moriah Drive and Toncoro Road.
- R102 and Old North Coast Road Intersection.
- Old North Coast Road and Donald Ensor Road.

In the Phase 1 of the Avoca South proposed development, which is 2020, the proposed Rohill Business Park on the opposite eastern side of the N2 is expected to be fully developed and operational. This will increase the total number of trips that will be generated in the region of Rohill Business Estate and together with the natural growth of traffic, a cumulative effect will be created on the increase of traffic flow around the Avoca South Development.

Phase 2 of the proposed Avoca South industrial development will be opened in 2030 and it is anticipated that most of the proposed road improvements will be operational at the opening of this phase. MR 577 and the R102 (MR 2) form part of the proposed eThekwin Integrated Rapid Public Transport Network (IRPTN) and will be upgraded to a 6 lane dual carriageway.

It is anticipated that the construction of Avoca South will be complete by 2035 and all the proposed local road infrastructure improvements are assumed to be fully operational by the opening of Phase 3. Access to Avoca South will be via the new R102 / P93 directional ramp, the intersection of Boulevard Road and Old North Coast Road, and via Toncoro Road off the R102 / MR 2 (left-in, left-out).

#### *2.5.7 Socio-Economic Development Statistics*

Rob Kirby and Associates, the project's town planner, has commissioned a preliminary socio-economic analysis of the proposed 90ha nett developable land of Avoca South Industrial Park based on traffic modelling predictions, property values and rates, building construction costs and infrastructural costs. The following statistics were generated:

- A maximum of 540 000m<sup>2</sup> of building floor space will be created;
- Approximately 10 800 jobs will be created during the infrastructure and building construction phase. If 1 000 jobs are added to construct the infrastructural services a total of 1 800 jobs will be created over a 10-15 year building and construction period;
- Approximately 18 000 jobs will be created during the operational phase. If additional jobs are added for security staff, Home Owners Association, administrative and maintenance staff, 21 000 full time permanent jobs are likely to be created on site;

- Approximately 28 000 permanent jobs are likely to be created from the Avoca South development in terms of downstream “spin-off jobs” in the local and KZN building supplies sector and the more general local retail and service industry economy;
- The total number of jobs directly and indirectly created during construction and the operational phase of the Avoca South development is calculated at approximately 41 000 jobs;
- The total monetary value to be injected into the local economy arising from the project is anticipated to be at least approximately R 4.15 billion. If an approximate one-third downstream ripple effect is included it would not be inappropriate to predict an overall injection of approximately R 5.5 billion into the local Durban Metro economy; and
- It is estimated the eThekweni Municipality will accrue up to R 100 million per annum in rates when the project is complete.

### *2.5.8 Telecommunications*

#### *2.5.8.1 Availability*

At this stage it is not known who the telecommunications service provider will be. Usually the telecommunications network is designed and installed by Telkom (or other service providers where applicable).

#### *2.5.8.2 Requirements*

The Developer is however normally required to install the ducting to be used by the selected service provider. This is usually in the form of 2 x 160mm diameter cable ducts installed alongside the roadways.

Due to uncertainty on the final service provider and the fact that there are a number of wireless technologies available, longitudinal ducts and associated manholes will only be installed at a later date if required. To facilitate road crossings, a number of general services ducts will be laid across the various road intersections and roadways at determined intervals. These will be used for both telecommunications and data services and for general services should additional services be required in the future. Their inclusion will prevent the roads from being excavated at a later stage to install the services.

### 3 CONSIDERATION OF ALTERNATIVES

#### 3.1 Description of Alternatives

The environmental investigation of the proposed development needs to consider different feasible alternatives as set out in the EIA Regulations of 2010. The goal of evaluating alternatives is thus to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, or through reducing or avoiding potentially significant negative impacts. This assessment of alternatives is done through a comprehensive comparison of all potential impacts, direct, indirect and cumulative, on the environment.

“Alternatives” are defined in the EIA Regulations as different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- (a) Property on which or location where it is proposed to undertake the activity;
- (b) Type of activity to be undertaken;
- (c) Design or layout of the activity;
- (d) Technology to be used in the activity; and
- (e) Operational aspects of the activity.

For this project, land use alternative and layout alternatives have been investigated. Site location alternatives have not been considered by the proponent as Investec had identified the Corobrik property as the optimum site for a new major industrial and logistics node in the eThekweni Metropolitan area due to:

- Availability of the land for development post mining;
- Demand for such developments in the Durban region;
- Its location along and between primary transport routes in the Durban Metropolitan area;
- Its location within the Effingham-Avoca area which is already an existing industrial node catering for light industry and residential services. The proximity to an already developed area provides the opportunity for the development to easily tie into the existing bulk services.
- Its position in terms of proximity to major import and export gateways i.e. the Durban port and King Shaka International Airport and Dube Tradeport;
- The zoning of the land for such uses and related integration of the proposed development with strategic and spatial development plans for this region; and
- Integration of the proposed land use with adjacent land uses such as the Riverhorse Valley Logistics and Light Industrial Park.

## 3.2 Potential Land Use Alternatives Assessment

A detailed assessment of land use alternatives has been undertaken, considering the following context of the site:

- Main Street 57 (Pty) Ltd owns the land and a brick making factory is operated on the property;
- The land is currently zoned for 'extractive industry';
- The SDF proposes industrial land use for the site; and
- The site is located adjacent to existing or proposed industrial development of a similar nature and is therefore complimentary to the surrounding land use.

The potential land use alternatives assessed are as follows:

### 3.2.1 *Alternative 1: Developer's Preferred Option*

The applicant desires to develop levelled platforms and subdivided for the development of light industrial, general business and warehousing platforms use as described in detail in Section 2.

### 3.2.2 *Alternative 2: No Go*

Maintaining the *status quo* would imply that the site continues to be mined by Corobrik according to a phased mining plan until all the areas have been fully mined in approximately 15 years, or to a point when the demand for industrial and related land dictates that the mining should cease. The brickmaking factory would also remain or all rehabilitated mined areas would continue to be used for sugarcane farming until an alternative land use is decided post closure of the mining operations. Thereafter, an alternative land use to mining will need to be explored and such strategically placed and economically valuable portion of land within the inner city boundaries cannot lie fallow and/or be used to agriculture when there is a shortage of land for other urban uses. Should the site be left dormant or derelict, the site would over time return to a semi-natural vegetated state although the economic value and potential such a site has in the context of its local and regional setting, would not be realised or maximised.

### 3.2.3 *Alternative 3: Low Cost/Middle Income Housing Development*

The eThekweni Municipality initially earmarked a portion of the site for a low cost housing development with the possibility for the further expansion once the use for mining has been exhausted. This is, however, not a viable alternative for Investec as it is not in their business focus or interest to develop housing, low cost or otherwise. It is also not desirable to establish a residential development adjacent to an operating brick-making factory. In addition, the Avoca North site has been earmarked for residential development. Furthermore, the strategic position of the land within an urban setting already developed

for commercial use and close to transport routes, lends itself better to industrial and commercial development. This is further substantiated by the identification of the area for industrial and commercial development in the SDF for the area. Thus this option is not explored further as part of the EIA process.

#### *3.2.4 Alternative 4: Mixed Land Use Development*

The mixed land use option would include residential and business units built on the property. Within the mixed-use development framework there is scope for changes in densities and proportional allocations of the different land uses depending on the findings of the numerous specialist studies. However, again, it is not desirable to have the brick-making operation together with residential. It is also not within Investec's development policy to consider and/or integrate housing and commercial developments in their key business of industrial land development. For this particular site, because of the shortage of prime land for large site industrial development within the Durban areas, and because of Investec's key development interest areas, options to incorporate housing and commercial components have been disregarded.

Please refer to Table 3-1 for a comparative assessment of land use alternatives.

Table 3-1: Comparative Assessment of Potential Land Use Alternatives

Land Alternative	Use	Key Features	Opportunities / Benefits	Constraints / Negative Impacts	Technical and Financial Viability
Alternative 1: Developer's Preferred Option - Light industrial, general business and warehousing platforms		<ul style="list-style-type: none"> <li>Platform area is maximised taking into account:                             <ul style="list-style-type: none"> <li>Preservation of watercourses on the northern and western boundaries of site.</li> <li>Exclusion of the Eskom power servitude which crosses the site from the developable area.</li> <li>Accessibility to the site and associated road network.</li> </ul> </li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Maximised rehabilitation of riverine and wetland ecosystems along the northern and western boundaries.</li> <li>Clearing of alien vegetation.</li> </ul> <p><u>Socio-Economic:</u></p> <ul style="list-style-type: none"> <li>Acceptable platform area and thus economic viability for the developer.</li> <li>Maximise creation of temporary and permanent employment and income.</li> <li>Increase in local business opportunities.</li> <li>Increase in rates base and income to the local authority.</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Loss of watercourses.</li> <li>Loss of wetland areas.</li> <li>Clearing of remaining indigenous vegetation.</li> <li>Loss of faunal habitat.</li> <li>Reduced buffer zone from development.</li> <li>Loss of the central drainage line and associated ecosystems irrespective of the condition.</li> </ul> <p><u>Socio-Economic:</u></p> <ul style="list-style-type: none"> <li>Visual and aesthetic intrusion.</li> <li>Construction and operational noise.</li> <li>Traffic congestion and pedestrian safety impacts.</li> <li>Air pollution and dust primarily during the construction phase.</li> <li>Loss of income from sugarcane farming.</li> <li>Loss of income from mining activities.</li> </ul>	<ul style="list-style-type: none"> <li>The option is technically and financially feasible while taking into account environmental and social constraints.</li> </ul>
Alternative 2: No-Go Option (Status Quo)		<ul style="list-style-type: none"> <li>In the medium term - Continuation of cane farming and clay mining.</li> <li>In the long term - Will be developed for either low to middle income residential development or similar light industrial and commercial use.</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Remaining indigenous vegetation not disturbed or removed.</li> <li>Land not cleared.</li> <li>No wetland infill and encroachment.</li> </ul> <p><u>Socio-Economic:</u></p>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Status quo will remain and the site will remain in a degraded state and will likely further degrade over time due to disturbance from activities on site current or future.</li> <li>Rehabilitation of wetlands</li> </ul>	<ul style="list-style-type: none"> <li>Not financially viable for the developer.</li> </ul>

Land Alternative	Use	Key Features	Opportunities / Benefits	Constraints / Negative Impacts	Technical and Financial Viability
			<ul style="list-style-type: none"> <li>• None to the current owner/developer or surrounding area.</li> </ul>	<p>and riverine habitats will not occur.</p> <p><u>Socio-Economic:</u></p> <ul style="list-style-type: none"> <li>• Financial losses to the developer.</li> <li>• Non-realisation of potential rates income.</li> <li>• Non-realisation of potential job opportunities.</li> <li>• Non-integration with surrounding land uses.</li> </ul>	
<p>Alternative 3:</p> <p>Low to middle income housing development</p>		<ul style="list-style-type: none"> <li>• Residential development maximised taking into account the following constraints:                             <ul style="list-style-type: none"> <li>○ Preservation of all watercourses.</li> <li>○ Brick-making operation continues to operate.</li> <li>○ Location of land and current state of the land which lends itself to industrial and commercial development as well as housing as viable development options.</li> </ul> </li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>• Maintenance of wetlands zone.</li> <li>• Minimal wetland infill and encroachment besides road crossings.</li> <li>• Maintenance of marginal faunal habitats along watercourse.</li> <li>• Retention of the central drainage line.</li> </ul> <p><u>Socio-Economic:</u></p> <ul style="list-style-type: none"> <li>• Limited economic value for the landowner.</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>• Typical watercourse impacts associated with low to middle income residential areas e.g. dumping, informal earthworks etc.</li> <li>• Increase human damage to riverine and wetland ecosystems due to numbers of people in the vicinity of the site.</li> </ul> <p><u>Socio-Economic:</u></p> <ul style="list-style-type: none"> <li>• Noise and light pollution.</li> <li>• Increased traffic volumes.</li> <li>• Reduced pedestrian safety impacts.</li> <li>• Potential increase in crime.</li> <li>• Reduction in income and employment opportunities relative to light-industrial land use.</li> <li>• Loss of sugarcane farming and associated revenue generated.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Not within Investec’s development policy to consider and/or integrate housing and commercial developments in their key business of industrial land development.</li> <li>• The topography does not lend itself to residential development without considerable investment in infrastructure.</li> <li>• Potential Income from a residential development makes such a scheme financially viable.</li> </ul>

Land Alternative	Use	Key Features	Opportunities / Benefits	Constraints / Negative Impacts	Technical and Financial Viability
Alternative 4:  Mixed-Use Development (Residential and Business)		<ul style="list-style-type: none"> <li>• Same as Alternative 3</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative 3</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative 3</li> </ul>	<ul style="list-style-type: none"> <li>• Not within Investec’s development policy to consider and/or integrate housing and commercial developments in their key business of industrial land development.</li> <li>• The market for residential units in such a mixed-use setting and location is unknown and may not be feasible.</li> </ul>



### 3.3 Layout Alternatives

The assessment of layout alternatives has considered five (5) potential layout options, as indicated in Figure 1-3 and Figures 2.2-2.5. The primary purpose of this assessment was to understand both the developer's layout constraints and environmental constraints, and determine the most feasible layout options.

There are a number of factors that determine the viability of a project of this nature, all of which are interrelated and contribute to achieving an acceptable financial return and environmentally sustainable development:

1. The location of the industrial and business estate.
2. The total platform area that can be achieved.
3. The extent of existing and new infrastructure in and around the industrial and business estate.
4. The Floor Area Ratio (FAR) applicable to each individual platform and the site as a whole which determines the total building area and/or rentable area achievable as a ratio of the total area of each platform or site.
5. Environmental constraints and opportunities.
6. The developments cost related to all of the above.

In determining the financial viability of the project a developer needs to achieve a 'mix' of points 1-6 above to provide for the projected market demand. Furthermore, if minimum returns and level of risk are not achieved, the perceived risk of the project is higher resulting in refusal of development loans or higher interest rates making the project unviable. Each of the alternatives assessed in this section has taken into consideration the following requirements:

- Buffers to watercourses on or adjacent to the property.
- Maximized platform areas.
- Exclusion of unstable geological areas.
- Engineering services requirements.
- South African National Standards (SANS) Codes.
- eThekweni Municipality bylaws (e.g. traffic design requirements).
- Access points off Curnick Ndlovu Highway, MR577 and North Coast Road.

The town planner for the project has documented five (5) layout options have been considered with Option 5 recognised as the preferred layout for the development. For all layout options, access to the southern portion of the site will occur off Curnick Ndlovu Highway and to the northern portion of the site via North Coast Road.

Please refer to Figure 1-3 and Figure 3-1 to Figure 3-4 for layout maps of the above alternatives, and to Table 3-6 for the assessment of layout alternatives.

### 3.3.1 Option 1: Interchange Access

#### Drawing No. 1223/WD7 (Layout Option 1)

This layout consisted of a simple cross-shaped road network and utilised the new proposed upgrade of the N2/Curnick Ndlovu Highway (P93) grade separated intersection as the primary point of access and egress. This option results in optimising the projected land use demand and maximizes the use of the available site area. Two boulevard roads of 4 lanes each were proposed running north/south midway between, and parallel to, the N2 and R102, linking the N2 interchange with Old North Coast Road. This North/South route would also provide access to the Avoca North land portion to the North on which a large 5 000 unit social housing development is under consideration by the eThekweni Municipality Housing Department.

A 2 lane service road stopping at the N2 was proposed running eastwards which had the potential to be continued over the N2 as a bridge which would supply access to the Investec Rinaldo East development which is now the JT Ross Rohill Light Industrial Development. The layout also proposed a few very large sites to accommodate very large industrial buildings. The area under the Electrical Power Transmission Line Servitude (EPTLS) was included in available usable land.

The primary/core wetland and Glen Anil Stream water courses to the west and north of the site were left as conservation areas to protect and enhance the sensitive wetland/riverine areas which had been identified by DMOSS although the central Y-shaped drainage line had been infilled and platformed. No buffer zones to the wetland and riverine area had been considered.

This option is not the preferred option for the following reasons:

- ±10 Year delay in S.A. National Roads Agency Limited (SANRAL) building the N2 interchange and the cost of the improvements.
- Only 30% of the total access and egress traffic being generated by the development would use this very expensive access option.
- The KZN Department of Transport (DOT) and eThekweni Traffic Authority (ETA) deemed the intersection of Toncoro Road/R102 interchange to be too close to the CNH/R102 interchange.
- Eskom indicated that the EPTLS required a 100m non-use servitude within which no development was permitted.
- From a marketing point of view, smaller operators on smaller sites could not be accommodated.

### 3.3.2 Option 2: Loop Road

Drawing No. 1223/WD18 (Layout Option 2)

This Option 2 was similar to Option 1 but solved the N2 and R102 interchange problems by proposing a loop over CNH linking into the North/South Boulevard and closing the link on the R102 via Toncoro Road with a single direct left-out exit proposed onto Curnick Ndlovu Highway. Additional side roads were introduced to provide access to the increased number of sites.

A greater range of site sizes was proposed to accommodate a wider range of entrepreneurs. Some Mixed Use sites were introduced to accommodate a greater range of general commercial land uses as distinct from Light Industry.

The wetland MOSS area was left unchanged and the Electrical Power Transmission Line Servitude (EPTLS) was proposed as an open area to provide relief from the visual impact of large buildings and possible open air storage. No buffer zones to the wetland and riverine area had been considered.

This option was not chosen for the following reasons:

- The loop road to the west of Curnick Ndlovu Highway was located on land not owned by the developer and the owner was asking an exorbitantly high price for the land.
- The founding legs of the loop road and the road embankment would be constructed in the floodplain of the River.
- The position of the loop road would also intersect the Transnet Pipeline Servitude which runs parallel with Curnick Ndlovu Highway.
- DOT/SANRAL and ETA required an upgraded grade separated access at the intersection of old North Coast Road and the R102.

Table 3-2 below tabulates the land use data for Option 2.

Table 3-2: Option 2 Land Use Data

Land Use	TOTAL			
	No. of erven	Gross area (ha)	Nett area (ha)	%
Logistics / Light Industry	21	98.20	(85.65)	62.32
Mixed Use	1	4.16	(2.88)	2.64
Shops, Petrol Filling Station Take aways	2	2.22	(1.47)	1.41
Conservation	5	41.20	-	26.14
Proposed roads		11.80	-	7.49
<b>TOTAL</b>	<b>29</b>	<b>157.58</b>	<b>(90.00)</b>	<b>100.00</b>

In summary, light industrial and associated land use accounts for 116.68ha (73.86%) of the site area while Conservation accounts for 41.20ha (26.14%).

### 3.3.3 Option 3: P93 Directional Ramp

Drawing No. 1223/WD13 (Layout Option 3)

This option solved the problems of Option 2 by providing a new directional ramp over CNH (P93) instead of the loop road linking into the Boulevard Road and a grade separated interchange at the intersection of Old North Coast Road and the R102. A greater variety of site sizes was also introduced to accommodate smaller developers by the realignment of internal roads and the creation of a circular road network.

This option was not chosen for the following reasons:

- Land area was lost to roads and road servitudes
- Design and position of the off-ramp off the CNH was complicated by the position of the Petrol Filling Station on the CNH
- The layout proposed too many small sites and not enough big box sites.

### 3.3.4 Option 4: Extended P93 Directional Ramp

Drawing No. 1223/WD19 (Layout Option 4)

This option proposed the relocation of the CNH directional ramp further north to improve alignment with the North/South Boulevard Road.

The layout was also amended from Option 3 to create a road pattern which accommodated large and medium sized sites with a possibility of introducing new roads to the later phases without disturbing the existing road network to create smaller sites should a demand for these materialize over time. Significant retail floor area was avoided in order to avoid conflict with activities in the still-emerging Bridge City node. All MOSS areas and the EPTLS were proposed as conservation areas but no buffer zones to the wetland and riverine area had been considered.

The eastern edge of Platform 2 adjacent to North Coast Road, east of the new access road, has been also pulled back to allow for a 32m buffer to the riverine system.

This was presented in the Scoping Report as the preferred option for the development but was not chosen as it did not comply with the required 32m riverine and wetland buffer zones along the upper northern and eastern edges which had not been accommodated in the layout. Table 3-3 below tabulates the land use data for Option 4.

Table 3-3: Option 4 Land Use Data

Land Use	TOTAL			
	No. of erven	Gross area (ha)	Nett area (ha)	%
Logistics / Light Industry	24	103.73	(90.00)	65.83
Conservation	4	24.52	-	15.56
Public Open Space	2	16.49		10.46

Proposed roads	-	11.27	-	7.15
Existing roads (Toncoro & North Coast)	2	1.57	-	1.00
TOTAL	29	157.58	(90.00)	100.00

In summary, Light Industry and Roads account for 116.57ha (73.98%) of the site area while Conservation and Public Open Space account for 41.01ha (26.02%).

### 3.3.5 Option 5: Extended Glide Over Bridge with Buffer Zone Considerations (Proposed Layout)

Option 5 is the same as Option 4 except that the outer edge of the northern and eastern boundaries of Platform 9 has been retracted to accommodate a wetland and riverine buffer zone of 20m from the edge of the wetland unit in the Glen Anil Stream to the toe of the platform embankment. This buffer area also includes a 5m stormwater dissipation zone at the toe of each embankment to contain, control and dissipate energy of water shedding off the embankments before entering the watercourse where uncontrolled water flow from the embankment could cause significant biophysical and ecological damage to the river system.

Consideration of a 32m buffer to the toe of the northern and eastern boundaries of Site 9 would significantly reduce the size of the site and impact on the feasibility of the project as a whole. Due to the nature and degraded condition of the Glen Anil Stream and wetlands, it was agreed with the wetland specialist and the eThekweni Environmental Department that a 20m buffer zone be applied (inclusive of a 5m stormwater dissipation zone) from the edge of the wetland unit to the toe of the embankment provided an efficient and effective stormwater management system was installed onsite. The net area of Portion 9 is reduced by 6 304m<sup>2</sup> as a consequence from 132 029m<sup>2</sup> (net) to 125 725m<sup>2</sup>.

Furthermore, the north-eastern portion of Platform 9 adjacent to North Coast Road between the access entrance to the site and the convergence of the tributary watercourse with the Glen Anil Stream (Portion 6 in Layout Option 4), has been removed from the development area and added to the conservation area, thereby increasing the buffer zone in places by to up to 50m and increasing the total conservation area by 4 852m<sup>2</sup>. With the inclusion of the proposed onsite wetland rehabilitation into the proposed development plan, which includes this area, the positive net gain in wetland functional and habitat equivalents of 2.7ha, as calculated by EcoPulse, is considered as adequate compensation for the reduced buffer zone and the anticipated negative impacts from the proposed development on water resources on and around the site.

An area of 26 875m<sup>2</sup> (gross) (Portion 4) has also been allocated to a new electrical substation and switching station which is required to provide additional power to the development and surrounding businesses as current capacity within the eThekweni power system is limited and inadequate for anticipated power needs. Table 3-4 below tabulates

the land use data for Option 5.

**Table 3-4: Option 5 Land Use Data**

Land Use	TOTAL			
	No. of erven	Gross area (ha)	Nett area (ha)	%
Logistics / Light Industry	19	101.20	(90.00)	64.22
ESS & Switching Station	1	2.68		1.70
Private Open Space	2	1.30		0.82
Public Open Space (EPTLS)	2	16.37		10.40
Conservation	4	25.37	-	16.10
Proposed roads	7	9.46	-	6.00
Existing roads (Toncoro & North Coast)	2	1.20	-	0.76
<b>TOTAL</b>	<b>29</b>	<b>157.70</b>	<b>(90.00)</b>	<b>100.00</b>

In summary, Light Industry and Roads account for 114.66ha (72.68%) while Private and Public Open Space and Conservation account for 43.04 ha (27.32%) of the site area. If the areas of Layout 2, 4 and 5 are tabulated together, the increase in Conservation and Open Space from earlier layout versions becomes apparent showing an increase from 41.20ha (26.14%) to 43.04ha (27.32%) (18 400m<sup>2</sup>) as the development layout has evolved. The usable light industrial area also increases slightly from 98.20ha to 101.2ha.

**Table 3-5: Comparison of Options 2, 4 and 5**

Land Use	OPTION 2		OPTION 4		OPTION 5	
	Gross area (ha)	%	Gross area (ha)	%	Gross area (ha)	%
Logistics / Light Industry	98.20	62.32	103.73	65.83	101.20	64.22
Mixed Use	4.16	2.64				
Shops, Petrol Filling Station, Take aways	2.22	1.41				
ESS & Switching Station					2.68	1.70
Private Open Space					1.30	0.82
Public Open Space (EPTLS)			16.49	10.46	16.37	10.40
Conservation	41.20	26.14	24.52	15.56	25.37	16.10
Proposed roads	11.80	7.49	11.27	7.15	9.46	6.00
Existing roads (Toncoro & North Coast)			1.57	1.00	1.20	0.76
<b>TOTAL</b>	<b>157.58</b>	<b>100.00</b>	<b>157.58</b>	<b>100.00</b>	<b>157.70</b>	<b>100.00</b>

In Option 2, light industrial and associated land use accounts for 116.68ha (73.86%) of the site area while Conservation accounts for 41.20ha (26.14%), while Light Industry and Roads account for 116.57ha (73.98%) of the site area while Conservation and Public Open Space account for 41.01ha (26.02%) in Option 4. Comparatively, in Option 5, Light Industry and Roads account for 114.66ha (72.68%) while Private and Public Open Space and Conservation account for 43.04 ha (27.32%) of the site area.

