

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT
FOR
THE PROPOSED HUDDLE TOWNSHIP DEVELOPMENT
FINAL REPORT**

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

THE PROPOSED HUDDLE TOWNSHIP DEVELOPMENT (PROPOSED LINKSFIELD NORTH EXTENSION 6 TOWNSHIP)

Prepared for:

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Submitted to:

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S · E · F

S T R A T E G I C E N V I R O N M E N T A L F O C U S

November 2014

SEF Project Code: 504342
GDARD Ref No: Gaut: 002/12-13/E0032

PURPOSE OF DOCUMENT

The purpose of this Environmental Impact Report (EIR) is to provide all registered Interested and Affected Parties (I&APs) and relevant State Departments with an opportunity to review the assessment of potential impacts associated with the proposed development and comment on the assessment, specialist findings and recommendations put forward by the Environmental Assessment Practitioner (EAP).

A period of **21 calendar days (21 November – 12 December 2014), excluding public holidays and Jewish School Holidays** has been provided to the **registered I&APs** and the **general public** for the review and commenting phase of the Final EIR. The exclusion of the Jewish School Holidays from the review and commenting period was at the request of community members. **State Departments** have been provided with the same review and commenting period (i.e. **21 November – 12 December 2014**).

All registered I&APs and State Departments have been notified of this review period as well as the **follow-up clarification meeting** that was held at Huddle Golf Club on **13th November 2014** from 18:30 to 20:00. The purpose of the public meeting was to:

- Provide I&APs with an opportunity to raise their queries directly with the appointed Traffic and Wetland specialists and to obtain clarification on the Traffic Impact Assessment and Wetland Impact Assessment findings;
- Keep I&APs updated about the environmental process; and
- Give I&APs an opportunity to interact directly with the project team

The Final EIR contains the following information:

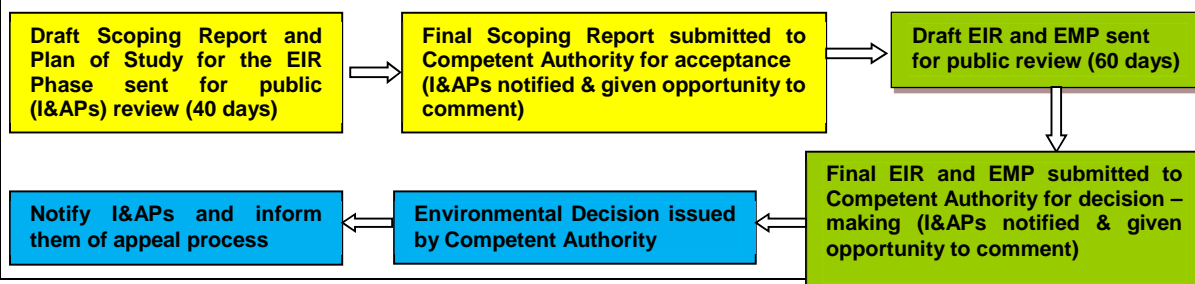
- A detailed description of the project, including project motivation (supplied by the applicant);
- A description of the environment affected by the project;
- The public participation process;
- Discussion and assessment of applicable alternatives;
- Assessment of impacts for the construction and operational phases; and
- The EAP's recommendations.

The Final EIR can be viewed at the following venue:

Name of public venue	Name of Contact Person	Contact Number(s)	Viewing Times
Sandringham Library, Dan Pienaar Park Athlone Ave, Sandringham	The Librarian	Tel: 011 640 5676	Mon – Fri: 10h00 to 17h00 Saturday: 09h00 to 13h00

Please visit SEF's website at <http://www.sefsa.co.za>. To register as an I&AP or comment on the project, click on "Stakeholder Engagement". Click on the "register" button and complete the compulsory fields to register as an I&AP. On completion of these fields, you will be logged in. Click on stakeholder engagement under categories on the right hand side of the page. Then click the Proposed Huddle Township Development to view the report and the associated appendices. Should you have any problems in obtaining the information from the Internet, please feel free to contact SEF for assistance.

All comments received during the review and commenting phase of the Final EIR should be sent directly to the competent authority, the Gauteng Department of Agriculture and Rural Development (GDARD) and copied to SEF. The flow diagram below highlights the phases in the project where I&APs have the opportunity to participate within the process.



PROJECT SUMMARY																						
Project Name	Huddle Township Development (proposed Linksfield North Ext 6 Township)																					
Farm Name and Portions	Proposed Portion 84 (a portion of the remainder) of the Farm Bedford 68 IR, Linksfield, City of Johannesburg Metropolitan Municipality (CJMM), Gauteng Province (refer to Figure 1 and Appendix 1 for the Locality Map).																					
Surveyor-General 21 Digit Code	T0IR0000000006800000																					
Brief Development Overview	<p>The proposed Huddle Township Development (approximately 53ha in extent) provides for this portion of land to be developed for a residential estate, a small neighbourhood node that will consist of retail facilities, some offices and a component of higher density residential apartments and a public and private road system.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #92d050;">Residential Category</th> <th style="background-color: #92d050;">Area (ha)</th> <th style="background-color: #92d050;">Description (number of units, size, density, etc.)</th> </tr> </thead> <tbody> <tr> <td>Residential 1</td> <td>24.7 ha</td> <td>314 units (or erven) between $\approx 450\text{m}^2$ and 1000m^2 (average of 800m^2). 2 Storeys (provided that a storey that does not protrude above natural ground level at the highest point of the site on which the dwelling house is located, shall not be regarded as a storey). Coverage: Single storey = 60%; and Double storey = 50%.</td> </tr> <tr> <td>Residential 2</td> <td>0.82 ha</td> <td>Two small cluster developments. 2 storey's in height. Coverage = 60% Total of 33 units (density of 40 units/ ha). Access from a proposed private road.</td> </tr> <tr> <td>Residential 3</td> <td>1.38 ha</td> <td>110 units (density of 80 units/ ha). 3 and 4 storey residential apartments. Coverage = 70%, remainder is parking. Access from the proposed 25m public road.</td> </tr> <tr> <td>Neighbourhood Node</td> <td>4.80 ha</td> <td>Maximum gross leasable area of $10\,000\text{m}^2$. Access from the proposed 25m public road. Provision is also made for the proposed retail/business node to obtain direct access from Club Street at one access point.</td> </tr> <tr> <td>Public/ Private Road System</td> <td></td> <td>Road reserve widths vary between 10, 5m – 30m to provide access to the various components within the proposed estate. Proposed estate access is a 25m wide public road that intersects at both ends with Club Street.</td> </tr> <tr> <td>Open Space System</td> <td></td> <td>Clubhouse and maintenance facilities at one of the entrances to the proposed estate. Provides for pedestrian linkages within the proposed.</td> </tr> </tbody> </table>	Residential Category	Area (ha)	Description (number of units, size, density, etc.)	Residential 1	24.7 ha	314 units (or erven) between $\approx 450\text{m}^2$ and 1000m^2 (average of 800m^2). 2 Storeys (provided that a storey that does not protrude above natural ground level at the highest point of the site on which the dwelling house is located, shall not be regarded as a storey). Coverage: Single storey = 60%; and Double storey = 50%.	Residential 2	0.82 ha	Two small cluster developments. 2 storey's in height. Coverage = 60% Total of 33 units (density of 40 units/ ha). Access from a proposed private road.	Residential 3	1.38 ha	110 units (density of 80 units/ ha). 3 and 4 storey residential apartments. Coverage = 70%, remainder is parking. Access from the proposed 25m public road.	Neighbourhood Node	4.80 ha	Maximum gross leasable area of $10\,000\text{m}^2$. Access from the proposed 25m public road. Provision is also made for the proposed retail/business node to obtain direct access from Club Street at one access point.	Public/ Private Road System		Road reserve widths vary between 10, 5m – 30m to provide access to the various components within the proposed estate. Proposed estate access is a 25m wide public road that intersects at both ends with Club Street.	Open Space System		Clubhouse and maintenance facilities at one of the entrances to the proposed estate. Provides for pedestrian linkages within the proposed.
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Development Footprint	Approximately 53 ha (excluding associated infrastructure).																					
Site Photographs	Please refer to Appendix 2																					

Additional Authorisations Required:	
Water Use License	<p><u>National Water Act, 1998 (Act No. 36 of 1998) – NWA</u></p> <p>An unnamed tributary of the Jukskei River runs from south to north across the Huddle Park Golf Course property and is located, on average, approximately 200m to 300m to the west of the proposed Huddle Township Development site, save a small area of approximately 1 109m² in extent that encroaches into the 30m temporary wetland buffer at the south-western corner of the proposed development.</p> <p>Due to the gas, sewer and electrical connections crossing the tributary of the Jukskei River and associated wetland, and the overall proximity of the proposed development to the wetland, according to the NWA, the proposed development will trigger the following water uses listed in Section 21:</p> <p>(c) impeding or diverting the flow of water in a watercourse; and (i) altering the bed, banks, course or characteristics of a watercourse.</p> <p>Accordingly, the proposed Huddle Township Development will thus require a Water Use Licence (WUL), which is administered by the Department of Water and Sanitation (DWS).</p>
Permits for the Relocation of Protected Plants	<p>A large number of <i>Hypoxis hemerocallidea</i> (African Potato - nationally classified as Declining and on GDARD's Orange List) was recorded throughout the northern section of the site with numbers at each locality ranging from 1 to 70 individuals. The specialist recommended that a permit is obtained from GDARD to relocate the plants to a suitable, grassland area in the near vicinity.</p>
Confirmation of capacity to supply bulk services:	
Water (Construction & Operational Phases)	<p>Supplier: Johannesburg Water</p> <p>Approximately 783 kl (kilolitres) of water will be consumed daily by the proposed Huddle Township Development, resulting in a continuous demand of approximately 45.31 l/s (litres per second).</p> <p>A new connector line (200mm diameter, 1 380m long) from the Corner of Grant Road, along the Club Street servitude, to a connection point opposite Donne Avenue will be provided for the proposed development as the existing water pipeline in Club Street has been shown to be inadequate to supply the proposed development. The connection point is from an existing high pressure municipal supply line from the Linksfield reservoir and it is indicated that a connection, in Club Street, can be taken from an existing Scour Valve, through a pressure reducing valve, to connect into a proposed 200mm diameter link pipeline, which will be piped jacked under Club Street and the reticulation of the township will be fed from a single point.</p>
Sewage (Construction & Operational Phases)	<p>Supplier: Johannesburg Water</p> <p>The proposed development will be served by waterborne sewerage, observing Johannesburg Water's standards throughout. It is estimated that the daily flow of effluent from the township will be approximately 608kl. Peak flow is based on 80% of peak water demand and is estimated at 35.19m/s.</p> <p>There is a major existing sewer main 1 500mm diameter pipeline located in the valley to the west of the proposed development. This sewer is a major collector for the area and drains from south to north. A 200m pipeline with a diameter of 200mm will be required to transfer effluent from the north western corner of the proposed development to the existing sewer main. A servitude across the Huddle Park Golf Course will have to be registered and it is proposed that the sewer line be jacked under the wetland and associated watercourse to avoid the impacts associated with open trenching.</p>

Confirmation of capacity to supply bulk services:	
Electricity (Construction & Operational Phases)	<p>Supplier: City Power</p> <p>The capacity required by the proposed development is as follows: Residential 1 = 1,548kVA; High Density Development = 365kVA; Neighbourhood Node = 1,000kVA; Total of 2,913kVA x0.85 Diversity Factor = approximately 2,500kVA.</p> <p>To supply the proposed development, 2 x 185mm² x 3c copper XLPE 11kV underground powerline cables will be installed from the corner of Pretoria and Modderfontein Road (where it connects into the existing powerline from the Alexander Substation located further to the north), south along Modderfontein Road, then east along Club Street, to a 6x3m site situated along the eastern boundary of the proposed development. From this point 2 x MV cables will continue to the Residential 3 component and Neighbourhood Node stands.</p>
Gas (Operational Phase)	<p>Supplier: Egoli Gas (Pty) Ltd</p> <p>Arrangements have been made with Egoli Gas for a connection to the existing Egoli Gas pipeline to the west of the proposed development. The proposed gas line (110mm diameter) crosses the wetland and associated watercourse to the west of the proposed development and will be jacked under this system to limit disruption as a result of trenching.</p>
Solid Waste (Construction & Operational Phases)	<p>Construction Phase: The Contractor will be responsible for the management and removal of all solid waste (refer to the Environmental Management Programme (EMP) in Appendix 8).</p> <p>Operational Phase: All waste (glass, plastic, paper) generated on site will be recycled as far as possible – managed by the proposed Home Owners Association (HOA). General waste, not recycled, will be collected on a weekly basis for removal by an appointed registered waste removal company or the Local Municipality.</p>
Stormwater Attenuation	<p>It is proposed that the attenuation of stormwater will be facilitated within the proposed development footprint. A large number of attenuation facilities have been proposed throughout the development's open space system. The "wet" ponds are estimated to cover approximately 13 000m², thus the attenuation required can therefore be accommodated in a freeboard of between 400-500mm depending on the locality and routing of stormwater flows. Attenuated stormwater will then be discharged into the surrounding Huddle Park Golf Course area. Stormwater attenuation within the Neighbourhood Node (retail/ business component) and Residential 2 and 3 components (i.e. cluster and apartment housing areas) will be provided by way of underground tanks sized at 2 200m³ and 620m³, respectively.</p> <p>The underground stormwater system will be designed to intercept the 1:5 year storm and routing of the 1:25 year storm will take place throughout the development and will be directed towards the attenuation facilities. The attenuation facilities will be designed to reduce the outflow from the entire development to the 1:5 year pre-development flow.</p>

ENVIRONMENTAL ASSESSMENT PRACTITIONER

Strategic Environmental Focus (Pty) Ltd (SEF) is a privately owned company and was formed in 1997 with the objective of providing **expert solutions to pressing environmental issues**. **SEF is one of Africa's largest multi-disciplinary environmental consultancies**, offering sustainable environmental solutions to private and public sector clients. With our integrated services approach in the management of natural, built and social environments; and with over a decade of experience, we bring a wealth of knowledge and expertise to each project.

SEF's Vision

SEF offers holistic and innovative sustainable solutions in response to global challenges.

SEF's Mission

SEF is a national sustainability consultancy which provides integrated and innovative Social, Biophysical & Economic solutions while fostering strategic stakeholder relationships, underpinned by SEF's core values.

SEF has assembled a team of professionals, consisting of a core of environmental experts with extensive experience in dealing with Environmental Impact Assessments (EIAs), Public Participation Processes, Architectural and Landscape Architecture, Mining and Environmental Management. SEF also has a team of specialist practitioners such as specialists in Heritage Impact Assessments (HIA), Wetland Delineation and Functional Assessments; Wetland/ Riparian Rehabilitation, Aquatic Assessments; Ecological (Fauna, Avifauna and Flora) Assessment, Visual Impact Assessments (VIAs), Soils and Agricultural Potential Assessments, Socio-Economic Assessments, etc.

SEF is a Qualifying Small Enterprise and a **Level 2 contributor in terms of the Broad Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003)** and has a procurement recognition level of 156%.

SEF commits itself to comply with the requirements and the implementation of a Quality Management System. The Quality Management System will be reviewed and implemented to continually improve efficiency and effectiveness of the organisation.

SEF uses a "green" approach to anything we embark on. We believe in using technology to our and the environment's best advantage. We encourage the use of green alternatives such as telephone and video conferencing instead of travelling for workshops and meetings and CDs instead of printed material, where possible.

The following project team members are involved in this S&EIR application process.

Table 1: Project Team Members

Name	Organization	Project Role
Mr Dave Rudolph	SEF	Project Director
Mr Willie Howell	SEF	Project Manager
Ms Hanlie van Greunen	SEF	Environmental Assistant & Public Participation Coordinator

Mr Dave Rudolph

Dave Rudolph has 22 years of experience in the field of environmental management and resource planning. The experience relates to large scale spatial planning and assessment initiatives at a National, Provincial and Local level. He has managed numerous large scale Environmental Assessments both nationally and internationally.

Mr Willie Howell

Willie is a Project Manager with over 10 years' experience in the mining, industrial and transportation sectors. Originally a GIS specialist, he gained invaluable background knowledge with regard to sectors in which he now operates as an Environmental Scientist. Projects to date include the compilation of a supporting technical report for the 2010 Soccer World Cup bid, environmental issues affected by freight transport in Gauteng and KwaZulu-Natal, Social Surveys of taxi and bus facilities to meet the Land Transport Act, an Environmental Profile and Plan for the East West Corridor and Basic Assessments and EIAs for SANRAL's road upgrading programme in Gauteng. Willie also worked on the multi-award winning Berg River project in the Western Cape where he project managed various social components of a Sustainable Utilization Plan and Social Monitoring of the impacts of the construction of the Berg River Dam and appurtenant works. He has also been involved in Independent Socio-Economic monitoring of the Gautrain project and Environmental Scientist Studies on bridges and various Environmental Studies at an Automotive Supplier Park. Mining experience covered work for Ashanti Gold and diamond mines in Lesotho. Willie also worked as Project Manager for the Kusile Power Station Water Use Licenses. He worked on various projects in the DRC for Anvil mining which included Environmental Impact Assessments, Environmental Management Plans and Social Studies. Further work experience includes the Environmental Impact Assessment and Environmental Management Plan for the Neckertal Dam Construction and related activities in Namibia.

Hanlie van Greunen

Hanlie has 8 years of professional experience as a Landscape Technician and holds a BSc Larch Degree. She also completed a BSc Honours in Environmental Monitoring and Modelling in 2010. Hanlie spent 5 years in the UK working as a Landscape Architect at a charitable environmental regeneration organisation where she gained skills in community consultation along with the design and implementation of community led landscape projects. Hanlie also has 2 years' experience in the compilation of Basic Assessments and Scoping and EIA's in terms of NEMA as well as compliance monitoring of waste streams and the handling and storage of hazardous chemicals in terms of the MPRDA.

Table 2: Contact Details of Environmental Assessment Practitioner

Name	Contact Details
Mr. Willie Howell	Strategic Environmental Focus (Pty) Ltd Postal Address: PO Box 74785, Lynnwood Ridge, Pretoria, 0040 Tel: +27 12 349 1307 Fax: +27 12 349 1229 Email: willie@sefsa.co.za

EXECUTIVE SUMMARY

1 INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by Huddle Investments (Pty) Ltd to undertake an environmental application process for the proposed Huddle Township Development. The proposed Huddle Township Development (detailed in the section to follow) will be situated on a portion of what used to be the Huddle Park Golf Course (Figure 1 and Appendix 1), the proposed Portion 84 (a portion of the remainder) of the Farm Bedford 68 IR, Linksfield, City of Johannesburg Metropolitan Municipality (CJMM), Gauteng Province.

In general terms the site is located adjacent to and to the west of Club Street and at its intersection with Linksfield Road, to the west of Senderwood, to the east of the Royal Johannesburg Golf Course and to the south of the Sandringham High School (Figure 1 and Appendix 1).

The Scoping Phase of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) Environmental Authorisation (EA) Application for the proposed project has been completed. The Final Scoping Report and Plan of Study for the Environmental Impact Reporting (EIR) Phase were submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) on 21 January 2013 and accepted on 08 May 2013 (Appendix 4). Refer to Section C-4.7 of this report for a summary of the Comments and Response Report (CRR) based on the Scoping and EIR Phase.

The Draft EIR was subsequently compiled and the public were given an opportunity to comment from 28 January to 28 March 2014. The purpose of this EIR is to provide all registered Interested and Affected Parties (I&APs) and relevant State Departments with an opportunity to review the assessment of potential impacts associated with the proposed development and comment on the assessment, specialist findings and recommendations put forward by the Environmental Assessment Practitioner (EAP). All comments that have been received and actions taken thereafter have been incorporated into the Final EIR for consideration by the approving authority, GDARD. Any comments made during the Final EIR phase should be submitted directly to the GDARD and copied to SEF.

2 BRIEF PROJECT DESCRIPTION

The proposed Huddle Township Development will primarily consist of 314 residential erven ranging in size from 450m² to 1000m², two small pockets of cluster developments (33 units) and one higher density apartment development (110 units) and a small neighbourhood node (maximum gross leasable area of 10000m²) consisting of speciality stores and services (such as a grocery store, a Postnet, banking facilities, internet cafes, hairdressers, etc.), appropriately scaled offices targeted at small and medium size businesses, as well as a lifestyle component. The proposed development will also have a private open space system that provides for landscaped recreational areas and pedestrian linkages as well as an integrated stormwater management system. The design of the township has taken into account the existing trees for which a survey was compiled. The total area of the development is approximately 53ha (Figure 1).

Approximately 783kl (kilolitres) of water will be consumed daily by the proposed Huddle Township Development, resulting in a continuous demand of approximately 45.31l/s (litres per second). A new connector line (200mm diameter, 1 380m long) from the Corner of Grant Road, along the Club Street servitude, to a connection point opposite Donne Avenue will be provided for the proposed development as the existing water pipeline in Club Street has been shown inadequate to supply the proposed development.

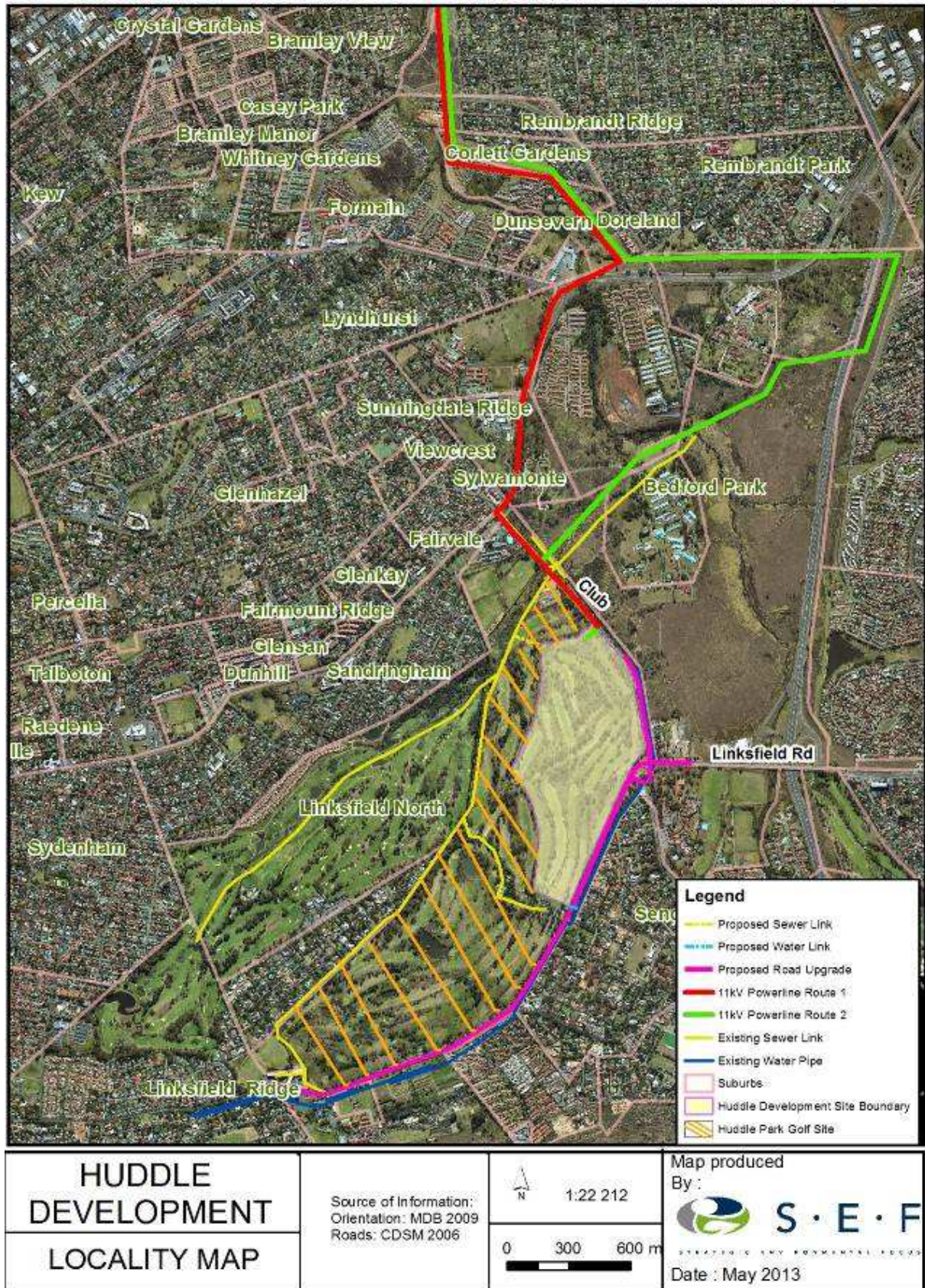


Figure 1: Huddle Township Development Locality Map

The proposed development will be served by waterborne sewerage, observing Johannesburg Water's standards throughout. It is estimated that the daily flow of effluent from the township will be approximately 608kl. Peak flow is based on 80% of peak water demand and is estimated at 35.19m/s. There is a major existing sewer main 1 500mm diameter pipeline located in the valley to the west of the proposed development. This sewer is a major collector for the area and drains from south to north. An 8 200m pipeline will be required to transfer effluent from the north western corner of the proposed development to the existing sewer main.

Two alternative powerline routes were proposed to connect the proposed development to the existing Alexander Substation to the north, which has been confirmed to have available capacity to supply the proposed development with electricity. To supply the proposed development, 11kV underground powerline cables will be installed from the corner of Pretoria- and Modderfontein Road, south along Modderfontein Road, then east along Club Street, to the eastern boundary of the proposed development. In addition to the conventional electricity supply of power, the proposed Huddle Township Development is also proposed to be reticulated with town gas. Arrangements have been made with Egoli Gas for a connection to the existing Egoli Gas pipeline to the west of the proposed development.

Internal roads within the proposed Huddle Township Development will be private roads (varying between 5.5 and 7.4m in width) and maintained by the Home Owners Association (HOA). These roads will be constructed to the necessary municipal standards and will be fully serviced with a mixture of black top and segmented paving, as appropriate. Access to the development will be well away of the two connections/intersections with Club Street. Additionally there is a proposed access directly into the parking area associated with the Neighbourhood Node (retail/business component). Various road upgrades are proposed to mitigate operational concerns, such as congestion on the road network, these include upgrades to the following areas of the road network:

- Club Street;
- Club Street/Civin Drive and Linksfield Road Intersection;
- Civin Drive/Chaucer Avenue and St Christopher Drive Intersection;
- Club Street and St. Andrews intersection;
- Club Street and Huddle Park Golf Club Access; and
- Development accesses;
 - The developer will construct the Huddle Crescent 25m width public road with access onto Club Street. All these intersections will require signalisation; and
 - Three entrance lanes and two exit lanes are proposed for each of the security access controlled residential estate access points (refer to Figure 2).

3 KEY IMPACTS

The following key impacts were identified during the Scoping Phase, which included comments received from I&APs and State Departments during the review of both the Draft and Final Scoping Reports as well as the Draft EIR.

Impact Category	Description of Impact	Section of EIR where impact has been assessed
CONSTRUCTION PHASE		
Biophysical Impacts	Destruction of natural habitat and vegetation	F-3.1.1
	Exposure to erosion	F-3.1.2
	Increase in invasive vegetation	F-3.1.3
	Interference with fauna and faunal breeding activities	F-3.1.4
	Contamination of the environment	F-3.1.5
	Altered surface water run-off patters into the adjacent wetland	F-3.1.6
	Disturbance of the wetland and watercourse during the installation of bulk services	F-3.1.7
Socio-Economic Impacts	Increase in ambient dust levels	F-3.2.1
	Increase in ambient noise levels (impact of the proposed development on the existing noise climate)	F-3.2.2
	Visual impact of construction of the development on visual receptors	F-3.2.3
	Visual impact of construction of infrastructure upgrades on visual receptors	F-3.2.4
	Increased traffic congestion and altered traffic patterns	F-3.2.5
	Adverse human health impacts related to possible Anthrax contamination/ infection	F-3.2.6
	Increase in crime/ criminal activity in the community	F-3.2.7
OPERATIONAL PHASE		
Biophysical Impacts	Surface and groundwater contamination	F-4.1.1
	Introduction and spread of alien and domesticated animals	F-4.1.2
	Increased stormwater run-off into the adjacent wetland	F-4.1.3
	Loss of groundwater recharge area within the temporary wetland buffer	F-4.1.4
Socio-Economic Impacts	Increase in ambient noise levels (impact of the proposed development on the existing noise climate)	F-4.2.1
	Visual impact of operational activities on visual receptors	F-4.2.2
	Visual impact of operational activities on the visual resource	F-4.2.3
	Increased traffic congestion and altered traffic patterns	F-4.2.4
	Increase in crime/ criminal activity in the community	F-4.2.5
CUMULATIVE IMPACTS		
	Increased loss of open space within the greater area	F-5.1.1
	Obtrusive lighting	F-5.1.2
	Impact on traffic patterns	F-5.1.3
	Impact on adjacent water resources	F-5.1.4

The above key impacts have been investigated and assessed within this EIR. A number of specialist studies were commissioned by the applicant to assist the EAP in assessing these key impacts. The following studies have been undertaken and included in this EIR:

- Ecological Assessment (floral and faunal);
- Wetland Delineation Verification Report;
- Noise Impact Assessment;
- Social Impact Assessment;
- Traffic Impact Assessment and an additional traffic addendum compiled in 2014;
- Visual Impact Assessment;
- Electrical Engineering Report; and
- Civil Engineering Services Report.

These independent specialist studies identified a number of potential negative and positive impacts in terms of the biophysical, social and economic environments on site and in the local area. These impacts have been assessed and mitigation measures have been highlighted that may reduce the significance of negative impacts and enhance those positive impacts.

4 PROJECT ALTERNATIVES

To give effect to the principles of NEMA and Integrated Environmental Management (IEM), an EIA should assess a number of reasonable and feasible alternatives that may achieve the same end result as that of the preferred project alternative.

No site alternatives exist for the proposed development. The following alternatives have been identified as part of this EA Application; refer to Section E for more details:

Alternative 1: Electrical Powerline Route Alternatives:

During the Scoping phase, two (2) route alternatives for the 11kV underground powerline to connect the proposed development to the Alexandra Substation in the north were proposed (Figure 1). The Preferred Alternative is Alternative Powerline Route 1 (red line on the Locality Map – Figure 1 and Appendix 1); however, the new underground powerline cable is able to connect into the existing point at the corner of Pretoria and Modderfontein Road, rather than having to install additional cables northwards to the substation itself.

Alternative 2: Layout/ Design Alternatives:

The layout/ design plan has changed based on the proposed developments of the adjacent golf course. The original layout has been amended based on the following aspects (refer to Annexure 3 for the alternative layout design):

- Consider more open space;
- Alternative stormwater attenuation open spaces;
- Greater variety of product for the market; and
- To retain as many of the existing trees as possible.

Alternative 3: Technology Alternatives:

The technology alternatives will vary substantially as individual erven will be sold and a set of design guidelines will apply. These architectural guidelines will comply with the building code of the CoJMM and may include aspects such as solar geysers, low energy light fittings and the use of gas instead of electricity; for the connection of major energy consumption appliances.

Alternative 4: No development Alternatives:

Two no-go or No Development Alternatives were identified. Should the proposed Huddle Township Development not be approved, the site could be incorporated into the existing Huddle Park Golf Course and managed in terms of the requirements for this activity. Should this option be pursued, the land would have to be purchased from the applicant. The other alternative is for the site to remain as public open space and managed appropriately to improve and restore biodiversity, such that the area becomes a “park” for the local community. This alternative would require that the CoJMM or local community organisation purchase the land from the applicant and ensure that sufficient funds and personnel are available to actively manage and maintain the open space/ park site.

5 CONCLUSIONS AND RECOMMENDATIONS

In accordance with GN No. 543, the Environmental Impact Phase for the proposed Huddle Township Development has identified and assessed the potential impacts caused by the proposed development. The ability to mitigate identified impacts are also addressed and summarised into a working/ dynamic Environmental Management Programme (EMP) (Appendix 8). Comments and/or concerns identified by I&APs during the review period of the Final EIR should be forwarded directly to the GDARD and SEF should be copied in on the communication.

The greater area surrounding Huddle Park is predominantly in a residential urban environment consisting mainly of lower density residential developments, pockets of higher density residential developments and land uses, such as a number of small shopping centres and a large number of schools. The Huddle Park area is within easy driving distance of a large number of places of employment including Johannesburg Central Business District (CBD), Sandton, Bedfordview Town Centre, and OR Tambo Airport. The area has approximately 24 schools in the vicinity. The existing Huddle Park is approximately 183 hectares of which only 53 hectares is owned by the applicant and is proposed as a predominantly residential township. Thus the proposed township development will cover approximately 28.8% of the total site previously known as Huddle Park, with 71.2% remaining as a golf course (Figure 1) which is under a long term lease to a private party.

Having assessed all the potential impacts associated with the proposed development, it is the opinion of the EAP that the proposed Huddle Township Development is issued with a positive EA from GDARD for the following reasons:

- Club Street and Linksfeld Road have been identified as east-west mobility roads within the CoJMM. Maintenance of efficient connectivity of the CoJMM to the surrounding areas requires road maintenance and upgrades. As part of the proposed Huddle Township Development, a section of Club Street will be upgraded to meet the CoJMM's requirements;
- Market research has shown that the area lacks suitable convenience retail and recommends that, at least, 5000m² of retail floor area is needed. To meet this need, the proposed Huddle Township Development will provide a neighbourhood node with a maximum leasable area of 10 000m²;
- Residential growth in this upmarket suburb is limited by the lack of suitable developable areas. By developing this site, the unsatisfied potential demand for middle to upper income housing opportunities is likely to be provided as the site is considered attractive and the area is linked to major places of employment (e.g. Sandton and Johannesburg CBDs) and have a number of schools located within it;
- The proposed development should have minimal impacts on the surrounding suburbs because it is buffered by large open spaces or major roads;
- In terms of achieving sustainable development, the CoJMM promotes the compact city by discouraging urban sprawl. The promotion of compact mixed land uses (residential, open space, business and commercial nodes) within an existing urban area by the proposed Huddle Township Development will assist in achieving this goal;
- The significance of the environmental impacts identified by stakeholders and I&APs during the Scoping and EIR phase has allowed the specialist studies to investigate and mitigate these impacts to an acceptable level. Consequently, there are no fatal flaws that should prevent the development from proceeding. However, the following key conditions should form part of the EA:
 - The EMP is a legally binding document and the mitigation measures stipulated within the document and EIR must be implemented;
 - An independent Environmental Control Officer (ECO) must be appointed to manage the

- implementation of the EMP during the construction phase. Environmental Audit Reports must be compiled and made available for inspection;
- The requirements of the stormwater management plan must be adopted and implemented prior to construction close to or associated with the activities requiring authorisation by way of a Water Use License, GDARD must be provided with a copy of the Water Use License in terms of Sections 21(i) (e) and (g) of the National Water Act, 1998 (Act No. 36 of 1998) issued by the Department of Water and Sanitation (DWS);
 - Only indigenous vegetation is to be used in landscaping open space areas and preferably within private gardens;
 - The floral species, *Hypoxis hemerocallidea* which is classified as “Declining” has been confirmed on site and a plant recovery and relocation plan must be compiled to assist a suitably qualified botanist relocate this species before construction commences;
 - The 32m wetland buffer must be strictly adhered to, and no intrusion is permitted except for the area in the south-west corner of the site. The encroachment into this area is limited to soft development (i.e. landscaping and gardens); and
 - Architectural, landscape and aesthetic guidelines must be compiled for the Huddle Township Development.

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LIST OF ABBREVIATIONS AND ACRONYMS

CRR	Comments and Responses Report
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation (formerly Department of Water Affairs)
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Reporting
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Programme
GDARD	Gauteng Department of Agriculture and Rural Development
GN	Government Notice
ha	Hectares
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
MAP	Mean Annual Precipitation
MAT	Mean Annual Temperature
ME	Mitigation Efficiency
mm	Millimetres
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
POC	Probability of Occurrence
PES	Present Ecological State
SAHRA	South African Heritage Resources Agency
SEF	Strategic Environmental Focus (Pty) Ltd
SFM	Significance Following Mitigation
S&EIR	Scoping and Environmental Impact Reporting
SDF	Spatial Development Framework
WOM	Without Mitigation Measures
WM	With Mitigation Measures

GLOSSARY OF TERMS

Applicant	Any person who applies for an authorisation to undertake an activity or to cause such activity to be undertaken as contemplated in sections 24(5), 24M and 44 of the National Environmental Management Act, 19998 (Act No. 107 of 1998).
Ecology	The study of the interrelationships between organisms and their environments.
Environment	The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact Assessment	Systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR.
Environmental Management Programme	A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.
Interested and Affected Party	Any person or groups of persons who may express interest in a project or be affected by the project, positively or negatively.
Key Stakeholder	Any person who acts as a spokesperson for his/her constituency and/or community/organization, has specialized knowledge about the project and/or area, is directly or indirectly affected by the project or who considers himself/herself a key stakeholder.
Stakeholder	Any person or group of persons whose live(s) may be affected by a project.
Study Area	Refers to the entire study area encompassing all the alternatives as indicated on the study area or locality map.
Succession	The natural restoration process of vegetation after disturbance.
State Department	Any department or administration in the national or provincial sphere of government exercising functions that involve the management of the environment.
Water Use License	A Water Use License is an application made to DWS in terms of Section 21 of the National Water Act (36 of 1998) for activities listed in the act, that are likely to impact on South Africa's water resources. These activities include, but are not limited to the abstraction and storage of water, impeding or diverting flow in a watercourse and altering the bed banks, course or characteristics of a watercourse.

SECTION A: INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by Huddle Investments (Pty) Ltd to undertake an Environmental Authorisation (EA) application process (Scoping and Environmental Impact Reporting (S&EIR) process) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Water Use License Application (WULA) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) for the proposed Huddle Township Development.

A-1 DESCRIPTION OF PROPOSED DEVELOPMENT/ ACTIVITIES

A-1.1 Locality

The proposed Huddle Township Development (approximately 53 ha in extent) will be situated on a portion of what used to be Huddle Park Golf Course (Figure 1 and Appendix 1), i.e. on the proposed Portion 84 (a portion of the remainder) of the Farm Bedford 68 IR, Linksfield, City of Johannesburg Metropolitan Municipality (CoJMM), Gauteng Province.

In general terms the site is located adjacent to and to the west of Club Street and at its intersection with Linksfield Road, to the west of Senderwood, to the east of the Royal Johannesburg Golf Course and to the south of the Sandringham High School (Figure 1 and Appendix 1).

The sites central co-ordinates are: 26°08'54.05"S and 28°07'19.64"E. The site is currently zoned as public open space. Access for the present Huddle Park Golf Course is obtained from Club Street.

A-1.1.1 *Surrounding Land Use*

To further place the site in context, the land uses within all four major compass directions that immediately surround the proposed development (or site) are described in the Table 3 below.

Table 3: Surrounding Land Use Table

Direction	Land Use	Distance (m)
North	Club Street (4 lane main road)	Boundary of the site
East	Club Street (4 lane main road)	Boundary of the site
South	Huddle Park Golf Course and Club House	Boundary of the site
	Club Street (2 lane main road)	Boundary of the site
West	Remainder of Huddle Park Golf Course	Boundary of the site

Some medium density residential developments, dwelling houses, the Saheti School and a service station are located further to the east of and across that section of Club Street, and to the south of its intersection with Linksfield Road.

A plant nursery, a small shopping centre and the Sizwe Tropical Disease Hospital on a large farm portion to the north east and across that section of Club Street, and to the north of its intersection with Linksfield Road. The site is located approximately 700 metres from the hospital.

Part of Huddle Park Golf Course, Sandringham High School and Sandringham Residential Area are located further to the north west of the site, while another part of the Huddle Park Golf Course, Royal Johannesburg Golf Course and the low density residential township of Linksfield North are located further to the west and south west of the site. Huddle Park Golf Course, sports fields and the business and high density residential developments of Linksfield Extension 3 Township are further located to the south west of the site.

A-1.2 Details of the Project

A-1.2.1 Proposed Township Development

The proposed Huddle Township Development provides for this portion of land to be developed for a residential estate, a small neighbourhood node that will consist of retail facilities, some offices and a component of higher density residential apartments and a public and private road system (Table 4).

Table 4: Details of the Proposed Huddle Township Development (Refer to Figure 2 and Appendix 3)

Residential Category	Approximate footprint area (ha)	Description (number of units, size, density, etc.)	Location within the proposed Huddle Development (estate)
Residential 1	24.7 ha	314 units (or erven) between $\approx 450\text{m}^2$ and 1000m^2 (average of 800m^2). 2 storeys (provided that a storey that does not protrude above natural ground level at the highest point of the site on which the dwelling house is located, shall not be regarded as a storey). Coverage: Single storey = 60%; and Double storey = 50%.	Throughout the proposed estate – main feature of the estate.
Residential 2	0.82 ha	Two small cluster developments. 2 storey's in height. Coverage = 60% Total of 33 units (density of 40 units/ ha). Access from the proposed 16 m private road.	Interface between the existing Huddle Park Golf Course clubhouse (to the south) and the "Residential 1" component (to its north). Interface between the proposed Clubhouse and maintenance facilities and the "Residential 1" component.
Residential 3	1.38 ha	110 units (density of 80 units/ ha). 3 and 4 storey residential apartments. Coverage = 70%, remainder is parking. Access from the proposed 25m public road.	North of the proposed Neighbourhood Node. Just north of the intersection of Club Street with Linksfield Road.
Neighbourhood Node	4.80 ha	Maximum gross leasable area of $10\,000\text{m}^2$. Access from the proposed 25m public road. Provision is also made for the proposed retail/business node to obtain direct access from Club Street at one access point.	Located at the intersection between Club Street and Linksfield Road where the high activity land uses will have the least impact on existing lower density residential developments in the vicinity.
Public/ Private Road System		Road reserve widths vary between 10,5m – 30m to provide access to the various components within the proposed estate. Proposed estate access is a 25m wide public road that intersects at both ends with Club Street.	Throughout the proposed estate.
Open Space System		Clubhouse and maintenance facilities at one of the entrances to the proposed estate. Provides for pedestrian linkages within the proposed.	Throughout the proposed estate.