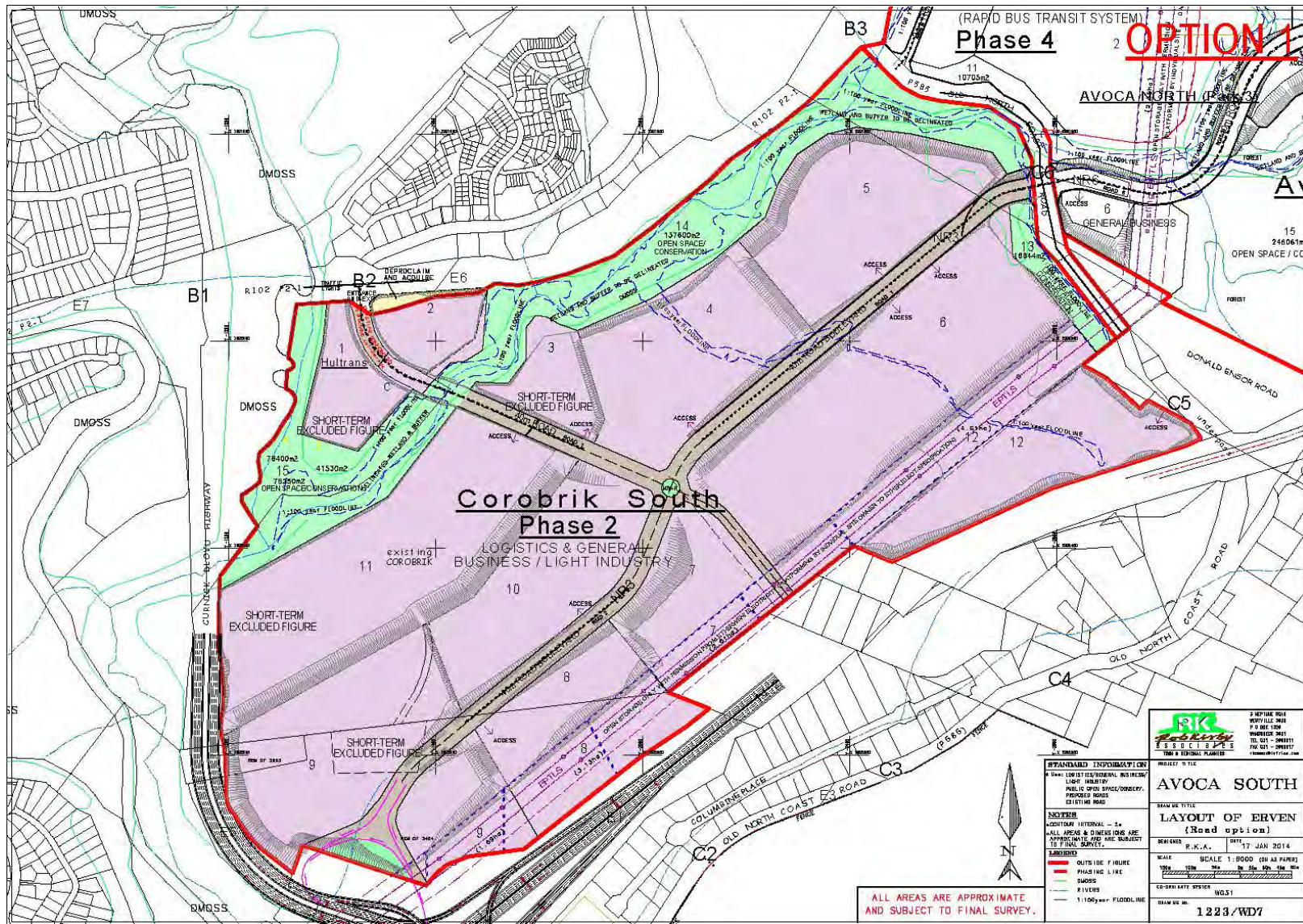


Figure 3-1: Proposed Layout Option 1 (Drawing No. 1223/WD7)



Figure 3-2: Layout Option 2 (Drawing No. 1223/WD18)





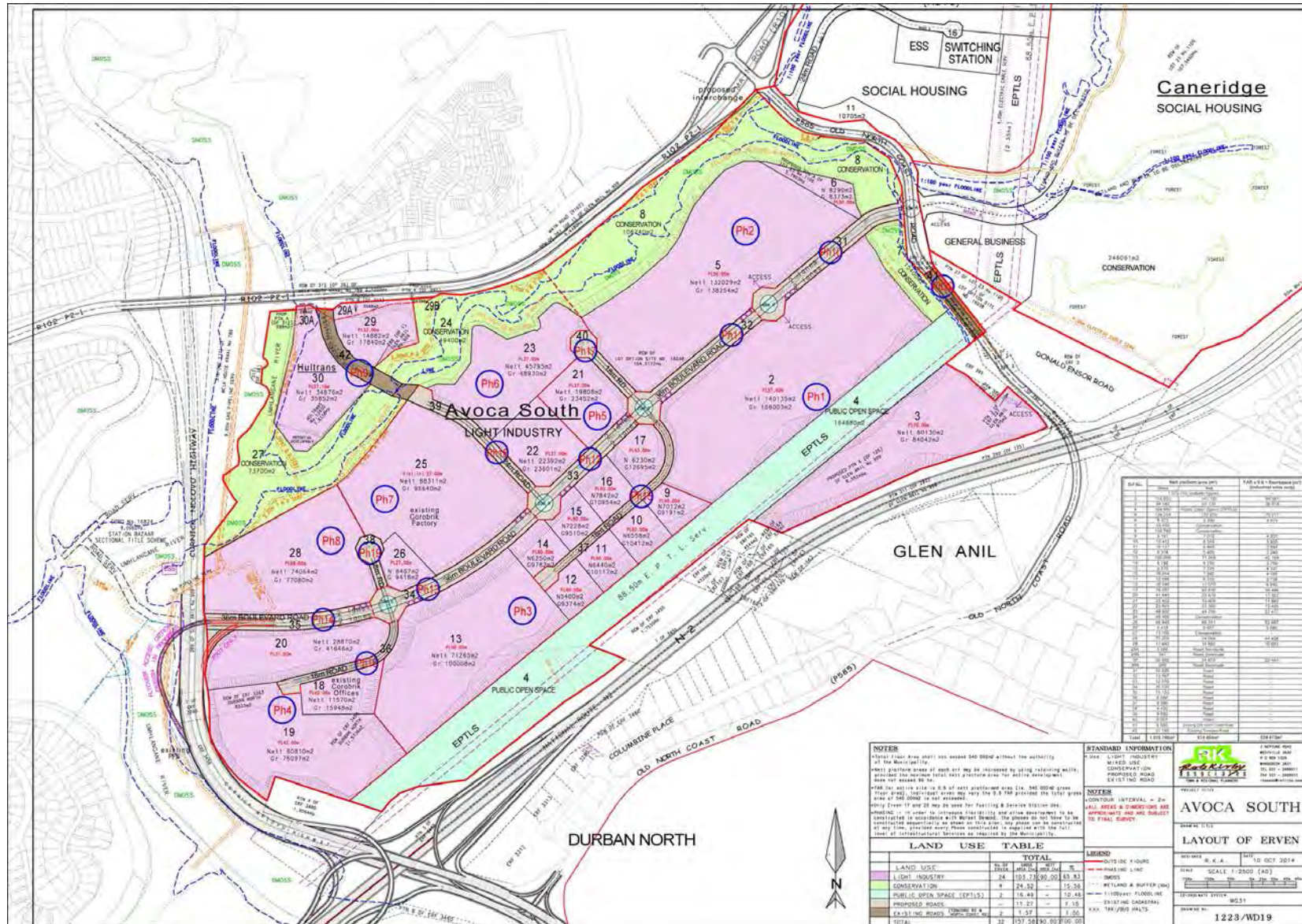


Figure 3-4: Layout Option 4 (Drawing No. 1223/WD19)

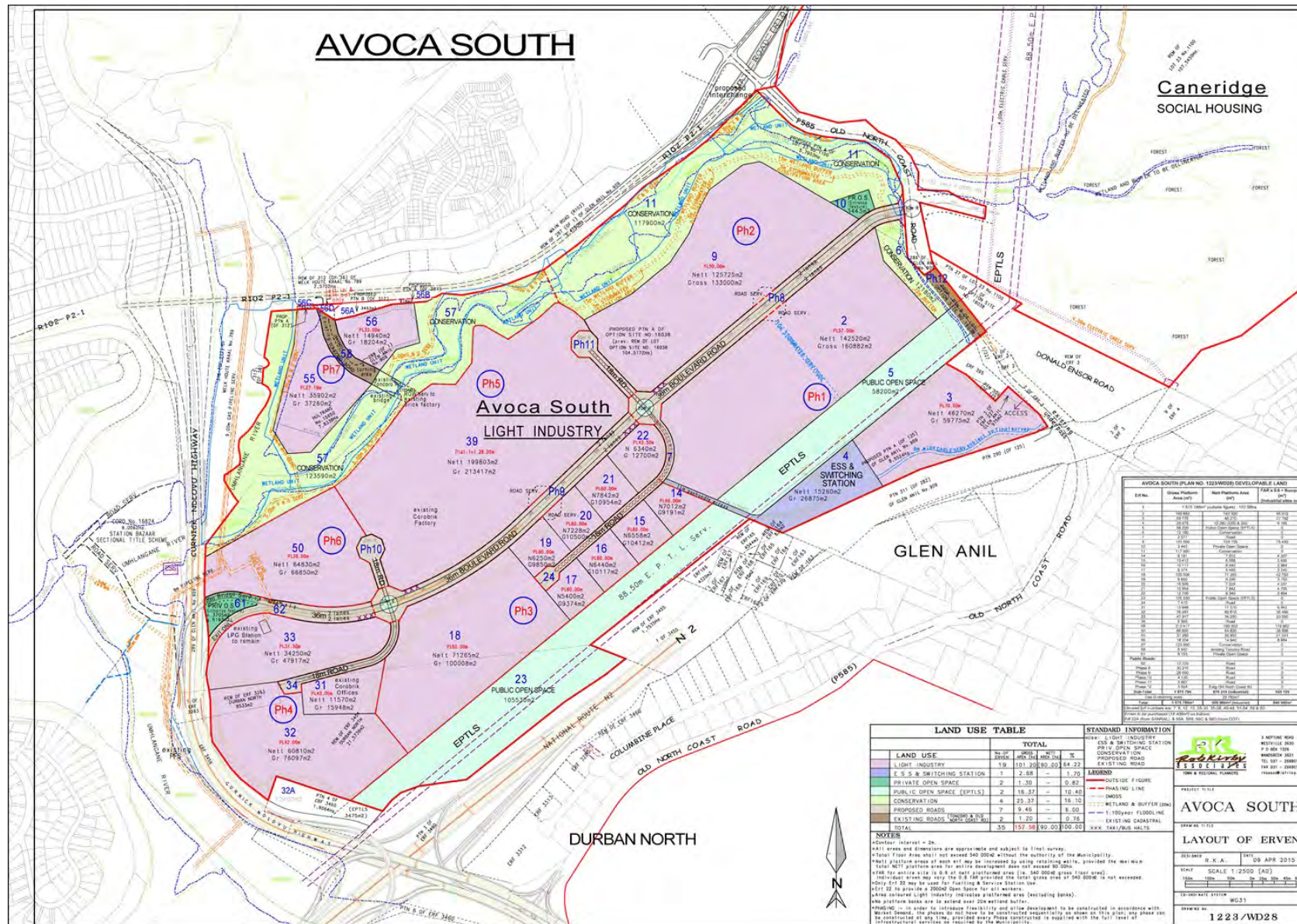


Figure 1-3: Layout Option 5 (Drawing 1223/DW28) Preferred Option.

3.3.6 Alternatives Comparison

Table 3-6: Comparative Assessment of Layout Alternatives

Alternative Options	Key Features	Opportunities / Benefits	Constraints / Negative Impacts	Technical and Financial Viability
<p>Option 1: Drawing No. 1223/WD7</p>	<ul style="list-style-type: none"> <li>• This option aims for in maximum financial returns as it maximizes use of the available site. Developed land will be sold per square metre (m2).</li> <li>• Northern access is via a bridge over the Glen Anil Stream tributary flowing along the eastern boundary.</li> <li>• This option includes infilling of all watercourses on site and extension of the northern boundary to the front edge of the existing dirt road adjacent to the Glen Anil Stream.</li> <li>• Development boundary is within 32m of the watercourse.</li> <li>• No buffer zones are provided for.</li> <li>• Open storage areas within the EPTLS are included in the developable land area.</li> <li>• Primary access to the site is via an extension of the upgraded SANRAL N2 KwaMashu Interchange.</li> <li>• A few very large sites to accommodate very large industrial buildings are accommodated.</li> <li>• 12 sites proposed.</li> <li>• Possible new bridge over the N2 linking the site with the adjacent development across</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>• Removal of alien vegetation from the riverine and wetland system as well as form the main site area as part of the site’s rehabilitation.</li> </ul> <p><u>Socio- Economic:</u></p> <ul style="list-style-type: none"> <li>• Maximise platform area for maximum economic value.</li> <li>• Maximise temporary and permanent employment and income.</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>• Infilling and loss of all watercourses onsite.</li> <li>• Alteration of hydrological flow and drainage.</li> <li>• Loss of all marginal faunal habitats along the northern and eastern watercourses.</li> </ul>	<ul style="list-style-type: none"> <li>• ±10 Year delay in S.A. National Roads Agency Limited (SANRAL) building the N2 interchange and the cost of the improvements.</li> <li>• Only 30% of the total access and egress traffic being generated by the development would use this very expensive access option.</li> <li>• The KZN Department of Transport (DOT) and eThekweni Traffic Authority (ETA) deemed the intersection of Toncoro Road/R102 interchange to be too close to the CNH/R102 interchange.</li> <li>• Eskom indicated that the EPTLS required a 100m non-use servitude within which no development was permitted.</li> <li>• From a marketing point of view, smaller operators on smaller sites could not be accommodated.</li> </ul>

Alternative Options	Key Features	Opportunities / Benefits	Constraints / Negative Impacts	Technical and Financial Viability
<p>Option 2: Drawing No.1223/WD18</p>	<p>the N2.</p> <ul style="list-style-type: none"> <li>Layout is considerate of the exclusion of the EPTLS</li> <li>Northern and eastern boundaries are still based on the existing road and not the 32m buffer zone.</li> <li>No buffer zone is provided for.</li> <li>Access to the site is via a Loop Road over the P93. Northern access remains the same.</li> <li>Northern access is via a bridge over a Glen Anil Stream tributary.</li> <li>Internal road network includes a number of smaller side roads off the main boulevard.</li> <li>30 sites proposed varying in size with some mixed use sites.</li> <li>Additional traffic circles are introduced.</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Removal of alien vegetation from the riverine and wetland system as part of the site’s rehabilitation.</li> <li>EPTLS servitude is integrated into the site’s conservation zoned area.</li> </ul> <p><u>Social-Economic:</u></p> <ul style="list-style-type: none"> <li>Acceptable platform area and thus economic value for the developer.</li> <li>Creation of temporary and permanent employment and income.</li> <li>Cost of loop road is significantly less than extension of the interchange.</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Similar to Option 1.</li> <li>Infilling and loss of all watercourses onsite.</li> <li>Alteration of hydrological flow and drainage.</li> <li>Loss of all marginal faunal habitats along the northern and eastern watercourses.</li> <li>Foundations and supporting berms of the loop road would be in the flood plain of the uMhlangane River and may impact on riverine ecosystems and hydrology.</li> </ul> <p><u>Socio- Economic:</u></p> <ul style="list-style-type: none"> <li>Developable land area reduced due to increased number of roads and large embankments.</li> <li>Financial viability further reduced due to the exclusion of the EPTLS servitude (approx. 180 000m<sup>2</sup>).</li> <li>Requirement to upgrade the Old North Coast Road/R102 interchange to a grade-separated access, adds additional costs to the project.</li> </ul>	<ul style="list-style-type: none"> <li>The loop road to the west of Curnick Ndlovu Highway was located on land not owned by the developer and the owner was asking an exorbitantly high price for the land.</li> <li>The founding legs of the loop road and the road embankment would be constructed in the floodplain of the River.</li> <li>The position of the loop road would also intersect the Transnet Pipeline Servitude which runs parallel with Curnick Ndlovu Highway.</li> <li>DOT/SANRAL and ETA required an upgraded grade separated access at the intersection of old North Coast Road and the R102.</li> </ul>
<p>Option 3: Drawing No. 1223/WD13</p>	<ul style="list-style-type: none"> <li>Loop road linking into the Boulevard Road is replaced by a new directional ramp over the CNH (P93).</li> <li>A greater variety of site sizes (no, 66) was also introduced to accommodate smaller developers</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Same as Option 2 except impacts related to the loop road foundations in the river base removed.</li> </ul> <p><u>Social-Economic:</u></p> <ul style="list-style-type: none"> <li>Increase portion of developable</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Similar to Options 1&amp;2.</li> <li>Infilling and loss of all watercourses onsite.</li> <li>Alteration of hydrological flow and drainage.</li> <li>Loss of all marginal faunal habitats along the northern and</li> </ul>	<ul style="list-style-type: none"> <li>Land area was lost to roads and road servitudes</li> <li>Design and position of the off-ramp off the CNH was complicated by the position of the Petrol Filling Station on the CNH</li> <li>The layout proposed too</li> </ul>

Alternative Options	Key Features	Opportunities / Benefits	Constraints / Negative Impacts	Technical and Financial Viability
	<ul style="list-style-type: none"> <li>Realignment of internal roads and the creation of a circular road network.</li> </ul>	<p>area lost to road servitudes.</p>	<p>eastern watercourses.</p> <p><u>Socio- Economic:</u></p> <ul style="list-style-type: none"> <li>Extension of Option 2.</li> <li>Developable land area reduced due to increased number of roads servitudes and large embankments.</li> </ul>	<p>many small sites and not enough big box sites.</p>
<p>Alternative 4: Drawing No. 1223/WD19</p>	<ul style="list-style-type: none"> <li>Relocation of the CNH directional ramp further north to improve alignment with the North/South Boulevard Road</li> <li>Creation of a road pattern which accommodated large and medium sized sites with a possibility of introducing new roads to the later phases without disturbing the existing road network to create smaller sites should a demand for these materialize over time.</li> <li>Significant mixed use area (retail) was removed to avoid conflict with Bridge City.</li> <li>No buffer zones to the wetland and riverine area considered.</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Same as Option 3.</li> </ul> <p><u>Social-Economic:</u></p> <ul style="list-style-type: none"> <li>Same as Option 3</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Same as Option 3.</li> </ul> <p><u>Social- Economic:</u></p> <ul style="list-style-type: none"> <li>Same as Option 3.</li> </ul>	<ul style="list-style-type: none"> <li>Did not comply with the required 32m riverine and wetland buffer zones along the upper northern and eastern edges which had not been accommodated in the layout.</li> </ul>
<p>Option 5: Drawing 1223/DW28</p>	<ul style="list-style-type: none"> <li>Outer edge of the northern and eastern boundaries of Platform 9 has been retracted to accommodate a wetland and riverine buffer zone of 20m from the edge of the wetland unit in the Glen Anil Stream to the toe of the platform embankment.</li> <li>This buffer area also includes a 5m stormwater dissipation zone at the toe of each</li> </ul>	<p><u>Environmental:</u></p> <ul style="list-style-type: none"> <li>Application of a 20m wetland buffer zone to boundary of Portion 9 (Option 5 layout)</li> <li>Inclusion of Portion 6 (Option 4 layout) into the Conservation area of 4 852m<sup>2</sup>.</li> <li>Conservation and open space area gain of 180 400m<sup>2</sup></li> <li>Improved rehabilitation measures</li> <li>Improved stormwater</li> </ul>	<p><u>Social-Economic:</u></p> <ul style="list-style-type: none"> <li>Loss of 10 184m<sup>2</sup> of developable land from Portions 6 and 9.</li> <li>26 875m<sup>2</sup> (gross) lost to provision of a site for the construction of an electrical substation and switching station (Portion 4).</li> <li>Reduced total developable area from 1 037 300m<sup>2</sup> to 1 012 000m<sup>2</sup> resulting in</li> </ul>	<ul style="list-style-type: none"> <li>Layout Option 5 is the preferred option as it meets both environmental requirements including the positive net gain in wetland area, and is still financially viable for the developer.</li> </ul>

Alternative Options	Key Features	Opportunities / Benefits	Constraints / Negative Impacts	Technical and Financial Viability
	<p>embankment.</p> <ul style="list-style-type: none"> <li>• Far northern portion of the site adjacent to North Coast Road between the access entrance to the site and the convergence of the tributary watercourse with the Glen Anil Stream (Portion 6 in Layout Option 4), has been removed from the development area and added to the conservation area.</li> <li>• Eastern edge of Platform 2 adjacent to North Coast Road, east of the new access road, has been also pulled back to allow for a 32m buffer to the riverine system.</li> </ul>	<p>management measures.</p>	<p>reduced value.</p>	

## 4 DESCRIPTION OF THE PROJECT ENVIRONMENT

### 4.1 Biophysical Environment

#### 4.1.1 Climate

Summers are hot to very hot and winters are mild with almost no frost. During summer high humidity conditions may exist which may cause discomfort but it assists in maintaining the temperature sensitive and moisture demanding tropical vegetation of the region (Mucina & Rutherford, 2006).

The rainfall is about 759mm of rain per year with most rainfall occurring mainly during mid-summer. The average midday temperatures range from 22.2 degrees Celsius (°C) in July to 27.4°C in February. This region is the coldest during July when the temperature can drop to 9.5°C during the night. High evapotranspiration rates are associated with high temperatures in summer therefore Mean Annual Evapotranspiration (MAE) is high (A-pan 1692 mm).

Predominately strong winds blow from either the north-east or east-north-east with slightly less strong winds blowing from between south and south-west.

#### 4.1.2 Geology

The geology found on this site is described in the following paragraph as per findings of the Geotechnical Assessment for the EIA Documentation: Proposed Development Avoca South by Drennan Maud Geotechnical Engineers and Engineering Geologists (Appendix K4).

*Recent Alluvium* - This formation is found within the well-defined stream channels but also within the broader depressions transecting the spurs. The horizon attains a thickness of up to 3 to 4m but varies from location to location. The material has a mottled appearance and colour ranging from grey to light brown. The texture is sandy to silt clay but on the proposed site for development it has high clay content.

*Quaternary Dune Sand* - This sedimentary unit only occurs in a few places on the proposed site for development. It is susceptible to erosion and is exposed as light beige to buff dune sand but the undisturbed material is in fact light grey mottled light brown clayey sand to sandy clay. Rounded cobble and gravel accumulations occur toward the base of this unit which is atypical characterisation of typical Berea formation.

*Karoo Dolerite* - The dolerite encountered within inspection pits and quarry exposures is typically a completely to highly weathered, light brown to yellow or orange brown, very soft to soft rock that is recovered from excavation as a closely packed, medium to coarse subangular gravel in a coarse sand to locally clayey sand matrix. It is likely that much of the



dolerite will be used in proposed road layer works. The red clay soils typically associated with Karoo dolerite are very poorly developed to absent on this site. The prevailing soil cover comprises of a thin upper colluvial sandy clay to clayey sand (<1m), beneath which occurs the weathered dolerite bedrock. The upper 0,5m of dolerite is generally “completely weathered” and very clayey/silt, thereunder is encountered more gravelly material.

*Vryheid Formation* - On the site this rock unit may generally be classified as “shale” which comprises of intimately interbedded shale, siltstone and fine grained silt sandstone. The rock materials are highly micaceous and as a result, are prone to absorption of water and subsequent disintegration at the surface. The slightly weathered to unweathered bedrock exposed in the quarries is typically very dark grey, medium jointed, medium hard rock.

The Vryheid formation also includes sandstone that is found on the southern to eastern portion of the site. The sandstone is thickly bedded and may require blasting or hard breaking for removal during the excavations. This means that the sandstone will generally be recovered as large blocks unlikely to be of use as anything other than rock fill unless it is first crushed. However, the upper 0,5m to 1,0m of the material can be excavated as a sand/gravel and may be used in pavement layer works up to sub-base level.