Figure 2: Proposed Huddle Township Development Layout Plan

Neighbourhood Node:

The proposed Neighbourhood Node is *inter alia*, proposed to include the following range of facilities:

- Food outlets, such as outdoor coffee bars, food bistros and a variety of nationally and locally themed quality restaurants which will create ambience and a social setting;
- Essential day to day needs, such as a speciality grocery store, food stores and delicatessens, a Postnet, banking facilities, internet cafes, a domestic hardware store, hairdressers and other business uses that are associated with a retail development and that are required to serve the needs of the community;
- Appropriately scaled offices targeted at small and medium size businesses. It is anticipated that their presence will reinforce the mixed use nature of the development;
- A lifestyle component that could include uses such as a community centre, plant nursery, a crèche and a nursery school;
- The height of the development is limited to a maximum of two storeys, excluding basements. Due to the slope in the land, a building that is two storeys in height on the Club Street side of the development could be three storeys in height on the western side of the development. It is therefore proposed that a storey that does not protrude above natural ground level at the highest point of the erf should not be regarded as a storey. Provision is also made for offices to be three storeys in height; and
- Access to the proposed development will be obtained from the proposed 25m public road that intersects with Club Street at two points. The spacing of intersections on Club Street complies with accepted traffic engineering standards.

A-1.2.2 Proposed Bulk Services**Water Supply:**

Approximately 783kl (kilolitres) of water will be consumed daily by the proposed Huddle Township Development, resulting in a continuous demand of approximately 45.31l/s (litres per second).

A new connector line (200mm diameter, 1 380m long) from the Corner of Grant Road, along the Club Street servitude, to a connection point opposite Donne Avenue will be provided for the proposed development as the existing water pipeline in Club Street has been shown inadequate to supply the proposed development. The connection point is from an existing high pressure municipal supply line from the Linkfield reservoir and it is indicated that a connection, in Club Street, can be taken from an existing Scour Valve, through a pressure reducing valve, to connect into a proposed 200mm diameter link pipeline, which will be piped jacked under Club Street and the reticulation of the township will be fed from a single point(Figure 3) (Civil Engineering Services Report in Appendix 6).

Please refer to Appendix 7 for correspondence from Johannesburg Water confirming capacity to supply the required water to the proposed Huddle Township Development.

Sewage Treatment:

The proposed development will be served by waterborne sewerage, observing Johannesburg Water's standards throughout. It is estimated that the daily flow of effluent from the township will be approximately 608kl. Peak flow is based on 80% of peak water demand and is estimated at 35.19m/s.

There is a major existing sewer main 1 500mm diameter pipeline located in the valley to the west of the proposed development. This sewer is a major collector for the area and drains from south to north. A 200m pipeline with a diameter of 200mm will be required to transfer effluent from the north western corner of the proposed development to the existing sewer main. A servitude across the Huddle Park Golf Course will have to be registered and it is proposed that the sewer line be jacked under the wetland

and associated watercourse to avoid the impacts associated with open trenching(Figure 3) (Civil Engineering Services Report in Appendix 6).

Please refer to Appendix 7 for correspondence from Johannesburg Water confirming capacity to receive sewage from the proposed Huddle Township Development at the Northern Waste Water Treatment Works.

Solid Waste:

The contractor will remove solid waste during the construction phase on a weekly basis to the nearest registered waste disposal facility. Disposal receipts will be kept.

During the operational phase, all waste (glass, plastic, paper, tins) generated on site will be recycled (as far as possible) and managed by the Home Owners Association (HOA). Other waste types that cannot be recycled will be removed regularly to a registered waste disposal facility.

Electricity Supply:

The supply authority is City Power and the capacity required by the proposed development is as follows:

- Residential: 1 548kVA;
- High Density Development: 365kVA;
- Neighbourhood Node: 1 000kVA;
- Total: 2 913kVA x0.85 Diversity Factor = Approximately 2 500kVA

Two alternative powerline routes were proposed to connect the proposed development to the existing Alexander Substation to the north, which has been confirmed to have available capacity to supply the proposed development. The Preferred Alternative is Alternative Powerline Route 1 (red line on the Locality Map – Figure 1 and Appendix 1); however, the new underground cable is able to connect into an existing connection point at the corner of Pretoria and Modderfontein Road, rather than having to install an additional cable northwards to the substation itself.

To supply the proposed development, 2 x 185mm² x 3c copper XLPE 11kV underground powerline cables will be installed from the corner of Pretoria and Modderfontein Road (where it connects into the existing underground cable from the Alexander Substation located further to the north), south along Modderfontein Road, then east along Club Street, to a 6x3m site situated along the eastern boundary of the proposed development. From this point 2 x MV cables will continue to the Residential 3 component and Neighbourhood Node stands (Figure 3).

Please refer to Appendix 7 for correspondence from City Power confirming capacity to supply the proposed Huddle Township Development with electricity.

Egoli Gas Supply:

In addition to the conventional electricity supply of power, the proposed Huddle Township Development is also proposed to be reticulated with town gas. Arrangements have been made with Egoli Gas for a connection to the existing Egoli Gas pipeline to the west of the proposed development. The proposed gas line (110mm diameter) crosses the wetland and associated watercourse to the west of the proposed development and will be jacked under this system to limit disruption as a result of trenching. The position of the proposed gas line link is illustrated in Figure 3.

Please refer to Appendix 7 for correspondence from Egoli Gas confirming capacity to provide this service to the proposed development.

Proposed Access Road and Road Upgrades:

Internal roads within the proposed Huddle Township Development will be private roads (varying between 5.5m and 7.4m in width) and maintained by the HOA. These roads will be constructed to the necessary municipal standards and will be fully serviced with a mixture of black top and segmented paving, as appropriate.

Access to the development will be well away from the two connections/ intersections with Club Street. Additionally there is a proposed access directly into the parking area associated with the Neighbourhood Node (retail/ business component).

A comprehensive Traffic Impact Assessment (TIA) has been undertaken by Goba (Pty) Ltd, and has been appended to the Civil Engineering Services Report (Appendix 6).

The Traffic Engineer has proposed the following road upgrades (Figure 4 and detailed below) to mitigate operational concerns, such as congestion on the road network. Comments from the Johannesburg Roads Agency (JRA) are included in Annexure 7 and have been addressed in the TIA addendum for this final EIR.

Subsequent to this, an addendum to the TIA has been compiled by MPA Consulting Engineers in August 2014 and is included in the EIR.

Proposed Road Upgrades

A: Club Street

- An upgrade of Club Street south of the development to a two lane per direction road from the Club Street/Linksfield Road/Civin Drive intersection to a point 60m south of the Club Street/Huddle Park Golf Course access is proposed.

B: Club Street/Civin Drive and Linksfield Road Intersection

- North approach: 100 m exclusive right turn lane, 2 through lanes and the existing left turn slip lane, 100 short exit lane;
- South approach: 3 through lanes, 2 exclusive right turn lanes (60m) and an exclusive left turn slip lane;
- East approach: 2 through lanes, 2 exclusive right turn lanes and 1 left turn lane; and
- Revised signal phasing.

C: Civin Drive/Chaucer Avenue and St Christopher Drive Intersection

- Signal optimisation is proposed to meet the high demand on the south approach;
- A short 60m receiving lane is proposed on the north approach; and
- An extension to 120m of the proposed short 60m accepting lane on the north approach is proposed to accommodate future traffic.

D: Club Street and St. Andrews intersection

- A traffic signal is proposed at this intersection.

E: Club Street and Huddle Park Golf Club Access

- It is proposed to consolidate this intersection at the location of the entrance by providing a protected exit right turn lane with the four lane cross section at this location. Traffic will be able to exit under priority control because of the gaps created by the proposed St. Andrews/Club Street signalisation.

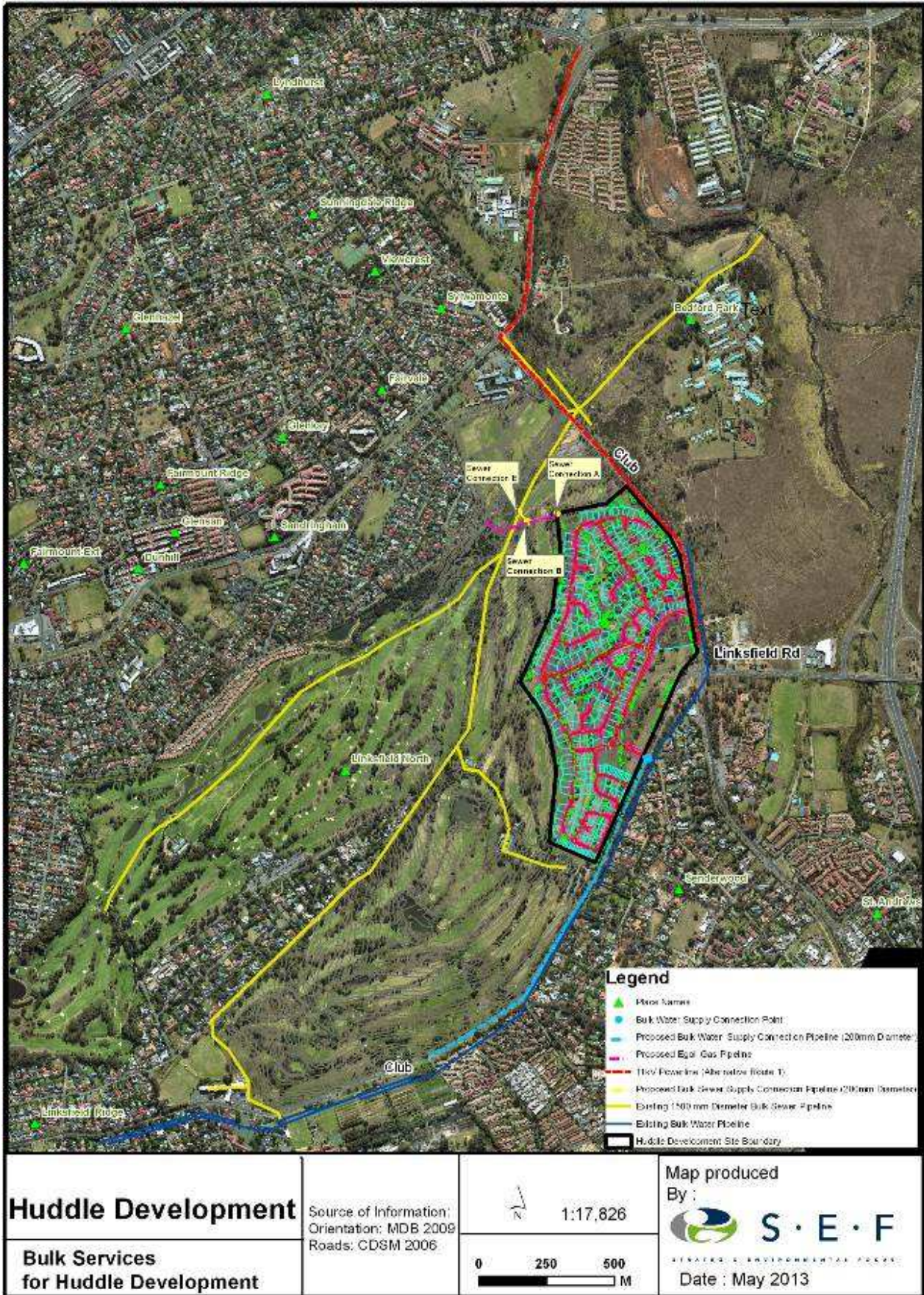


Figure 3: Proposed bulk services connections for the proposed Huddle Township Development

F: Development accesses

- The developer will construct the Huddle Crescent 25m width public road with access onto Club Street at intersection 4 and 9 of the new proposed signalised intersection to the Neighbourhood Node (intersection 8). All these intersections will require signalisation;
- A roundabout with a mountable internal circle 20m diameter and outer circle diameter of 28m is proposed for the northern residential access on Huddle Crescent;
- A stop control T-junction is proposed for the Residential 3 component and westernmost residential access off Huddle Crescent (Intersection 10 and 12); and
- Three entrance lanes and two exit lanes are proposed for each of the security access controlled residential estate access points (refer to Figure 2). The entrance stop lines should be at least 30m set back from the Huddle Crescent intersections and at least one of the lanes should be 4m wide and 5m high to allow emergency vehicle access.

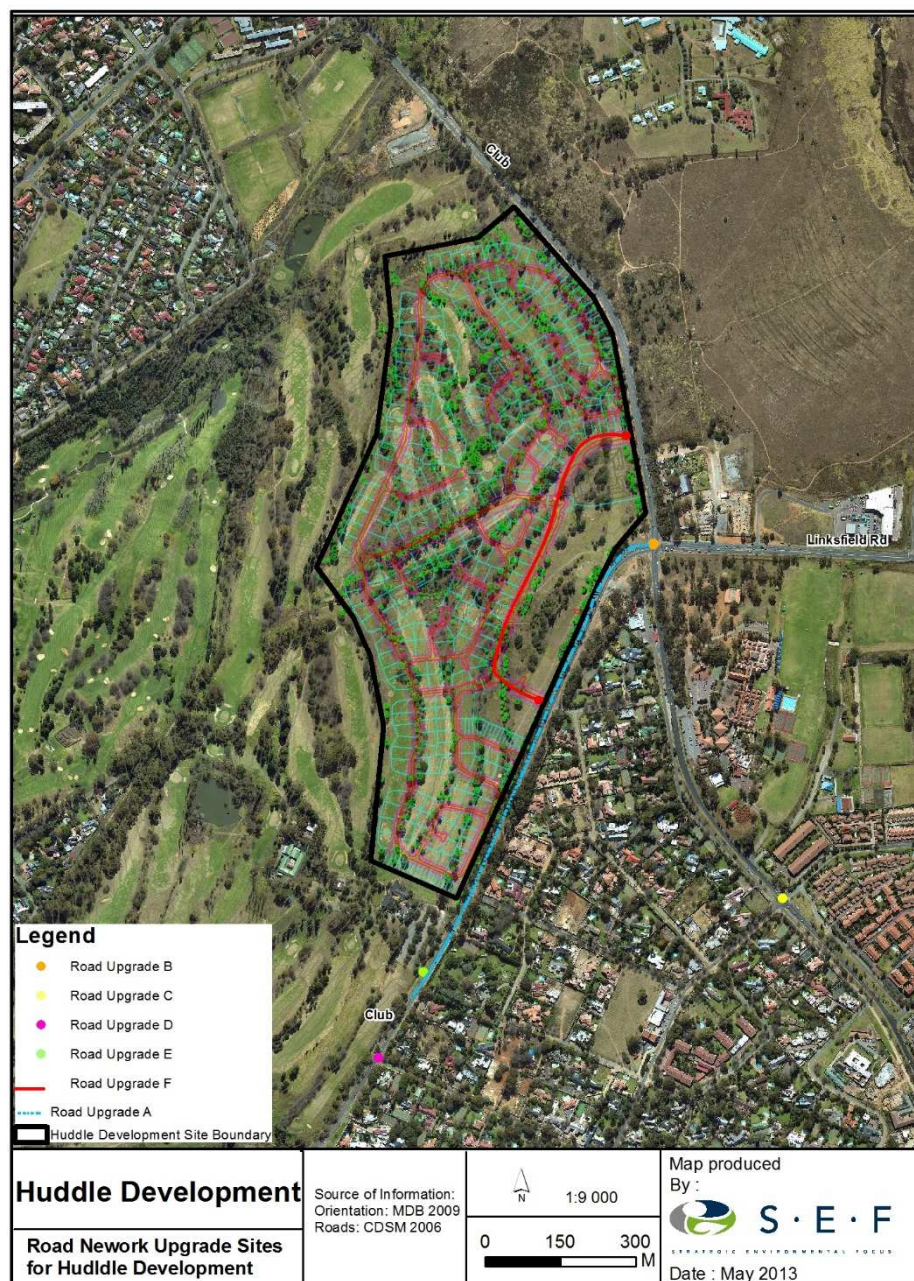


Figure 4: Location of road upgrades associated with the proposed Huddle Township Development

Stormwater Management:

It is proposed that the attenuation of stormwater will be facilitated within the proposed development footprint. A large number of attenuation facilities have been proposed throughout the development's open space system (Figure 5) to limit the concentration of water and provide "waterways" (those ponds that may be lined to retain water for longer periods of time) which, during heavy and/or frequent rain events may allow for the use of this water for irrigation purposes. The "wet" ponds (some are proposed to be lined in order to retain water for longer periods of time) are estimated to cover approximately 13 000m² (refer to Figure 5 for the approximate sizing of each attenuation pond), thus the attenuation required can therefore be accommodated in a freeboard of between 400-500mm depending on the locality and routing of stormwater flows. Attenuated stormwater will then be discharged via a pipe from the attenuation pond into a large dissipation area within the adjacent Huddle Park Golf Course area (Figure 5).

Stormwater attenuation within the Neighbourhood Node (retail/ business component) and Residential 2 and 3 components (i.e. cluster and apartment housing areas) will be provided by way of underground concrete tanks sized at 2 200m³ and 620m³, respectively.

The underground piped stormwater system (associated with the internal road network) will be designed to intercept the 1:5 year storm and routing of the 1:25 year storm will take place throughout the development and will be directed towards the attenuation facilities. The attenuation facilities will be designed to reduce the outflow from the entire development to the 1:5 year pre-development flow.

A-1.2.3 *Details of the Construction Phase*

The appointed Contractor will be responsible to prepare a Construction Site Development Plan prior to establishing on site. This plan will indicate the boundaries of the site that encompasses all construction related activities, vehicle and pedestrian access points, laydown area/s, offices, stockpile areas, storage areas, ablution facilities, etc. The Contractor's Camp will be located along the eastern boundary of the proposed development, in order to ensure easy access from Club Street and to ensure it is located as far as possible away from the "downstream" wetlands and watercourse to the west of the proposed development.

Water supply required for the proposed development during construction will be provided by water tankers until the proposed and approved water connection to the existing Johannesburg Water network has been constructed. Power required for the construction phase will be supplied through generators until such a time that the underground powerlines and connections have been installed to secure electricity from City Power's local network (i.e. Alexander Substation).

This Construction Site Development Plan must be approved by the appointed Environmental Control Officer (ECO) as provided for within the Environmental Management Programme (EMPr) (Appendix 8).

The construction programme will reflect the separate work sections, in chronological order, according to the Contractor's intended production sequence, as described on the Construction Site Layout Plan.

The Contractor will be responsible for the management and removal of all solid waste from site to a designated landfill site. Solid waste generation will be minimal and the Contractor will dispose by means of contracting a reputable waste removal company or by entering into an agreement with the local municipality. A method statement for the management of waste will be drafted and signed off by the ECO prior to commencement of construction activities, as per the attached EMPr (Appendix 8).

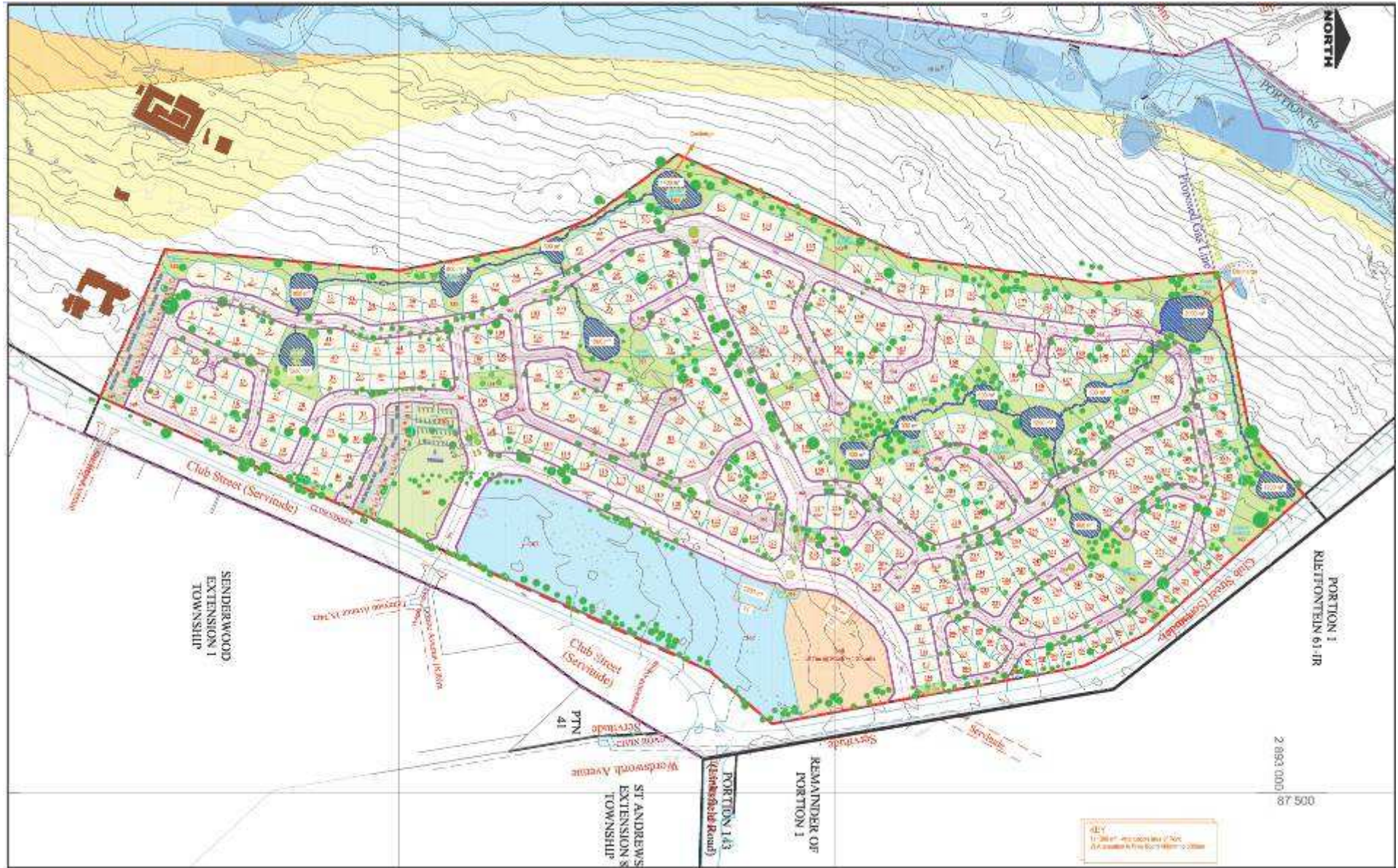


Figure 5: Stormwater Attenuation Pond Layout within the proposed Huddle Township Development

A-2 LEGAL REQUIREMENTS APPLICABLE TO THIS APPLICATION

SEF has submitted an application for EA with the GDARD for the proposed Huddle Township Development and received an official GDARD reference number: **Gaut 002/12-13/E0032**.