The Vryheid formation is, in the areas where the earthworks associated with brick making did not remove it, mantled by relatively poorly developed topsoil/subsoil horizons including an upper colluvial horizon (typically 0,5 to 1m dark brown clayey sand) and a lower residual horizon of strongly mottled (light yellow brown/grey) sandy clay to clayey sand (typically 0,5 to 1,5m thickness).

#### *4.1.3 Topography and Surface Hydrology*

The proposed site for development consists of a generally undulating topography, with an altitude ranging from 20m-80masl. The most elevated area of the site is in the east, where a northeast-southwest trending spur accommodating the Eskom Power lines overlooks the N2 at an elevation of 75-85masl. The adjoining ground between the Eskom power lines and Corobrik platform level takes the form of a series of gently plunging spurs between which pan-shaped depressions define the local drainage lines. No rocky outcrops were noted.

The study area falls within the U20M quaternary catchment, as defined by Midgley *et al.* (1994). The Glen Anil Stream is located on the northern boundary of the site and is a left-bank tributary to the uMhlangane River. The uMhlangane River is a left-bank tributary of the Mngeni River and the confluence of the two rivers is located approximately 6 km south of the property. The Glen Anil Stream has been heavily degraded after years of farming and clay mining in, or adjacent to, the river system.

#### *4.1.4 Land use*

The total area of the site is approximately 157ha, of which a significant portion is covered by the Corobrik factory, storage yards and management head office. This facility is located on the flat portion of the site adjacent to the confluence of the Glen Anil Stream and uMhlangane River. Hultrans occupies a site in the north-west corner and a major power line servitude traverses the entire south-eastern boundary adjacent to the N2.

The land is currently zoned as 'Extractive Industrial' and a substantial portion of the central and eastern sections of the land has been mined for shale. This has left numerous small quarries in the landscape. The areas that have not been mined are used to cultivate sugarcane.

#### *4.1.5 Soils*

The most notable soils found on site were alluvium and residual soils (residual Vryheid Formation and residual dolerite) (Refer to Geotechnical Report, Appendix K4). These soils are highly unsuitable for use even as general fill material. The high clay content (swelling clays in particular) will make them prone to expansion and contraction with fluctuations in moisture content.

Other soils included colluvium which occurs in the uppermost transported soil horizon. This is also found unsuitable for filling material due to its clay content. Quaternary dune sand which is also present on the site has a clay content slightly in excess of 30% and should not be used as subgrade, however, it may be included judiciously within the general fill material, either sandwiched between more suitable layers or as a void-filler within coarser rock fill.

#### *4.1.6 Waste Management*

Waste that is generated on the Avoca South site includes domestic waste that originated from the Corobrik factory and offices which will be removed with municipal services and a small amount of hazardous waste will be generated by maintenance of equipment. The hazardous waste will consist of used oil, spills from fuel storage areas collected in bunds, oil from drip trays used at workshops, and the sludge collected from oil interceptors/silt traps. This waste has to be collected by a hazardous waste service provider for safe disposal.

#### *4.1.7 Major Hazard Installation Risk*

A high pressure gas transmission pipeline, owned and operated by Transnet Pipelines (hereinafter referred to as Transnet), is routed through the north-western section of the property. The pipeline, which transfers natural gas underground, travels adjacent to the

R102 road from north to south and adjacent to the N2 highway from northeast to southwest. Natural gas is a highly flammable component and the main hazards that would occur with a loss of containment of the Transnet pipeline.

A study to quantify the risks to employees, neighbours and the public with regard to the proposed Transnet pipeline has been completed (Refer to Major Hazard Installation Risk Assessment of the Transnet Pipeline within the Proposed Avoca South Industrial and Business Estate in Durban North, Kwazulu-Natal; Appendix K5) are thermal radiation from fires and over pressurisation from explosions.

The risk assessment that was performed on the pipeline was done with the following assumptions:

- The gas pipeline is maintained to an acceptable level and that all statutory regulations are applied.
- Detailed engineering designs were done by competent people and are correctly specified for the intended duty.

Various incidence scenarios were assessed and it was found that the risk from accidental releases of natural gas from the Transnet pipeline in the study area fire will pose a risk to employees and the public and the pipeline is thus classified as a 'Major Hazard Installation' (MHI). The risk assessment recommended:

- A review of the risk assessment every 5 years.
- Investigation into a risk reduction programme.
- An update of emergency procedures.
- Light industrial land use in the vicinity of MHI the will be acceptable provided that it would not be used by the disabled.

## 4.2 Ecological Environment

### 4.2.1 *Vegetation*

A Vegetation Assessment, by David Styles, was undertaken on the site for the proposed development and the following information was obtained from the study (Appendix K6).

#### 4.2.1.1 *Sensitivity*

The site falls within the endangered KwaZulu-Natal Coastal Belt vegetation classification (Mucina & Rutherford 2006). The region has, however, undergone such extensive transformation that it is difficult to know exactly what vegetation originally occurred. The site also falls within a smaller Critically Endangered listed ecosystem, namely Durban Metropole North Coast Grassland (KZN 2) (SANBI 2009). It was found that the ecosystem on site is an amalgam of different vegetation types and severely transformed.

#### 4.2.1.2 Floristic Description of the area

Vegetation types are divided into dryland and wetland components and described below:

##### Dryland components

- Majority of the site has been transformed due to mining and sugar cultivation activities. The vegetation mainly appears to be made up of sugar cane cultivation, abandoned sugar cane cultivation or excavated areas upon and near which alien and secondary vegetation have established. One protected plant, the orchid *Eulophia speciose*, was found in one place in this transformed landscape. It is not rare or threatened but all orchids are protected by the provincial conservation ordinance and may not be damaged, destroyed or relocated without permit authorization from the provincial conservation authority, EKZNW. This site has little worth and as is, can only be used as degraded habitat for fauna or open space that could be rehabilitated to better vegetation with difficulty. However vegetation adjacent to the main wetland area on the northern edge of the property outside the proposed footprint could be rehabilitated with better success.
- An area described as “Mixed Alien and Indigenous Thicket with Plantings” seems to have been exposed by alien control work but is still invaded by alien plants including *Chromolaena odorata*, *Leucaena leucocephala*, which is one of the principal alien invaders on the site. In this area some indigenous trees occur as well as indigenous plantings of which *Olea europaea* subsp. *africana* (Wild Olive) and *Plumbago auriculata* are present. The indigenous species that have been noted are all common except for some of the plantings.
- The area designated as “Alien Vegetation and Scrub” contains mostly alien vegetation including *Arundo donax* (Spanish Reed). However a small number of indigenous trees, of which some were planted, and a protected species, the Snake Lily (*Scandoxus piniceus*), are sparsely scattered in this area.
- The area named as “Mixed alien and indigenous thicket” has more valuable vegetation and has the highest concentration of indigenous trees and woody plants. Unfortunately the indigenous woody plant growth is also densely infilled and infiltrated with alien species which made the mapping of protected species and individual plants difficult.

##### Wetland components

- The site is severely degraded and this makes it very difficult to identify wetland vegetation and it was only noted in the two places in the southern part of the site. In the north-western area, along a narrow, channeled drainage line, there is a small band of vegetation that includes some wetland species which has been

heavily impacted on by sugar cane cultivation. This area was designated “Degraded Wetland and Alien Vegetation”. In this area there was very sparse distribution of wetland species which included the following; *Cyperus dives*, *C. sexangularis* and *Typha capensis*. A few occurrences of the following herbs associated with wet to damp substrates were seen in one place: *Lobelia anceps*, *Ludwigia octovalvis* and *Ranunculus multifidus*. It was noted that most of the vegetation comprises weeds of disturbance, or alien species, with sugar cane cultivation encroaching into the wetland areas.

- An area is designated as “*Kniphofia* Wetland” is surrounded on all sides, except the north-west, by sugar cane cultivation. In this small area a large occurrence of a *Kniphofia* species was noted. All *Kniphofia* species are protected by the provincial conservation ordinance and may not be damaged, destroyed or relocated without permit authorization of the provincial conservation authority, EKZNW. After extensive investigation it was found that the plants are most likely *K. baurii* (pers. comm.) and not the rare and Red listed *K. littoralis* as initially thought. *K. baurii* is not rare or threatened, however its occurrence in the eThekweni Municipal Area is somewhat unusual.
- The wetland situated in the north consists of a large stream, associated wetland areas and floodplains and is categorized as ‘Disturbed and alien invaded wetland’. Vegetation occurring there is disturbed as a result of the surrounding development, episodic floods, invasion of alien species, eutrophic conditions and pollutants. Multiple alien reed species are present in this system and include *Arundo donax* (Spanish reed), *Coix lacryma-jobii* (Job’s Tears), *Pennisetum purpureum* (Napier Fodder), with *Arundo donax* and *Pennisetum purpureum*. Indigenous trees are few and are dominated by alien species.

#### 4.2.1.3 Rehabilitation

Rehabilitation of specifically the wetland area situated on the northern boundary of the site will be a major undertaking. The alien reeds will be a challenge to eradicate. The indigenous hygrophytic species will recover if a strict alien control program is put in place, however there is a very limited range of indigenous species and introduction of more will have to be considered. It will be challenging to cultivate smaller less vigorous indigenous species in this area due to the disturbance and flood events that have altered the natural contours, invasive species, eutrophication, and pollutants.

#### 4.2.1.4 Conservation significance

All vegetation on the site has been degraded to a greater or lesser extent. Therefore all of the areas described are considered of low conservation significance except for the *Kniphofia* wetland, mixed indigenous and alien thicket and Disturbed and alien invaded wetland vegetation (northern area of site) which are considered of medium significance.

In the Vegetation assessment (Appendix K6) it is recommended that a buffer of 30m is established around vegetation that has a medium level of significance towards conservation. However it was established in the Freshwater Habitat Impact Assessment & Conceptual Rehabilitation Plan (Appendix K8) that a 15-20m buffer will be acceptable as the minimum buffer zone around outer edges of the wetland/riparian areas and the toe of the platform embankments.

#### 4.2.2 Fauna

A detailed Faunal Assessment was been performed by Harvey Ecological to establish which types of fauna species are present on the proposed development site (Appendix K7).

The following broad habitat types were identified considering fauna:

- Build-up areas and bare surfaces which could support roosting colonies of certain bat species.
- Sugarcane fields which has a very low value for fauna.
- Secondary scrubland that can only support generalist species.
- Disturbed woodland that contains a fair portion of indigenous vegetation but also has alien vegetation present. While this provides a slightly higher quality habitat than the rest of the site, it is unlikely to support any sensitive vertebrate fauna.
- Drainage lines and wetlands which are highly modified, very constricted and minimal natural vegetation present. It is highly unlikely that these altered habitats will be able to provide any breeding habitat for aquatic amphibians.

The proposed site for development is considered a 'Biodiversity Priority Area 1' according to the Ezemvelo-KwaZulu-Natal Wildlife (EKZNW) minset database. The vertebrate faunal features which result in this area being considered of high biodiversity value are the KwaZulu Dwarf *Chameleon Bradypodion melanocephalum* and Pickersgill's Reed Frog *Hyperolius pickersgilli*. However, based on the condition of the site, neither of the species were found and as such, is not a Biodiversity Priority Area 1 in terms of its actual status. It must be noted that the planned conservation area component and open space areas of the site, overlays and extends on to the onsite D'MOSS area and therefore linkages with adjacent D'MOSS areas are maintained.

##### 4.2.2.1 Mammals

The proposed site for development is severely transformed with limited habitat and therefore a limited number of species are expected to be present. Animals that may be found are small rodents and carnivores that have the ability to utilise semi-transformed habitats. Some bat species may be present, including the rare and threatened bat *Otomops martienseni* which has been recorded in buildings in the surrounding area but was not

observed.

#### 4.2.2.2 Birds

The limited habitat diversity and degraded nature of the site means that it will support relatively low diversity of birds. Species present are primarily widespread, common habitat generalists that are capable of utilising degraded and secondary habitats.

#### 4.2.2.3 Amphibians

Most of the site is not favorable for sustaining many amphibian species. The species that are capable of utilising the site will be primarily adaptable species that can tolerate drier microhabitats. There is a drainage line in the northern part of the site which may provide breeding habitat for several species. However, much of the system consists of fast flowing rivers, habitats not typically favoured by many local species. The favourite breeding areas will be patches of inundated wetland vegetation (*Typha* and *Cyperus* beds) and these areas should be viewed as priority biodiversity areas.

#### 4.2.2.4 Reptiles

The diversity of reptiles is relatively high in coastal KwaZulu-Natal but a very small number of these species will be present due to the low quality of habitat that is available on the development site. The species that will be present are the species that are capable of living commensally with humans, and those capable of utilising a diversity of modified habitats. Four red data species may occur in the area but only two of these species will be at best rare and localised if at all present, i.e. Black-headed (Kwazulu) Dwarf Chameleon (*Bradypodion melanocephalum*) and Natal Back Snake (*Macrelaps microlepidotus*).

#### 4.2.3 Freshwater Ecosystems

A number of wetlands were delineated by SiVEST Environmental Division (SiVEST) in September 2012 (Appendix K11). These wetlands were not assessed in detail and the Freshwater Habitat Assessment for the proposed development completed by Ryan Edwards from Eco-Pulse Environmental Consulting Services (Appendix K8) refined the boundaries based on onsite findings and an analysis of detailed 1m contours.

It was established that there are 17 wetland and 3 riparian units present on the site. These units can be divided in the following types:

- uMhlangane floodplain wetland and riparian zone;
- Channelled valley bottom wetland;
- Unchannelled valley bottom wetland;
- Seep; and
- Modified riparian zone in poorly rehabilitated mining land.

The channelled valley bottom wetland units, located in the lower reaches of the Glen Anil stream system, are seasonally and temporarily inundated/saturated wetlands. These wetlands have been highly modified by changes in catchment hydrology and, as a result, the vegetation and habitat integrity of these units have been severely modified. The remaining wetland units have been partially to completely transform by historic mining and sugarcane cultivation.

#### Present ecological state

The present ecological state of the wetlands and river within the proposed site for development were assessed. It was established that the wetland and riparian areas assessed are highly modified with majority of the wetland and riparian units being seriously to critically modified.

Impacts on the wetlands include drying out of the wetland habitats, infilling and direct physical modification and confinement, water pollution, proliferation of alien plants and physical transformation of the wetland. The seep wetland units were the only units found with a slight better ecological state in comparison with the rest of the wetland units. It was found that the seep units still have intact hydrological and geomorphological integrity, although their vegetation communities have long been cleared for sugarcane cultivation.

#### Ecosystem services

Wetland systems provide key ecosystem services that are assessed by evaluating the demand, supply and importance of these services. It was found that, despite the high level of modification of the wetland units and the relatively low levels of supply indirectly regulating and supporting services, the ecosystem services are of moderate importance in most of the wetland units.

At the proposed site for development it was found that the provision of biodiversity maintenance services of wetlands are greatly affected by the level of direct and indirect habitat transformation and modification; it will decrease with an increase of habitat transformation and fragmentation.

#### Ecological importance and sensitivity

The Ecological Importance and Sensitivity (EIS) of wetland/aquatic habitat refer to the importance of the wetland/aquatic resource for the maintenance of biological diversity and ecological functioning and to a system's ability to resist disturbance and its capability to recover from disturbance once it has occurred. Transformation and modification of the wetlands on the proposed site have resulted in a decrease of the EIS.



## 4.3 Socio-Economic Environment

### 4.3.1 Socio-Economic Context

The proposed development within the eThekweni Municipality is northwest of the KwaMashu off-ramp of the N2, and between the N2 and R102. The residential suburbs around the development site include low income townships and informal areas west of N2 (KwaMashu, Inanda, Ntuzuma, Newlands East and Newlands West), lower/middle income areas (Phoenix west of N2 and Sea Cow Lake, Kenville and Avoca east of N2) and middle/upper income areas around Rinaldo Road east of the N2. Residential areas that are closest to the site are Avoca Hills and Mt. Moriah, however these residents are located a distance of 1 km or more from the site's borders.

The site is surrounded with several industrial areas where commercial land uses are situated east of the N2 on North Coast road. The River Horse Valley Business Estate, a similar development type to the proposed Avoca South Industrial and Business Estate, is situated to the south west of the proposed development site, and includes a mix of light manufacturing and warehousing. The Rohill Industrial Estate is currently in planning to be built on the opposite side of the N2 and will provide similar facilities but on a smaller scale. Most of the area is dominated by Corobrik which operates an extractive industry mining the clay reserves on the site and on east side of N2.

### 4.3.2 Agriculture and Mining Use

The proposed development site is currently used by Corobrik for brick making and is zoned as "extractive industrial". Corobrik's business is based on the quarrying of various shales in the Ecca formations and the clay is used to manufacture bricks. The remaining vacant land is used by farmers to grow sugarcane. The total amount of land that is utilised for sugarcane cultivation is approximately 63 ha.

### 4.3.3 Population and demographics

The social and development context of the site is considered with an emphasis on the residential communities of Corovoca, Avoca Hills and Mt. Moriah. Corovoca and Avoca Hills is located to the south west of the proposed development and Mt Moriah is situated to the north west of the development. Both these areas are lower-middle income areas.

### 4.3.4 Crime

Crime is present throughout the northern residential suburbs particularly along and inland of the N2 which includes suburbs close to the Avoca South site such as Corovoca and Duff's Road. Crime incidents fluctuate and "hotspots" move from area to area which makes the crime rates fluid and changeable. Businesses and industrial areas in the northern areas have also experienced crime as they are accessible from the main transportation routes

(KwaMashu Highway, N2 and Old North Coast road). Crime activities includes house-breakings, electricity theft (illegal connections), cable theft, drug peddling aimed at school children and drag racing at night. There are also regular gangs that operate in the whole northern area.

#### 4.3.5 Traffic

Avoca South is fronted by the N2 along its eastern boundary, by Old North Coast Road (P585) on its northern boundary, by the R102 along its western boundary and by the R102 (P93) along its southern boundary.

A full Traffic Impact Assessment (TIA) has been prepared by Aurecon (Appendix K3) and the following existing traffic conditions have been found:

##### Intersection of Chris Hani Road and Old North Coast Road

There are currently very heavy through flows along both carriageways of Chris Hani Road during the morning peak hour. Long queues form along both carriageways of Chris Hani Road, along the east to north right-turn movement from Chris Hani Road into Old North Coast Road and the north to west left-turn movement from Old North Coast Road into Chris Hani Road.

##### KwaMashu Interchange

Currently the west terminal of this interchange is operating at acceptable levels during both the morning and afternoon peak hours. Queuing does occur along Chris Hani Road eastbound during both the morning and afternoon peak hours but levels are still found to be acceptable.

The east terminal of the KwaMashu interchange is experiencing long queues along the N2 freeway off-ramp during the morning peak hour and during afternoon peak time queues form eastbound along Chris Hani Road. The north-west to east left turn movement from the N2 off-ramp onto Chris Hani Road and the westbound movement along Chris Hani Road is very high flow volumes and not acceptable.

##### Lark Road and MR577 Intersection

Severe congestion is present at this intersection during morning and afternoon peak hour traffic. The heavy flow is caused by the high volumes of traffic flowing along the MR577. However the traffic is free flowing on the MR577 except where there is a right turn into Lark road.

##### R102 / MR577 Diamond Interchange

The Southern terminal is operating at acceptable levels during the morning and afternoon

peak hours. However increased flow is experienced on the R102 off ramp turning left on the MR577. Traffic flows at acceptable levels at the northern terminal during morning as well as afternoon peak periods.

#### Intersection at R102, Mount Moriah Drive and Toncoro Road

Mount Moriah Drive and Toncoro Road are both stop controlled roads at this intersection and some queuing is present during morning and afternoon peak hours. Due to low traffic volumes from the east and west approaches the installation of traffic signals are not warranted, based on guidelines by the eThekweni Transport Authority. Both Mount Moriah Drive and Toncoro Road will be changed to left in and out only.

#### R102 and Old North Coast Road Intersection

This intersection experience high congestion levels both morning and afternoon peak hour. Queues form during the morning peak due to traffic from the north and south turning left and right respectively into Old North Coast Road. In the afternoon, traffic turning right from Old North Coast Road into R102 and traffic from the north turning left into Old North Coast Road causes the formation of queues.

#### Old North Coast Road and Donald Ensor Road Intersection

Queues form along both north and south approaches to Old North Coast Road and high traffic volumes are present in the morning but are acceptable in the afternoon.

#### *4.3.6 Visual*

The area surrounding the proposed Avoca South Industrial and Business Estate can be described as a mix of urban, agricultural and residential environments. The proposed development is within close proximity to existing light industrial areas. Thus the area surrounding the development can be described as being a transitional landscape characterised by intermixed land use between rural, agricultural and urban areas.

There are no residential areas close to the site but components of Mt. Moriah (north of the site), **Corovoca (west of the site,)** and Avoca Hills (southwest of the site) residential areas look over the site. Only a small section of the residential community will be affected by a change in the visual nature of the site. The sense of place around the proposed Avoca South Industrial and Business Estate will be that of light industry, agriculture and residential.

#### *4.3.7 Noise*

Noise levels in the areas surrounding the proposed Avoca South Industrial and Business Estate will have some variability. High noise levels are present at the traffic intersections

and are amplified by the noise created by the high speed traffic on the N2 which is bordering the proposed site. Other sources of noise are industries located in the area. Noise levels will be much lower in the residential areas and will only slightly increase during morning and afternoon traffic times. The proposed development is not expected to significantly change noise levels in the area as multiple sources of noise disturbance are already present.

#### *4.3.8 Cultural and Heritage Resources*

Stone artefacts have been found on the site of the proposed development by Frans Prins who completed an initial and extended Heritage Impact Assessment of the Avoca South site (Appendix K10). These artefacts were found lying scattered in open sandy patches that represent historical dunes in the old mining area behind the Corobrik buildings. The majority of the stone artefacts discovered belong to the Middle Stone Age and no other archaeological material was observed such as bone or plant remains. The stone artefacts are not in any stratigraphic or spatial context and they appear to be eroding from the ancient sand dunes that have been disturbed by mining activities in the past.

Following the initial find of stone artefacts an extended Heritage Impact Assessment was conducted. In this assessment the whole site were assessed for any additional artefacts of heritage value. No further finds were made and it was concluded that the site has very little research value due to this disturbance as well as poor preservation but a surface collection, under the auspices of AMAFA, of the stone artefacts will have educational value and can be used for teaching purposes.

## 5 ASSESSMENT OF ENVIRONMENTAL IMPACTS

### 5.1 Introduction

In this chapter the potential impacts of the proposed Avoca South Industrial and Business Estate are described and assessed in terms of the construction and operational phases. Mitigation measures will be recommended for each impact. These impacts were identified during the Scoping Phase of the EIA and include potential biophysical, ecological, economic and social environment impacts.

### 5.2 Impact Assessment Methodology

#### 5.2.1 Significance Rating Criteria

In this section the impact assessment methodology is explained. In order to calculate the significance of the impacts of the construction and operational phases of the proposed development a number of aspects (listed below) have to be considered. The predicted impacts can also be grouped into two categories which are qualitative impacts and quantitative impacts.

To ensure uniformity, the assessment of potential impacts is addressed in a standard manner so that a wide range of impacts are comparable. For this reason a clearly defined rating methodology has been used to assess the impacts identified in each specialist study.

The methodology used to rate all potential and identified environmental impacts: Impact risk or significance was determined using a quantitative ranking technique, and ultimately expressed as a Low (0-6.9), Moderate (7-12.9) or High (13-18) significance. The predicted impacts are rated before and after mitigation measures are applied. Regarding the cases where mitigation requires time to establish, the consequential impact is based on the situation after establishment of the mitigation measures.

Each impact identified was assessed in terms of the following aspects:

- Status of the Impact (i.e. positive or negative).
- Probability of the Impact.
- Frequency of the Impact.
- Spatial Extent of the Impact.
- Intensity of the Impact
- Duration of the Impact

The significance of the impact upon each environmental factor is rated according to its

quantitative evaluation (Table 5-1). This rating, however, is not a reflection of the environmental risk or severity of impact. In certain instances a specific factor may have been permanently altered, but the impact of that factor on the environment (natural, cultural, social) is marginal or even inconsequential. It is therefore important to analyse the entire scope of the impact and its context and not assess it entirely on the significance of the rating alone.