The environmental legislation, guidelines and policies **applicable** to this project are as follows:

A-2.1 NEMA and the Environmental Impact Assessment Regulations

The EIA Regulations, promulgated under NEMA, focus primarily on creating a framework for co-operative environmental governance. NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by State Departments and to provide for matters connected therewith.

In terms of the EIA Regulations of 2010 and activities listed in GN No. 544 and 546 (requiring a Basic Assessment process) and GN No. 545 (requiring a S&EIR process), the following listed activities are deemed by the EAP to be applicable to the proposed Huddle Township Development based on the information provided by the project proponent, the professional team and specialists.

It must be noted that activities requiring a Basic Assessment process, as well as activities requiring a S&EIR process are triggered by the proposed development. Therefore, according to the below listed activities, a situation arises, whereby the legal requirements of the activity listed in terms of GN No. 545 of 2010 supersede those of the activities listed in terms of GN No. 544 and 546 of 2010, and as such **this application has undergone a S&EIR process**.

The listed activities are deemed to include activities that could potentially have a detrimental impact on the social and biophysical state of an area and as such, are required to undergo an environmental impact assessment process.

GN No & Activity Number	Activity Description
GN No. 544 of 18 June 2010	11 The construction of: <ol style="list-style-type: none"> i. canals; ii. channels; iii. bridges; iv. dams; v. weirs; vi. bulk storm water outlet structures; vii. marinas; viii. jetties exceeding 50 square metres in size; ix. slipways exceeding 50 square metres in size; x. buildings exceeding 50 square metres in size; or xi. infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 meters of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.

GN No & Activity Number	Activity Description
GN No. 544 of 18 June 2010	<p>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:</p> <ul style="list-style-type: none"> i. a watercourse; ii. the sea; iii. the seashore; iv. the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater- but excluding where such infilling, depositing, dredging, excavation, removal or moving; <ul style="list-style-type: none"> a. is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or b. occurs behind the development setback line.
GN No. 546 of 18 June 2010	<p>The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, at the time of the coming into effect of this Schedule or thereafter such land was zoned open space, conservation or had an equivalent zoning.</p>
GN No. 545 of 18 June 2010	<p>The construction of:</p> <ul style="list-style-type: none"> i. jetties exceeding 10 square metres in size; ii. slipways exceeding 10 square metres in size; iii. buildings with a footprint exceeding 10 square metres in size; or iv. infrastructure covering 10 square metres or more <p>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.(b) In Gauteng:</p> <ul style="list-style-type: none"> v. Sites identified as irreplaceable or important in the Gauteng Conservation Plan; vi. Areas zoned for a conservation purpose.
GN No. 545 of 18 June 2010	<p>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; except where such physical alteration takes place for:</p> <ul style="list-style-type: none"> i. linear development activities; ii. or agriculture or afforestation where activity 16 in this Schedule will apply.

In accordance with the EIA Regulations (2010), an EIA report must contain all the information that is necessary for the competent authority to consider the application and to reach a decision and must include those points included in Section 31(2) of Regulation 543 which are laid out in the table below. In order to facilitate review by the competent authority, this report is structured around these requirements.

NEMA Regulation 543, Section 31 Requirements	Relevant Section of the Report
Details of the EAP who compiled the report and the expertise of the EAP to carry out an environmental impact assessment	Environmental Assessment Practitioner
A detailed description of the proposed activity	Section A
A description of the property on which the activity is to be undertaken and the location of the activity on the property.	Section A
A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.	Section B
Details of the public participation process conducted including: <ul style="list-style-type: none"> (i) Steps undertaken in accordance with the plan of study; (ii) A list of persons, organisations and organs of state that were registered as interested and affected parties; (iii) 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; and (iv) Copies of any representations and comments received from registered and affected parties. 	Section C-4
A description of the need and desirability of the proposed activity	Section A-4
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 E
An indication of the methodology used in determining the significance of potential environmental impacts.	Appendix D
A description and comparative assessment of all alternatives identified during the environmental impact process.	Section E
A summary of the findings and recommendations of any specialist report or report on a specialised process.	Section G
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 F
An assessment of each identified potentially significant impact.	Section F
A description of assumptions, uncertainties and gaps in knowledge.	Section D
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 G
An environmental impact statement which contains a summary of the key findings and a comparative assessment of the positive and negative implications.	Section G
An environmental management programme	Appendix 8
Copies of any specialist reports and reports on specialist processes.	Appendix 6

A-2.2 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways.

Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.

Due to the gas, sewer and electrical connections crossing the tributary of the Jukskei River and associated wetland, as well as the close proximity of the development as a whole, according to the NWA, the proposed development will trigger the following water uses listed in Section 21:

- (c) impeding or diverting the flow of water in a watercourse; and
- (i) altering the bed, banks, course or characteristics of a watercourse.

Accordingly, the proposed Huddle Township Development will thus require a water use licence, which is administered by the Department of Water and Sanitation (DWS). A water use license application will be undertaken for the proposed development.

A-2.3 Other Legal Requirements

A-2.3.1 Acts

Constitution of the Republic of South Africa

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

Everyone has the right -

- To an environment that is not harmful to their health or well-being; and
 - To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -Prevent pollution and ecological degradation;
 - Promote conservation; and
 - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

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

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that

warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

This Act is applicable to this application for environmental authorisation, in the sense that it requires the project applicant to consider the protection and management of local biodiversity.

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

This Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 hectares (ha) and where linear developments (including roads) exceed 300 metres in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA) or their subsidiary bodies.

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

The Act recognises that everyone has a Constitutional right of access to any information held by the state and by another person when that information is required to exercise or protect any rights. The purpose of the Act is to foster a culture of transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their rights

A-2.3.2 *Provincial Policies and/or Guidelines*

Integrated Environmental Management (IEM)

IEM is a philosophy for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels.

The Department of Environmental Affairs (DEA) Integrated Environmental Management Information Series guidelines are also considered during this S&EIR application process.

National Spatial Biodiversity Assessment

The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

Protected Species – Provincial Ordinances

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the Provincial Departments of Environmental Affairs.

Johannesburg Metropolitan Open Space System & Open Space Framework, 2007

According to this framework the site falls within the Sport and Recreational open space category, due to it previously being considered part of the golf course. Due to the transformed nature of the site, the site (and greater golf course area) was rated a 10 in terms of the Desired Open Space Rating, which is the lowest class in this ranking system. The site is also not classified as part of the green network within the City (refer to Figure 1 within the Ecological Verification Assessment in Appendix 6).

Regional Spatial Development Framework: Region E, June 2010

The Regional Spatial Development Framework (RSDF), together with the Spatial Development Framework (SDF), represents the prevailing spatial planning policy within the CoJMM. These spatial planning policy documents are prepared and adopted in terms of the Municipal Systems Act, 2000 (Act No. 32 of 2000) as an integral component of the CoJMM's Integrated Development Plan (IDP).

According to the RSDF, Club Street and Linksfield Road have been identified as east – west mobility roads within the CoJMM. As such, the maintenance and upgrade of these roads are important in maintaining the efficient connectivity of the metropolitan area to the surrounding areas. It is proposed to upgrade a section of Club Street (See Section E-6.1.3) and this is in line with the RSDF of the city, with regards to traffic and the road network.

CoJMM Integrated Development Plan 2012 - 2016

An IDP encourages both short- and long-term planning. In the short term it assists in addressing issues or challenges that may be resolved within the relevant term of office while at the same time it provides space for the long term development of the area in an integrated and coordinated manner.

The IDP states that the most desired and efficient urban form is compact with mixed land use and attractive environments for walking and cycling. The proposed development achieves this by virtue of the fact that it has residential 1 and 3, private open space and business/commercial land use components.

A-3 DETAILS OF THE APPLICANT

The details of the project applicant are:

Name of Applicant	Postal Address	Relevant Numbers
Mr John Rosmarin, for and on behalf of, Huddle Investments (Pty) Ltd	100 Grayston Drive, Sandton, 2196	Tel: 011 291 3031 Fax: 011 291 3611 E-mail: john.rosmarin@investec.co.za

A-4 NEED AND DESIRABILITY OF THE PROJECT

The proposed development site is centrally located in relation to the metropolitan urbanised areas of the CoJMM and Ekurhuleni and approximately 6km from Bedfordview Town Centre, 10km from O.R. Tambo Airport, 7km from the Johannesburg Central Business District (CBD) and 8km from the Sandton CBD. The site is further located in close proximity to the N3 freeway (Eastern Bypass)/ Linksfield Road interchange which provides excellent regional access to all parts of the metropolitan areas of Johannesburg and Tshwane and, via the R21 and R24, to Ekurhuleni and the O.R. Tambo Airport. Furthermore, unlike many other parts of the metropolitan area, good east west routes exists which link the site to other major routes such as the M1 freeway and Louis Botha Avenue.

Thus, the site is located within easy driving distance of a large number of major places of employment including Johannesburg CBD, Sandton CBD, Bedfordview Town Centre, the industrial areas of Kempton Park, Edenvale and Germiston and the southern industrial areas of Johannesburg.

Further to this, the site is located in an established and stable residential urban environment consisting mainly of lower density residential developments on erven varying in size between 1 000m² and 4 000m², pockets of higher density residential developments and support land uses, such as a number of small shopping centres and a large number of schools (24 schools of different sizes) located within 5 minutes driving distance of the site. This constitutes a high concentration of educational facilities

compared to other parts of the metropolitan area).

A relatively low level of residential growth is taking place due to the fact that the area is almost fully developed. However, the proximity to places of employment and amenities (such as shopping centres and schools) creates a strong demand for housing in the middle to upper income groups.

The area within which the proposed Huddle Township Development is located also lacks suitable convenience retail and a need exists for at least 5 000m² of retail floor area. To provide for other business uses that are normally associated with convenience retail facilities, a neighbourhood node, with a maximum floor area of 10000m² is proposed.

The proposed development will have little or no impact on adjoining existing developments, as it is buffered from them by large open spaces (i.e. golf courses) and major roads.

SECTION B: THE RECEIVING ENVIRONMENT

In order to, with any level of confidence, assess the potential impacts of the proposed Huddle Township Development on the receiving environment, it is necessary to first assess the baseline conditions found over the study area. Using this *Status Quo* one can then, broadly speaking, determine the likely impacts that will emanate from a specific development typology on a well-defined receiving environment.

B-1 BIOPHYSICAL ENVIRONMENT

B-1.1 Geology and Geotechnical Suitability

The site is mainly underlain by Halfway House Granites which are Swazian in age. The site is thus structurally suitable for the proposed development.

B-1.2 Soils and Agricultural Potential

The site is composed of the Bb1 land type, with moderate to severe limitations in terms of land capability. The site was previously used as a golf course.

B-1.3 Climate

The climate is mostly influenced by altitude. Even though the Gauteng Province is at a “subtropical” latitude, the climate is comparatively cooler, especially in Johannesburg, at 1 700m above sea level. Most precipitation occurs as brief afternoon thunderstorms; however, relative humidity never becomes uncomfortable. Winters are crisp and dry with frost occurring often in the southern areas. Snow is rare, but it has occurred on some occasions in the CoJMM area¹.

Johannesburg averages: January maximum: 26°C (min: 15°C), July maximum: 17°C (min: 6°C), annual precipitation: 728mm².

B-1.4 Topography

The site topography is undulating with flat plain, elevated areas (typical of certain sections of a golf course/ club). There are no ridges on site.

B-1.5 Hydrology

The proposed site is in close proximity (on average about 200 – 300m away) to a tributary of the Jukskei River and associated wetland. A Wetland Delineation and Functional Assessment (Appendix 6) were conducted during August 2008 for the greater area. The study is briefly discussed below.

According to the National Water Act, 1998 (Act No. 36 of 1998) a wetland is defined as, “*land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.*”

The study identified two Hydro-Geomorphic (HGM) units namely, a Valley Bottom unit, and a Hillslope Seepage unit, and as such two wetland zones were identified, a Seasonal and Permanent Wetland Zone and a Temporary Wetland Zone (Figure 7). The frequent occurrence of *Cyperuses culentus* within the study area was interpreted as an indicator of disturbed wetland conditions. The presence of the golf

¹http://en.wikipedia.org/wiki/Gauteng#Geography_.26_Climat

²<http://clients.customweather.com/cgi-bin/1STWX/old/climate.cgi>

course and the associated suppression of hydrophytes by *Pennisetum clandestinum*, resulted in soils being the most reliable wetland indicator that could be used throughout the entire study area.

The study found that the site, including the surrounding golf course site, is severely degraded from its natural state, due to historic upslope development outside the property and the golf course construction, as well as dams, within the greater golf course property. The result is water infiltration and movement barriers, canalisation and draining, as well as a vegetation cover that predominately consists of invasive alien species.

The large scale and range of transformations have caused both HGM units' wetland functions (which fall outside of the study site) to drastically decline, such as their ability to regulate stream flow, control erosion and maintain biodiversity. The change of land use and prevalence of alien plant species has reduced the general site's biodiversity, but the large area of open space within the larger Huddle property still functions as a movement corridor for faunal species. HGM unit 1 (Valley Bottom) is of particular importance as a movement corridor, because of its longitudinal shape and the link it provides to other open space areas outside the greater property's boundary.

Thus, the development footprint of the township falls outside of the wetland zones (even though the wetlands have been identified as being severely degraded), thus reducing the impact of the proposed development on the wetland as a whole and the corridor linkage (Figure 7) it provides within the greater landscape. A 32m buffer zone was placed on the wetlands.

The wetland verification study that was undertaken by Ixaphozi Enviro Services (Appendix 6) established that the wetland delineation studies done by SEF and ImperataConsulting on the greater Huddle site are accepted as accurate and that the proposed development does not encroach into the wetland and buffer of the greater site (apart from a small portion). The wetland has a low Present Ecological Status (PES) and Ecological Importance and sensitivity (EIS) rating and the proposed Huddle Township Development should have little impact on the system if due diligence is paid during the different stages of development and operation. Mitigation measures should focus on stormwater control, preventing water pollution, erosion and sedimentation.

The wetland ecologists established that the development area does not encroach on the wetland area except for a small area (1 109m²in extent) in the 32m buffer zone that is earmarked for "soft" development (landscaping and gardens). Therefore, this specialist considers the significance of this specific impact of encroachment into the buffer zone to be negligible.

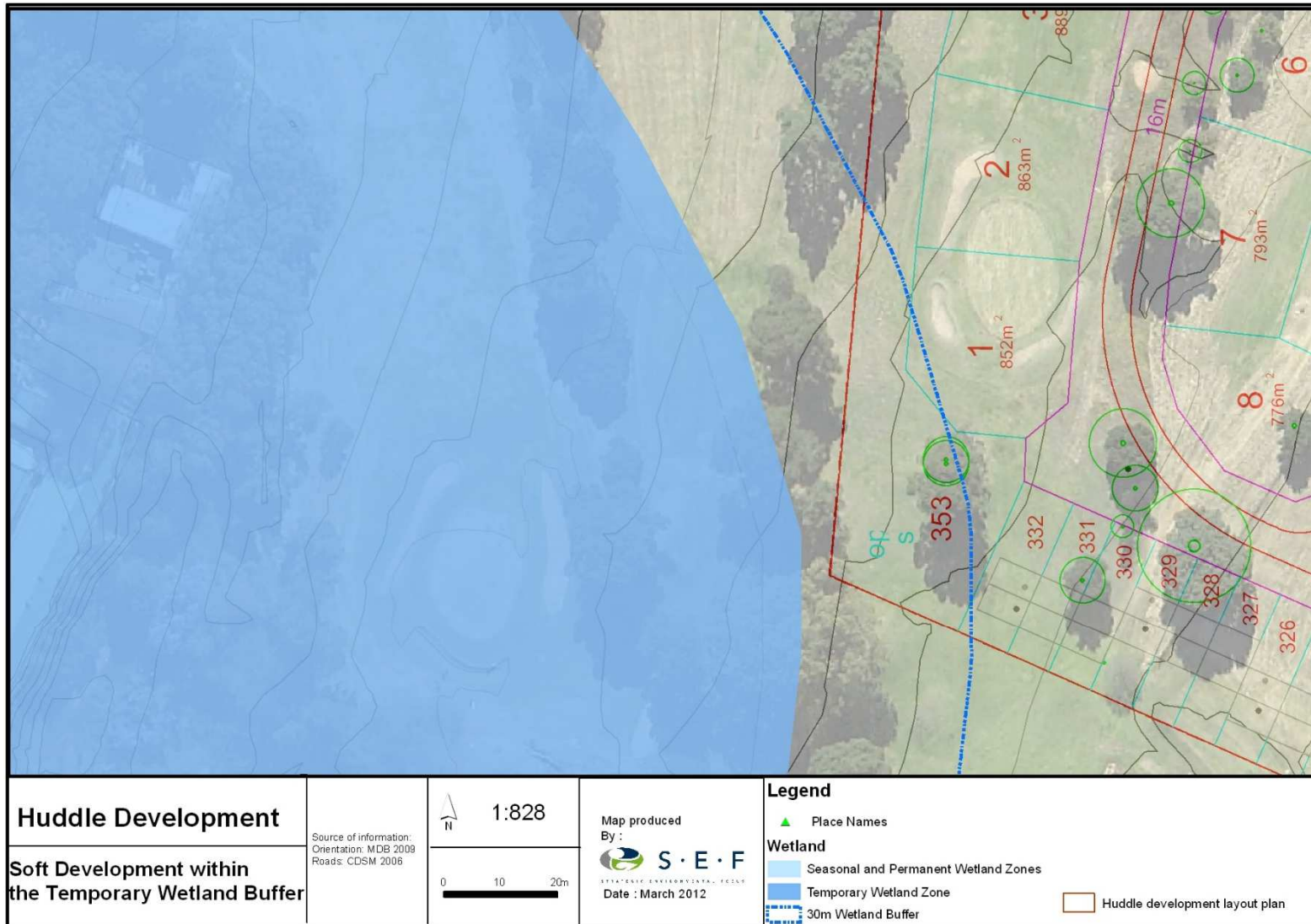


Figure 6: South Western corner of the proposed Huddle Township Development within the 30m buffer of the Temporary Wetland Zone

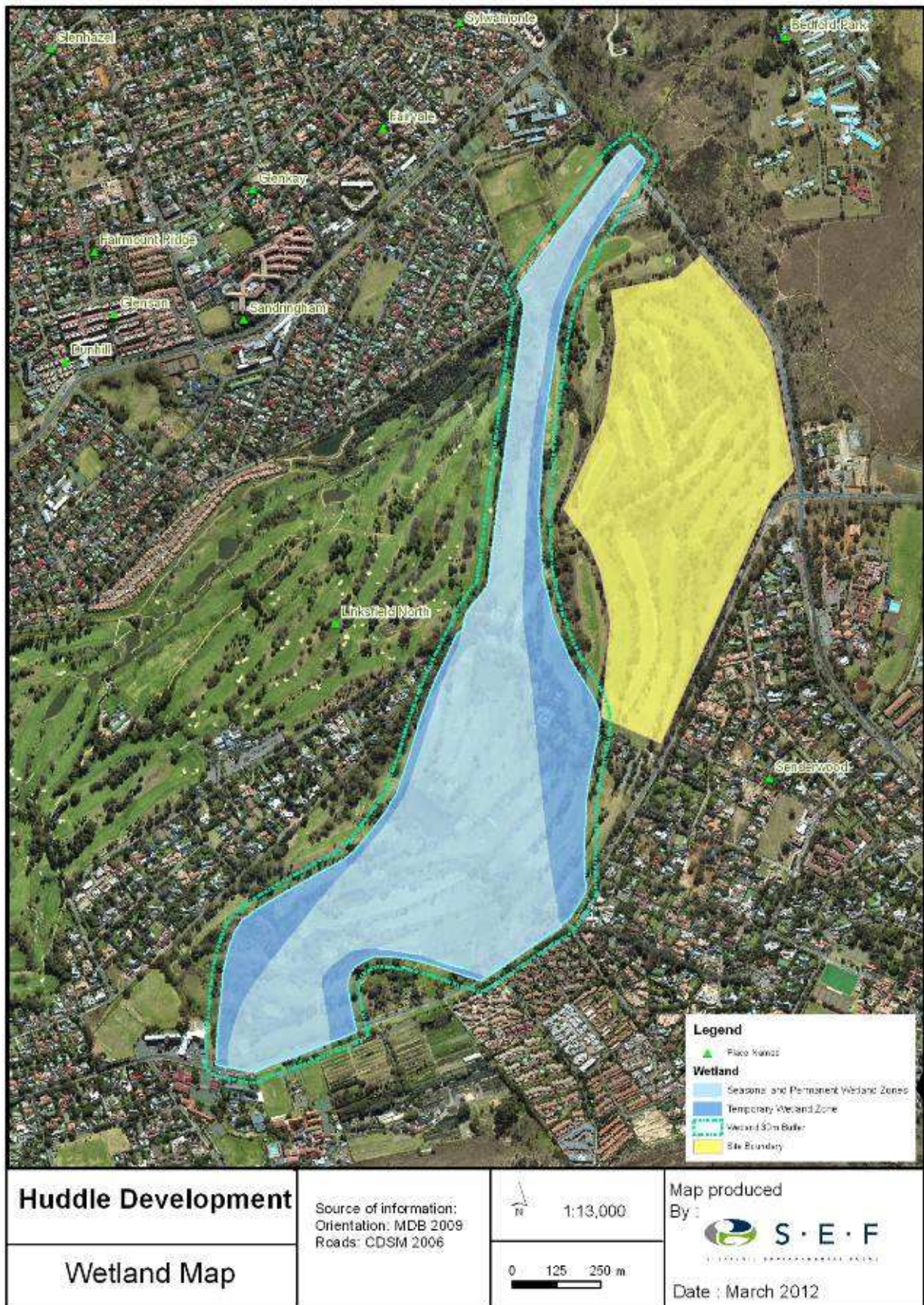


Figure 7:Wetlands within the greater Huddle Park area

B-1.6 Flora and Fauna

It is important to note that the site on which the proposed township is to be established was previously a golf course, and as such, is greatly transformed and dominated by exotic species. An Ecological Assessment was conducted for the greater area (Huddle Park Golf Course) during May 2005 (Appendix 6) with an Ecological (floral and faunal) Verification Assessment conducted in November 2012.

The ecologists established that the study area is situated within the Egoli Granite Grassland vegetation type, which is classified as an Endangered Ecosystem. However, the site was found to be mostly transformed since it is located on an old gold course and species diversity was generally rather low. A large number of *Hypoxis hemerocallidea* (African Potato -nationally classified as “Declining” on GDARD’s Orange List - Figure 8) was recorded throughout the northern section of the site with numbers at each locality ranging from 1 to 70 individuals. According to GDARD (2012), the entire area which is occupied by populations of Red List and Orange List species must be mapped and buffered by 200m in urban areas. However, since the area is largely transformed, the specialist recommended that a permit be obtained from GDARD to relocate the plants to a suitable, grassland area in the near vicinity.

According to the Gauteng Conservation Plan (C-Plan), there are no sensitive areas within the proposed development site, although an Ecological Support Areas is located on the north eastern boundary of the site on the opposite side of Club Street (Figure 10).

No areas of high ecological sensitivity were found on the site. The majority of the study area was classified as medium-low sensitivity (Figure 10) as the entire site was found to be degraded and all natural habitats altered. Areas of low ecological sensitivity included roads, building rubble dumping sites and old fairways.



Figure 8: African Potato (*Hypoxishemerocallidea*) found on the proposed development site



Figure 9: Ecological Sensitivity Map for the proposed Huddle Development site

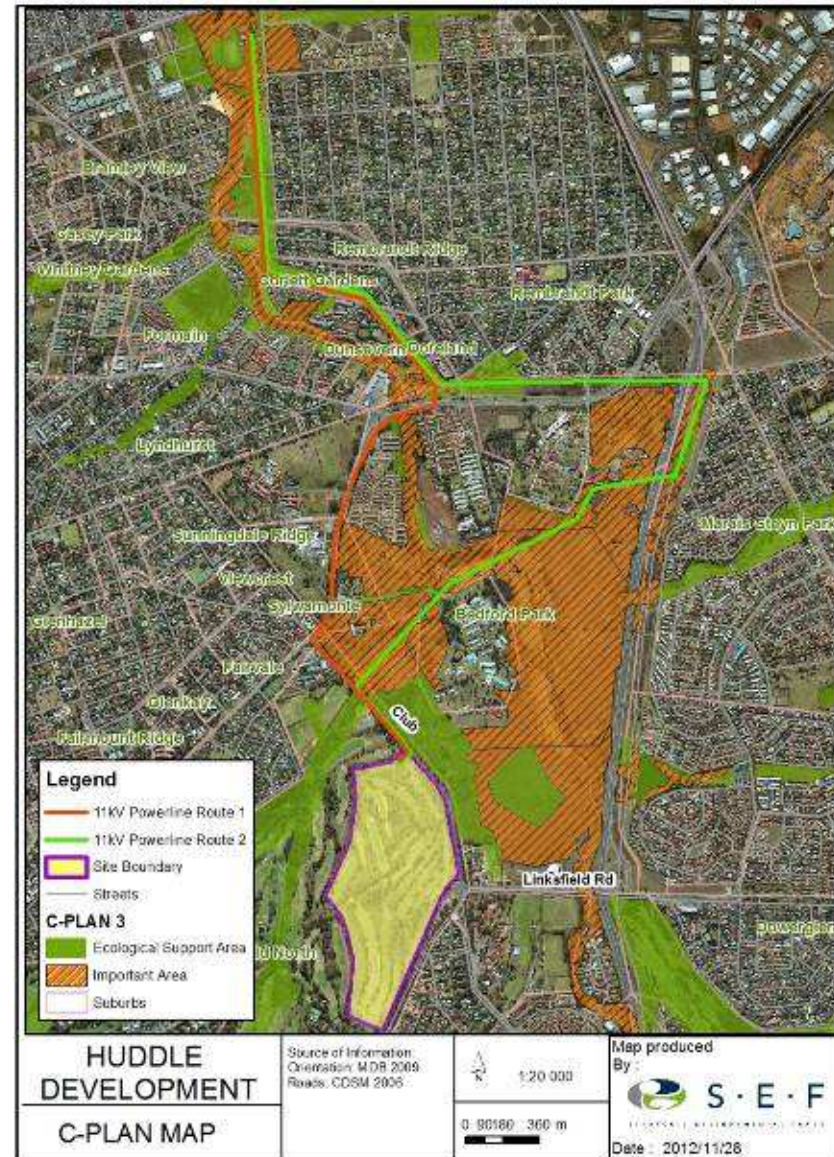


Figure 10: C-Plan Map for the greater area

B-2 SOCIAL ENVIRONMENT

B-2.1 Visual

Huddle Park is one of the largest remaining open spaces in the urban area of the CoJMM, with an extent of approximately 183ha of green open space. The well-established tree population provide the study area with a park-like open space feel with rows of trees aligning the grassed fairways. It is important to mention, however, that vegetation in Huddle Park is dominated by exotic species, such as *Acacia dealbata* (Silver Wattle), *Pinus patula* (Patula Pine) *Eucalyptus* (Blue Gum) and *Quercus* (Oak) species (Visual Impact Assessment (VIA), Appendix 6).

There are no existing structures present on the proposed Huddle Township Development site.

The dense vegetation cover restricts one's view to open corridors along the fairways or roads and completely dominates the Huddle Open Space System. An intimate and strong sense of enclosure prevails as one travels through this landscape as vegetation provides an enveloping canopy of branches and leaves.

The VIA specialist defines the existing landscape character as follows:

- Site is moderately sloped in a north-westerly direction;
- The development site (save a small 1 109m² portion that encroaches into the wetland buffer in the south western corner) is located outside of the 32m wetland buffer of identified wetlands associated with the tributary of the Jukskei River located within the Huddle Park Golf Course to the west of the proposed development site;
- Urban-woodland recognised for the dense tree canopy and lush green appearance, although dominated by exotic plant species; and
- Largely within a greater residential context.

The VIA specialist also defines the existing visual character of the development site and surrounds, as follows:

- Visual character relates to human perception and includes concepts such as aesthetic value;
- An intimate and strong sense of enclosure prevails due to the dense tree cover and enveloping canopy of branches and leaves;
- Area is surrounded by low density residential neighbourhoods with mature gardens, many of which are enclosed with high security walls; and
- Many streets are lined with mature trees where the road user will experience a green corridor feeling.

The visual quality of the regional landscape is considered to be moderately high. The Visual Absorption Capacity (VAC) of the landscape is considered to be moderate.

In order to assess the extent of visual exposure in the area, a viewshed analysis was created using a Digital Elevation Model (DEM) with 20m contour intervals and a maximum height of three (3) storeys. The receptors that will experience views of the development site include the following:

- **Residents:** Residential receptors within a 2km range will have limited visibility of the site mainly due to the mature trees in the area and on the site as well as the topography, existing dense vegetation and most residences along Club Street face away from the development site behind high security walls;
- **Recreational users:** Visitors and users of the Huddle Park Golf Course may have direct views of the proposed development, however a landscaped berm is proposed along the western boundary to limit views of the proposed development. Visitors to the Harvey Municipal Nature

Reserve will experience elevated views of the proposed development. Runners and walkers along Club Street will have views of the proposed development, while those on Edward Avenue and Margret Rose Street will have partially screened views; and

- **Motorists:** specifically those travelling along Club Street.

B-2.2 Heritage

As per the National Heritage Resources Act, 1999 (Act No. 25 of 1999), due to the size of the development exceeding 0.5ha, a Phase 1: Heritage Impact Assessment was conducted for the greater area (Huddle Park Golf Course) during September 2006 by an independent specialist, Cultmatrix cc (Appendix 6).

All the heritage features identified in the greater area are located outside of the proposed development footprint and as such are not affected by the proposed development.

B-2.3 Noise

The Noise Impact Assessment (NIA) was undertaken by an independent specialist, JH Consulting, in December 2012. The findings of this NIA were compared to findings of a previous study undertaken in October 2005 (Appendix 6).

All measurements taken during the assessments were typical of the area in which the measurements were taken, with occasional intrusive noise stemming predominantly from road traffic.

The impact of noise on the site is almost entirely from the traffic on Club Street, which dominates the noise climate of the area. No other significant noise sources were identified. A comparison of the two studies revealed that there has been little change in the noise climate in the intervening seven years.

Noise levels along Club Street are greater than the suggested daytime SANS 1013:2008 level of 50dB(A).

B-2.4 Air Quality

Dust generated off the earth's surface is generally regarded as a nuisance rather than a health or environmental hazard. On a large scale, dust will impair atmospheric visibility, however, in the context of the proposed activity, the impact of dust production on air quality should be minimal (during the construction phase) taking into account that effective dust suppression techniques are available and have been recommended in this EIR and included within the EMP.

B-2.5 Social

A qualitative Social Impact Assessment (SIA) was conducted by SEF and peer reviewed by Jessica de Beer to ensure objectivity and independence in terms of reporting on findings and recommendations provided. The full SIA Report is including in Appendix 6.

The Huddle Park area lies within and on the boundary of the CoJMM, specifically within Ward 72. The adjacent area falls within the Ekurhuleni Municipality (EM), Ward 19. The largest population groups within these Wards are White People followed by Black African People (SIA, Appendix 6). The majority of earning residents fall within the income earning brackets of R 19 601-R 38 200 and R 307 601-R 614 400, annually.

According to the statistics provided by three local police stations, namely the Norwood, Bedfordview and Edenvale police stations, crime within the associated local communities has decreased, on average by 64% between the period 2004 to 2012. The reason for the significant decrease in criminal activity

could be attributed to the increase in private security firms in operation, the increase in security camera installations and the continual presence of security guards (SIA, Appendix 6).

Traffic in the area is also largely congested during morning and afternoon peak times, refer to section B-2.6 below for more details on the existing/ current traffic patterns.

B-2.6 Traffic

A TIA has been conducted (Appendix 6) by an independent specialist, namely GOBA Consulting Engineers and Project Managers. Subsequent to this, an addendum to the TIA has been compiled by MPA Consulting Engineers in August 2014.

The proposed Huddle Township Development is located within the vicinity of the following roads:

- **N3 Eastern Bypass Freeway:** This is a fully developed Class 1 Freeway with four lanes to each direction traversing north south. It carries high volumes of traffic during the morning and afternoon peak hours;
- **N12 Eastern Bypass Freeway:** This is a fully developed Class 1 Freeway with four lanes to each direction traversing east west. It carries high volumes of traffic during the morning and afternoon peak hours;
- **Club Street (South of the proposed development):** This road performs the function of an arterial although it is a Class 3 Urban Collector with one lane in each direction and forms a continuation of Linksfeld Road to the west. It carries high volumes of traffic during both the morning and afternoon peaks;
- **Club Street (North of the proposed development):** This road performs the function of an arterial although it is a Class 3 Urban Collector with two lanes in each direction and intersects with George Avenue (Modderfontein Road). It carries high volumes of traffic during both the morning and afternoon peaks;
- **Linksfeld Road:** This is A Class 2 Road Arterial with two lanes in each direction and turning lanes at major intersections. It carries high volumes of traffic during peak hours and is directly linked to the N3 Eastern Bypass Freeway; and
- **Civin Drive:** This Class 3 Urban Collector road with one lane in each direction traverses north south and is located east of the development. It carries average to high volumes of traffic during both the morning and afternoon peaks.

Seven key intersections surrounding the proposed development were identified, described and assessed in terms of current Levels of Service (LOS)/ performance. The following provides a summary:

- **Intersection 1: Club Street and George Avenue**
 - The intersection is currently operating at acceptable LOS C during the AM; PM and Saturday peak hours. The highest volume was recorded on the south approach and the approach is shown to be operating at LOS B with a 68% saturation level.
- **Intersection 2: Club Street; Civin Drive and Linksfeld Road**
 - North approach: 100 m exclusive right turn lane, 2 through lanes and the existing left turn slip lane, 100 short exit lane;
 - South approach: 3 through lanes, 2 exclusive right turn lanes (60m) and an exclusive left turn slip lane;
 - East approach: 2 through lanes, 2 exclusive right turn lanes and 1 left turn lane; and
 - Revised signal phasing.
- **Intersection 3: Civin Drive, Chaucer Avenue and St Christopher Road**
 - Long queues were observed during the site visit and that can be attributed to the insufficient green time in the current signal plan. The south approach is currently operating at LOS F. The queues and delays will be reduced once the signal plan is changed giving more green time to the main road (Civin Drive).

- **Intersection 4: Club Street and Donné Avenue**
 - The east approach is currently experiencing high delays (LOS F) due to high volumes on the main road resulting in lack of gaps and long delays.
 - The solution to this would be to convert the stop controlled intersection to a signalised intersection; however, the traffic from Donné Avenue is low and does not warrant a traffic signal at present.
- **Intersection 5: Club Street and Shelley Avenue**
 - The intersection is operating at LOS F due to long delays experienced by the traffic attempting to join Club Street from Shelley Avenue. Once again the solution to this would be to convert the stop controlled intersection to a signalised intersection; however, the traffic from the minor road is low and does not warrant a traffic signal at present.
- **Intersection 6: Club Street and St Andrews Avenue**
 - The intersection is operating at LOS F due to long delays experienced by the traffic attempting to join Club Street from the minor road. Once again the solution to this would be to convert the stop controlled intersection to a signalised intersection; however, the traffic from the minor road is low and does not warrant a traffic signal at present.
- **Intersection 7: Club Street and Byron Avenue;**
 - The intersection is operating at LOS F due to long delays experienced by the traffic attempting to join Club Street from the minor road. Once again the solution to this would be to convert the stop controlled intersection to a signalised intersection; however, the traffic from the minor road is low and does not warrant a traffic signal at present.
- **Club Street extending to Bedford Street**
 - The traffic count conducted in 2014 indicates that there is about 950 vehicles per hour (vph) per direction on Club Street in both the AM and PM peak hours, therefore the current saturation of Club Street is 63% of the 1 500 passenger car unit (pcu) per hour per lane. This means that the current lanes on Club Street are sufficient to cater for the existing traffic demand;
 - The minor roads along Club Street south of the proposed development are all currently experiencing long delays due to lack of gaps and should be upgraded to signalised intersections; however, the traffic magnitude at these junctions is minimal and unfortunately do not warrant traffic signals according to the South African Road Traffic Signs Manual criteria of queue length; and
 - Major congestion was observed in the westbound direction at the King David's School entrance during the AM peak period. Parents are parking on the verge, getting out of the car, and accompanying their children to the school gate. In so doing they are completely blocking the westbound lane of Club Street. This existing situation is unsafe and highly problematic.

Based on comments made by I&APs during the previous phases of the environmental process and specifically in response to comments made during the public meeting held in February 2014, the addendum to the TIA (undertaken by MPA Consulting Engineers in August 2014) shows the comparison of traffic volumes in 2012 and 2014. The traffic count comparisons found a decrease in selected traffic volumes such as the Linksfeld-Club Street corridor. The only significant conclusion drawn from the comparison showed that the traffic along the Civin Drive-Club Street north south corridor was higher in 2014 than in 2012 by 16% to 50% during peak times. Although this conclusion was reached, the Civin Drive-Club Street -Linksfeld Road Intersection is earmarked for upgrading (as detailed in B below), and this upgrade will accommodate the effect of the traffic increase. This proposed intersection, in addition, is expected to operate satisfactorily under the 2019 full development conditions, based on the generated development scenario of 2.5% growth per annum. All upgrades to the road network that have been

proposed are anticipated to sufficiently cater for the Huddle Park Development in five years taking into account the expected growth rate.

As part of the proposed development, various road network upgrades are proposed. These are further discussed in section A-1.2.1 above and in the impact assessment section below, see sections F-4.2.4 and F-5.1.3.

SECTION C: ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

C-1 APPROACH TO THE EIA

An Environmental Impact Assessment (EIA) is an effective environmental planning tool. It identifies the environmental impacts of a proposed project and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The EIA for this project complies with the requirements of the National Environmental Management Act, 1998 (Act 107 of 1998) [NEMA] and the NEMA EIA Regulations, 2010 of the DEA. The guiding principles of an EIA are listed below.

Definition of the term “environment”

The term “environment” is used in the broadest sense in an environmental impact assessment. It covers the physical, biological, social, economic, cultural, historical, institutional and political environments.

C-2 GUIDING PRINCIPLES FOR AN EIA

The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.

There should be on-going consultation with Interested and Affected Parties (I&APs) representing all walks of life. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should finally be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

The eight guiding principles that govern the entire process of EIA are as follows (Figure 12):

- **Participation:** An appropriate and timely access to the process for all interested parties.
- **Transparency:** All assessment decisions and their basis should be open and accessible.
- **Certainty:** The process and timing of the assessment should be agreed in advanced and followed by all participants.
- **Accountability:** The decision-makers are responsible to all parties for their action and decisions under the assessment process.
- **Credibility:** Assessment is undertaken with professionalism and objectivity.
- **Cost-effectiveness:** The assessment process and its outcomes will ensure environmental protection at the least cost to the society.
- **Flexibility:** The assessment process should be able to adapt to deal efficiently with any proposal and decision making situation.
- **Practicality:** The information and outputs provided by the assessment process are readily usable in decision making and planning.

An S&EIR process is considered as a project management tool for collecting and analysing information on the environmental effects of a project. As such, it is used to:

- Identify potential environmental impacts;
- Examine the significance of environmental implications;
- Assess whether impacts can be mitigated;

- Recommend preventive and corrective mitigating measures;
- Inform decision makers and concerned parties about the environmental implications; and
- Advise whether development should go ahead.



Figure 11: The eight guiding principles for the EIA process

An S&EIR process typically has four phases, as illustrated in the Figure below. The Public Participation Process forms an integral part of all four phases and is discussed in greater detail in Section C – 4 of this final EIR.

C-3 S&EIR TECHNICAL PROCESS

This section provides a summary of the technical process to be followed for this S&EIR process.



Figure 12: Flow diagram of the Scoping and EIR process

C-3.1 Pre-application Consultation with the GDARD

No pre-consultation meeting was held between SEF and GDARD. The EAP conducting the S&EIR process for the applicant, in support of their application for an environmental authorisation, is deemed to have a good understanding of the information requirements of the Department for the proposed development, such that the Department's specific information requirements are deemed to have been met for the scoping phase of this project.

C-3.2 Application for Authorization

The application form informing the Department of intent to obtain an environmental authorisation was submitted to the GDARD on 20 April 2012, with amendments submitted on 04 May 2012. The project was subsequently registered and assigned the reference number **Gaut: 002/12-13/E0032**.

C-3.3 Information Gathering

Early in the EIA process, the technical specialists identified the information that would be required for the impact assessment and the relevant data was obtained. In addition, the specialists sourced available information about the receiving environment from reliable sources, I&APs, previous documented studies in the area and previous EIA Reports.

C-3.4 Specialist Studies

The following specialist studies have been undertaken to provide information for the S&EIR process:

- Ecological Verification Assessment;
- Visual Impact Assessment;
- Noise Impact Assessment;
- Social Impact Assessment;
- Traffic Impact Assessment and the additional addendum;
- Civil Engineering Services Report;
- Electrical Engineering Report; and
- Wetland Delineation and Functional Verification Assessment.

C-4 PUBLIC PARTICIPATION PROCESS

The principles of NEMA govern many aspects of the S&EIR process, including consultation with I&APs. These principles include the provision of sufficient and transparent information to I&APs on an on-going basis, to allow them to comment; and ensuring the participation of historically disadvantaged individuals, including women, the disabled and the youth.

The principal objective of public participation is thus to inform and enrich decision-making.

C-4.1 Identification of Interested and Affected Parties

I&APs representing the following sectors of society have been identified in terms of Regulation 55 of the EIA Regulations R543 of 2010 (see Appendix 5 for a complete preliminary I&AP distribution list):

- Provincial Authorities;
- Local Authorities;
- Ward Councillors;
- Parastatal/ Service Providers;
- Non-governmental Organisations;
- Local forums/ unions; and
- Adjacent Landowners.