Table 5-1: Impact Assessment Scoring

Rating	Description	Quantitative Rating
<b>Status (S)</b>		
Positive	A benefit to the holistic environment	1
Negative	A detriment to the holistic environment	-1
<b>Probability (P)</b>		
Improbable	In all likelihood the impact will not occur	1
Low Probability	Possibility of the impacts to materialise is very low	2
Probable	A distinct possibility that the impact will occur	3
Highly Probable	Most likely that the impact will occur	4
Definite	The impact will occur regardless of any prevention measures	5
<b>Frequency (F)</b>		
Continuous	Daily	1
Frequent	Less than daily (hours)	0.8
Infrequent	Moderate frequency (weekly)	0.5
Occasional	Less than weekly (once or twice per month)	0.2
<b>Spatial Extent (SE)</b>		
Site Specific	Effects occur within the site/servitude boundary	1
Local	Effects extend beyond the site boundary	2
	Affects immediate surrounding areas	
Regional	Widespread	3
	Extends far beyond the site boundary	
	Effects felt within a 50km radius of the surface lease area	
National	Effects felt beyond the 50km radius	4
<b>Intensity (I)</b>		
Very Severe	Substantial deterioration/improvement	4
	Irreversible or permanent	
	Cannot be mitigated	
Very Beneficial	Permanent improvement and benefit	4
Severe	Marked deterioration	3
	Long term duration	
	Serious and severe impacts	
	Mitigation is very expensive, difficult or time consuming	
Beneficial	Large improvement	3
	Long term duration	
Moderately Severe	Moderate deterioration	2

Rating	Description	Quantitative Rating
Moderately Beneficial	Medium term to long term duration	2
	Fairly easily mitigated	
	Moderate improvement	
	Medium to long term duration	
Slight	Minor deterioration	1
	Short to medium term duration	
	Mitigation is easy, cheap or quick	
Beneficial	Minor improvement	1
	Short to medium term duration	
<i>Duration (D)</i>		
Short Term	0 - 5 years	1
	Less than the project life span	
Medium Term	5 - 10 years	2
Long Term	15 - 40 years	3
	Life of project	
Permanent	Where the impact will be irreversible and will remain	4
<i>Significance</i>		
NEGATIVE		
High	Negative long term/permanent change to the natural and social environment	13 - 18
Medium	Medium or long term effects to natural and social environment	7 - 12.9
	These effects are real and mitigation is possible, difficult and often costly	
Low	Short term effects on the natural environment	0 - 6.9
	Effects are not substantial and are often viewed as unimportant	
	Mitigation is cheap, easy, quick or seldom required	
POSITIVE		
Low	No real benefit to the holistic environment	0 - 6.9
Medium	A benefit to the holistic environment	7 - 12.9
	Monitoring is needed	
	Some mitigation is needed	
High	To the greater benefit of the social and/or natural environment	13 - 18
	No mitigation or monitoring needed	

### 5.2.2 Mitigation Measures

Mitigation measures need to be put in place to control negative impacts and reduce environmental damage during the construction and operational phases. The significance rating of an impact plays an important role in establishing what level or degree of mitigation is required. Suitable and appropriate mitigation measures were identified for each of the potential impacts based on specialist recommendations and GCS expertise. Impacts were rated with and without mitigation measures to illustrate the difference of such measures.

The recommended mitigation measures are incorporated in the Environmental Management

Programme (EMPr) for the proposed Avoca South Business Estate (Please refer to Appendix I).

### 5.3 Project Activities Potentially Resulting in Environmental Impacts

An array of activities will be undertaken during construction and operation of the proposed Avoca South Business Estate which by nature will have the potential to cause on and off-site environmental damage. These activities are listed in the following sections.

#### 5.3.1 Construction Phase impacts

- Setting up of a construction camp site at the proposed site.
- Clearing of vegetation on large areas of land.
- Destruction of ecosystems.
- Use of available roads and tracks, and creation of new roads for transportation of equipment materials and for construction site access.
- Traffic congestion and disruption during construction of the new intersections and road upgrades.
- Dust generation from earth moving activities to create level platforms.
- Use of transportation and construction vehicles and equipment.
- Refuelling and maintenance of construction vehicles and equipment.
- Resourcing, introduction, storage and use of construction material such as water, concrete, brick, fuel, oils, steel structures and other equipment Removal of vegetation and infilling of wetlands for platform creation.
- Establishment and use of concrete batching equipment and/or a concrete batching facility.
- Removal of historical buildings and loss of heritage resources.
- Noisy construction activities, such as heavy vehicles, jack hammers, hoists, cranes, etc.
- Use of hazardous substances such as fuels, oils, paints, solvents, etc.
- Use of temporary ablution facilities on site for construction workers.
- Disposal of construction rubble and excess spoil material.
- Waste generation, handling and storage during construction.
- Undertaking of potentially dangerous construction activities by construction workers.
- Stormwater management on the construction site which could result in erosion and soil loss.
- Visual impact as the landscape changes through the construction phase.



### 5.3.2 Operational Phase Impacts

- Increased traffic as a result of operational activities and movement of heavy vehicles in and out of the site (transporting materials and goods).
- Traffic congestion and disruption during construction of further new intersections and long-term road upgrades.
- Maintenance of the open space areas on site for conservation and visual buffer purposes.
- Noisy operational activities at industrial facilities.
- Light pollution due to operational activities at night.
- Storage and handling of potential contaminants at workshops, fuelling stations or industries (e.g. fuels, oils, chemicals, paints).
- Sorting, storage and transportation of domestic, garden and hazardous waste.
- Use of ablution facilities.
- Stormwater management on site with discharge into the northern watercourse, which could result in erosion and soil loss.

## 5.4 Impacts identified in the Scoping Phase

In the Scoping Phase of this project, various potential significant environmental impacts and issues were identified and described. During the Impact Assessment Phase, these impact aspects were investigated and assessed by specialists to establish the significance of each one. The consolidated significant issues and concerns are summarised herewith, along with the reference of where in the Final EIA Report this issue has been investigated (Table 5-2).

Table 5-2: Potential Impacts Identified in the Scoping Phase

Issues	Report reference for assessment of impacts
a) Soils and Erosion <ul style="list-style-type: none"> <li>• Contamination of soil due to improper disposal of hazardous substances.</li> <li>• Erosion of soil during construction phase.</li> <li>• Slope instability and financial and safety implications for onsite and neighbouring properties.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.5.3 for soil erosion and sedimentation related impacts.</li> <li>• Geotechnical Assessment in Appendix K4.</li> </ul>
b) Water Pollution <ul style="list-style-type: none"> <li>• Potential for surface/groundwater contamination from spills/leakages.</li> <li>• Soil erosion and sedimentation.</li> <li>• Spill contingency plans required for handling and storage of hazardous materials onsite.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.5.4 for the assessment of water contamination impacts.</li> <li>• EMPr in Appendix I.</li> </ul>
c) Wetland Systems <ul style="list-style-type: none"> <li>• Construction in the 32m buffer zones.</li> <li>• Wetland and riparian zone infilling.</li> <li>• Mitigation and rehabilitation of riverine system on the northern boundary of the</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.6.3 for the assessment of impacts on wetland systems as well as rehabilitation opportunities.</li> <li>• Wetland Impact Assessment in Appendix K8.</li> </ul>

Issues	Report reference for assessment of impacts
site.	
d) Wetland and River Systems <ul style="list-style-type: none"> <li>• Sedimentation of river system.</li> <li>• Alteration of hydrological functioning and change in habitat of the wetlands and river.</li> <li>• Loss of biodiversity.</li> <li>• Issue of establishment of stormwater structures within wetlands.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.6.3 for the assessment of impacts on wetland systems as well as rehabilitation opportunities</li> <li>• Wetland Impact Assessment in Appendix K8.</li> </ul>
e) Vegetation <ul style="list-style-type: none"> <li>• Disturbance to onsite flora.</li> <li>• Impacts on local floral biodiversity.</li> <li>• Impacts to adjacent D'MOSS area.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.6.1 for the assessment of impacts to local vegetation.</li> <li>• Vegetation Impact Assessment in Appendix K6.</li> </ul>
f) Fauna <ul style="list-style-type: none"> <li>• Impacts to onsite and surrounding fauna.</li> <li>• Impacts on local faunal biodiversity maintenance.</li> <li>• Disturbance of local bat population.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.6.2 for the assessment of impacts to local fauna.</li> <li>• Refer to the Faunal Assessment in Appendix K7.</li> </ul>
g) Visual and aesthetic value <ul style="list-style-type: none"> <li>• Change the sense of place.</li> <li>• Litter present.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.8.4 for the assessment of visual impacts.</li> </ul>
h) Noise <ul style="list-style-type: none"> <li>• Increase in ambient noise levels during construction phase.</li> <li>• Increase in ambient noise levels caused by operation activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.8.5 for the assessment of noise impacts.</li> </ul>
i) Traffic <ul style="list-style-type: none"> <li>• Increase in traffic congestion.</li> <li>• Exacerbation of already poor congestion situation.</li> <li>• Increased use of smaller residential roads by heavy vehicles.</li> <li>• Location of access points.</li> <li>• Upgrade requirements and costs.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.8.3 for the assessment of traffic-related impacts.</li> <li>• Traffic Impact Assessment in Appendix K3.</li> </ul>
j) Cultural and Heritage Resources <ul style="list-style-type: none"> <li>• Disturbance of cultural and heritage resources.</li> <li>• Loss or heritage resources.</li> <li>• Loss of historically valued buildings.</li> <li>• Relocation of heritage resources.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.8.6 for the assessment of impacts relating to Cultural and Heritage Resources.</li> <li>• First and Second Phase Cultural Heritage Impact Assessment in Appendix K10.</li> </ul>
k) Stormwater Management <ul style="list-style-type: none"> <li>• Increased stormwater volumes.</li> <li>• Erosion and sedimentation of watercourses.</li> <li>• Impacts on municipal stormwater infrastructure and services.</li> <li>• Capacity of infrastructure.</li> <li>• Reduction in level of service and flooding.</li> <li>• Upgrade requirements.</li> <li>• Damage to existing services.</li> <li>• Attenuation requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.5.6 for the assessment of stormwater related impacts.</li> <li>• Stormwater Management Plan in Appendix K2.</li> </ul>
l) Floodlines <ul style="list-style-type: none"> <li>• Alteration of onsite drainage and associated water carrying capacity.</li> <li>• Impact on onsite flood line levels after modification of the site topography.</li> <li>• Impact on discharge volumes due to site design.</li> <li>• Changes to floodlines of adjacent rivers due to increased stormwater discharge from hard surface sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.6.3 for the assessment of floodlines.</li> </ul>
m) Impacts on municipal waterborne sewer services	<ul style="list-style-type: none"> <li>• Section 2.5 for a description of infrastructure availability and requirements.</li> </ul>

Issues	Report reference for assessment of impacts
<ul style="list-style-type: none"> <li>• Increased sewage volumes.</li> <li>• Capacity of infrastructure (pipes, pump stations and Waste water treatment works WWTWs) to meet additional demands.</li> <li>• Reduction in level of service.</li> <li>• Upgrade requirements.</li> <li>• Damage to existing services.</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering Services Report in Appendix K1.</li> </ul>
<p>n) Impacts on municipal water services</p> <ul style="list-style-type: none"> <li>• Increased demand.</li> <li>• Capacity of infrastructure and supply.</li> <li>• Reduction in level of service.</li> <li>• Upgrade requirements.</li> <li>• Damage to existing services.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 2.5 for a description of infrastructure availability and requirements.</li> <li>• Engineering Services Report in Appendix K1.</li> </ul>
<p>o) Impacts on municipal electrical services</p> <ul style="list-style-type: none"> <li>• Increased demand.</li> <li>• Capacity of infrastructure.</li> <li>• Reduction in level of service.</li> <li>• Upgrade requirements.</li> <li>• Damage to existing services.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 2.5.4 for a description of infrastructure availability and requirements.</li> <li>• Engineering Services Report in Appendix K1.</li> </ul>
<p>p) Waste management</p> <ul style="list-style-type: none"> <li>• Require a plan for how waste is going to be managed within the proposed development.</li> <li>• Require details on waste generated during construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 2.5 for a description of infrastructure availability and requirements.</li> <li>• Engineering Services Report in Appendix K1.</li> </ul>
<p>q) Socio-economic impacts</p> <ul style="list-style-type: none"> <li>• Increase in municipal rates base.</li> <li>• Loss of cane yields and the resultant impacts on the sugar industry.</li> <li>• Loss of agricultural jobs.</li> <li>• Employment/job creation (Industrial and Construction).</li> <li>• Possible increase in crime.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 5.8 for the assessment of socio-economic impacts.</li> <li>• Economic Impact Assessment in Appendix K9.</li> </ul>
<p>r) Implications of Corobrik mining</p> <ul style="list-style-type: none"> <li>• Impacts of the duration of the brickmaking operation on the development of the Estate.</li> <li>• Mine rehabilitation requirements prior to proposed development.</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to Section 5.7.3 for the assessment of impacts on mining.</li> </ul>
<p>s) Air quality impacts and carbon footprint</p> <ul style="list-style-type: none"> <li>• Emissions from businesses from within the estate.</li> <li>• Emissions from increased number of vehicles in the area.</li> <li>• Emissions from plant machinery during construction.</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to Section 5.5.7 for the assessment of air quality impacts.</li> </ul>
<p>t) Major Hazardous Installation impacts</p> <ul style="list-style-type: none"> <li>• Impact of fire and explosion incidences.</li> <li>• Social risks.</li> <li>• Impact of gas release.</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to Section 5.5.9 for the assessment of the Major Hazard Installation.</li> </ul>
<p>u) Cumulative impacts</p> <ul style="list-style-type: none"> <li>• It is anticipated that the development of the Proposed Business Estate will create a number of cumulative impacts.</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to Section 5.9 for the assessment of cumulative impacts.</li> </ul>

## 5.5 Biophysical impacts

### 5.5.1 Loss of Topographical Structure and Landform

#### 5.5.1.1 Impact Description

During the construction phase, major earthworks will be required for the creation of large level platforms due to the undulating topography of the site. The cutting and infilling activities will result in the reduction of a number of the hills and have an impact on the topographical structure of the site. Only the eastern ridgeline will remain intact as the crest serves as a power line servitude which cannot be moved. Potential visual and aesthetic impacts may occur due to the change of topographical structure and landform of the site (Refer to Section 5.8.4).

#### 5.5.1.2 Impact Assessment and Rating

The construction phase impact on topographical character of the site will be restricted to the immediate surrounding area. The impact is likely to occur even with the implementation of mitigation measures, due to the height of the proposed site in line with or below many of the surrounding residents. This impact is rated as having a Medium significance before and after mitigation.

The change in topographical structure and landform in the operational phase will be long-term, highly probable and will affect the immediate surrounds of the site. However the significance of the impact is of fairly low importance as it will only be visual and may provide a more aesthetic view in comparison with quarry activities. This impact is rated as having a Medium significance before mitigation and after mitigation (Table 5-3).

Table 5-3: Impact of Topographical structure and landform change

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance Before Mitigation		Significance After Mitigation	
		Total	Rating	Total	Rating
		<b>CONSTRUCTION PHASE</b>			
Topographical structure and Landform	Change in the topographical structure and land form: Reduction in hill heights and change in shape	-12.8	Medium	-11.5	Medium
<b>OPERATIONAL PHASE</b>					
Topographical structure and Landform	Change in the topographical structure and land form: Reduction in hill heights	-12.8	Medium	-11.5	Medium

#### 5.5.1.3 Mitigation Measures

The following mitigation measures can be applied to reduce the potential impact of topographical and landform change:

- Use building materials and colours that will blend in with the environment to minimize visual impact.
- Use extensive landscaping of the site to beautify the proposed development and hide/obscure buildings from view.

### 5.5.2 Impacts on Geological Stability

#### 5.5.2.1 Impact Description

Extensive earthworks will take place during the construction phase and landslides or significant soil instability can be encountered due to the nature of the geology which is underlain with shale bedrock that is susceptible to sliding. In the Geotechnical Assessment (Appendix K4) it is stated that the new fill embankments will impose a substantial load upon the *in-situ* materials and founding of these fills into competent bedrock or firm *in situ* sub-soils will be a critical aspect of the development.

#### 5.5.2.2 Impact Assessment and Rating

The impact of destabilising slopes could be severe on human safety as well as financial implications could be at risk. It is crucial to implement the correct engineering measures to construct the platforms and it is recommended that safety procedures and measures be implemented during construction to minimise the risk to human life. The impact has a significance rating of Medium without mitigation, and Low with mitigation (Table 5-4).

During operation of the site, embankment stability remains a minor risk should maintenance of the embankments and stormwater system not be ongoing, resulting in erosion and possible collapse of weakened areas of embankments.

Table 5-4: Geological Stability impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Geological Stability	Impacts on Slope Stability	-9.8	Medium	-6.5	Low

#### 5.5.2.3 Mitigation Measures

Mitigation actions will include the following:

- Appropriate cut and fill techniques to suit the specific embankment materials.
- The development budget should make provision for stabilising any locally unstable zones exposed during the earthworks by using stability berms, gabion walls or rock bolting.

- Body Corporate rules must ensure that management and maintenance of embankments within a property are made the responsibility of the property owner.

### 5.5.3 Soil Erosion and Sedimentation

#### 5.5.3.1 Impact Description

The extensive earthworks that will take place during the construction phase will be across almost the entire site. Vegetation will be removed from large areas of the land which will leave open soil exposed to wind and water for short to lengthy periods of time, increasing the potential for significant soil erosion especially on the steep cut banks and heavily used access roads to the construction site. Similarly, large stockpiles of soil will have to be created as materials are moved around to create the platforms and shape the site. Soil erosion is most likely to occur when these construction activities are in progress, as rain and wind erode soil particles which are then dispersed and/or deposited in water systems.

The erosion of topsoil or subsoil may lead to the following impacts:

- Soil erosion may lead to a loss of nutrients, loss of topsoil, as well as ground instability.
- Eroded soil from the site deposited down slope or downstream can clog or block water flow creating ponding or restricted water flow. Further, deposited material can inhibit or delay the emergence of seeds and bury small seedling and plants as well as aquatic fauna and flora.
- If sediment run-off from the site reaches the northern watercourse or moves off site to downstream water systems, it can accelerate scouring of streams.
- An increase in sedimentation in the watercourses can clog stormwater drains and stream channels, fill in wetlands and reduce downstream water quality. If severe amounts of sediment load from the site enter into the watercourse or wetlands, the possible destruction of these systems could result which, in turn, will increase rehabilitation cost and efforts.
- If hazardous substances (such as fuels or oils) are spilled on the site they can be transported along with the eroded soil and water and contaminate or pollute downstream watercourses and wetlands.

Minimal soil erosion impacts are anticipated during the operational phase as the majority of activities will be restricted to areas of hard standing. However, there is the potential for soil erosion to occur if stormwater discharge is not undertaken correctly in line with the SWMP (Appendix K2). The SWMP presents a design of discharge points leading directly into the northern watercourse and it is therefore critical that the SWMP be implemented

effectively to prevent erosion from occurring during periods of peak water flow, such as high rainfall events. If not implemented correctly, erosion may occur at the stormwater discharge points, as the fast moving water has increased energy and can potentially erode soil, undercut pipes, destabilise and collapse banks or remove vegetation, transporting it downstream until it is deposited in a water system.

#### 5.5.3.2 Impact Assessment and Rating

The probability of erosion taking place is much higher during the construction phase than during the operational phase due to major earthwork activities. However, due to the geology of the site (Refer Section 4.1.2), the sub soils and bedrock present are not considered to be highly erodible. The impact therefore has a low probability of occurrence, and would likely only occur on an infrequent basis during high wind or rainfall events. The extent of the potential impact will affect the immediate surrounding areas and the intensity of the impact may lead to moderate deterioration of on-site soil conditions or watercourse/wetland ecological functioning. The impact rating for soil erosion and sedimentation impacts in the construction phase is Medium (negative) without mitigation and Low (negative) with mitigation.

The potential impact of erosion is greatly reduced during the operational phase. The exposed areas of soil will either re-vegetated or covered in hard surface areas of the new platforms. However, erosion may occur at the stormwater discharge points due to insufficient attenuation times and/or due to poor management of the stormwater system. The impact probability is very low, and would only occur during periods of high water flow. However, should the impact occur it would likely extend to the immediate surrounds of the site and have a moderately severe intensity. The impact rating in the operational phase is Medium (negative) without mitigation and Low (negative) with mitigation (Table 5-5).

Table 5-5: Soil Management Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Soil Management	Soil Erosion and Sedimentation: Loss of topsoil and nutrients, inhibit emergence of seeds, scouring of streams, sedimentation affecting water quality and freshwater habitat functioning	-7.5	Medium	-5.5	Low
OPERATIONAL PHASE					

Soil Management	Soil Erosion and Sedimentation: Erosion at stormwater discharge points or on bare soil in open spaces, leading to the creation of erosional dongas with downstream deposition and sedimentation without management and maintenance.	-9.2	Medium	-6.2	Low
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### 5.5.3.3 Mitigation Measures

The following mitigation measures can be applied to reduce the potential impact of soil erosion and sedimentation:

- Stabilise and manage cleared areas to prevent and control erosion.
- During the construction phase stormwater must be captured effectively and directed well away from soil stockpiles and exposed soil.
- Designs measures in the SWMP (Sivest 2015) must be implemented correctly.
- It is recommended that earthworks and stockpiling must be done in the dry winter months; however, should this not be possible considering that construction will be for an extended time period, it is recommended that stockpiles must be properly prepared, protected and maintained. Install silt fences around stockpiles to prevent erosion and downstream sedimentation, and install erosion control measures on slopes adjacent to the wetlands / watercourse.
- Measures to prevent soil erosion must be put in place, including the use of hessian sheets, sand bags and retention or replacement of vegetation. These measures can be implemented on areas sensitive and prone to erosion such as steep banks.
- Minimise erosion by reducing the flow velocity of stormwater within the camp and construction site using appropriate attenuation measures.

An expanded list of detailed mitigation measures can be found in the EMPr.

## 5.5.4 Soil, Surface and Groundwater Contamination

### 5.5.4.1 Impact Description

Soil may become contaminated during the construction phase as a result of poor and improper management and maintenance of heavy plant machinery which can leak fuels and oils on site. These then soak into soils, contaminating them, or transfer to water systems impacting natural habitats. Poor and uninformed use, storage and disposal of hazardous substances such as fuel, oil and cement, can also result in soil or water contamination.

Soil contamination may also occur in the operational phase as a result of poor management of hazardous materials, waste or stored materials. Following from the soil contamination, contamination of the groundwater is the next environmental aspect that could be impacted upon in both the construction and operational phases of the project as hazardous substances leach out of the soils into sub-surface water bodies. The risk of surface and groundwater contamination is very high, particularly during the construction phase with so



much activity and machinery on-site. The probability of oil and fuel spills and leakages is high for both surface and groundwater aspects.

In operation, the risk of surface water contamination is higher due to much of the site being hard-surfaced with water channelled through specific routes generating significantly more surface water runoff than under natural, softer surface conditions. This “exposed” surface water has a higher probability of becoming contaminated as it flows through, past and under the various individual site businesses that will occupy the site.

In addition, contamination (oil and fuel spills) on the roads could potentially lead to stormwater contamination should such contaminants drain into the roads’ stormwater system.

#### 5.5.4.2 Impact Assessment and Rating

The contamination of soil or water is a possibility through accidental or negligent spillages/leaks, as well as from sedimentation during the construction and operational phases. Thus the implementation of mitigation measures is very important. The impact may be site specific but if spills of hazardous materials are not cleaned up, they can leach into the soil resulting in soil contamination and further entering the groundwater system from which contaminants are easily dispersed and can negatively impact on the downstream environment. In the circumstance described above the impact will go beyond the site and may have far reaching effects on the local ecosystems.

Construction and operational phase impacts are rated as having a Medium significance before mitigation and Low after mitigation, however it is important to note that this cannot be accurately predicted at this stage, as the degree of pollution will vary depending on the nature and concentration of the contaminant, and the receptor affected (Table 5-6).

Table 5-6: Soil, Surface and Ground water Contamination Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Soil, Surface and Groundwater Quality	Storage and handling of potential contaminants / hazardous waste	-9.8	Medium	-6.8	Low
	Contamination of watercourses / wetlands via sedimentation	-9.8	Medium	-6.8	Low

OPERATIONAL PHASE					
Soil, Surface and Groundwater Quality	Contamination of soils or water by hazardous substances	-11.2	Medium	-6.2	Low
	Contamination of watercourses / wetlands via sedimentation	-9.2	Medium	-6.2	Low

#### 5.5.4.3 Mitigation Measures

The potential contamination of soil and water resources can be prevented by good environmental management practices. Mitigation measures include but are not limited to the following:

- A detailed Spill Prevention and Management Plan must be prepared for the construction and operational phases of the project, to be implemented and monitored on an ongoing basis (dependent on types and quantities of potential contaminants stored on site).
- Safeguard hazardous substances from being stolen, vandalised, catching fire or spilling on open ground.
- Ensure storage areas are designed according to the appropriate South African National Standard (SANS) Codes e.g. storage areas must be bunded (110% of volume stored) to contain any leaks or spills during construction.
- Ensure that maintenance activities are undertaken in such a manner that no spillage of hazardous substances occur.
- Install appropriate waste collection and disposal procedures and facilities.
- Ensure that alien vegetation control and spraying with herbicides is undertaken by a trained and experienced professional qualified to do so.
- As far as possible, alien vegetation removal on slopes or in close proximity to wetlands / the central watercourse should take place during the dry winter months to reduce the potential for water contamination by herbicides.
- Adhere to all requirements of the Occupational Health and Safety Act and associated Regulations and any amendments thereto that are relevant for management of hazardous substances.
- Compile and implement a detailed Stormwater Control Plan, in line with the findings of the SWMP and the Conceptual Wetland Rehabilitation Plan (Appendix K8).