C-4.2 Public Announcement of the Project

The project was announced on 04 September 2012 by way of the following (see Appendix 5 for public announcement documentation):

- Publication of media advertisements in two local newspapers (North Eastern Tribune and the Bedford & Edenvale News);
- Nineteen (19) on-site notices advertising the S&EIR process were placed at and around the site; and
- Distribution of notification letters by fax/ hand/ post/ email to I&APs including Registration and Comment Sheets.

C-4.3 Draft Scoping Report

Interested and Affected Parties had an opportunity to comment, either in writing, by telephone or email, on the Draft Scoping Report for a period of 30 days (excluding Jewish school holidays) from **Tuesday, 04 September 2012 to Monday, 29 October 2012**. Relevant State Departments had an opportunity to comment for a period of 40 days (excluding public holidays) from **Tuesday, 04 September 2012 until Monday, 15 October 2012**.

The availability of the Draft Scoping Report was announced within the project announcement documentation highlighted in section C-4.2 above.

In addition, the Draft Scoping Report was distributed, for comment, as follows:

- Available in a public venue (Sandringham Public Library);
- Hand-delivered/ couriered to the relevant commenting authorities; and
- Posted on SEF's website at <http://www.sefsa.co.za>.

All the comments and concerns raised by I&APs during the S&EIR process were captured in a Comment and Response Report (CRR). I&APs received letters acknowledging their contributions.

C-4.4 Final Scoping Report

This Final Scoping Report was updated with comments and/or concerns raised by I&APs. The Comments and Response Report (CRR) is attached to this Report (Appendix 5). The Final Scoping Report was submitted to the GDARD and registered I&APs on **21 January 2013**, simultaneously for review and comment for a period of 30 calendar days. Registered I&APs were advised to submit additional comments on the Final Scoping Report directly to GDARD, copied to SEF, prior to the lapsing of the 30 day review period (i.e. on or before 20 February 2013). Additional comments received by SEF were incorporated into the CRR for inclusion and discussion in this EIR.

In a letter dated 08 May 2013, the DEA approved the Final Scoping Report and gave the authority to proceed with the EIR phase (refer to Appendix 5).

C-4.5 Draft Environmental Impact Report

A period of **30 calendar days (28 January - 28 March 2014), excluding public holidays and Jewish School Holidays** was provided to the **registered I&APs** and the **general public** for the review and commenting phase of the Draft EIR. The exclusion of the Jewish School Holidays from the review and commenting period was at the request of community members. **State Departments** have been provided with the same review and commenting period (i.e. **28 January - 28 March 2014**), as their legislated **40 calendar day** period does not require the exclusion of school holidays). *Thus, a total of*

60 calendar days (excluding public holidays) was provided when applying the legal requirements of the NEMA 2010 EIA Regulations.

In addition, the Draft EIR was distributed for comment as follows:

- Available in a public venue (Sandringham Public Library);
- Hand-delivered/ couriered to the relevant commenting authorities; and
- Posted on SEF's website at <http://www.sefsa.co.za>.

All comments and concerns raised by stakeholders and I&APs upon reviewing this report is captured in the CRR. I&APs were sent letters acknowledging their contributions.

C-4.5.1 Public Meeting – Presentation of the Draft EIR

All registered I&APs and State Departments have been notified of a public meeting to be held at Huddle Golf Club on 26 February 2014 from 18:30 to 20:00.

The purpose of the public meeting was to present the Draft EIR to interested parties; the presentation included the following information:

- S&EIR process to-date, including details of the public participation process;
- Findings of the specialist studies;
- Overall assessment of identified impacts; and
- EAPs opinion and recommendations.

All persons attending the public meeting were requested to sign an attendance register. The CRR detailing comments and responses raised and discussed at the meeting were circulated to all of those who attended for review and comment to ensure all comments and responses were captured correctly (as stated during the meeting). The Meeting's CRR as well as a copy of the Power Point Presentation is included within the Final EIR together with the updated CRR which includes all other comments received on the Draft EIR during the review period.

C-4.5.2 Follow-up Clarification Meeting

All registered I&APs and State Departments have been notified of a follow-up clarification meeting to be held at Huddle Golf Club on 13 November 2014 from 18:30 to 20:00.

The purpose of the meeting was to:

- Provide I&APs with an opportunity to raise their queries directly with the appointed Traffic and Wetland specialists and to obtain clarification on the Traffic Impact Assessment (TIA) and Wetland Impact Assessment (WIA) findings;
- Keep I&APs updated about the environmental process; and
- Give I&APs an opportunity to interact directly with the project team

All persons attending the meeting were requested to sign an attendance register. The Meeting's CRR as well as a copy of the Power Point Presentation is included within the Final EIR together with the updated CRR which includes all other comments received on the Draft EIR during the review period.

C-4.6 Final Environmental Impact Report

The EIR has been updated or amended, where appropriate, with comments and/or concerns raised by I&APs. In addition, an addendum to the TIA was created and is summarised in the relevant section of this report (Section B-2.6). The CRR is attached to the Final EIR. The Final EIR will be submitted to the GDARD and registered I&APs simultaneously for review from **21 November – 12 December 2014**.

Registered I&APs have been advised to submit any additional comments on the Final EIR directly to the GDARD for consideration towards an Environmental Authorisation.

In addition, the Final EIR will be distributed for comment as follows:

- Available in a public venue (Sandringham Public Library);
- Hand-delivered/ couriered to the relevant commenting authorities; and
- Posted on SEF's website at <http://www.sefsa.co.za>.

C-4.7 Summary of the Comment and Response Report

The table below provides a summary of the main comments raised by I&APs during the S&EIR process. Comments included within the CRR are those received on the Draft and Final Scoping Report and those received on the Draft EIR (i.e. including those comments submitted directly to GDARD in which SEF was copied).

The detailed CRR and copies of the actual comment received (email, letter or fax) are included in Appendix 5.

Table 5: Summary of the Comment and Response Report for the proposed Huddle Township Development S&EIR process

SUMMARY OF COMMENTS RAISED	SUMMARY OF RESPONSES PROVIDED	RELEVANT SECTION OF THE FINAL EIR
NATURAL ENVIRONMENT		
Wetland		
<ul style="list-style-type: none"> • Disturbance of the feeder area to the wetland. • Negative influence of township development on the wetland. • Additional service infrastructure will negatively influence the wetland. • Flooding of developed areas due to a loss of drainage capacity. • The proposed development will contribute to the negative impacts caused by the existing developments on the wetland. • Biodiversity will be lost due to degradation of the wetland. 	<ul style="list-style-type: none"> • The impacts associated with the proposed development on the adjacent wetland system will be assessed within the EIR phase of the application and detailed within the Draft EIR. • The wetland areas do not extend into the development footprint area. • Stormwater generated by the proposed development will be attenuated on site, within the open space areas within the proposed development. • There will be no encroachment on the wetland. A 32m buffer zone was established and a small portion of the development will take place within the buffer zone. • This assessment has considered the cumulative impacts of the proposed development. 	<ul style="list-style-type: none"> • F-3.1.1 • F-3.1.2 • F-3.1.3
Pollution		
<ul style="list-style-type: none"> • Interested and Affected Parties (I&APs) are mainly concerned with anthrax buried on site as well as additional air pollution as a result of increased traffic volumes as a direct result from the proposed development. • Visual and physical pollution due to the development is also a pending concern. • There was no air quality study. Therefore, EIA did not look at the pollution issue in detail. 	<ul style="list-style-type: none"> • A study concluded in 2006 found that no anthrax occurs on site. • It is unlikely that the additional traffic will contribute significantly to air pollution; however this will be discussed in more detail in the Draft EIR. • A Visual Impact Assessment will be conducted during the EIR phase to assess visual impacts and recommend mitigation measures to reduce 	<ul style="list-style-type: none"> • F-3.1.2 • F-3.1.3

SUMMARY OF COMMENTS RAISED	SUMMARY OF RESPONSES PROVIDED	RELEVANT SECTION OF THE FINAL EIR
	negative impacts and enhance positive impacts. <ul style="list-style-type: none"> Due to the nature of the proposed development, the activities will not result in significant pollution. Hence undertaking the Air Quality Study was unnecessary. 	
Fauna		
<ul style="list-style-type: none"> I&APs are concerned that wildlife as well as birdlife will be negatively affected due to the proposed development. Destruction of the wetland will have a negative effect on fauna in the area. 	<ul style="list-style-type: none"> An Ecological Verification Assessment will be conducted during the EIR phase of the project and findings shall be incorporated in the Draft EIR. The development will not occur in the wetland or buffer areas which are preferred faunal habitats. 	<ul style="list-style-type: none"> F-3.1.5
Flora		
<ul style="list-style-type: none"> I&APs are concerned that trees will be lost or damaged due to the development and widening of the road. 	<ul style="list-style-type: none"> The 2005 Ecological Assessment found that the majority of trees are exotic. It will therefore be better to replace trees felled with indigenous species that will add to the biodiversity value of the greater area. The proposed development will retain as many trees as is practically possible. 	<ul style="list-style-type: none"> F-3.1.4
Loss of Open Space		
<ul style="list-style-type: none"> I&APs commented that the development will result in the loss of the wetland and important open space area's functioning as 'green lungs' within the urban edge. CoJ commented that the development plan be in line with the CoJ Open Space Framework. There will be loss of open space "green fields" which is a scarce resource in the CoJ. 	<ul style="list-style-type: none"> The wetland area (including associated vegetation) that performs the "green lung" function does not fall within the proposed development footprint. The proposed development will reduce the existing open space area of the total "Huddle Site" by approximately 28.8%. The Draft EIR will address the CoJ's Open Space Framework 	<ul style="list-style-type: none"> F-5.1.1
BUILT ENVIRONMENT		
Pressure on Service Infrastructure		
<ul style="list-style-type: none"> The main concern with regard to service infrastructure is that these services are already under pressure, and that the township development will require additional capacity which will not be feasible. Service infrastructure listed include: water, sewage, electricity, stormwater and roads. 	<ul style="list-style-type: none"> Details pertaining to bulk services will be provided within the Draft EIR. Proof of capacity to accommodate the proposed development must also be included within the Draft EIR. A detailed stormwater management plan will also be provided in the Draft EIR. 	<ul style="list-style-type: none"> A-1.3.2
Site Access, Parking & Traffic Congestion		
<ul style="list-style-type: none"> The safety of parents dropping kids off at school on Club Street is a concern. Access to the proposed township development is of concern as more vehicles will use the existing road network which is already congested. Comments regarding the upgrading of the immediate road network were also raised. 	<ul style="list-style-type: none"> A detailed Traffic Impact Assessment (TIA) has been completed, which will be made available for review and consideration with the Draft EIR. The TIA will assess all impacts relating to traffic volumes, access and parking. 	<ul style="list-style-type: none"> F-3.2.5 F-5.1.3
Commercial Activities		

SUMMARY OF COMMENTS RAISED	SUMMARY OF RESPONSES PROVIDED	RELEVANT SECTION OF THE FINAL EIR
<ul style="list-style-type: none"> The main concern raised by I&APs is the actual need for another commercial development within the area as there are already abundant shopping complexes serving the local community. There is no need for a shopping centre in the area. The existing ones are more than enough as the residents are already overtraded. 	<ul style="list-style-type: none"> The township developer is applying for approximately 10,000 sqm of gross lettable area for a local community orientated retail component. The Draft EIR will provide more information on the proposed layout. A market research indicated that there is a need for the nature of commercial activities brought by the development. 	<ul style="list-style-type: none"> A-4
SOCIAL ENVIRONMENT & GENERAL CONCERNS		
Crime		
<ul style="list-style-type: none"> There will be an increase in crime over the 5 year construction period of the township due to an influx of people/workers in the area. 	<ul style="list-style-type: none"> A successful, high quality township development will increase security in the area and tight control will be exercised during the construction phase. The Environmental Management Programme (EMP), a component of the Draft EIR, will provide mitigation measures to address all impacts. 	<ul style="list-style-type: none"> F-3.2.7
Environmental Application Process		
<ul style="list-style-type: none"> The original purchase of the land for the proposed township development did not include any public consultation. The Public Participation Process is not transparent and should allow the public to be more involved. The EIR did not present the no-go alternative and the legal requirements were not stated in the report. 	<ul style="list-style-type: none"> The land was purchased in response to a public tender announced by the City of Johannesburg during 2011. SEF will facilitate a transparent and consultative public participation process throughout the S&EIR process. SEF and the Applicant have adhered to and exceeded the minimum requirements, set out by legislation, in order to ensure that as many people as possible have the opportunity to participate. The report contains all the information as required by the relevant legislation, including the no-go alternative and the legal requirements. 	<ul style="list-style-type: none"> C-1 C-2 C-3 C-4
Investment Opportunity		
<ul style="list-style-type: none"> I&APs enquired about possible investment opportunities. 	<ul style="list-style-type: none"> These enquiries were noted. 	<ul style="list-style-type: none"> A-4
Administrative Requests		
<ul style="list-style-type: none"> A number of requests for information were received. 	<ul style="list-style-type: none"> These requests were all addressed and the information was sent to the relevant parties. 	<ul style="list-style-type: none">

SECTION D: ASSESSMENT CRITERIA

D-1 IMPACT IDENTIFICATION AND ASSESSMENT

The assessment criteria must clearly identify the environmental impacts of the proposed development. The environmental impacts identified will be quantified and the significance of the impacts assessed according to the criteria set out below. The EAP must make a clear statement, identifying the environmental impacts of the construction, operation and management of the proposed development. As far as possible, the EAP must quantify the suite of potential environmental impacts identified in the study and assess the significance of the impacts according to the criteria set out below. Each impact will be assessed and rated. The assessment of the data must, where possible, be based on accepted scientific techniques, failing which the specialist is to make judgements based on his/ her professional expertise and experience.

D-1.1.1 *Assessment Procedure: Proposed Impact Assessment Methodology*

For the purpose of assessing impacts of the proposed development, during the EIR phase, the project was divided into two phases from which impacting activities can be identified, namely:

Construction Phase:	All the construction related activities on site, until the contractor leaves the site.
Operational Phase:	All activities, including the operation and maintenance of the proposed development.

The activities arising from each of these phases will be included in the impact assessment tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure.

Extent The physical and spatial scale of the impact.	Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
	Site	The impact could affect the whole, or a significant portion of the site.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
	National	The impact could have an effect that expands throughout the country (South Africa).
	International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.

<p style="text-align: center;">Duration</p> <p style="text-align: center;">The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.</p>	Short Term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
	Short-Medium Term	The impact will be relevant through to the end of a construction phase.
	Medium Term	The impact will last up to the end of the development phases, where after it will be entirely negated.
	Long Term	The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.
	Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
<p style="text-align: center;">Intensity</p> <p style="text-align: center;">Is the impact destructive or benign, does it destroy the impacted environment, alters its functioning, or slightly alter the environment itself?</p>	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
<p style="text-align: center;">Probability</p> <p style="text-align: center;">The likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.</p>	Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).
	Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.
	Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.
	Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.
	Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

Mitigation– The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. These measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

Determination of Significance (Without Mitigation) – Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance will be rated on the following scale:

- No significance: The impact is not substantial and does not require any mitigation action;
- Low: The impact is of little importance, but may require limited mitigation;
- Medium: The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels; and

- High: The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

Determination of Significance (With Mitigation) –Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation will be rated on the following scale:

- No significance: The impact will be mitigated to the point where it is regarded as insubstantial;
- Low: The impact will be mitigated to the point where it is of limited importance;
- Low to medium: The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels;
- Medium: Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw;
- Medium to high: The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels; and
- High: The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

Assessment Weighting– Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project’s life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it will be necessary to weigh and rank all the identified criteria.

Ranking, Weighting and Scaling– For each impact under scrutiny, a scaled weighting factor will be attached to each respective impact. The purposes of assigning such weightings serve to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist’s element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance (Figure below: Weighting description).

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2	Low to medium 2	Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4	High 4	Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Figure 13: Description of bio-physical assessment parameters with its respective weighting

Identifying the Potential Impacts Without Mitigation Measures (WOM) – Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1: Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

Identifying the Potential Impacts with Mitigation Measures (WM) – In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact.

Mitigation Efficiency (ME) – The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2: Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency (ME)

or

$$WM = WOM \times ME$$

Significance Following Mitigation (SFM) – The significance of the impact after the mitigation measures is taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact will, therefore, be seen in its entirety with all considerations taken into account.

D-1.1.2 Integration of Specialist's Input

In order to maintain consistency in the impact assessment, it is suggested that all potential impacts to the environment (or component of the environment under review) should be listed in a table similar to the example shown below (more than one table will be required if impacts require assessment at more than one scale). The assessment parameters used in the table should be applied to all of the impacts and a brief descriptive review of the impacts and their significance will then be provided in the text of

the specialist reports and consequently in the EIR. The implications of applying mitigation are reviewed in Section D-1.2 below.

Table 6: Example of an Impact Table

Impact source(s)		Status	
Nature of impact			
Reversibility of impact			
Degree of irreplaceable loss of resource			
Affected stakeholders			
Magnitude	<i>Extent</i>		
	<i>Intensity</i>		
	<i>Duration</i>		
	<i>Probability</i>		
Significance	<i>Without mitigation</i>		
	<i>With mitigation</i>		
Significance Following Mitigation (SFM)			

D-1.1.3 *Mitigation Measures*

Mitigation measures will be recommended in order to enhance benefits and minimise negative impacts and they will address the following:

- Mitigation objectives: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in a measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an “educated guess” based on his/ her professional experience;
- Recommended mitigation measures: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided;
- Effectiveness of mitigation measures: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and
- Recommended monitoring and evaluation programme: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented. The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.

Once the above objectives have been stated, feasible management actions, which can be applied as mitigation, must be provided. A duplicate column on the impact assessment tables described above will indicate how the application of the proposed mitigation or management actions has reduced the impact. If the proposed mitigation is to be of any consequence, it should result in a measurable reduction in impacts (or, where relevant, a measurable benefit).

D-1.2 Approach to the Assessment of Cumulative Impacts

Cumulative impacts can arise from one or more activities. A cumulative impact may result in an additive impact i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact.

Interactive impacts may be either countervailing (the net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (the net adverse cumulative impact is greater than the sum of the individual impacts).

Possible cumulative impacts of the project are evaluated in the EIR. In addition, various other cumulative impacts e.g. other external impacts that could arise from the project will be further investigated in the EIR phase of the project.

The assessment of cumulative impacts on a study area is complex; especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated. It is often difficult to determine at which point the accumulation of many small impacts reaches the point of an undesired or unintended cumulative impact that should be avoided or mitigated. There are often factors which are uncertain when potential cumulative impacts are identified.

D-1.2.1 *Steps in Assessing Cumulative Impacts*

The assessment of cumulative impacts will not be done separately from the assessment of other impacts. Cumulative impacts however, tend to have different time and space dimensions and therefore require specific steps. This may even mean that some of the actions in the assessment process, that preceded general impact identification, may have to be revisited after potential cumulative impacts have been identified. This will ensure that the scope of the EIR process is adequate to deal with the identified cumulative impacts.

Three (3) general steps, which are discussed below, will be recommended to ensure the proper assessment of cumulative impacts.

D-1.2.2 *Determining the Extent of Cumulative Impacts*

To initiate the process of assessing cumulative impacts, it is necessary to determine what the extent of potential cumulative impacts will be. This will be done by adopting the following approach:

- Identify potentially significant cumulative impacts associated with the proposed activity;
- Establish the geographic scope of the assessment;
- Identify other activities affecting the environmental resources of the area; and
- Define the goals of the assessment.

D-1.2.3 *Describing the Affected Environment*

The following approach is suggested for the compilation of a description of the environment:

- Characterise the identified external environmental resources in terms of their response to change and capacity to withstand stress;
- Characterise the stresses affecting these environmental resources and their relation to regulatory thresholds; and
- Define a baseline condition that provides a measuring point for the environmental resources that will be impacted on.

D-1.2.4 *Assessment of Cumulative Impacts*

The general methodology which is used for the assessment of cumulative impacts should be coherent and should comprise of the following:

- An identification of the important cause-and-impact relationships between proposed activity and the environmental resources;
- A determination of the magnitude and significance of cumulative impacts; and

The modification, or addition, of alternatives to avoid, minimize or mitigate significant cumulative

impacts.

SECTION E: ALTERNATIVES

E-1 IDENTIFICATION OF ALTERNATIVES

The EIA procedures and regulations stipulate that the environmental investigation needs to consider feasible alternatives for any proposed development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. During the EIR phase of the project, the identified alternatives were assessed, in terms of environmental acceptability as well as socio-economic feasibility. To define the term alternatives as per Government Notice No. 543 of the NEMA EIA Regulations 2010 means:

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

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

No site alternatives exist for the proposed development.

E-1.1 Alternative 1: Electrical Route Alternatives

During the Scoping Phase, two (2) route alternatives for the 11kV underground powerline to connect the proposed development to the Alexandra substation in the north were identified (Figure 1).

The Preferred Alternative is Alternative Powerline Route 1 (red line on the Locality Map – Figure 1 and Appendix 1); however, the new underground cables are able to connect into an existing connection point at the corner of Pretoria and Modderfontein Road, rather than having to install an additional cable northwards to the substation itself. Alternative Powerline Route 1 was preferred by City Power (the service provider installing the cables) as it is the most direct route to the proposed development and can be installed within existing City Power “servitudes” within the road reserves. Alternative Powerline Route B requires numerous water crossings which were deemed to be unfavourable in terms of cost and the need for a Water Use License.

Refer to Section E2.1 for a comparative assessment of these two alternative routes.