A number of additional mitigation measures are recommended in terms of water monitoring:

- It is recommended that the Glen Anil Stream running along the northern boundary of the site be sampled on a quarterly basis upstream and downstream. If any water quality issues are identified as a result of sampling, it is suggested that a groundwater quality monitoring programme is established.

### 5.5.5 Reduction in Groundwater Base Flow

#### 5.5.5.1 Impact Description

The proposed development involves the creation of very large platforms which will be used to build warehouses on. The construction of such platforms will cover the majority of the sites with impermeable surfaces and impact on the underlying aquifers because of a reduction of recharge from rainfall. This may have a negative impact on localized wetlands and reduction in base flow to the streams.

#### 5.5.5.2 Impact Assessment and Rating

At the start of construction phase there will be a low likelihood of the impact occurring. However as construction progress and the operational phase commence the probability of the impact will increase, as the hard-surfaces will reduce the amount of rainwater infiltrating into the soil. The impact may extend beyond the boundaries of the site to the immediate surrounds. The impact has a significance rating of Medium without mitigation, and Low with mitigation (Table 5-7).

Table 5-7: Reduction in Groundwater impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Groundwater Quantity	Reduction in groundwater base flow	-7.2	Medium	-4.2	Low
OPERATIONAL PHASE					
Groundwater Quantity	Reduction in groundwater base flow	-9.2	Medium	-6.2	Low

#### 5.5.5.3 Mitigation Measures

Currently there is no baseline water quality and volume data available. It is recommended that, for future reference, the owner of the site must have such information at hand to overcome future disputes or litigation if any issues occur. No further mitigation measures for groundwater recharge are applicable, other than ensuring that the SWMP is implemented such that clean and dirty water are separated and clean water is directed downstream to the Glen Anil Stream at numerous discharge points.

### 5.5.6 Stormwater Management

#### 5.5.6.1 Impact Description

The proposed development of Avoca South will reshape the current environment to consist of significantly more hardened surfaces through the creation of level platforms. This will

reduce natural rainfall infiltration and increase the impact of storm water. The increase of flow, volume and velocity of water runoff into the environment must be managed through an effective SWMP. If modifications to surface water flows are not managed, resulting implications on aquatic systems in the watercourse/wetlands in terms of their natural hydrological flow regimes can occur.

#### 5.5.6.2 Impact Assessment and Rating

The impact of the development on stormwater flow will become more significant from construction phase to operational phase as natural water flow is increasingly modified and contained as the Avoca South Development is implemented in phases. As such the number of hardened surfaces will increase overtime as the platforms are constructed and other hard-surface such as roads; parking areas and building foundations are laid. During the early stages stormwater will follow natural paths to the drainage lines until the stormwater infrastructure is completed which will control all water flow across and from the site.

The incorrect management of stormwater may lead to the alteration of surface water flows which can have severe implications for adjacent aquatic systems in terms of their natural hydrological flow regimes. Physical damage which can occur to aquatic ecosystems, especially during storms that result in high quantities of water flow over short periods of time, this can increase erosion, sedimentation and damage to vegetation and downstream ecosystems. The potential alteration of the stormwater flow regime at Avoca South is expected to be short-term during the construction phase, with the impact extended to the immediate surrounds and causing moderate deterioration to hydrological systems if not properly managed. During the operational phase, the re-establishment of modified stormwater flow regime will be long-term (i.e. duration of the project), but is not expected to result in serious modification of natural systems, considering that the SWMP for Avoca South is a key part of the planning process and has been produced to minimise potential impacts during the operational phase. Both construction and operational phase impacts are rated as Medium before mitigation and Low after mitigation (Table 5-8).

Table 5-8: Stormwater Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Stormwater Management	Alteration of stormwater flow regime	-7.2	Medium	-4.2	Low
OPERATIONAL PHASE					

Stormwater Management	Alteration of stormwater flow regime	-9.2	Medium	-6.2	Low
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### 5.5.6.3 Mitigation Measures

The Avoca South Industrial and Business Estate SWMP has been compiled to ensure appropriate management of stormwater. Stormwater will be managed by a major system consisting out of a piped stormwater system which will discharge at appropriate points into the Glen Anil Stream on the northern boundary of the site. A minor system will be installed for/or by the individual lot owners on each of the individual properties. The minor systems will link into the major systems. Attenuation of stormwater for this development will be fundamental due to the majority of the site being modified to hardened surfaces and to prevent flood peaks. All attenuation within the development will be done on the individual platform sites. The SWMP provides an allowable maximum post development discharge rate which ensures that the total post development discharge rates do not exceed the predevelopment rates. The prescribed rates provided in the SWMP includes additional attenuation, on a pro rata basis (by site area), for each site to accommodate the additional runoff from the road reserves.

Further mitigation measure may include:

- Installations must be provided to contain pollution as close to source as possible and in a practical location for servicing.
- The potential increase in flood peaks must be mitigated to at least pre-development levels by the provision of sufficient stormwater attenuation facilities at micro and macro levels.
- The potential increase in flood volumes must be mitigated where possible by retention of runoff in on-site facilities for irrigation use and unsaturated wetland areas where evaporation and infiltration can help to reduce flood runoff rates.
- Prior to any physical work proceeding on site, a Stormwater Control Plan detailing the proposed stormwater control measures is to be formulated.
- The Conceptual Wetland Rehabilitation Plan (Appendix K8) must inform the detailed Stormwater Control Plan and designs in terms of attenuation of stormwater, preventing possible damage to the central watercourses or wetlands, and ensuring their successful rehabilitation.
- The construction of stormwater management infrastructure must take into consideration the required measures to protect faunal and floral species on site, and adhere to any buffer requirements agreed with the eThekweni Municipality, the Department of Water and Sanitation and Ezemvelo KZN Wildlife.

### 5.5.7 Air Quality

#### *5.5.7.1 Impact Description*

It is possible that air quality will be affected during the construction phase where dust generating activities such as vegetation-clearing, earth-moving activities for levelling of platforms, creation of soil stockpiles for platforms, creation of access roads and construction of buildings and associated infrastructure will take place. Also there will be an increase in vehicular emissions because of increased truck traffic and the presence of earth-moving vehicles. Residents exposed to these activities may potentially experience reduced health if they are sensitive receptors. However, considering that the Corobrik factory has been operating on the site for many years and operates large furnaces which release air emissions everyday as result of the brickmaking process, the change in operational emissions is considered negligible.

Operational activities may result in reduced air quality on and around the property as a result of the release of emissions from industrial activities on site and the increased volumes of emissions from increased traffic within and in the vicinity of the site.

#### *5.5.7.2 Impact Assessment and Rating*

Air pollution from dust and vehicular emissions during the construction phase are anticipated to be short-term. It is probable that the impact will occur considering that large volumes of soil will need to be moved in the creation of platforms creating dust. Even though the impact will occur on a regular basis during the construction phase the nearest residential areas, which are Avoca Hills and Mt. Moriah, are located a distance of 1 km or more from the site's borders and the intensity of the impact should be slight. These impacts are rated as having a medium (negative) significance.

There will be continued air quality impacts such as industrial and vehicular emissions during the operational phase but they are expected to have a low magnitude. The types of industries planned for the site still has to be confirmed but will most likely not involve emission-generating businesses considering that most tenants will be small light industry businesses and large warehouses. The impacts are anticipated to be long-term (i.e. for the duration of the project), and will extend to the immediate surrounding area. These impacts are rated as having a medium (negative) significance (Table 5-9).

Table 5-9: Air Quality impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Air Quality	Dust pollution from earth-moving activities	-7.8	Medium	-5.8	Low
	Air pollution from vehicular emissions	-7.8	Medium	-5.8	Low
OPERATIONAL PHASE					
Air Quality	Air pollution from industrial processes	-8.8	Medium	-6.8	Low
	Air pollution from vehicular emissions	-8.8	Medium	-6.8	Low

Cumulative air quality impacts are anticipated for the project, and have been assessed in Section 5.9 of this report.

#### 5.5.7.3 Mitigation Measures

The implementation of the following mitigation measures is expected to reduce the potential impact significance of reduced air quality to a Low rating:

- Construction vehicles to be well maintained to reduce emissions, and speed limits to be strictly adhered to.
- Dust suppression measures or temporary stabilising mechanisms must be used when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including platform areas, access roads, borrow pits, construction camp, etc.
- No erodible materials may be excavated, handled or transported under high wind conditions.
- Seed long-standing soil stockpiles and exposed areas of the site.
- Soil stockpiles must be wetted and/or sheltered from the wind.
- No fires shall be permitted on site.
- Once the types of industries to be constructed on site have been confirmed, Investec must determine whether any further studies or management plans are required, based on whether or not any air pollutants will be emitted. The relevant legislative requirements must also be determined at this stage.

#### 5.5.8 Waste Management

##### 5.5.8.1 Impact Description

During the construction phase excess soil and excavated material (subsoil and rocks) from platform levelling, as well as construction and domestic waste, will likely be generated.

Hazardous waste will be produced but only in small quantities due to accidental spills/leakages of fuels or oils. The risk for soil, groundwater and surface water contamination increases, when spills/leakages of fuels or oils occur.

The contaminated soil and/or materials used to clean up spills (such as rags or containers) also constitute a hazardous waste, as do liquid wastes such as collected oils from drip trays or contaminated stormwater. These all need to be contained and disposed of correctly by a certified service provider. Waste generated during the construction process and in the contractors' camp will be the responsibility of the contractor.

During the operation phase the following waste will likely be generated:

- Solid and liquid waste comprising general litter,
- General waste;
- Garden waste;
- Hazardous waste;
- Sanitary waste; and
- Contaminated water or collected contaminants.

The latter may consist of used oil, spills from fuel storage areas collected in bunds, oil from drip trays used at workshops, and the sludge collected from oil interceptors/silt traps. The management of waste during the operational phase is important to ensure that all waste is stored, handled and disposed of in such a manner as to prevent any contamination of the site/surrounding environment.

#### *5.5.8.2 Impact Assessment and Rating*

During the construction phase there it is a distinct possibility that waste management impacts will occur if waste is not properly managed, and the intensity of these impacts may be severe and expensive/ time-consuming to mitigate. The waste impacts related to the construction phase will be short term as they will only occur for the duration of the construction phase. The spatial extent of this impact includes not only the site but also the immediate surrounding areas as it can be affected if waste is not correctly handled or contained or disposed at an appropriately licensed landfill site. Construction phase impacts are rated as having a Medium significance (negative). The implementation of mitigation measures for the construction phase is expected to reduce impact significance to a Low rating.

Operational phase impacts associated with waste management, in terms of the handling, storage and disposal of general or hazardous waste are expected to continue for the duration of the operational phase (i.e. long term impact). If waste is not correctly managed it may result in impacts that are severe and mitigation measures will be expensive



and time-consuming. The impact may extend beyond the site boundaries in terms of the incorrect storage/disposal of waste, e.g. if waste is not disposed of at an appropriately licensed landfill site. Operational phase impacts are rated as having a Medium significance (negative). The implementation of mitigation measures for the operational phase is expected to reduce impact significance to a Medium rating as the duration of the impact would be long-term (Table 5-10).

Table 5-10: Waste Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Waste Management	Pollution arising from poor waste management	-10	Medium	-6.0	Low
	Pollution arising from poor management of excess soil	-9.5	Medium	-4.2	Low
OPERATIONAL PHASE					
Waste Management	Pollution arising from poor waste management	-12.0	Medium	-8.0	Low

#### 5.5.8.3 Mitigation Measures

The EMPr prepared for the project incorporates a detailed Waste Management Plan with mitigation measures related to waste management during and post construction. The key mitigation measures are summarised as follows:

- Implement appropriate training and induction procedures to ensure all sub-contractors adopt best practice waste minimisation procedures.
- Establish a contract with the waste service provider specifying the requirements for removal and disposal of waste generated on site.
- Permission must be obtained from eThekweni Water and Sanitation for the disposal of sewage into the municipal reticulation system.
- Ensure that an adequate number of correctly labelled waste receptacles are provided on site in the construction and operational phase.
- Implement the correct handling and disposal procedures as required by the NEM:WA and according to best practice.
- Reduce the amount of waste generated from the construction and operational phase by means of efficient operations and recycling of general waste.
- Hazardous waste must be stored separately in sealed containers, on a bunded impermeable surface, and collected by a hazardous waste service provider for safe disposal or recovery.

### 5.5.9 Major Hazardous Risk Installation

A Major Hazardous Risk Impact Assessment of the Transnet Gas Pipeline was undertaken and is available in Appendix K13.

#### 5.5.9.1 Impact Description

Various incidence scenarios were assessed and it was found that the risk from accidental releases of natural gas from the Transnet pipeline in the study area fire will pose a risk to employees and the public and the pipeline is thus classified as a 'Major Hazard Installation' (MHI).

#### 5.5.9.2 Impact Assessment and Rating

During the construction and operational phase there is a low probability of any impacts from the MHI. If there should be an accidental release of gas through fire or an explosion due to over pressurization this will be site specific and the safety of employees and nearby public can be life threatening. The impact is rated a Medium (negative) but will decrease to a low Medium when mitigation measures are applied (Table 5-11).

Table 5-11: Accidental Release of Gas Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
MHI - Accidental release of natural gas	Safety risk to employees, the public and the pipeline	-9.2	Medium	-7.2	Medium
OPERATIONAL PHASE					
MHI - Accidental release of natural gas	Safety risk to employees, the public and the pipeline	-9.2	Medium	-7.2	Medium

#### 5.5.9.3 Mitigation measures

The following mitigation measures are recommended for the MHI:

- Risk assessment must be reviewed every 5 years
- Risk reduction programs should be investigated.
- Emergency procedures should be updated.
- Appropriate land planning should be done.

## 5.6 Ecological impacts

### 5.6.1 Vegetation

A Vegetation Impact Assessment was undertaken for the project, and is available in Appendix K6.

#### 5.6.1.1 Impact Description

The site has been severely transformed by mining activities and sugar cane cultivation. Through the Vegetation Assessment it was established that the vegetation remaining on site is largely dominated by alien vegetation and has little ecological value except as open space or degraded habitat for fauna.

The following potential impacts have been identified which may occur during the construction phase:

- Disturbance of indigenous vegetation alongside the development which may lead to opportunistic establishment of alien species.
- Complete loss of vegetation communities on site through clearing so the platforms can be created.
- Complete loss of the wetland in the southern part of the site through infilling for the creation of platforms.
- Loss of the existing wetland habitat, specifically the *Kniphofia* wetland.
- Removal of vegetative cover leading to a loss of ecological habitat/open space for movement of fauna on site.
- Piecemeal damage to vegetation.
- Spread or further increase in alien vegetation as a result of disturbance of established vegetation communities which includes indigenous species.
- Loss or disturbance of protected species such as the orchid *Eulophia speciose* and the Snake Lily (*Scadoxus puniceus*).
- Pollution of litter, refuse and other waste.
- Vegetation may be affected by contamination of soil or surface water with chemicals, fuels or oils.
- Legacy contamination of soils may also occur as a result of soil moving activities releasing residual fertilizers and chemicals which may have been used in past agricultural activity.

Rehabilitation and maintenance of the remaining open spaces, wetlands and watercourse areas will be done in the operational phase. This is considered as a positive impact of the development and no negative impacts are anticipated in this phase.

### 5.6.1.2 Impact Assessment and Rating

Disturbance and clearing of vegetation as well as earthwork activities to create platforms will occur during the construction phase. It is during this phase that impacts to the vegetative communities will most likely occur and may potentially lead to the loss of ecological habitat and open space for fauna. The intensity of this impact would be long-term and show a marked loss of habitat availability. This impact is rated as Medium (negative) before mitigation. However, the mitigation measure for this is the proposed rehabilitation of the northern watercourse and wetlands. Therefore, the impact is rated as Medium (positive) after mitigation, as the site conditions will have improved from an ecological habitat perspective both prior to (original state) and after the construction phase.

There will most likely be disturbance or loss of vegetation associated with riparian or wetland habitats. A definite loss of wetland habitats in the southern side of the site will occur based on the proposed layout for the site and the developer's requirement to establish large platforms. This would be a long-term and severe alteration of the vegetation structure. However, the mitigation measure is the proposed rehabilitation of the northern watercourse and remaining wetlands as part of the Rehabilitation and Conservation Management Plan (Appendix K12), which will mitigate the impact from a Medium (negative) significance to a Medium (positive) significance.

The potential loss of indigenous and protected species is likely to occur where the infilling of wetland areas including the identified *Kniphofia* wetland will take place to create platforms. The mitigation measures include the relocation of protected plant species to suitable habitat. The impact is rated as Medium (negative) before mitigation and Low (negative) after mitigation.

The purpose of this proposed development is to create large platforms and the potential loss of whole vegetative communities is likely to occur. This impact is severe and will be long term alteration of the vegetation structure. The impact is rated as Medium (negative) before mitigation and Low (negative) after mitigation.

The spread of alien vegetation as a result of land disturbance is a probable impact of the construction phase, due to the intensity of land-clearing to take place. This may extend to the immediate surrounds of the site and have a moderate impact on biodiversity of indigenous vegetation communities. The probability for this impact to occur is expected to reduce in the operational phase after rehabilitation and landscaping of the site. The impact is rated as Medium (negative) before mitigation and Low (negative) after mitigation for both phases.

Contamination of soil affecting the health of on-site vegetation, as a result of spills or

leakages of hazardous substances, or from poor waste management, has a distinct possibility of occurring in the construction phase. This would impact negatively on the ecosystem health should it occur, particularly where contamination may be transported by stormwater, thereby entering remaining watercourses and wetland areas. The potential for this impact to occur is reduced in the operational phase, as potential contaminants will be stored on impermeable surfaces and the SWMP includes the construction of oil/grease interceptors before stormwater discharge. The impact is rated as Medium (negative) before mitigation and Low after mitigation for both phases.

The rehabilitation and maintenance of the northern watercourse and wetlands together with responsible landscaping, taking into account the recommendations of the Landscape Planning undertaken by Indiflora (Appendix K13), will be a positive impact on vegetation during the operational phase. This impact is rated as having Medium significance, as it will continue throughout the life of the project and will improve current vegetation conditions on site to a large extent (Table 5-12).

Table 5-12: Vegetative Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
<b>CONSTRUCTION PHASE</b>					
Flora	Loss of ecological habitat and open space	-12.0	Medium	-6.0	Low
	Disturbance or loss of wetland / riparian vegetation	-12.5	Medium	-5.5	Low
	Loss of indigenous and protected species	-12.5	Medium	-6.5	Low
	Loss of vegetation communities	-12.0	Medium	-6.5	Low
	Spread of alien invasive vegetation	-8.5	Medium	-5.2	Low
	Contamination of soil reducing vegetative health	-8.5	Medium	-4.2	Low
<b>OPERATIONAL PHASE</b>					
Flora	Maintenance of removed alien vegetation	10.5	Medium		
	Maintenance of rehabilitated watercourse and wetland areas	12.0	Medium		
	Spread of alien invasive vegetation	-9.2	Medium	-5.2	Low
	Contamination of soil reducing vegetative health	-8.2	Medium	-4.2	Low

#### 5.6.1.3 Mitigation Measures

The following mitigation measures are recommended, which can improve vegetation composition within the open spaces as well as ecological functioning:

- Hydrological conditions outside of the built areas should not be altered by construction activities so as to sustain the growth of hygrophytic plants.
- An alien vegetation control program must be implemented to maintain open and rehabilitated areas as directed by the Rehabilitation and Conservation Management Plan compiled by Themtek Environmental Consultancy (Appendix K12).
- Open space areas outside of built areas must be provided with good vegetation cover. It recommended that indigenous plants be introduced given that the current vegetation diversity is poor.
- Application of the Landscaping Plan (Appendix K13) to ensure the most appropriate indigenous vegetation is used for the landscaped areas of the development.
- Protected species identified on site are protected by the provincial conservation ordinance and these plants may not be damaged or destroyed without permit authorization from Ezemvelo KZN Wildlife. These species must be relocated to other suitable habitats on the site at the right time of the year (summer) where they will be protected from development. This must be done in consultation with a Vegetation Specialist prior to the commencement of earth-moving activities.
- A suitable area should be located or created on site for the relocation of the *Kniphofia* plants.
- A Waste Management Plan, as included in the EMPr, must be implemented during the construction and operational phases.
- Soil contamination must be prevented through the compilation and implementation of a Spill Prevention and Management Plan.
- The mitigation measures applicable to the faunal impacts must be implemented, as specified in the EMPr.

### 5.6.2 Fauna

A Faunal Impact Assessment was undertaken for the project, and is available in Appendix K7.

#### 5.6.2.1 Impact Description

The site identified for the proposed development is highly transformed and disturbed and will only be able to support highly adaptable species of fauna. The potential negative impacts of the proposed development are as follows:

- The construction phase will result in the disturbance of habitat and fauna will avoid the area, but animals will likely return to open space areas during the operational phase.
- Habitat loss will occur during the construction phase, but as described in Section 3.2, the area offers very little value to vertebrate animals and is unlikely to cause significant biodiversity losses. However remaining habitat will improve with the

upgrading and maintenance of the identified open and conservation areas.

- Alien invasive plant species are currently present on the proposed site and pose a threat to the local biodiversity. Further proliferation of alien vegetation is likely to occur during the construction phase as a result of land disturbance. This can be improved during the operational phase with an intensive alien control programme.
- Pollution is an impact that can occur during the construction as well as the operational phase. There is a possibility that construction materials may be deposited in the conservation areas.
- Changes in hydrology can occur with the proposed levelling and the substantial increase in impermeable surfaces. This will result in a likely change in the volumes and temporal patterns of stormwater flow runoff. This, in turn, has the potential to negatively impact on the wetland areas and fauna, through increased rates of erosion, sedimentation and introduction of contaminants from the platform areas. This impact will be present in both the construction and operational phases.

#### 5.6.2.2 *Impact Assessment and Rating*

- It is definite that areas containing natural faunal habitats and fauna on the proposed site will be disturbed by construction and operational activities. This impact will be site specific and will continue for a short term (0-5 years) or until the open spaces have been rehabilitated. The significance rating of this impact will be Medium (negative) before mitigation and a lower Medium (negative) after mitigation.
- The loss of habitat will definitely occur when construction takes place. The impact will affect the immediate surrounding areas and will be permanent. The impact is therefore rated as High (negative) before mitigation, and remains High (negative) after mitigation due to the impact being irreversible. No habitat loss is expected during the operational phase as stringent measures and plans have been proposed to protect and rehabilitate the wetlands and riparian habitats and conservation areas resulting in a positive impact on the remaining habitats.
- During the construction and operational phases of the project, the probability of introducing alien fauna and plant species as well as domesticated animals to the site is considered definite. The impact will also be local but long term and has been calculated as a Medium (negative) impact significance before mitigation and a lower Medium (negative) rating after mitigation. In the operational phase the possibility of alien faunal and floral intrusion is of Medium (negative) significance without mitigation and of Low (negative) significance if mitigation measures and alien eradication plans are applied.
- It is probable that pollution will occur but it will be for a short term with higher intensity during the construction phase than the operational phase. The significance rating for this impact is Medium (negative) which changed to Low (negative) after

mitigation.

- The potential impact of changing hydrology leading to changes in wetland habitat and fauna is highly probable. This impact will most likely be permanent and may affect immediate surrounding areas. The impact is therefore rated as Medium (negative) before mitigation, and still Medium (negative) after mitigation for both construction and operation due to the impact being irreversible.
- The positive impacts of the rehabilitation of the open and conservation areas will have a high probability of occurring, will be site specific and have a long term duration. This will also apply to the operational phase of the project as the complete rehabilitation of open and conservation areas is only expected to be completed after the construction phase. The significance of this impact is Medium (positive) (Table 5-13) for a summary of impact ratings.

Table 5-13: Faunal Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
<b>CONSTRUCTION PHASE</b>					
Fauna	Disturbance to faunal habitat	-8.8	Medium	-7.5	Medium
	Habitat loss	-14.0	High		
	Introduction and spread of alien and domesticated animals and vegetation	-12.2	Medium	-7.2	Medium
	Pollution of faunal habitats	-7.8	Medium	-6.5	Low
	Changes in hydrology	-12.5	Medium	-9.5	Medium
<b>OPERATIONAL PHASE</b>					
	Disturbance to faunal habitat.	-7.8	Medium	-7.5	Medium
	Introduction and spread of alien and domesticated animals and vegetation	-12.2	Medium	-6.2	Low
	Pollution of faunal habitats	-7.8	Medium	-6.5	Low
	Changes in hydrology	-12.5	Medium	-9.5	Medium
	Rehabilitation of wetland habitat in conservation areas	12.2	Medium		

#### 5.6.2.3 Mitigation Measures

The following mitigation measures apply to habitat disturbance and loss:

- In order to mitigate the disturbance of habitat and fauna; wherever possible, the proposed development should remain outside of the wetland buffer of the conservation areas lying north-west on the site as delineated by the Wetland Impact Assessment (Appendix K8). It must be cordoned off and no building rubble or soil removed during the levelling process must be allowed to fall into the



drainage line or associated wetland and riparian habitat.