E-1.2 Alternative 2: Layout/ Design Alternatives

Two layout alternatives exist with the proposed Huddle Township Development (approximately 53ha in extent) that provides for the portion of land to be developed for a residential estate, a small neighbourhood node that will consist of retail facilities, some offices and a component of higher density residential apartments and a public and private road system being the preferred alternative. (See Annexure 3 for layout plans of the 2 alternatives)

The layout/ design plan has changed based on the proposed developments. The original layout (alternative 1) consisted of single residential, group housing, commercial and a school with no public open space area. This was amended in order to:

- Consider more open space;

- Incorporate alternative stormwater structures;
- Include a greater variety of product for the market; and
- Retain as many of the existing trees as possible.

E-1.3 Alternative 3: Technology Alternatives

The technology alternatives will vary substantially as individual erven will be sold and a set of design guidelines will apply. These architectural guidelines will comply with the building code of the CoJMM and may include aspects such as solar geysers, low energy light fittings and the use of gas instead of electricity; for the connection of major energy consumption appliances.

E-1.4 Alternative 4: No Development Alternatives

Two no-go or no development alternatives were identified. Should the proposed Huddle Township Development not be approved, the site could be incorporated into the existing Huddle Park Golf Course and managed in terms of the requirements for this activity. Should this option be pursued the land would have to be purchased from the applicant. The other alternative is for the site to remain as public open space and managed appropriately to improve and restore biodiversity, such that the area becomes a “park” for the local community. This alternative would require that the CoJMM (specifically Joburg City Parks) or local community organisation purchase the land from the applicant and ensure that sufficient funds and personnel are available to actively manage and maintain the open space/ park site.

Refer to Section E2.4 for a comparative assessment of these two no-development alternatives against the current land development proposal.

E-2 COMPARATIVE ASSESSMENT

Advantages are marked with a (✓) while disadvantages are marked with (X) under the subsequent headings.

E-2.1 Electrical Route Alternatives

Alternative Powerline Route 1 (Red line on Figure 1)	Alternative Powerline Route 2 (Green line on Figure 1)
✓ Most direct route to the proposed development site from the connection point. Thus, saving on installation costs.	X Longer route, thus having a higher installation cost.
✓ Electrical cables can be laid within existing City Power servitudes within the road reserves.	X Electrical cables would be laid within the existing overhead power line servitude and would require crossing the N3 highway twice and open land in which no road reserves exist.
✓ Electrical cable route will only cross one watercourse/ wetland area (the unnamed tributary and associated wetlands traversing through the Huddle Park Golf Course – at the crossing of Club Street); however the cable will be “attached” to the road bridge crossing and not impact on the watercourse.	X Cable route would be required to cross at least 4 watercourse/ wetland areas along the length of the route.

E-2.2 Layout/design Alternatives

Alternative Layout (Preferred Alternative)	Alternative Layout(Alternative 1) on Figure 1)
√ Consider open space to be incorporated in the layout design.	✗ No open space is considered in this layout due to the group housing that is incorporated
√ The commercial node will include a greater variety of products to the local market and will have a footprint of 4.8 ha including parking facilities	✗ The commercial node will be 5.3 ha in extent thus taking a much larger area of open land.
√ More trees will be retained on the site with this layout due to strategic placement of buildings	✗ Due to the group housing node most of the trees on site will have to be removed.

E-2.3 Technology Alternatives

No Architectural Guidelines to be implemented	Architectural Guidelines to be implemented (Preferred)
√ A combination of electricity and gas might be used for the operation of major appliances.	√ Gas only might be used for the operation of major appliances as per architectural objectives and guided by SANS 204.
✗ Electricity will be the major source of power for the use in geysers adding to additional strain on the infrastructure.	√ Solar geysers or a combination of solar/electricity will be the minimum standard for the inclusion in the design objectives.

E-2.4 No Development Alternatives

Alternative 1: Proposed Huddle Development (Preferred)	Alternative 2: Incorporation into Huddle Park Golf Course	Alternative 3: Establish a public open space area/ park for recreational use
√ In terms of achieving sustainable development, the Municipality promotes a compact city by minimising urban sprawl.	✗ The incorporation of the land in to the Huddle Park Golf Course will not utilise the land effectively and therefore not address the need for achieving sustainable development.	✗ By retaining the land in its current form the ever increasing need for housing of this kind is not addressed.
√ The proposed Huddle Township Development will be controlled so criminal activities will be less.	✗ Criminal activities cannot be controlled in the open area if associated with the existing golf course.	✗ Criminal activities might increase as a result of the associated open area if no development takes place.
√ The development will add a commercial node to the area in order to better service the community.	✗ No commercial node will be added resulting in the area relying on current shopping complexes with other developments taking place around the area.	✗ No commercial node will be added resulting in the area relying on current shopping complexes with other developments taking place around the area.
√ The proposed Huddle Township Development will result in the upgrading of roads in the area. These upgrades will better serve both the current as well as future traffic as a result of the development.	✗ The road upgrades will be incorporated in the design and might not have the same positive effect on the surrounding roads.	✗ No road upgrades will take place leaving the current status unchanged.

SECTION F: ASSESSMENT OF IMPACTS

F-1 IDENTIFIED IMPACTS

The following issues were identified in the Plan of Study and were investigated as assessed for the proposed development and the preferred alternatives (as discussed in Section E above):

Impact Category	Description of Impact	Section of EIR where impact has been assessed
CONSTRUCTION PHASE		
Biophysical Impacts	Destruction of natural habitat and vegetation	F-3.1.1
	Exposure to erosion	F-3.1.2
	Increase in invasive vegetation	F-3.1.3
	Interference with fauna and faunal breeding activities	F-3.1.4
	Contamination of the environment	F-3.1.5
	Altered surface water run-off patterns into the adjacent wetland	F-3.1.6
	Disturbance of the wetland and watercourse during the installation of bulk services	F-3.1.7
Socio-Economic Impacts	Increase in ambient dust levels	F-3.2.1
	Increase in ambient noise levels (impact of the proposed development on the existing noise climate)	F-3.2.2
	Visual impact of construction of the development on visual receptors	F-3.2.3
	Visual impact of construction of infrastructure upgrades on visual receptors	F-3.2.4
	Increased traffic congestion and altered traffic patterns	F-3.2.5
	Adverse human health impacts related to possible Anthrax contamination/ infection	F-3.2.6
	Increase in crime/ criminal activity in the community	F-3.2.7
OPERATIONAL PHASE		
Biophysical Impacts	Surface and groundwater contamination	F-4.1.1
	Introduction and spread of alien and domesticated animals	F-4.1.2
	Increased stormwater run-off into the adjacent wetland	F-4.1.3
	Loss of groundwater recharge area within the temporary wetland buffer	F-4.1.4
Socio-Economic Impacts	Increase in ambient noise levels (impact of the proposed development on the existing noise climate)	F-4.2.1
	Visual impact of operational activities on visual receptors	F-4.2.2
	Visual impact of operational activities on the visual resource	F-4.2.3
	Increased traffic congestion and altered traffic patterns	F-4.2.4
	Increase in crime/ criminal activity in the community	F-4.2.5

F-2 IDENTIFIED CUMULATIVE IMPACTS

Cumulative impacts, as illustrated below, occur as a result from the combined effect of incremental changes caused by other activities together with the particular project. In other words, several developments with insignificant impacts individually may, when viewed together, have a significant cumulative adverse impact on the environment (Figure 15).

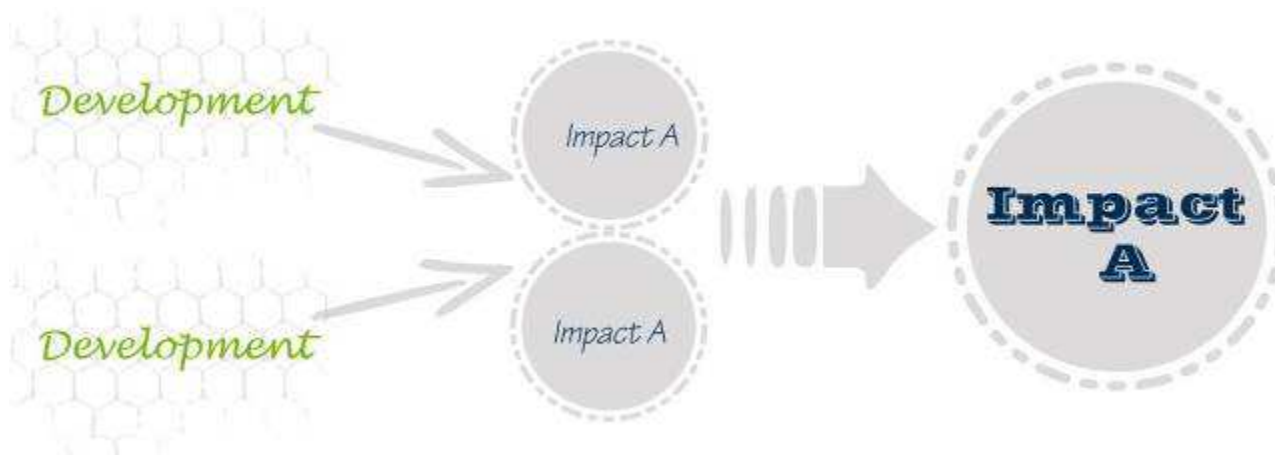


Figure 14: The identification of Cumulative Impacts

The following cumulative impacts have been identified in terms of the proposed development and warrant further investigation during the assessment phase:

Impact Category	Description of Impact	Section of EIR where impact has been assessed
Cumulative Impacts	Increased loss of open space within the greater area	F-5.1.1
	Obtrusive lighting	F-5.1.2
	Impact on traffic patterns	F-5.1.3
	Impact on adjacent water resources	F-5.1.4

F-3 IMPACT ASSESSMENT: CONSTRUCTION PHASE

F-3.1 Biophysical Environment

F-3.1.1 Destruction of natural habitat and vegetation

Source and nature of the impact:

The establishment of the proposed Huddle Township Development will result in the clearing of vegetation on site for the construction of roads, installation of services and establishment of the proposed estate.

Table 7: Destruction of natural habitat and vegetation

Impact source(s)	Construction related activities such as clearing land and excavations.	Status	-
Nature of impact	Loss of natural habitat and vegetation		
Reversibility of impact	Medium		
Degree of irreplaceable loss of resource	Medium		
Affected stakeholders	Immediately adjacent landowners and occupiers of land		
Magnitude	<i>Extent</i>	Site – 2	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Permanent – 5	
	<i>Probability</i>	Definite – 5	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+5+5+5) \times 3 = 51$ Medium	M

	<i>With mitigation</i>	$WOM \times ME = WM$ $51 \times 0.2 = 10.2$ Low	L
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Mitigation measures:

- A permit for the destruction and/or relocation of plants of conservation concern or species which are provincially protected (such as the African Potato) must be obtained. Should the permit advocate relocation then these plants should be removed by a qualified botanist and replanted in a suitable area;
- An independent ECO should be appointed to oversee all construction activities;
- No open fires are be allowed; and
- Residential areas and internal roads should be landscaped with indigenous plant species that will be beneficial to faunal species, such as bats and birds thereby possibly contributing to increased faunal diversity within the urban environment.

Significance of the impact:

Due to the transformed nature of the site, the significance of the loss of natural habitat and vegetation due to the proposed development will be of medium significance without mitigation, however with the implementation of the above mentioned mitigation measures, especially the use of indigenous vegetation in all landscaping, will reduce the significance of impact to low, as mitigation has the potential to increase indigenous biodiversity on site.

F-3.1.2 Exposure to erosion**Source and nature of the impact:**

During the construction phase the removal of surface vegetation can cause exposed soil conditions where rainfall and high winds can cause mechanical erosion. Rainfall and inadequate drainage systems would lead to sediments washing down into wetlands and low lying areas, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soil.

Table 8: Exposure to erosion

Impact source(s)	Construction related activities such as clearing land and excavations.		Status	-
Nature of impact	Exposure of soils to erosion.			
Reversibility of impact	High			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Downstream and low-lying areas such as the adjacent Huddle Park Golf Course			
Magnitude	<i>Extent</i>	Regional – 3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Medium term – 3		
	<i>Probability</i>	Likely– 3		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+3+3) \times 3 = 36$ Low –Medium		L – M
	<i>With mitigation</i>	$WOM \times ME = WM$ $36 \times 0.4 = 14.4$ Low		L

Mitigation measures:

- An ecologically-sound stormwater management plan must be implemented during construction

and appropriate water diversion systems put in place;

- Erosion must not be allowed to develop on a large scale before effecting repairs;
- No construction/ activities may be undertaken within the wetland areas or within 500m from the edge of the wetlands until a Water Use License is granted by the DWS;
- Vegetation and soil must be retained in position for as long as possible, and removed immediately ahead of construction/ earthworks in that area;
- Runoff from roads must be managed to avoid erosion and pollution problems;
- All areas susceptible to erosion must be protected and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas; and
- Areas exposed to erosion due to construction should be vegetated with species naturally occurring in the area.

Significance of the impact:

The significance of the impact is regarded to be low-medium; however, the implementation of the above mentioned mitigation measures will reduce the significance of the impact to low.

F-3.1.3 Increase in invasive vegetation

Source and nature of the impact:

The establishment of the proposed Huddle Township Development will result in the clearing of vegetation on site for the construction of roads, installation of services and establishment of the proposed estate. The seed of alien invasive vegetation that occur on site and within the immediate area could spread into these disturbed areas.

Table 9: Potential increase in invasive vegetation

Impact source(s)	Construction related activities such as clearing vegetation and disturbing soils.	Status	-
Nature of impact	Spread of alien invasive plant species.		
Reversibility of impact	High		
Degree of irreplaceable loss of resource	Low		
Affected stakeholders	Adjacent Huddle Park Golf Course		
Magnitude	<i>Extent</i>	Regional – 3	
	<i>Intensity</i>	Medium – 3	
	<i>Duration</i>	Medium term – 3	
	<i>Probability</i>	Likely– 3	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+3+3) \times 3 = 36$ Low –Medium	L – M
	<i>With mitigation</i>	$WOM \times ME = WM$ $36 \times 0.4 = 14.4$ Low	L

Mitigation measures:

- During construction, the construction area and immediate surroundings should be monitored regularly for emergent invasive vegetation;
- Vehicles and construction workers should under no circumstances be allowed outside the site boundaries to prevent impact on surrounding vegetation, including the wetlands;
- All alien seedlings and saplings must be removed as they become evident for the duration of construction and operational phase; and
- Manual/ mechanical removal is preferred to chemical control.

Significance of the impact:

The significance of the impact is regarded to be low-medium; however, the implementation of the above mentioned mitigation measures will reduce the significance of the impact to low.

F-3.1.4 Interference with fauna and faunal breeding activities**Source and nature of the impact:**

A number of bird species were observed utilising the stands of exotic trees for breeding purposes. The removal these trees during the construction phase and construction activities on site will result in the temporary loss of shelter, roosting and breeding habitat for many species and could possibly lead to mortality of individuals. Food and rubbish can attract wildlife to the area, increasing the risk of negative interactions.

Table 10: Interference with fauna and faunal breeding activities

Impact source(s)	Destruction of habitat as well as associated noise, vibration and other construction related activities.		Status	-
Nature of impact	Interference with fauna and faunal breeding activities			
Reversibility of impact	Medium			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Adjacent Huddle Park Golf Course			
Magnitude	<i>Extent</i>	Regional – 3		
	<i>Intensity</i>	High – 5		
	<i>Duration</i>	Medium term – 3		
	<i>Probability</i>	Highly likely– 4		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+3+4) \times 3 = 45$ Medium		M
	<i>With mitigation</i>	$WOM \times ME = WM$ $45 \times 0.4 = 18$ Low		L

Mitigation measures:

- Construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species especially avifauna utilising the exotic trees;
- No wild animal may under any circumstance be handled, removed or be interfered with by construction workers;
- No wild animal may be fed on site;
- No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding 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;
- No domesticated animals must be allowed on site; and
- 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 located around the site should have tightly fitting lids to prevent faunal species raiding the bins and thereby becoming habituated to humans.

Significance of the impact:

The significance of the impact is regarded to be medium; however, the implementation of the above mentioned mitigation measures will reduce the significance of the impact to low.

F-3.1.5 Contamination of the environment

Source and nature of the impact:

Hydrocarbons (oil, petrol and diesel) and other chemicals/ liquids will be required during the construction phase. Spills and/or leakages could occur from construction vehicles and/or equipment. These spills could contaminate the soil and have the potential to contaminate surface and groundwater resources. Construction waste (such as plastic bags, cement bags, building rubble, etc.) may also pollute the immediately surrounding landscape if activities on site are not managed correctly and regular checks for litter and rubbish are not done.

Table 11: Contamination of the environment

Impact source(s)	Hydrocarbon and other chemical spillages as well as construction related waste and ineffective waste and pollution management.		Status	-
Nature of impact	Contamination and pollution of soil, surface and groundwater resources.			
Reversibility of impact	High			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Local community and adjacent Huddle Park Golf Course			
Magnitude	<i>Extent</i>	Regional – 3		
	<i>Intensity</i>	High – 5		
	<i>Duration</i>	Medium term–3		
	<i>Probability</i>	Highly likely – 4		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+3+4) \times 4 = 60$ Medium– High		M – H
	<i>With mitigation</i>	$WOM \times ME = WM$ $60 \times 0.4 = 24$ Low– Medium		L – M

Mitigation measures:

- Hazardous material and substances must be stored in an appropriate area within the Contractor's Camp. This area must be appropriately bunded to contain the volume of all substances including an additional volume of at least 10%. This area should also be under lock and key;
- All construction vehicles and equipment should be kept in good working condition;
- All construction vehicles should be parked in demarcated areas when not in use and drip trays should be placed under vehicles to collect any spillages/leaks;
- Surface water flows during the construction period must be managed to prevent contaminated/ dirty water from entering the adjacent Huddle Park Golf Course. All dirty and contaminated water should be directed towards oil traps/ separators to ensure that all hydrocarbons are removed;
- The construction site should be regularly checked and cleaned of litter and rubbish. All waste must be deposited in appropriately marked waste disposal bins which should be strategic located throughout the site. Waste must not be allowed to accumulate on site and should be regularly removed to a registered waste disposal site; and
- If hydrocarbon spills occur these should be cleaned using SUNSORB (or similar product) and the contaminated soils removed from site and disposed of at an appropriate registered landfill site.

Significance of the impact:

The significance of this impact is regarded as high-medium without mitigation due to the adjacent open

space system and associated wetlands/ watercourse. However, if spillages and waste are effectively managed and mitigated the significance of the impact can be reduced to a low-medium.

F-3.1.6 Altered surface water run-off patterns into the adjacent wetland

Source and nature of the impact:

During the construction phase, vegetation will be cleared and activities on site will result in a change in surface water run-off (or stormwater) patterns. This has an implication on erodible soils on the slopes downstream of the proposed development site (i.e. the soils associated with the adjacent wetland). Erosion of these slopes will result in the possible sedimentation of low-lying wetland areas and the associated watercourse in the valley.

Table 12: Altered surface water run-off patterns into the adjacent wetland

Impact source(s)	Clearing vegetation and construction activities on site.		Status	-
Nature of impact	Change in the surface water run-off patterns leading to soil erosion and potential sedimentation of the adjacent wetland and watercourse.			
Reversibility of impact	Medium			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Downstream landowners such as the Huddle Park Golf Course			
Magnitude	<i>Extent</i>	Regional– 3		
	<i>Intensity</i>	High–5		
	<i>Duration</i>	Medium term–3		
	<i>Probability</i>	Highly likely–4		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+3+4) \times 5 = 75$ Medium – High		M – H
	<i>With mitigation</i>	$WOM \times ME = WM$ $75 \times 0.4 = 30$ Low– Medium		L – M

Mitigation measures:

- Appropriate mitigation measures (in consultation with the ECO) must be implemented at areas susceptible to erosion (either by wind or rain) to decrease and/or cease erosion;
- Stormwater should not be allowed to enter directly into the adjacent wetland area, and must be buffered by vegetation and energy dissipating interventions;
- Re-vegetation and rehabilitation of disturbed areas must take place concurrently with construction. By obtaining a suitable protective cover during this process will reduce the percentage of the surface area which is left devoid of vegetation and susceptible to erosion;
- All areas of disturbed and where soil has been compacted must be ripped and re-profiled before rehabilitation in order to facilitate the quick establishment of a vegetative ground cover; and
- A detailed Method Statement must be compiled by the Contractor which is in line with the Stormwater Management Plan developed for the proposed Huddle Township Development. This Method Statement must be signed off by the Engineer and ECO.

Significance of the impact:

Due to the nature of the impact (as described above), the significance of this impact without mitigation, is regarded to be high-medium. Implementation of the mitigation measures will decrease the significance of the impact to low-medium.

F-3.1.7 Disturbance of the wetland and watercourse during the installation of bulk services

Source and nature of the impact:

In order for the proposed development to connect and/or feed-in to existing bulk infrastructure in the area, the associated pipelines will be required to cross the wetland and watercourse. The sewer and Egoli gas pipelines will have to cross the northern extent of the wetland and watercourse located within the Huddle Park Golf Course to connect the north-western corner of the proposed development to the existing pipelines to the west of the valley.