- The location of access routes is important and construction routes should not be wider than 3m in sensitive areas, with passing bays where two-way traffic is required. The construction of access roads for the construction phase should avoid drainage lines wherever possible.
- Adequate culverts are required so as to have a minimal impact on water flow patterns through the drainage line. Culverts and bridges must not restrict the movement of fauna.
- Where possible, avoid constructing broad hard surfaces or canalisation within the drainage line that may cause the drowning of fauna.
- All areas within the drainage line which have been modified by construction activities must be re-vegetated using indigenous wetland species found in the area.
- If any hard surfaces cannot be re-vegetated then steps or ledges should be incorporated to aid fauna in climbing or as a path for dispersal.
- All topsoil and spoil (excavated subsoil) must be stored without causing the damming of water, formation of erosion gullies, or washing away of the stockpiled material. Exotic/invasive plants and broad leaf weeds must be removed from topsoil stockpiles when they emerge.
- Any faunal species located on the site, which cannot relocate themselves (e.g. burrowing animals), should be moved in an ecologically acceptable manner to a more suitable location. Buildings should be checked for bat colonies in the event that they will be demolished. This should be undertaken by a faunal relocation expert with relevant permit approval, as required by the provincial MEC and Ezemvelo KZN Wildlife.
- No wild animal may under any circumstance be handled, hunted, snared, captured, injured or killed, including animals perceived to be vermin by construction workers. Checks of the surrounding natural areas must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of.
- To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered.

In the event that permanent loss of faunal habitat in the riparian zone is unavoidable, the following measures are recommended to mitigate residual impacts:

- The remaining natural areas must be rehabilitated and a riparian zone re-established using naturally occurring species, as per recommendations of the Rehabilitation and Conservation Management Plan compiled by Themtek Environmental Consultancy (2015) (Appendix K12), as well as the Conceptual Wetland Rehabilitation Plan compiled by Eco-Pulse (2015) (Appendix K8).

- The resulting development should be landscaped with indigenous plant species as per the Landscaping Plan prepared by Indiflora (Appendix K13) that will be beneficial to faunal species, such as bats and birds. Bat and owl nesting boxes could be erected to encourage these species to reside in the area which will result in environmentally friendly insect and rodent control.

The following mitigation measures apply to the introduction of alien/domestic animals:

- No domesticated animals must be allowed on site. Stray animals must be reported to the local SPCA for control measures to be implemented.
- All food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed of away from the site. Bins should have tightly fitting lids to prevent faunal species raiding the bins.

The following mitigation measures apply to the pollution of areas containing fauna:

- The ecologically-sound SWMP must be implemented during construction and appropriate water diversion systems put in place.
- All areas susceptible to erosion must be vegetated with species naturally occurring in the area and indigenous vegetation must be retained wherever possible and as proposed in the Landscape Plan.
- Ensure that when erosion does occur that it is repaired timeously.
- Surface water or stormwater must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place.
- Vehicles used during the construction phase must be parked in a designated area and drip trays should be used to prevent contamination arising from any oil leaks.
- Formal waste management, inclusive of a recycling program, and sewerage systems must be put in place.

### 5.6.3 *Wetland and Watercourses*

A Freshwater Habitat Impact Assessment was undertaken for the proposed project, and is available in Appendix K8.

#### 5.6.3.1 *Impact Description*

##### Negative Impacts

The potential negative impacts of the proposed development can be grouped into 5 impacts and are as follows:

- Freshwater habitat destruction and modification impacts relate to the direct physical destruction or disturbance of freshwater habitat (affecting current ecological state and functionality) caused by vegetation clearing, infilling and earthworks for platform creation, disturbance of in-stream, riparian and wetland habitat and alteration of river profiles which includes stream bed and banks.

- Catchment and surrounding terrestrial habitat modification impacts will occur when the surrounding terrestrial habitat vegetation will be cleared and infilling and shaping to create platforms. The platforms that are created will also result in an increase of hardened surfaces creating more surface water with higher energy which could cause significant bank erosion and sedimentation of the riparian zone.
- It is anticipated that physical alterations to the watercourse associated with the establishment of impoundments, diversions, culverts and water discharges will modify the direct flow of the watercourse. The key reason for this impact will be the temporary flow diversion/modification during the construction and operation phases of new culverts at new road crossings, construction of new sewer/water pipeline crossings and construction of rehabilitation structures.
- Water pollution impacts will result in the alteration/deterioration in the physical, chemical and biological characteristics of water resources. Potential impacts could be caused by the accidental spills or leakage of hazardous substances during the construction and operational phase and urban wash-off from road surfaces and platforms. Accidental sewer pipe leakages due to a crack or in appropriate design can also have significant physical, ecological and health impacts and risks. Increased water pollutants may cause eutrophication of the water that will increase algae blooms, decrease water clarity and reduce the amount of sunlight penetrating the water column. This will reduce the local macro invertebrate faunal populations and result in the increase of invasive aquatic organisms. The marginal and aquatic plant community could be altered in favour of nutrient loving species and increased alien invasive plant invasion and the expansion of existing alien plant populations. The result is an overall degradation in the ecological condition of onsite and downstream freshwater habitats.

#### Positive Impacts

The watercourse on the northern boundary of the site will be rehabilitated and will result in positive rehabilitation impacts. Key drivers that will give this impact effect are:

- The implementation of an alien plant eradication and control programme;
- Re-vegetation of areas cleared of aliens;
- Re-shaping and re-vegetation of buffer zones; and
- The management of the open spaces according to site specific Rehabilitation and Conservation Management Plan as prepared by Dr Granger of Themtek Environmental Consultancy (2015) (Appendix K12).

Implementation of these rehabilitation and management actions will result in:

- Reduction in the extent of alien invasive plant populations and an increase in the presence of indigenous plant species.
- Improvement in habitat condition and increase in the local and onsite indigenous

floral and faunal populations and communities.

- Increase in extent and representation of local and regional freshwater habitat types

#### *5.6.3.2 Impact Assessment and Rating*

The destruction and modification of freshwater habitats as part of earth-moving and platform creation in the construction phase has a high probability of occurrence, as this is included in the proposed construction process to maximise platform area. The impact will be permanent and will have a high intensity. The EcoPulse Freshwater Habitat Assessment has rated the impact as Moderate in terms of their rating system both with and without mitigation because this impact will result in the permanent destruction of freshwater habitat that cannot be remediated or mitigated directly recognising also that the freshwater habitats that will be lost through infilling is already severely transformed with minimal wetland functionality. Such an impact can only be mitigated and reduced through rehabilitation measures aimed at enhancing onsite freshwater habitat and/or implementation of offsite mitigation (offsets).

The modification of the terrestrial habitat and catchment will extend into the operational phase, and will therefore be long-term impacts. It is highly probable that habitat modification will occur in the construction phase and is probable during the operational phase. The intensity of the impact is moderate and the significance rating is Moderate (negative) during the construction phase and reduces to Moderately Low with mitigation. In operation, the modification of the terrestrial habitat and catchment is considered of Moderate significance reducing to Moderately Low with application and management of the prescribed mitigation measures.

It is highly probable that direct flow modification impacts will occur during the construction phase due to the installation of new culverts, sewer and pipelines and road crossings over the river. The duration of this impact will be short term during the operational phase as the building of infrastructure will be completed. The significant rating of this impact is Moderately Low (negative) and drops to Low when mitigation measures were applied.

Operational impacts related to direct water flow modification, are considered of Moderately Low impact significance with poor mitigation, improving to Low if appropriate measures are implemented.

The probability of water pollution occurring due to the proposed development increases from it being highly probable during the construction phase to a definite likelihood during the operational phase. The reason for this is that there are will be contaminants, such as hydrocarbons, oils, particulate matter and detergents/soaps, washed off the platforms and road surfaces within the development that cannot be contained. The extent of this impact

could be far reaching as contaminates will be distributed downstream of watercourses and affect ecosystems that it has come into contact with. The significance rating of this impact as rated by EcoPulse is Moderately Low (negative) and reducing to Low when mitigation measures are applied.

In the operational phase, water pollution impacts are rated as having a Moderate significance prior to the application of mitigation measures, dropping to Moderately Low with mitigation.

The EcoPulse Freshwater Habitat Assessment (2015) states that with the effective implementation of the recommended mitigation in this report, the significance of all of the negative Impacts can be reduced to acceptable levels while the significance of the positive rehabilitation impact could feasibly be increased to moderately-low.

The water course and wetlands located on the north-western part of the site have been identified for rehabilitation. The rehabilitation of these watercourses and wetlands will be site specific but will have a long term positive impacts with a calculated Moderately Low (positive) rating due to the limited gains. If no rehabilitation measures are implemented, the rated significance is expected to be a Low (positive) (Table 5-14).

Table 5-14: Freshwater Habitat Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance	
		Before Mitigation	After Mitigation
		Rating	Rating
OPERATIONAL PHASE			
Wetlands and Watercourses	Freshwater habitat destruction and modification impacts	Moderate (-)	Moderate (-)
	Catchment and surrounding terrestrial habitat modification impacts	Moderate (-)	Moderately Low (-)
	Direct flow modification impacts	Moderately Low (-)	Low (-)
	Water pollution impacts	Moderately Low (-)	Low (-)
Wetlands and Watercourses	Catchment and surrounding terrestrial habitat modification impacts	Moderate (-)	Moderately Low (-)
	Direct flow modification impacts	Moderately Low (-)	Low (-)
	Water pollution impacts	Moderate (-)	Moderately Low (-)
	Rehabilitation and management impacts	Low (-)	Moderately Low (+)

#### 5.6.3.3 *Mitigation Measures*

The following mitigation measures are recommended for the wetlands and watercourses and are in addition to the detailed and specific recommendations provided in Section 7.2 of the Fresh Water Habitat Assessment (Appendix K8) which have been integrated into the EMPr for the development:

- A series of detailed wetland rehabilitation, offset and revegetation plans should be drawn up prior to commencement of construction.
- Detailed method statements must be prepared and approved to guide the contractor during the construction phase for the following activities within the freshwater habitats.
- General site setup and wetland and riparian demarcation is imperative during the initiation of the construction phase.
- Freshwater habitats to be lost to infilling should be searched der to rescue any indigenous plants and animals of conservation concern.
- A wetland specialist or botanist should be involved in all facets of construction phase planning and initial phased of implementation.
- Cognisance of generic/general Best Practice Construction Mitigation Measures must be taken.
- Any and all work within the buffer zone of a riparian area or wetland must be in consultation with and in the presence of a wetland specialist.
- It is noted that the wetlands and riparian areas are highly modified and do not provide habitat to fauna and flora of conservation concern. It is therefore recommended that a buffer zone of 20m to the toe of the embankments is established to mainly serve for the conservation of water quality enhancement, sediment trapping and erosion control functions. This is inclusive of a 5m stormwater dissipation zone.
- All freshwater habitat and open space areas (buffer zones) must be demarcated and any of these demarcated areas must be considered no-go areas for the duration of the construction phase. Clearing of vegetation and earthworks associated with each phase must not commence until all freshwater habitats within that phase are demarcated.

#### 5.6.3.4 *Conceptual Wetland Rehabilitation Plan*

EcoPulse also compiled a Conceptual Wetland Rehabilitation Plan which aims to rehabilitate the onsite wetland areas within the property with the aim of enhancing and maximising the key ecosystem services such as:

- Flood Attenuation;
- Sediment Trapping;
- Phosphate Removal;
- Nitrate Removal;

- Toxicant Removal; and
- Erosion Control.

The contextual analysis revealed that the main rivers and wetlands downstream of the property have been heavily impacted by a number of human activities (as discussed earlier) and are thus highly modified, with key consequences being changes in water quantity and quality that affect both biota and human use. As such, there is a high demand for water quality enhancement and flow regulating services within the greater uMhlangane River catchment.

A number of preliminary interventions were proposed as part of this conceptual rehabilitation plan for each watercourse unit. The implementation order will need to be discussed and agreed to during the detailed rehabilitation planning phase. The proposed interventions include:

- Temporary / interim alien plant eradication and control programme;
- Temporary / interim re-vegetation plan;
- Concrete weir with raised gabion revetment/wing walls;
- Concrete weir;
- Earthworks & re-shaping;
- Concrete inlet structure;
- Concrete weir with flow deflection canal/berm;
- Comprehensive re-vegetation plan; and
- Comprehensive alien plant eradication and control programme.

A rough estimate of costs was compiled based on a desktop assessment of quantities and estimated unit costs for various items available at the time of the assessment. This preliminary estimate suggests that costs of the wetland rehabilitation is likely to be in the region of R3 500 000, excluding the rehabilitation of the buffer zones and all other non-wetland/riparian areas. Given anticipated further environmental authorization requirements, the need for more detailed site-level planning and monitoring and evaluation requirements, EcoPulse recommend that a minimum budget of R5 000 000 be set aside to fund initial rehabilitation activities noting that these figures are highly speculative and wholly based on the conceptual plan proposed that does not quantify areas and quantities.

EcoPulse proposed a number of recommendations to ensure successful rehabilitation:

- It is critically important that the majority of stormwater generated by the proposed development is discharged into the rehabilitated wetland areas of the Glen Anil Stream wetland systems (Wetland Units 2A-2F) at regular intervals.
- It is critically important that the stormwater design recommendations are adhered to and incorporated into the proposed development.

- Wherever possible and where the geology allows, infiltration of stormwater runoff must be encouraged within the buffer zones to ensure that there is some form of base level recharge. In this regard, infiltration structures should be established at selected stormwater outlets as well.
- All rehabilitation/enhancement and stabilization structures must be designed to cater for / withstand predicted post-development peak flows / design flood events.
- If it is desirable and necessary to incorporate stormwater attenuation into the design of the proposed weir and impoundment structures, 10-50 year flood events must be drained away from the wetland within a maximum of 24hrs and the 100 year flood within a maximum of 36hrs to limit the risk to wetland vegetation through inundation.

With the successful implementation of the onsite rehabilitation measures as recommended/proposed in EcoPulse Report, the proposed development was assessed as having a positive residual impact on local key indirect ecosystem services, despite the proposed physical destruction of 2.08ha of wetland and riparian habitat.

The positive impact was most prominent for the water quality enhancement services with an average 2.71ha gain in water quality enhancement functional equivalents anticipated as a result of the proposed onsite rehabilitation. This is substantial and will likely contribute to an improvement in the quality of water entering the uMhlangane River from the Glen Anil Stream. The average gain in sediment trapping and erosion control services is predicted to be 1.67ha which will contribute to reduced rates of erosion along the lower reaches of the Glen Anil Stream and a small reduction in the deposition of sediment into the uMhlangane River. The most significant gains in wetland and riparian habitat are expected along the Glen Anil Stream channelled valley bottom system where the bulk of the rehabilitation structures are proposed.

Flood attenuation service gains were positive (0.12ha) but not as significant as the rest of the services due to the fact that the main intended rehabilitation objective of creating permanent wetland habitat counteracts flood attenuation gains.

As a result of the net positive gains in wetland function associated with the proposed rehabilitation, no offset mitigation would be required under this post-rehabilitation scenario. With the inclusion of the proposed onsite wetland rehabilitation into the proposed development plan, the net gain in wetland functional and habitat equivalents would more than compensate for anticipated negative impacts to water. EcoPulse therefore support the development under this scenario as it has the potential to make a positive contribution to water resource management in the region.



## 5.7 Economic Impacts

### 5.7.1 *Employment and business opportunities*

#### 5.7.1.1 *Impact Description*

The proposed development of Avoca South Industrial and Business Estate will lead to a potential increase in available job opportunities. These job opportunities will consist of two types; temporary and permanent jobs. Temporary jobs will be created by the construction phase and may be in the thousands, but the precise figure will depend upon still-to-be-finalised factors including land use mix, construction type, and capital-intensity levels of construction methods, amongst others. The operational phase will provide permanent employment opportunities in the light industrial and retail sectors. In addition, employment opportunities will be created for support services, such as security, landscaping, maintenance, cleaning, etc. The operational phase will also create potential opportunities for the promotion and development of local businesses, which will further increase employment opportunities as well as encourage economic upliftment of the area.

A concern has been raised by some business owners about rising rental costs as the demand for the land increases. The increase in rent for business properties will have an overall price increase in services and products that these businesses can provide to the public. This may exclude the low income earners from being able to afford the locally produced products or services. Higher rent may also limit the type or number of businesses that may be able to afford the land and negatively impact on the availability of services in the vicinity of the proposed development.

#### 5.7.1.2 *Impact Assessment and Rating*

The potential availability of job opportunities will differ between the construction and operational phase. Job opportunities during the construction phase will be definite but short term and the scale of the impact would be localised as a result of people in the surrounding areas potentially being employed as unskilled or semi-skilled labour. The operational phase of the development will provide permanent skilled and semi-skilled job opportunities over a long term, and will extend over a local scale where people in the surrounding areas are likely to be employed. The significance rating of this positive impact for the construction phase is Medium, and High for the operational phase.

The creation of local business opportunities in the operational phase is rated as having a positive Medium significance, as the probability of the impact occurring is low, but will extend into the local area on a long-term basis.

The likelihood of rising rental costs due to an increase in demand for land during the

operational phase is probable. This impact will be long term as it will be present for the life of the development. The significance rating for this impact is Medium (Negative). See Table 5-15 for a summary of impact ratings.

Table 5-15: Employment and Business Opportunities Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance	
		Before Mitigation	
		Total	Rating
<b>CONSTRUCTION PHASE</b>			
Employment and Business Opportunities	Short-term employment opportunities	12.2	Medium
<b>OPERATIONAL PHASE</b>			
Employment and Business Opportunities	Long-term employment opportunities	15.2	High
	Local business opportunities	8.2	Medium
	Increase in rent for business property	-10.2	Medium

#### 5.7.1.3 Mitigation Measures

No mitigation measures are applicable to the positive impacts such as new employment and business opportunities. There are no mitigation measures that can be applied to the increase of rent for business properties.

#### 5.7.2 Public Revenue

##### 5.7.2.1 Impact Description

Public revenue gains will take place in the form of additional rates income to the Council and generation of new taxes for National Treasury as a consequence of new jobs.

##### 5.7.2.2 Impact Assessment and Rating

Public revenue gains will be more significant during the construction phase than during the operational phase due to a loss in construction jobs and no further procurement of building materials after the development is completed. Nevertheless, the impact of continued revenue gains as a result of rates, taxes and business income during the operational phase is long term and definite. The positive significance rating of this impact for both phases is Medium (Table 5-16).

Table 5-16: Public Revenue Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance	
		Before Mitigation	
		Total	Rating
CONSTRUCTION PHASE			
Public Revenue	Generation of public revenue	11.2	Medium
OPERATIONAL PHASE			
Public Revenue	Generation of public revenue	12.8	Medium

#### 5.7.2.3 Mitigation Measures

Mitigation measures are not applicable for the positive impact of public revenue generation.

### 5.7.3 Agriculture and Mining Use

#### 5.7.3.1 Impact Description

Currently there is no information on the impacts of sugar cane cultivation on residential or other properties, but there are several South African and international references to the need to separate such activities by 500 meters in order to mitigate the effects of chemicals, dust, noise during ploughing and burning before harvesting. Even though the impacts on residential properties with proximity to sugar cane cannot be quantified, it is known to be negative but is assumed to be of low significance. It is unlikely that the sugarcane on the proposed site will be further cultivated and the loss in jobs could take place. However, it is probable that these jobs would be recreated elsewhere in eThekweni or KZN in new cane-growing areas.

At the moment quarrying is a medium-scale land use on the present site and will be phased out, but for the medium term quarrying remains an existing influence upon externalities imposed upon residential areas nearby. Research shows that quarries have negative external effects on residential property which are actually somewhat greater than those for manufacturing in general.

Given all of the above, and given also that the nearest homes to the Avoca South site are only about 300m away from sugar cane and 250m away from quarrying, we could infer that the likely nett future magnitudes of the withdrawal of sugar/quarrying should be positive. It is also expected that especially the planned warehousing components of future development would benefit from the cleaner atmosphere without quarrying.

Another impact will be job losses due to the closure of the Corobrik factory and the quarry activities. In neither case will this be a significant impact as Corobrik's strategic planning involves closing the factory and moving the operations to another suitable site. The loss of

quarrying jobs is minor as the employment benefits of quarrying are diminutive, in the order of less than ten jobs per quarry.

#### 5.7.3.2 Impact Assessment and Rating

The loss of agricultural and mining activities is definite and will be permanent but is limited to the site. The loss of sugarcane cultivation and mining activities are seen as a positive due to a decrease of impacts to the neighboring residential areas. Therefore the significance rating of this impact is Low (positive), and limited to the construction phase (See Table 5-17).

Table 5-17: Loss of Agricultural and mining impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance	
		Before Mitigation	
		Total	Rating
Loss of Agricultural activity	Loss of Agricultural Potential	6.2	Low
Loss of Clay Mining	Loss of quarrying activities and jobs	6.2	Low

#### 5.7.3.3 Mitigation Measures

No mitigation measures are applicable for this impact as the loss of sugar cane production and quarrying on site will be a definite result of site development.

## 5.8 Social impacts

### 5.8.1 Quality of life

#### 5.8.1.1 Impact Description

The proposed project which will result in a large industrial park may have influences on the sense of place and quality of life of surrounding residents, both positive and negative.

The negative social impacts resulting from industrialisation can include 'change of sense of place'. However, it must be kept in mind that the residential areas are some distance from the proposed development and there are already existing industrial areas around the proposed development. These factors will decrease the significance of the impact. The impact is expected to result from the possible issues related to the development:

- Air pollution during the construction phase and associated health, nuisance and economic impacts.
- Noise pollution during the construction and operational phases and associated health and nuisance impacts.
- Loss of local sense of place and character for the surrounding residents.
- Visual impact of the industrial development as seen from the Avoca Hills and Mt

Moriah residents.

- Traffic impacts - Increase in stress and nuisance levels of the local residents as a result of an increase in traffic congestion and delay times associated with access point and intersection upgrades, and heavy construction vehicles travelling to and from the site during construction phase.
- The creation of jobs may result in the influx of people into the area from the rural areas, which may result in the expansion and/or creation of informal settlements in the area.
- Possible increase in crime in the area.

The positive impacts related to quality of life of local residents are as follows:

- A cleaner atmosphere and upgrading of environment through removal of quarrying activities.
- Possible upgrades of properties in response to an upgraded site;
- The creation of demand for housing and education with the increased number of employees of various levels in the area; and
- The increased mixing of races within the community.

#### 5.8.1.2 Impact Assessment and Rating

The negative impact of 'change of sense of place' applies to both the construction and operational phases, and is essentially a cumulative impact of many environmental aspects as described previously. The intensity of the impact is expected to be medium, extending to the local area. The probability that this impact will occur is low. It has been given a rating of Medium (negative) significance for the construction phase (as impacts will be short-term), and Medium (negative) significance for the operational phase (long-term). With the implementation of mitigation measures, a Low to Medium score is expected.

The enhancement of social and community life is rated as Medium (positive) for both the construction and operational phases, as impacts will extend to the regional area and has a distinct probability of occurring (See Table 5-18).

Table 5-18: Social - Quality of Life Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL Impact	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Quality of Life	Change of sense of place	-8.0	Medium	-5.2	Low
	Enhancement of social and community life	10.0	Medium		

OPERATIONAL PHASE					
Quality of Life	Change of sense of place	-10.0	Medium	-8.0	Medium
	Enhancement of social and community life	12.0	Medium		

### 5.8.1.3 Mitigation Measures

Mitigation measures applicable to all other impacts to be implemented, specifically in terms of traffic, visual and safety aspects.

## 5.8.2 Safety

### 5.8.2.1 Impact Description

A large industrial development such as Avoca South may cause some safety concerns. The following related potential negative impacts have been identified for the construction phase:

- Increased safety risks to pedestrians and motorists in the area as a result of movement of construction and earth-moving vehicles on nearby road networks.
- An influx of labourers may potentially bring associated crime activities of short term to densely populated construction camps or to hostels housing migrant workers looking for employment. Residential areas in the vicinity (i.e. Avoca and Glenhills) are already exposed to high crime levels.
- Safety risks to construction workers on site as a result of poor training, poorly maintained machinery or human error.

The following potential safety impacts relate to the operational phase of the development:

- Safety risks to pedestrians and motorists in the area as a result of elevated numbers of heavy vehicles entering and exiting the development, particularly if truck drivers not comply with road traffic regulations and speed restrictions or drive non-roadworthy vehicles.

### 5.8.2.2 Impact Assessment and Rating

Potential increase in safety risks and crime are possible impacts caused by the construction phase but both have a low possibility of occurring. However if the impact should occur, it may be severe (e.g. fatalities which may occur during robberies, traffic accidents or accidents on during construction). The duration of the impact will be limited to the construction phase, but permanent in the case of serious injury, loss of property, or fatalities. The safety risk impacts are rated as having a significance of Medium (negative) before mitigation and Low after mitigation (See Table 5-19).

Table 5-19: Social - Safety Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Safety	Safety risks to pedestrians and motorists	-9.2	Medium	-6.2	Low
	Potential increase in crime.	-9.5	Medium	6.2	Low
	Safety risks to construction workers.	-8.2	Medium	-6.2	Low
OPERATIONAL PHASE					
Safety	Safety risks to pedestrians and motorists	-12.5	Medium	-8.2	Medium

#### 5.8.2.3 Mitigation Measures

- Traffic warning signage and, where required, traffic calming measures must be employed during the construction phase to reduce the potential for traffic accidents.
- No heavy vehicles may move on residential roads in either the construction or operational phases.
- The construction area is to be demarcated and access must be restricted. All staff must comply with the relevant safety regulations on site and wear appropriate safety clothing and gear at all times while on site.
- In the construction phase, the site must be well managed to prevent crime and theft around the site. Installation of a secure boundary fence at the start of the project is recommended.
- Gated entries, electric fencing and CCTV cameras are recommended for the operational phase.
- Recommendations of the Traffic Impact Assessment (Appendix K3) to be implemented in consultation with the eThekweni Transport Authority to ensure that traffic congestion does not occur, which may lead to traffic accidents and safety risks to pedestrians and motorists.
- Communities are to be informed of the procedure for lodging complaints / concerns arising from the proposed development.

#### 5.8.3 Traffic

##### 5.8.3.1 Impact Description

Site observations and analyses undertaken show that under existing traffic conditions, the road network surrounding the proposed development currently carries heavy traffic volumes during the commuter peak hours and certain intersections are presently operating at, or beyond capacity. While the authorities responsible for the road network have some plans in

place for the necessary road infrastructure improvements the proposed development will generate more than 2 000 vehicular trips in the peak hours by the time the development is complete and the road network will require upgrading to accommodate the increased traffic numbers.

The road network was analysed to determine the impact of the additional trips on the surrounding road network including planned upgrades and upgrades under construction. The results of the SIDRA analyses revealed that road improvements will be required on certain sections of the road network to provide additional capacity for certain movements and hence improve the overall efficiency of the road network.

Avoca South will be developed in three phases of which Phase 1 is estimated to be opened in year 2020. Phase 2 of the proposed Avoca South industrial development is estimated to be opened in 2030 and it is anticipated that most of the proposed road improvements will be operational at the opening of this phase. Phase 3 represents the full build out of Avoca South, which is anticipated to be finished by 2035.

Two further developments referred to as Avoca North and Rohill Business Park, will be developed in the Avoca area of Durban North within a similar timeframe as the proposed Avoca South Industrial area. The three developments are expected to generate high volumes of traffic that would essentially use the same road network.

Traffic impacts will occur in both the construction and operational phases of the proposed development of Avoca South. During the construction phase, traffic impacts will include an increase in the number of heavy vehicles, such as construction trucks, that will transport building materials to the site or remove excess excavated soils from the site. Earth-moving vehicles, cranes and concrete mixer trucks are also anticipated to be travelling to and from site in the construction phase. The presence of heavy slow moving vehicles will impact on the flow of the traffic and cause congestion at traffic intersections and potentially increase the occurrence of vehicle accidents.

During the operational phase there will be an increase in the number of transport trucks (from current) on the road network in the vicinity of the development. Heavy vehicles will enter and leave the Avoca South Business Estate at all hours of the day thus increasing road usage from only business hours to 24 hours a day and therefore increasing the chance of accidents occurring. However, this can only be accurately determined once the tenants for the Avoca site are secured and business hours for the Estate have been established.

Traffic flow problems related to the proposed development were identified in the Traffic Impact Assessment (Appendix K3) and recommendations were provided to ensure that the



necessary road upgrades as listed below will mitigate traffic impacts:

- KwaMashu interchange;
- Intersection of Chris Hani Road and Old North Coast Road;
- R102 / MR577 Diamond Interchange;
- R102 and Old North Coast Road Intersection;
- Increase of number of carriageways on Old North Coast Road, Chris Hani Road R102(M2) and MR577 and
- Intersection upgrades for the smaller roads accessing the site.

The TIA showed that once the resultant plan of recommended improvements is implemented, the surrounding road network will have sufficient capacity to carry the forecast traffic plus the trips generated by this proposed development.

In their return comments on the Draft EIA Report, the eThekweni Traffic Authority (eTA) requested that a number of aspects be resolved to enable them to approve the TIA. In subsequent meetings it has been agreed that eTA and KZN DoT will issue an approval of Phase 1 only, subject to there being a resolution on all outstanding traffic matters for the balance of the site.

For the remaining development phases, eTA has requested that Investec, through their traffic specialist, undertake a strategic planning exercise together with them for all three sites (Avoca South, Rohill and the Avoca North Housing) combined.

#### *5.8.3.2 Impact Assessment and Rating*

In both the construction phase and operational phases, a substantial increase in traffic volumes on the road network surrounding the proposed development will be experienced. The impact created during construction is expected to have an influence on both the local and regional area despite the proposed road upgrades required which will add carrying capacity to the system. The impacts of traffic congestion, as well as the increase in heavy vehicle traffic, are rated as Medium before mitigation and after mitigation (lower score) in the construction phase, as this is a short-term impact.

The TIA predicts that the proposed development will generate more than 2 000 vehicular trips in the peak hours once fully operational and without mitigation infrastructure and traffic management redesign the potential impacts of congestion and heavy vehicle use are considered of High negative significance due to the long-term and regional nature of the impact even though the traffic increase will be over a 20 year period. With construction of the required intersection upgrades, the impact on traffic congestion and heavy vehicle use reduce to a Medium significance due to the permanent nature of the impact (see Table 5-20).

Table 5-20: Social - Traffic Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Traffic	Traffic congestion	-11.8	Medium	-9.8	Medium
	Increased heavy vehicle traffic	-10.8	Medium	-7.8	Medium
OPERATIONAL PHASE					
Traffic	Traffic congestion	-14.8	High	-11.8	Medium
	Increased heavy vehicle traffic	-14.8	High	-10.8	Medium

#### 5.8.3.3 Mitigation Measures

- Ensure implementation of the recommendations of the Traffic Impact Assessment in consultation with the eThekweni Transport Authority.
- Ensure implementation of appropriate upgrades required for the existing road network.
- Ensure that the road links and intersections in the vicinity of the development have adequate capacity to accommodate the estimated additional trips generated by the proposed development and from all other known proposed developments in the studied road network.

#### 5.8.4 Visual and Aesthetics

##### 5.8.4.1 Impact Description

Positive and negative visual and aesthetic impacts will result from the proposed development. During the construction phase, earth-moving activities, the creation of cut-to-fill platforms, and the construction of light industrial and retail buildings and infrastructure may result in a visual intrusion to sensitive receptors, which are predominantly residents of Corovoca, Avoca hills and Mt Moriah who overlook the Corobrik factory, open land and sugar cane plantations. The impact will also be highly visible due to the extensive area to be excavated and developed.

In the operational phase, the current mine and brick making factory will be replaced with large warehouse type buildings and factories which will create a view of a typical industrial business park with appropriate landscaping which is less obtrusive visually than a factory and land being mined (ongoing excavation and earth moving activities and land scaring), Thus the proposed development will change the view for residents living in the area. The change could be considered positive or negative depending on an individual's subjective opinion on whether they would prefer to look at a brick factory, sugar cane and land constantly under excavation, or a landscaped, light industrial and business estate.

#### 5.8.4.2 Impact Assessment and Rating

The construction phase impact on the visual and aesthetic character of the site is expected to be short-term in nature and restricted to the immediate surrounding area. The impact is likely to occur even with the implementation of mitigation measures. This impact is rated as having a Medium significance before mitigation and Low after mitigation.

The change in visual character in the operational phase will be permanent, highly probable and will affect the immediate surrounds of the site. This impact is rated as having a Medium (negative) significance before mitigation and a Medium (positive) significance after mitigation (application of screening, landscaping, architecture design etc.). Although the visual impacts are considered to be significant, appropriate mitigation measures such as landscaping may aid in reducing possible impacts (Table 5-21).

Table 5-21: Social - Visual and Aesthetic Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
CONSTRUCTION PHASE					
Visual and Aesthetic	Change in visual / aesthetic character	-9.0	Medium	-6.0	Low
OPERATIONAL PHASE					
Visual and Aesthetic	Change in visual / aesthetic character	-12.0	Medium	9.0	Medium

#### 5.8.4.3 Mitigation Measures

In order to mitigate the visual and aesthetic impact the following measures can be taken:

- Natural vegetation, wherever possible, should be retained on and around the proposed development site. The vegetation around a structure tends to break the outline of the structure against the landscape and will therefore allow for the structure to be less pronounced.
- Utilise effective and efficient building sizes to allow for market needs as well as aesthetically contributing to the landscape.
- Landscaping to include planting of fast growing trees and shrubs at same level as buildings to screen buildings/soften visual impact - trees to grow to height of at least 11m.
- The planting of indigenous vegetation should start during the construction phase if possible to reduce the period during which buildings will be unshielded.
- Building materials which minimise visual impact must be used.
- The glare of reflective surface can be reduced through making the external surfaces of the warehouses matte and using shade cloth carports to minimise vehicle glare.

- An aesthetically attractive fence should be used along the boundary of the site.
- Implement light mitigation measures, such as the installation of bulb shields and aligning the bulbs so as to direct light toward the ground and not upwards.

### 5.8.5 Noise

#### 5.8.5.1 Impact Description

Noise levels and noise disturbance in the immediate vicinity of the site will increase during construction activities due to:

- The large number of plant machinery to be used to excavate and shape the site;
- The movement of construction and earth-moving vehicles for creation of platforms;
- Increased traffic entering and exiting the site;
- Operation of generators;
- Noise from hydraulic hammers and winches; and
- General construction noise.

Noise disturbances during the operational phase of the project will be on a long term basis and will be caused by industrial noise or factory sirens on site, as well as from the increased traffic movement in and out of the site. Currently there are many industries already present in the area of the proposed development and residents may become accustomed to background industrial noise disturbances.

#### 5.8.5.2 Impact Assessment and Rating

Noise disturbances relating to increase traffic and construction activities, during the construction phase, will be short term and have a low probability occurring due to the distance between the residents and the site whereby noise is dissipated enough over the distance so as not to be audible or of a very low nuisance level. The impact is rated as having a Medium (negative) significance and Low significance after mitigation.

Noise disturbances relating to increase traffic and operational activities, during the operational phase, have a low probability of occurring due to the distance between the residents and the site although noise levels will be more audible after hours and post traffic times. Furthermore, the types of light industries and warehousing proposed to occupy the site are not high noise generators. But this impact has been rated slightly higher than in the construction phase due to the duration of the impact being long term (i.e. the life of the project). The significance rating is Medium (negative) and Low significance after mitigation (see Table 5-22).

Table 5-22: Social - Noise Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance		Significance	
		Before Mitigation		After Mitigation	
		Total	Rating	Total	Rating
<b>CONSTRUCTION PHASE</b>					
Noise	Noise disturbance from increased traffic	-7.0	Medium	-6.8	Low
	Noise disturbance from construction activities	-7.0	Medium	-6.8	Low
<b>OPERATIONAL PHASE</b>					
Noise	Noise disturbance from increased traffic	-8.0	Medium	-6.5	Low
	Noise disturbance from operational activities	-8.0	Medium	-6.5	Low

Cumulative noise impacts are anticipated for the project, and have been assessed in Section 5.9 of this report.

#### 5.8.5.3 Mitigation Measures

The following mitigation measures are recommended:

- Construction vehicles are to be well maintained and fitted with silencers prior to the construction phase.
- Generators and other noisy equipment must be situated within an enclosure for noise screening, and to be properly maintained at all times.
- Reverse hooters of heavy earthmoving vehicles must be set at recommended levels to comply with safety requirements.

#### 5.8.6 Cultural and Heritage Resources Impacts

##### 5.8.6.1 Impact Description

The Heritage Impact Assessment was undertaken in two (2) phases (Appendix K10). The First Phase Assessment was specific to the discovery of Stone artefacts found lying scattered in the old mining area behind the Corobrik buildings which is within the construction footprint. The area where the artefacts were found consists of sandy patches that represent ancient dunes and these areas are severely disturbed by mining activities and erosion. This site is protected by heritage legislation, however, it is severely disturbed and all the stone artefacts observed were not situated in any spatial or stratigraphic context. As such the artefacts have little heritage value but and has been rated as of low significance. The artefacts do have some educational value and should be “rescued” by qualified archaeologists to preserve the value of the items. The second Phase of the Heritage assessment included an investigation of the whole site which returned no further artefacts and areas of historical value. There was a concern that the Corobrik buildings on

site may have some heritage value an evaluation by a built heritage specialist indicated that the buildings were not older than 60 years and had no heritage significance.

#### 5.8.6.2 Impact Assessment and Rating

The destruction of cultural and heritage resources during the construction phase is highly probable but it will only be site specific. The scale of the impact would be localised and it would not occur on an ongoing basis. However, should artefacts be damaged or destroyed, the impact would be permanent. Therefore the significance rating of this impact is **High** before mitigation, and **Medium** after mitigation. Please refer to Table 5-23 for a summary of impact ratings. No operational impacts will occur as the site would have been fully developed.

Table 5-23: Social - Cultural and Heritage Resources Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance Before Mitigation		Significance After Mitigation	
		Total	Rating	Total	Rating
		CONSTRUCTION PHASE			
Cultural and Heritage Resources	Loss of cultural and heritage resources	-15.0	High	-11.0	Medium

#### 5.8.6.3 Mitigation Measures

- A surface collection of the stone artefacts has to take place under the auspices of Amafa *before construction commences*. This collection will have educational value and the collected stone artefacts can be used for teaching purposes.
- There is no value in demarcating a buffer zone around the site as the area will be filled-up as part of the planned rehabilitation of the site. In addition, the stone tools are very visible and will be an easy target for collectors and visitors to the area.
- A walk-through of the area, by a heritage specialist, must be conducted immediately prior to the filling-up of the mining depressions.
- As detailed in the EMP, in the event that the construction phase uncovers features or artefacts of heritage value such as graves or fossils, all construction should be halted until such time as AMAFA has been contacted and is able to assess the site. This is required in terms of the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Act (Act no 4 of 2008).

## 5.9 Cumulative Impacts

The NEMA EIA Regulations define cumulative impact as follows: “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.”

The report thus far details and assesses positive and negative impacts of the proposed project in isolation and without consideration of the larger, combined effects that could result from the combination of the impacts of this project with those of adjacent/surrounding current and future activities. In order to establish cumulative impacts the development must be viewed in context with other developments and the environment in which the Business Estate will be constructed which include:

- Rohill Business Estate;
- Avoca North Municipal Housing Development;
- Upgrading of the KwaMashu N2 Interchange; and
- Implementation of the Integrated Rapid Public Transport Network (IRPTN).

Cumulative effects may occur from individually minor, yet collectively significant, actions taking place over a period of time and/or space which will make them significant in the larger local/regional context. Understanding and attempting to allocate a potential impact significance rated is fairly subjective due to the wide range and variability in factors that need to be considered. Cumulative impacts have been rated in terms of significance of positive and negative anticipated changes from current/status quo. No consideration of the application of mitigation measures has been considered as there are too many variables which could influence such measures resulting in a very low confidence level in the rating provided. They are however, indicative of the anticipated change.

Specific cumulative impacts that have been identified include the following:

### 5.9.1 Noise

Industrial and traffic noise disturbance in the vicinity of the Avoca South Business Estate site is not an impact of a high significance on its own as the development will only house light industry and most logistics warehouses produce very little noise. But when coupled with anticipated similar noise levels arising from the nearby Rohill Business Estate along with the increased noise from increased traffic on and around the development site with the implementation of the IRPTN, and the imminent upgrade of the KwaMashu Interchange, as well as the possible Avoca North Housing Development, the cumulative impact once all are operational compared to status quo noise levels indicates that the baseline noise levels will increase during low and peak traffic times. As such, the cumulative impact of all noise

sources in the area combined will have a higher impact than the noise impact of Avoca South Business Estate on its own.

The cumulative impact will increase progressively as the various developments come online and will occur for the life of each development from the moment construction is initiated on each. The cumulative impact will extend to the local environment and have a long-term duration which will extend beyond the life of the project. The impact is thus assessed as having a **High** (negative) change.

### *5.9.2 Air Quality*

There is in both the construction and operational phases of Avoca South alone, a low magnitude of this occurring as the development is primarily light industry and warehousing. However, baseline traffic-related air pollution and the anticipated increase in air pollution arising from increased traffic from the surrounding road network and industrial areas, will have a cumulative negative impact on air quality when coupled with existing business parks like the Riverhorse Valley Development and new business parks like the Rohill Business Estate, and the possible Municipal Housing Development under consideration on the adjacent "Avoca North" property, and the air pollution generated by vehicles utilising all the developments. The area over which the impact will occur is substantially bigger than Avoca South alone and will have a permanent effect. Using the rating formula, the impact is assessed as having a **High** (negative) change (see Table 5-24).

### *5.9.3 Economic Growth*

The potential increase in economic growth relating to new business opportunities and job creation for the Durban North area will result from the anticipated positive cumulative economic upliftment impacts of the Avoca South Business Estate and the nearby development Rohill Business Estate. In both the construction and operational phases there is a definite probability of this impact occurring, and it would extend beyond the boundaries of the site on regional scale. The impact would have a long-term duration which will extend beyond the life of the project. The impact is assessed as having a **High** (positive) significance.

### *5.9.4 Traffic*

The current traffic impacts relating to traffic congestion and heavy vehicle presence will, when coupled with anticipated increased traffic arising from the construction activities and nearby existing and future developments (such as the Rohill Business Estate), have a cumulative negative impact in terms of increased traffic volumes. In both the construction and the operational phases is there a moderate probability of this impact occurring with the impact extending to the immediate surrounding area permanently. The impact is assessed as having a **Medium** (negative) change even with consideration of the road



upgrades planned.

### 5.9.5 Increased pressure on Municipal Services

Requirements for municipal services relating to water, sewer electricity and waste management will, when coupled with anticipated increased pressure from the Avoca South Business Estate development and nearby developments, have a cumulative impact of increased pressure on municipal services. The increased need for municipal services, if not managed correctly, could place unnecessary pressure on service provision to other businesses and residents. The probability of this occurring is fair, but should it occur, it would extend beyond the boundaries of the site on local scale. The impact would have a permanent impact. The impact is assessed as having a Medium (negative) change. Refer to Table 5-24 for a summary of impact ratings.

Table 5-24: Cumulative Impacts

ENVIRONMENTAL ASPECT	SUMMARY OF POTENTIAL IMPACT	Significance	
		Before Mitigation	
		Total	Rating
<b>CONSTRUCTION PHASE</b>			
Cumulative Impacts	Cumulative Noise Impact	-12.0	Medium(-)
	Cumulative Air Quality Impact	-12.0	Medium(-)
	Cumulative Economic Growth Impact	14.0	High(+)
	Cumulative Traffic Impact	-12.0	Medium(-)
<b>OPERATIONAL PHASE</b>			
Cumulative Impacts	Cumulative Noise Impact	-13.0	High(-)
	Cumulative Air Quality Impact	-14.0	High(-)
	Cumulative Economic Growth Impact	16.0	High(+)
	Cumulative Traffic Impact	-14.0	High(-)
	Cumulative impact of increased pressure on municipal services	-11.0	Medium(-)

### 5.10 Decommissioning Phase

It is anticipated that the Avoca South Business Estate will be developed over a 15-20 year period and will function for an indeterminable period of time post full completion. As such, determining decommissioning impacts seems superfluous at this stage when the development is still 2 years away from construction. However, should the site be decommissioned at some point, environmental impacts are anticipated to be similar to those identified for the construction phase, specifically in terms of soil management, surface and groundwater contamination, waste management, noise, air quality, and potential ecological impacts. Furthermore, a full EIA will have to be undertaken for the decommissioning of the estate to ensure environmental impacts are minimised.

## 6 ENVIRONMENTAL IMPACT STATEMENT

### 6.1 Summary

A Final EIA Report has been compiled where the potential impacts on the environment of listed activities associated with the proposed development of the Avoca South Industrial and Business Estate were considered, investigated and assessed in compliance with the NEMA and EIA Regulations. The report contains all information that is necessary for the competent authority to consider the application and to reach a decision regarding the application and includes an assessment of each identified potential impact, including biophysical, ecological, socio-economic and cumulative impacts of the proposed development on the environment.

The environmental process undertaken thus far includes a completed and approved Scoping Phase, which included a technical investigation and public participation exercise from which key issues were identified and further investigated in the Impact Assessment Phase through the undertaking of specialist studies.

### 6.2 Objectives of the EIA

The objectives of the EIA have been met where:

- Alternatives for the proposed project were assessed to ensure that the best option for development and the environment were considered.
- Specialist studies were completed.
- All the identified potential impacts were assessed by considering the nature, intensity, magnitude, duration, probability and significance of each impact.
- Mitigation measures to avoid and/or minimise the negative environmental impacts were identified and provided in the form of a draft construction and operational EMPr.
- Sufficient information is provided in this report to assist the competent authority to make a decision regarding the authorisation of the activity.

Evaluating the integrated results of the assessment of potential impacts and the feeding back of this information into the planning phase of the project has resulted in the evolution of the proposed development and design into the optimum layout (preferred alternative), Conceptual Layout Drawing No. 1223/WD28 (Layout Option 5,) as presented in this report which is considerate of, and is an acceptable compromise between, the developers requirements and those of the environment. Table 6-1 summarises all the identified impacts and their significance ratings without and with mitigation/enhancement for the preferred alternative.

Table 6-1: Summary of Impact Assessment Matrix

ASPECT	PHASE	POTENTIAL ENVIRONMENTAL IMPACT	Significance Before Mitigation		Significance After Mitigation	
			Total	Rating	Total	Rating
<b>BIOPHYSICAL IMPACTS</b>						
Topographical structure and Landform	Construction	Change in the topographical structure and land form: Reduction in hill heights	-12.8	Medium(-)	-11.5	Medium(-)
	Operational	Change in the topographical structure and land form: Reduction in hill heights	-12.8	Medium(-)	-11.5	Medium(-)
Soil Management	Construction	Soil Erosion and Sedimentation: Loss of topsoil and nutrients, inhibit emergence of seeds, scouring of streams, sedimentation affecting water quality and freshwater habitat functioning.	-7.5	Medium(-)	-5.5	Low(-)
	Operational	Soil Erosion and Sedimentation: Poor management of open space areas / rehabilitated watercourse leading to loss of topsoil and nutrients, inhibit emergence of seeds, scouring of streams, sedimentation affecting water quality and freshwater habitat functioning.	-9.2	Medium(-)	-6.2	Low(-)
Geological stability	Construction	Impacts on Slope Stability: Shale bedrock prone to subsidence, potential instability of platforms.	-9.8	Medium(-)	-6.5	Low(-)
Soil, Surface and Groundwater Quality	Construction	Contamination of soils, surface or groundwater from accidental leaks / spillages of fuels, oils or hazardous chemicals, or mismanagement of hazardous liquid waste.	-9.8	Medium(-)	-6.8	Low(-)
	Construction	Contamination of watercourses / wetlands via sedimentation: Mobilisation of sediments arising from soil erosion.	-9.8	Medium(-)	-6.8	Low(-)
	Operational	Contamination of soils or water by hazardous substances: Fuel / oil spills on roads or in workshops. Poor handling, storage or disposal of hazardous materials / wastes.	-11.2	Medium(-)	-6.2	Low(-)
	Operational	Contamination of watercourses / wetlands via sedimentation: Mobilisation of sediments arising from soil erosion.	-9.2	Medium(-)	-6.2	Low(-)
Groundwater Quantity	Construction	Reduction in groundwater baseflow: Creation of platforms covered with an impermeable surface may result in a reduction in recharge to the underlying aquifers.	-7.2	Medium(-)	-4.2	Low(-)
	Operational	Reduction in groundwater baseflow: Platforms covered with an impermeable surface may result in a reduction in recharge to the underlying aquifers.	-9.2	Medium(-)	-6.2	Low(-)
Stormwater Management	Construction	Alteration of stormwater flow regime: Removal of soil and vegetation, and increase in hardstanding, potentially altering flow, volume and velocity of water runoff and hydrological conditions of watercourses and wetlands.	-7.2	Medium(-)	-4.2	Low(-)

		Potential flooding from increase flow and velocity.				
	Operational	Alteration of stormwater flow regime: Increase in hardstanding potentially altering flow, volume and velocity of water runoff and hydrological conditions of watercourses and wetlands. Potential for flooding from increase flow and velocity.	-9.2	Medium(-)	-6.2	Low(-)
Noise	Construction	Traffic noise disturbance: Increased volumes of traffic in the surrounding area from movement, resulting in noise disturbance to nearby residences and businesses.	-7.0	Medium(-)	-6.8	Low(-)
	Construction	Construction noise disturbance: Construction activities resulting in noise disturbance to nearby residences and businesses.	-7.0	Medium(-)	-6.8	Low(-)
	Operational	Traffic noise disturbance: Increased volumes of traffic in the surrounding area from movement of delivery vehicles, resulting in noise disturbance to nearby residences and businesses.	-8.0	Medium(-)	-6.5	Low(-)
	Operational	Operational noise disturbance: Long-term operational activities resulting in noise disturbance to nearby residences and businesses (potential night-time noise).	-8.0	Medium(-)	-6.5	Low(-)
Air Quality	Construction	Dust pollution: Clearing of vegetation, earth-moving activities, storage of soil in stockpiles and clearing of vegetation resulting in dispersal of dust from development site to surrounding residential areas.	-7.8	Medium(-)	-5.8	Low(-)
	Construction	Air pollution from vehicular emissions: Dispersal of emissions from construction vehicles on site to surrounding residential areas during construction.	-7.8	Medium(-)	-5.8	Low(-)
	Operational	Air pollution from industrial activities: Potential generation of emissions from industrial processes in the operational phase.	-8.8	Medium(-)	-6.8	Low(-)
	Operational	Air pollution from vehicular emissions: Dispersal of emissions from delivery vehicles or trucks within and around the site to surrounding residential areas.	-8.8	Medium(-)	-6.8	Low(-)
Waste Management	Construction	Pollution arising from poor waste management: Pollution of onsite open space areas, immediate surrounds and final disposal site from incorrect handling, storage or disposal of general, construction or hazardous waste.	-10.0	Medium(-)	-6.0	Low(-)
	Construction	Pollution arising from poor management of excess soil: Erosion of stockpiles and sedimentation of surface water on site, or at the final disposal site, as a result of incorrect handling, storage or disposal of excess excavated material from platform creation.	-9.5	Medium(-)	-4.2	Low(-)
	Operational	Pollution arising from poor waste management: Improper management of general / hazardous solid or liquid waste, resulting in both direct and indirect soil and water pollution.	-12.0	Medium(-)	-8.0	Medium(-)
Major Hazardous Installation - Accidental release of natural gas	Construction	Safety risk to employees, the public and the pipeline.	-9.2	Medium(-)	-7.2	Medium(-)
	Operational	Safety risk to employees, the public and the pipeline.	-9.2	Medium(-)	-7.2	Medium(-)

ECOLOGICAL IMPACTS						
Vegetation	Construction	Loss of ecological habitat and open space as a result of vegetation clearing, excavation of soils and creation of levelled platforms.	-12.0	Medium(-)	-6.0	Low(-)
	Construction	Disturbance or loss of wetland / riparian vegetation: Alteration of hydrological conditions or encroachment of development within wetlands leading to change or loss in wetland habitat.	-12.5	Medium(-)	-5.5	Low(-)
	Construction	Loss of indigenous and protected species: Loss of indigenous species in Kniphofia wetland.	-12.5	Medium(-)	-6.5	Low(-)
	Construction	Complete loss of vegetation communities on site through clearing.	-12.0	Medium(-)	-6.5	Low(-)
	Construction	Spread of alien invasive vegetation: Disturbance of land leading to spread of invasive plants.	-8.5	Medium(-)	-5.2	Low(-)
	Construction	Contamination of soil reducing vegetative health: Spills / leakages / pollution potentially contaminating soil and affecting plant growth.	-8.5	Medium(-)	-4.2	Low(-)
	Operational	Maintenance of removed alien vegetation during the operational phase as part of developer's commitments for rehabilitation.	10.5	Medium(+)		
	Operational	Maintenance of rehabilitated water course and wetland areas during the operational phase as part of developer's commitments for mitigating loss of habitat.	12.0	Medium(+)		
	Operational	Spread of alien invasive vegetation: Poor management of alien plants leading to continued spread and poor establishment of indigenous species for rehabilitation.	-9.2	Medium(-)	-5.2	Low(-)
	Operational	Contamination of soil reducing vegetative health: Spills / leakages / pollution potentially contaminating soil and affecting plant growth.	-8.2	Medium(-)	-4.2	Low(-)
Fauna	Construction	Disturbance to faunal habitat: Disturbance to areas containing natural faunal habitat and fauna as result of ground clearing and earth-moving for platform creation and construction of embankments.	-8.8	Medium(-)	-7.5	Medium(-)
	Construction	Habitat / individual disturbance of protected species: Direct loss of habitat and possible disturbance to individuals of protected species as a result of ground clearing and earth-moving for platform creation and construction of embankments.	-14.0	High(-)		
	Construction	Introduction and spread of alien and domesticated animals from human presence on site in the construction phase.	-12.2	Medium(-)	-7.2	Medium(-)
	Construction	Pollution of faunal habitats: Pollution of areas containing natural faunal habitat as a result of poor waste management (handling, storage and disposal).	-7.8	Medium(-)	-6.5	Low(-)
	Construction	Changes in hydrology affecting wetlands and resident fauna	-12.5	Medium(-)	-9.5	Medium(-)
	Operational	Disturbance to faunal habitat: Disturbance to areas containing natural faunal habitat and fauna as result of ground clearing and earth-moving for platform	-7.8	Medium(-)	-7.5	Medium(-)

		creation and construction of embankments.				
	Operational	Introduction and spread of alien and domesticated animals from human presence on site in the operational phase.	-12.2	Medium (-)	-6.2	Low (-)
	Operational	Pollution of faunal habitats: Pollution of areas containing natural faunal habitat as a result of poor waste management (handling, storage and disposal).	-7.8	Medium (-)	-6.5	Low (-)
	Operational	Changes in hydrology affecting wetlands and resident fauna	-12.5	Medium (-)	-9.5	Medium (-)
	Operational	Rehabilitation of wetland habitat: Rehabilitation of wetland habitat associated with the conservation area on the north west side. This wetland could support species of conservation concern if managed correctly.	12.2	Medium(+)		
Wetlands and Watercourses	Construction	Direct loss and of fresh water habitat and modification of wetland systems resulting from vegetation-clearing, earth-moving activities for levelling of platforms, creation of soil stockpiles for platforms, creation of access roads and construction of buildings and associated infrastructure.		Moderate (-)		Moderate (-)
	Construction	Alteration of catchment and surrounding terrestrial habitat as a result of surrounding terrestrial habitat clearing, excavation, re-shaping and development.		Moderate (-)		Moderately Low (-)
	Construction	Alteration of freshwater habitat flow as a result of as a result of bank erosion, flow modification and inundation from stormwater drainage in central watercourse.		Moderately Low (-)		Low (-)
	Construction	Water pollution impacts as a result of leakages and/or mishandling of hazardous substances during the construction phase and urban contaminants washed off platform and road surfaces.		Moderately Low (-)		Low (-)
	Operational	Alteration of catchment and surrounding terrestrial habitat as a result of surrounding terrestrial habitat clearing, excavation, re-shaping and development.		Moderate (-)		Moderately Low (-)
	Operational	Alteration of freshwater habitat flow as a result of as a result of bank erosion, flow modification and inundation from stormwater drainage in central watercourse.		Moderately Low (-)		Low (-)
	Operational	Water pollution impacts as a result of leakages and/or mishandling of hazardous substances during the operational phase and urban contaminants washed off platform and road surfaces.		Moderate (-)		Moderately Low (-)
	Operational	Rehabilitation of watercourses and wetlands resulting in positive ecological services being established.		Low (-)		Moderately Low (+)
<b>ECONOMIC IMPACTS</b>						
Employment and Business	Construction	Short-term employment opportunities during the construction phase: unskilled and semi-skilled labour.	12.2	Medium(+)		

Opportunities	Operational	Long-term employment opportunities in the light industrial and retail sectors, as well as support services (security, landscaping, maintenance, cleaning, etc.)	15.2	High(+)		
	Operational	Local business opportunities by creating available business premises and increasing local economic growth in the area.	8.2	Medium(+)		
	Operational	Expansion of new business may lead to increase in rent for business premises.	-10.2	Medium(-)		
Public Revenue	Construction	Generation of public revenue through the the purchase of construction materials.	11.2	Medium(+)		
Public Revenue	Operational	Generation of public revenue through the payment of rates and taxes.	12.8	Medium(+)		
Property Value	Operational	Possible increase in residential property values: Potentially resulting from construction activities and affecting those homes closest to the site or with views of the site.	11.2	Medium(+)		
Agricultural	Construction	Loss of sugar cane farming	9.2	Medium(+)		
Mining	Construction	Loss of Clay mining: Loss of quarrying activities and jobs	-6.2	Low(-)	8.2	Medium(+)
<b>SOCIAL IMPACTS</b>						
Traffic	Construction	Traffic congestion from increased traffic volumes moving to and from the site and delivering construction materials / removing excess spoil.	-11.8	Medium(-)	-9.8	Medium(-)
	Construction	Increased heavy vehicle traffic on road network transporting construction materials, excess excavated soils, waste and equipment. Earth-moving vehicles, cranes and concrete mixer trucks are also anticipated to be travelling to and from site in the construction phase.	-10.8	Medium(-)	-7.8	Medium(-)
	Operational	Traffic congestion from increased traffic volumes moving to and from the site in the operational phase.	-14.8	High(-)	-11.8	Medium(-)
	Operational	Increased heavy vehicle traffic from delivery vehicles, which may intrude into residential roads.	-14.8	High(-)	-10.8	Medium(-)
Visual and Aesthetic	Construction	Change in visual / aesthetic character: Visual and aesthetic impact of construction activities in close proximity to residential suburbs.	-9.0	Medium(-)	-6.0	Low(-)
	Operational	Change in visual / aesthetic character: Visual and aesthetic impact of large scale industrial warehouses in close proximity to residential suburbs.	-12.0	Medium(-)	9.0	Medium(+)
Cultural and Heritage Resources	Construction	Loss of cultural / heritage resources during the construction phase earth-moving activities.	-15.0	High(-)	-11.0	Medium(-)
Safety	Construction	Safety risks to pedestrians and motorists in the area as a result of movement of construction and earth-moving vehicles on nearby road networks.	-9.2	Medium(-)	-6.2	Low(-)

	Construction	Potential increase in crime associated with the presence of construction workers in the site, in suburbs where crime is already an issue experienced by residents (i.e. Avoca and Glenhills).	-9.5	Medium(-)	6.2	Low(+)
	Construction	Safety risks to construction workers on site as a result of poor training, poorly maintained machinery or human error.	-8.2	Medium(-)	-6.2	Low(-)
	Operational	Safety risks to pedestrians and motorists in the area as a result of increased heavy vehicle traffic entering and existing the site.	-12.5	Medium(-)	-8.2	Medium(-)
Quality of Life	Construction	Change of sense of place from cumulative impact of air, noise and visual pollution of construction activities, as well as possible safety impacts, increase in traffic and growth of informal settlements.	-8.0	Medium(-)	-5.2	Low(-)
	Construction	Enhancement of social and community life: Increased vitality, racial diversity and upgrading of area. Possible upgrades of properties in response to an upgraded site; increased need for housing and education; and increased mixing of races within the community.	10.0	Medium(+)		
	Operational	Change of sense of place from cumulative impact of air, noise and visual pollution from the proposed Business Estate, as well as possible safety impacts, increase in traffic, growth of informal settlements and decrease in property values.	-10.0	Medium(-)	-8.0	Medium(-)
	Operational	Enhancement of social and community life: Increased vitality, racial diversity and upgrading of area. Possible upgrades of properties in response to an upgraded site; increased need for housing and education; and increased mixing of races within the community.	12.0	Medium(+)		
<b>CUMULATIVE IMPACTS</b>						
Cumulative Impacts	Construction	Cumulative Noise Impact: Baseline industrial and traffic noise in the vicinity of the site, when coupled with anticipated noise levels arising from the construction activities and associated traffic noise, will have a cumulative noise impact.	-12.0	Medium(-)		
	Construction	Cumulative Air Quality Impact: Baseline traffic-related air pollution from the surrounding road network and industrial areas, when coupled with increased traffic congestion and heavy vehicles traffic arising from the construction phase, will have a cumulative traffic impact.	-12.0	Medium(-)		
	Construction	Cumulative Economic Impact: The construction phase of Avoca South business Estate together with Rohill business Estate will have a cumulative effect on the economic status of the region.	14.0	High(+)		
	Construction	Cumulative Traffic Impact: Baseline traffic-conditions from the surrounding road network and industrial areas, when coupled with anticipated increase from the construction phase, will have a cumulative air quality impact.	-12.0	Medium(-)		
	Operational	Cumulative Noise Impact: Baseline industrial and traffic noise in the vicinity of the site, when coupled with anticipated noise levels arising from the Rohill Business Estate, Avoca North Municipal Housing Development and Avoca South	-13.0	High(-)		



		Business Estate (i.e. increased traffic and industrial noise in the operational phase), will have a cumulative noise impact.				
	Operational	Cumulative Air Quality Impact: Baseline traffic-related air pollution from the surrounding road network and industrial areas, when coupled with anticipated air pollution arising from increased traffic from the Rohill Business Estate and Avoca North Municipal Housing Development, will have a cumulative air quality impact.	-14.0	High(-)		
	Operational	Cumulative Economic Impact: The construction phase of Avoca South business Estate together with Rohill Business Estate will have a cumulative effect on the economic status of the region.	16.0	High(+)		
	Operational	Cumulative Traffic Impact: Baseline traffic-conditions from the surrounding road network and industrial areas, when coupled with anticipated increase from the construction phase, will have a cumulative traffic impact.	-14.0	High(-)		
	Operational	Cumulative impact of Increased Pressure on Municipal Services: Baseline availability of services (water, sewer and electricity) is sufficient but when coupled with multiple development cumulative impacts will occur.	-11.0	Medium(-)		

### 6.3 Summary of the Adequacy of the Information, Implications for Decision-making of Gaps, Uncertainties and Assumptions

All information provided by Investec Property (Pty) Ltd and the specialties studies are correct and valid at the time it was provided. The information provided in this report pertains to the impacts of the proposed development of Avoca South. The potential impacts of any future developments near or next to the proposed Avoca South Business Estate site, such as the possible housing development on the Avoca north property provide some uncertainty. However these potential impacts can only be assessed once this proposed development has been confirmed to take place.

The following assumptions are made in this report:

- Investec will utilise sustainable development practices for the development of Avoca South Business Estate.
- Investec is committed to undertake environmental rehabilitation works as per specification of environmental authorisation.
- Infrastructural requirements for roads, electricity, sewerage, water supply, stormwater, security and telecommunications have been investigated and will be designed in accordance with the relevant standards and specifications.

### 6.4 Risk

Potential risks to the proposed development were minimised through the undertaking of compressive specialist studies, detailed analysis of potential impacts and evaluation of alternatives. However the following actions may pose some risk:

- Ignorance of the commitments to adhere to the:
  - Rehabilitation of the watercourse and wetlands on the north-western boundary of the site and
  - Agreed buffer zone of 20m from the watercourses and wetlands.
- Inadequate implementation of the specifically designed Stormwater Management Plan (SWMP).
- Establishment of businesses that are non-compliant with the EMPr and Business Estate rules which may lead to pollution of stormwater systems, watercourses and wetlands.
- Provision of services such as electricity and sewage is a risk to the project due to a lack of capacity if all surrounding developments should take place within similar timeframes.

- Challenges of long term traffic planning by the eThekweni Municipality Traffic Authority for future phases of the development. This could impede future planned development of the site.

## 6.5 Summary of Key Findings and Recommendations

### 6.5.1 Key findings

The following key findings and conclusions are drawn from the EIA:

- Various layout alternatives were considered and assessed, and the option which accommodates both the development needs and the environmental restrictions best was found to be Option 5.
- The specialist studies commissioned for the project identified the following key aspects of the site:
  - A number of wetlands units were identified on site however these areas have proven to have very poor present ecological state and importance and sensitivity.
  - The development has the potential to have a positive residual impact on local freshwater habitat conservation through sound mitigation and wetland rehabilitation.
  - With the effective implementation of the recommended mitigation in this report, the significance of all of the negative impacts can be reduced to acceptable levels while the significance of the positive rehabilitation impact could feasibly be increased to moderately-low
  - If riverine and wetland rehabilitation is undertaken as per the recommendations, and the Rehabilitation and Conservation Management Plan implemented, an average 2.71ha gain in water quality enhancement functional equivalents could be achieved. Removal of alien vegetation as part of the rehabilitation will further improve the ecological value of the site.
  - With the inclusion of the proposed onsite wetland rehabilitation into the proposed development plan, the net gain in wetland functional and habitat equivalents would more than compensate for anticipated negative impacts to water.
  - As a result of the net positive gains in wetland function associated with the proposed rehabilitation, no offset mitigation would be required under this post-rehabilitation scenario.
  - The bulk infrastructure services are adequate to supply the required demands generated by the development.
  - There are no threatened plant species on site and most of the vegetation is of low conservation value. The small minority of plant species that has conservation value can be relocated successfully.

- The faunal biodiversity on the site is of low value and the proposed development will not negatively affect the terrestrial vertebrate fauna.
- The Stone artifacts found on site have little heritage value and have been rated as of low significance. The Corobrik buildings on site are younger than 60 years and therefore have no heritage significance.
- The likely public economic benefits of the proposed development including job opportunities and national taxes outweigh any potential costs of the proposed development.
- The surrounding road network of the proposed site is already experiencing increased traffic congestion thus multiple intersection upgrades are required to ensure that the road infrastructure can handle the increased anticipated increased traffic volumes in the construction and operational phases of the development.
- It was found that there are no environmental fatal flaws to the proposed development due to the poor ecological state of the proposed site.
- Majority biophysical impacts identified for the proposed development were found to be of medium significance and after mitigation measures are applied would have a low significance.
- The majority potential ecological impacts identified were of medium significance. Ecological impacts are more challenging to mitigate and application of mitigation measures can reduce the impact significances from Medium to Low in most instances.
- The only potential ecological impact rated as High was faunal habitat loss.
- Additional potential impacts that were rated as High without mitigation are:
  - Traffic congestion and increased heavy vehicle traffic (Operational Phase).
  - Potential loss of cultural and heritage resources (Construction Phase).
  - Increases in cumulative operational noise.
  - Increases in cumulative operational air quality.
  - Increases in cumulative traffic.
- All above impacts except the cumulative impacts, can be reduced to a Medium significance if mitigation measures are applied.
- Mitigation measures could be applied to the majority of identified impacts in the construction and operational phases (Refer to Table 6-1).
- A number of positive impacts are associated with the development, namely:
  - Rehabilitation and maintenance of water course and wetland areas (Operational phase).
  - Maintenance of alien vegetation removal (Operational phase).
  - Short-term employment opportunities (Construction phase).
  - Long-term employment opportunities (Operational phase).
  - Local business opportunities (Operational phase).

- Generation of public revenue (Construction phase).
- Loss of agricultural activity (Construction phase).

### 6.5.2 Key recommendations

The following are key recommendations:

#### General

- The EMPr, along with the array of management plans proposed such as the Stormwater Management Plan, Rehabilitation and Conservation Management Plan, and guidelines provided, must be implemented effectively to ensure the envisaged positive impacts are realized.
- It is recommended that a suitably experienced independent Environmental Control Officer (ECO) is appointed by the developer to perform audits during the construction phase of the project. It is recommended that the ECO should do a site visit once weekly in the initial phases of construction. However the ECO should be on site daily for any earthworks and excavations that take place near the watercourse. Once the majority of the excavations have been completed (to be decided and agreed by the Project Manager and the ECO), audits intervals could be extended to bi-weekly and then monthly.
- It is recommended that the Glen Anil Stream running along the northern boundary of the site be sampled on a quarterly basis upstream of the site and at the downstream area where it leaves the site for a period of 2 years post construction of the platform construction particularly of Platforms 2 and 9. If any water quality issues are identified as a result of sampling, it is suggested that a ground water quality monitoring programme is established.
- It is recommended that monitoring should take place to ensure compliance to the Environmental Authorisation.
- It is recommended that skills development and entrepreneurial programmes are developed by the Estate Owners Association for the adjacent local communities from whom it is assumed that unskilled labour will be sourced. This initiative will enable this development to be socially and environmentally responsible and so strengthen the potential positive impact of economic upliftment.

#### Ecological

- It is recommended that buffer zones (inclusive of a 5m stormwater dissipation zone) of 20m minimum between the outer edges of the wetland/riparian areas and the toe of the platform embankments are created and that fill embankments are not considered part of the buffer zone.
- Protected plant species on site (*Eulophia speciose*, *Kniphofia* species and *Scandoxus piniceus*) may not be damaged or destroyed without permit authorization from

Ezemvelo KZN Wildlife. These species should be relocated to other suitable habitat on site. This must be done in consultation with a Vegetation Specialist prior to the commencement of earth-moving activities.

- Any control of alien vegetation, which must be implemented in line with recommendations of the Rehabilitation and Conservation Management Plan compiled by Themtek Environmental Consultancy (2015).
- Faunal and floral rescues must take place prior to the destruction of the central drainage line.

#### Economic

- The developer should endeavour to employ local labour in the construction phase as far as possible.

#### Social

- The installation of a secure boundary fence and access control to the site is recommended to prevent crime from happening in and around the site during the construction phase.
- A surface collection of the archaeological stone tools discovered on site must be made, under the auspices of Amafa, prior to any construction activities.
- The traffic infrastructure required to service the property and surrounding area, as detailed in the TIA, must be implemented to ensure the road network maintains its carrying capacity.
- Investec must develop a “Green Sustainability Policy” for the estate and undertake to ensure the development during both construction and operation maximises opportunities to optimise energy use, manage waste effectively and improve sustainability of the development in the long term.

### 6.6 Environmental Management Programme (EMPr)

GCS has prepared a Final Draft EMPr (Appendix I) which is required as part of the EIA submission (Regulation 33). The purpose of the EMPr is to guide and control the impacts of construction and operational activities and will be amended if significant changes take place. The effective implementation of an EMPr will ensure that the required works are conducted in an environmentally sound manner and that the potential negative impacts of construction and operational activities are minimised and/or prevented. The Draft EMPr document details the responsibilities and authority of the various parties involved in the project and contains environmental specifications to which the Contractor and tenants are required to adhere throughout the duration of the construction and operational phases.

The Draft EMPr is also considerate of all of the recommendations of each of the relevant

specialist studies to ensure the development of the site is appropriate, optimal and effective in reducing impacts to the environment of construction and operation but also achieves environmental promotion and protection sustainable for the life of the project.

## 6.7 Conclusion

GCS conducted a compressive impact assessment to identify potential impacts triggered by the proposed development of the Avoca South Industrial and Business Estate. From this assessment it is expected that the development will bring much needed economic upliftment to the region and that the various potential negative impacts can be reduced in significance to acceptable limits, through the implementation of recommendations, mitigation procedures and the EMPr provided in this report.

With sound mitigation and wetland rehabilitation, the proposed development was assessed as also having a positive residual impact on local freshwater habitat conservation. While an estimated 2.08ha of wetland and riparian habitat will be destroyed by the proposed development, significant improvements in vegetation condition are expected within areas targeted for rehabilitation. Under this scenario, the development has the potential to result in a gain in 2.71ha of freshwater habitat equivalents.

Based on the conclusion that no environmental fatal flaw was found, that all negative impacts can be effectively mitigated to acceptable levels, and that the proposed development is anticipated to create some positive impacts on the natural and socio-economic environments, GCS recommends that Environmental Authorisation be granted for the Avoca South Industrial and Business Estate provided that the recommendations and mitigation measures documented this report and in each of the specialist studies are considered and implemented. All rehabilitation measures must also be implemented.

## 7 WAY FORWARD

The Draft EIA Report was compiled after completion of all specialist studies and assessment and rating of the environmental impacts. The Draft Report was made available to all I&APs for a 40 day comment period and a Public Meeting was held to facilitate the submission and discussion of comments. Comments received were recorded, responded to, and addressed in the Comments and Responses Report, and have been addressed in this Final EIA Report.

This Report will be submitted to the DEDTEA for Environmental Authorisation to develop the proposed Avoca South Industrial and Business Park and will be made available simultaneously for a further 21 day public comment period from 21 September 2015 - 12 October 2015.

In terms of the EIA Regulations, the DEDTEA has 60 days to accept or reject the Report and a further 45 days to issue a Record of Decision. On receiving the decision, GCS will notify I&APs of the decision and the procedure to appeal the decision.



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