Table 13: Disturbance of the wetland and watercourse during the installation of bulk services

Impact source(s)	Installation of bulk service pipelines in the wetland and watercourse.	Status	-
Nature of impact	Disturbance of the soils resulting in increased sedimentation of the watercourse and wetland as well as impacting on the associated ecological functions performed by wetlands.		
Reversibility of impact	Medium		
Degree of irreplaceable loss of resource	Low		
Affected stakeholders	Huddle Park Golf Course and downstream landowners and occupiers of land.		
Magnitude	<i>Extent</i>	Site– 2	
	<i>Intensity</i>	High–5	
	<i>Duration</i>	Medium term –3	
	<i>Probability</i>	Likely–3	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+5+3+3) \times 5 = 65$ Medium – High	M – H
	<i>With mitigation</i>	$WOM \times ME = WM$ $65 \times 0.4 = 26$ Low – Medium	L – M

Mitigation measures:

- All bulk service pipelines are to be pipe jacked under the wetland and watercourse to minimise the impacts associated with excavating trenches;
- Disturbed areas must be immediately rehabilitated to ensure that soils are stabilised and vegetation cover is restored to decrease the erosion potential and resultant sedimentation of the wetland and watercourse; and
- All rehabilitated areas must be monitored to ensure that erosion is not occurring. If erosion is taking place immediate remedial action is required. Monitoring should continue until the area is restored.

Significance of the impact:

Due to the already highly disturbed nature of the area through which service pipelines are to be installed, the significance of the impact is regarded to be that of medium-high without mitigation. However, the method of pipe jacking under watercourses and wetlands is efficient to reduce the significance of the impact to that of a low-medium provided that associated rehabilitation measures are implemented and maintained.

F-3.2 Socio-Economic Environment

F-3.2.1 Increase in ambient dust levels**Source and nature of the impact:**

Construction activities, such as vegetation clearing, vehicles travelling on exposed surfaces, excavations and earthworks will result in elevated ambient dust levels within the area during the construction phase. Increased dust levels may adversely affect persons working and/or residing in the nearby area.

Table 14: Increase in ambient dust levels

Impact source(s)	Construction activities on site such as vegetation clearing, excavations, etc.		Status	-
Nature of impact	Increased ambient dust levels			
Reversibility of impact	N/A			
Degree of irreplaceable loss of resource	N/A			
Affected stakeholders	Surrounding land owners and occupiers of land as well as construction workers			
Magnitude	<i>Extent</i>	Regional – 3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Medium Term – 3		
	<i>Probability</i>	Definite – 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+3+5) \times 4 = 56$ Medium		M
	<i>With mitigation</i>	$WOM \times ME = WM$ $52 \times 0.6 = 31.2$ Low to Medium		L - M

Mitigation Measures:

- Appropriate dust suppression methods must be applied;
- Exposed soil stockpiles shall be covered, kept damp or protected using organic binding agents or alternative techniques that are not water intensive;
- The clearing of vegetation must be kept to a minimum and only undertaken where and when required;
- Avoid unnecessary movement of construction vehicles on exposed soils; and
- Vehicles travelling on unsurfaced roads must travel at a speed that creates minimal dust entrainment.

Significance of the impact:

The significance of this impact, without mitigation, is regarded to be medium. Implementation of the mitigation measures will decrease the significance of the impact to low - medium.

F-3.2.2 Increase in ambient noise levels (impact of the proposed development on the existing noise climate)**Source and nature of the impact:**

Construction activities and movement of construction vehicles may temporarily increase the ambient noise levels within the area during the construction phase.

Table 15: Increase in ambient noise levels

Impact source(s)	Construction activities and construction vehicles		Status	-
Nature of impact	Increased ambient noise levels			
Reversibility of impact	The impact is irreversible but can be mitigated to a large extent			
Degree of irreplaceable loss of resource	N/A			
Affected stakeholders	Adjacent landowners and occupiers of land			
Magnitude	<i>Extent</i>	Site – 2		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Medium Term – 3		
	<i>Probability</i>	Definite – 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+3+3+5) \times 2 = 26$ Low –Medium		L - M
	<i>With mitigation</i>	$WOM \times ME = WM$ $26 \times 0.6 = 15.6$ Low		L

Mitigation measures:

- Construction times must be restricted to working hours (06:00 – 18:00), whilst also avoiding peak traffic hours;
- All construction equipment or machinery should be switched off when not in use;
- Construction equipment must be kept in good working condition;
- All construction vehicles must abide by speed limits and should not exceed speed limits of 40km/ hour to reduce their potential to contribute to the already high traffic noise; and
- As per the noise specialist's recommendations, a boundary wall, or linked faced acting as a noise barrier should be erected along the south and eastern boundaries, especially during the construction phase.

Significance of the impact:

Noise levels along Club Street are currently greater than the suggested daytime SANS 1013:2008 level of 50dB(A) (NIA, Appendix 6), thus the daytime impact of the construction phase of the proposed development on the neighbouring residential area is likely to be of low to medium significance, however, with mitigation the significance of the impact can be reduced to low.

F-3.2.3 Visual impact of construction of the development on visual receptors**Source and nature of the impact:**

Parcels of exposed soil will define the construction areas of the different zones and will be a dominant feature during the construction phase. The construction site will appear dispersed with construction equipment, material stockpiles and ancillary components. Large construction equipment may be used for the construction of complex buildings. Extensive earthworks will be necessary to grade the sites and possible dust clouds may be generated by the activities. Delivery vehicles and trucks will frequently deliver building material to the site. The **intensity** of the impact on visual receptors during the construction phase is considered to be **medium**.

Table 16: Visual impact of construction activities on visual receptors

Impact source(s)	Construction activities including construction camps, material lay down yards, stockpiles, cranes, scaffolding, delivery vehicles and dust		Status	-
Nature of impact	Views of the abovementioned construction activities which are out of character with the surrounding landscape and will affect the sense of place negatively.			
Reversibility of impact	Partially reversible through the implementation of adequate visual mitigation measures during the construction phase.			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding land owners, motorists travelling along Club Street and recreational users of the Harvey Municipal Nature Reserve.			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Short to Medium term – 2		
	<i>Probability</i>	Highly likely – 4		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+2+4) \times 4 = 48$ Medium		M
	<i>With mitigation</i>	$WOM \times ME = WM$ $48 \times 0.6 = 28.80$ Low to Medium		L - M

Mitigation measures:

- Protect identified trees specimens;
- Utilise the existing screening capacity of the site and improve it by enclosing the construction site and stockyards with a dark green or khaki brown shade cloth of at least 20% density and at least 3 metres high, as an additional screen;
- Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance;
- Remove rubble and other construction rubbish off site as soon as possible or place it in containers in order to keep the construction site free from additional unsightly elements;
- Dust suppression techniques should be implemented especially on windy days, preferably using biodegradable binding agents;
- If practically possible, locate construction camps in areas that are already disturbed or where it is not necessary to remove established vegetation;
- Retain the existing vegetation cover of the site through selective clearing, where practical;
- Exposed soil must be covered or 'camouflaged' using a biodegradable soil mat and vegetation cover to reduce the duration of visible scarring of the landscape;
- Rehabilitation of all stripped and damaged areas must be implemented as soon as practically possible;
- It is suggested that construction should start and stop during normal working hours without starting too early or continuing until late into the night to avoid night-time visual impacts, also avoid working over weekends and holiday periods; and
- If construction is necessary during night-time, light sources should be directed downwards and inwards away from sensitive view points and roads to prevent obtrusive lighting.

Significance of the impact:

Construction activities have the potential to be unsightly and intrude visually on neighbouring landowners and residents. However, in the case of the Huddle Township Development, sloping topography and existing dense vegetation between the site and neighbouring residences on the

southern western and north-western perimeters will reduce the visual impact. High walls and mature gardens combined with the orientation of existing residences along Club Street will also reduce this impact. The moderate VAC of the landscape as well as the sheer viewing distance will reduce the impact to residents in high lying neighbourhoods as well as recreational users of the Harvey Municipal Nature reserve. The visual impact associated with construction activities during the construction phase is predicted to be of a medium significance; however, the implementation of mitigation measures will reduce the significance of the impact to a low-medium.

F-3.2.4 Visual Impact of construction of infrastructure upgrades on visual receptors

Source and nature of the impact:

Linear stretches of exposed soil will be visible when the underground gas pipeline and electric cables intercept areas of green open space. This impact will be imparted mainly onto golfers for a limited period of time. Pedestrian footways will be temporarily closed where servitude installations take place next to roads (Club Street), thus mainly impacting runners and walkers. The proposed road upgrades (in Club Street) will also leave stretches of uncovered soil and will be scattered with earth moving and road construction equipment. These interventions will not only be unsightly but can also lead to traffic delays. The **intensity** of the impact on visual receptors during the construction phase is considered to be **high**.

Table 17: Visual impact of construction of infrastructure upgrades on visual receptors

Impact source(s)	Infrastructure upgrade, construction activities that include exposed soil, disturbed pedestrian footways and equipment.	Status	-
Nature of impact	Views of the abovementioned construction activities which are out of character with the surrounding landscape and will affect the sense of place negatively.		
Reversibility of impact	Partially reversible through the implementation of adequate visual mitigation measures during the construction phase.		
Degree of irreplaceable loss of resource	High		
Affected stakeholders	Surrounding land owners, motorists travelling along Club Street and recreational users of the Harvey Municipal Nature Reserve.		
Magnitude	<i>Extent</i>	Regional -3	
	<i>Intensity</i>	High -5	
	<i>Duration</i>	Short to Medium term - 2	
	<i>Probability</i>	Highly likely - 4	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+2+4) \times 4 = 56$ Medium	M
	<i>With mitigation</i>	$WOM \times ME = WM$ $56 \times 0.6 = 33.6$ Low to Medium	L - M

Mitigation measures:

- Refer to the general construction mitigation measures presented in the section above (E-5.2.3);
- Clearing of a full servitude to be avoided. Vegetation must only be stripped where necessary;
- Linear earthworks must be carried out in phases and rehabilitation of completed sections should be implemented concurrently with the next section;
- Rehabilitation should include at the very least reinstatement, but preferably the improvement of the pre-construction environment; and
- Re-vegetated areas should be monitored on a monthly basis to ensure successful rehabilitation.

Significance of impact:

Infrastructure upgrades are generally unsightly and inconvenient and leave scars on the landscape until rehabilitation is completed successfully. In the case of this development, infrastructure upgrades will have a temporary negative visual impact on residences overlooking the affected servitudes as well as residences, recreational users and motorists along the affected section of Club Street. The impact on residences will be reduced slightly as a result of the aesthetic impact that is currently compromised by overhead powerlines. High security walls, mature gardens and the orientation of residences along Club Street will reduce the visual impact on these residences to a degree. The significance of the impact caused by construction of infrastructure upgrades without mitigation is therefore regarded to be medium. Implementation of the appropriate mitigation measures will decrease the significance of the impact to low-medium.

F-3.2.5 Increased traffic congestion and altered traffic patterns**Source and nature of the impact:**

Due to construction activities and associated machinery movement, the traffic patterns of the surrounding roads network will be affected. The Traffic Engineer has confirmed that several intersections along Club Street are currently experiencing unacceptable levels of service and include:

- Club/Civin/Linksfield intersection during the AM Peak;
- Civin/Chaucer/St Christopher intersection during the AM Peak;
- Club Street and Donne Avenue;
- Club Street and Shelley Street;
- Club Street and St Andrews Street;
- Club Street and Byron Street; and
- Club Street and King David School Access.

Table 18: Increased traffic congestion and altered traffic patterns

Impact source(s)	Construction activities and vehicle movement	Status	-
Nature of impact	Traffic patterns of the surrounding area will be affected		
Reversibility of impact	The impact is irreversible but will be less intrusive if appropriate mitigation measures are adopted		
Degree of irreplaceable loss of resource	Low		
Affected stakeholders	Surrounding land owners and road users		
Magnitude	<i>Extent</i>	Regional -3	
	<i>Intensity</i>	Medium – 3	
	<i>Duration</i>	Short – Medium Term - 2	
	<i>Probability</i>	Definite – 5	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+2+4) \times 5 = 60$ Medium– High	M-H
	<i>With mitigation</i>	$WOM \times ME = WM$ $60 \times 0.8 = 48$ Medium	M

Mitigation measures:

- Avoid movement of construction vehicles and machinery on main access roads during peak times (7:00 – 9:00) & (16:00 – 18:00); and
- If the above is unavoidable – implement traffic control measures such as points-men at busy intersections.

Significance of the impact:

The impact that construction related traffic would have on the current traffic patterns is predicted to be of a medium to high significance without mitigation measures, however, this impact can be reduced to a medium significance if appropriate measures are adopted.

F-3.2.6 Adverse human health impacts related to possible Anthrax contamination/ infection
Source and nature of the impact:

Bacillus anthracis, the causative organism of anthrax, grows vegetatively within an infected host and sporulation only occurs when the vegetative form is exposed to the atmosphere and conditions are unfavourable for the continued multiplication of the vegetative form. As a result, *B. anthracis* shed by infected animals at death is found in or on products from such animals, or in soil contaminated by them, as resistant spores that may persist for years (Professor Adriano G Duse - Chief Specialist, Chair and Academic Head: Department of Clinical Microbiology and Infectious Diseases – refer to letter in Appendix 6).

Spore formation occurs only under aerobic conditions and extensive spores could only be formed in association with a human cadaver if blood containing the organism had been spilt at the time of death. Large numbers of spores are therefore unlikely to be found in human remains in old burial sites (Professor Adriano G Duse). Because humans are relatively resistant to anthrax they are unlikely to be infected even in contact with an infected cadaver (Professor Adriano G Duse). The HIA (Appendix 6) states that no graves were identified on site, however the specialist does state that the possible presence of burial pits for livestock that died of anthrax must be acknowledged.

Thus, construction activities on site may uncover (if present) livestock and/or human (although unlikely) burial sites. This may result in resistant spores becoming airborne. This may pose a threat to human health if spores are at concentrations high enough to cause pulmonary anthrax.

Table 19: Adverse human health impacts related to possible Anthrax contamination/ infection

Impact source(s)	Construction activities such as excavations, earthworks, etc.	Status	-
Nature of impact	Uncovering livestock and human burial sites contaminated with <i>Bacillus anthracis</i>		
Reversibility of impact	Irreversible		
Degree of irreplaceable loss of resource	N/A		
Affected stakeholders	Construction workers (very low probability of adjacent landowners and occupiers of land being infected)		
Magnitude	<i>Extent</i>	Footprint – 1	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Permanent–5	
	<i>Probability</i>	Probable – 1	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(1+5+5+1) \times 2 = 24$ Low to Medium	L – M
	<i>With mitigation</i>	$WOM \times ME = WM$ $24 \times 0.8 = 19.2$ Low	L

Mitigation measures:

- Any skeletal remains (i.e.bones) that are uncovered during construction activities must be tested for anthrax;
- Construction staff should be provided with appropriate personal protective clothing and infection

control education from a Specialist Unit such as The Infection Control Division, Department of Clinical Microbiology and Infectious Disease of the NHLS and Wits School of Pathology, could be considered; and

- Close monitoring and evaluation of staff health during the construction phase must be instituted.

Significance of the impact:

The incidence of notified human disease is presently very low. Humans are relatively resistant to anthrax and the inhalational dose for pulmonary anthrax is high. Another consideration is airflow. Outdoor construction is assumed to be accompanied by high air flow, which further reduces the concentration dose in the air. Further to this, the fact that for decades there have been no confirmed cases of human anthrax in this densely populated, dusty area (Alexander Township) suggests that human cases of anthrax would still be unlikely to occur.

Furthermore, in the early 1900s, many areas in Gauteng were farmlands. Cattle and livestock would most certainly have been kept and some may well have succumbed to the 1923 anthrax outbreak. Construction projects have continued unabated and, to the best of Professor Adriano G Duse's knowledge, there have been no reported human cases of anthrax consequent to the many land development and construction activities that have occurred to date. In addition extensive housing developments have taken place in Sandringham and Linksfield and these have not resulted in human cases of anthrax infection (Professor Adriano G Duse, Appendix 6).

The risk of exposure to anthrax, although relatively small, cannot be ignored. Infection Control strategies, under the guidance of an expert, could be employed to reduce the risk of human anthrax to negligible levels during the construction process.

F-3.2.7 Increase in crime/ criminal activity within the community

Source and nature of the impact:

The construction phase of the proposed development is estimated to continue for approximately 5 years. During this time, there will be an influx of construction workers and associated persons into the area, which may have a resultant impact on increased crime and/or criminal activity within the community. Construction workers will also have to commute to site, thus increasing the demand for taxi services within the community which may further facilitate unwanted groups/ criminals accessing the area/ community.

There is currently a large private security presence within the community of Huddle Park, highlighting that crime is perceived to be an existing concern.

Table 20: Increase in crime/ criminal activity within the community

Impact source(s)	Construction workers and associated persons accessing the area and the associated increase in demand for taxi services.		Status	-
Nature of impact	Increase in local crime/ criminal activity levels within the community			
Reversibility of impact	NA			
Degree of irreplaceable loss of resource	NA			
Affected stakeholders	Local community members including schools and businesses			
Magnitude	<i>Extent</i>	Regional – 3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Short to medium term– 2		
	<i>Probability</i>	Likely –3		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+2+3) \times 4 = 44$ Medium		M
	<i>With mitigation</i>	$WOM \times ME = WM$ $44 \times 0.8 = 35.2$ Low		L - M

Mitigation measures:

- The Contractor will have to ensure that the development site is secure at all times. Security guards must be present and visible at all times during the day and at night;
- Limit access to the site. The public are not to have access to the development site;
- To prevent the influx of people to the area, the employment of temporary staff must not take place at on site. This process must be facilitated outside of the local community, if temporary staff is to be employed;
- Ensure that the contact details of the police or relevant security company, ambulance service and fire brigade are available on site;
- No informal trading will be allowed on the site or in close proximity to the site (i.e. along Club Street); and
- Do not allow for the congregation of vagrants on or near the site.

Significance of the impact:

Due to the lengthy period over which construction will occur, the impact of a possible increase in crime during the construction phase is predicted to be of a medium significance. The implementation of effective crime mitigation measures will reduce the significance of the impact, but only marginally to low-medium.

F-4 IMPACT ASSESSMENT: OPERATIONAL PHASE**F-4.1 Biophysical Environment****F-4.1.1 Surface and groundwater contamination****Source and nature of the impact:**

Due to the nature of the development (mixture of residential and commercial), hydrocarbons (oil, petrol and diesel) and other chemicals/ liquids may be required during the operational phase. Although unlikely, spills and/or leakages could occur and enter the stormwater system and thus potentially contaminate surrounding surface and groundwater resources.

Table 21: Surface and groundwater contamination

Impact source(s)	Hydrocarbon and other chemical spillages.		Status	-
Nature of impact	Contamination of surface and groundwater during heavy rainfall events.			
Reversibility of impact	High			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Downstream landowners such as the Huddle Park Golf Course			
Magnitude	<i>Extent</i>	Regional– 3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Short term–1		
	<i>Probability</i>	Possible – 2		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+1+2) \times 3 = 27$ Low – Medium		L – M
	<i>With mitigation</i>	$WOM \times ME = WM$ $27 \times 0.4 = 10.8$ Low		L

Mitigation measures:

- The stormwater attenuation facilities must be designed to filter/ trap any contaminants prior to water seeping into the ground or adjacent wetland area.
- If a hydrocarbon spillage occurs these should be cleaned using SUNSORB (or similar product) and the contaminated soils/ materials removed from site and dispose of at an appropriate registered landfill site.

Significance of the impact:

The significance of this impact is regarded as low-medium without mitigation, however, if spillages are effectively mitigated and stormwater attenuation facilities maintained, the significance will be reduced to low.

F-4.1.2 Introduction and spread of alien and domesticated animals**Source and nature of the impact:**

Domesticated animals, such as dogs and cats, can have an impact on the local indigenous faunal species through direct competition, spread of diseases and hunting, while alien species often associated with human presence, such as the Indian Myna (*Acrida thestristis*) and Black Rats (*Rattus rattus*) also have negative impacts on local biodiversity.

Table 22: Introduction and spread of alien and domesticated animals

Impact source(s)	Increase in the number of residents and pets.	Status	-
Nature of impact	Spread of alien and domesticated animals into surrounding natural areas.		
Reversibility of impact	Medium		
Degree of irreplaceable loss of resource	Medium		
Affected stakeholders	Adjacent Huddle Park Golf Course and the surrounding community		
Magnitude	<i>Extent</i>	Regional – 3	
	<i>Intensity</i>	Medium – 3	
	<i>Duration</i>	Medium term – 3	
	<i>Probability</i>	Highly likely– 4	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+3+4) \times 2 = 26$ Low –Medium	L – M
	<i>With mitigation</i>	$WOM \times ME = WM$ $26 \times 0.8 = 20.8$ Low	L

Mitigation measures:

- The HOA guidelines should include clauses indicating that domestic animals must not be allowed to roam in areas containing natural vegetation and should also indicate that stray animals will be eradicated.

Significance of the impact:

The above-mentioned species are likely to be in the area already, thus the significance of the impact is rated as low-medium, however with the implementation of the mitigation measure which will limit the impact of these animals. The significance of the impact will be reduced to low.

F-4.1.3 Increased stormwater run-off into the adjacent wetland**Source and nature of the impact:**

Due to the present of hard surfaces, surface water flows will be altered, thus stormwater, if not managed appropriately through the proposed open space system within the proposed development may have an implication on erodible soils on the slopes downstream of the proposed development site (i.e. the soils associated with the adjacent wetland). Erosion of these slopes will result in the possible sedimentation of low-lying wetland areas and the associated watercourse in the valley.

Table 23: Increased stormwater run-off into the adjacent wetland

Impact source(s)	Proposed development and associated hard surfaces such as roads, parking areas, etc.		Status	-
Nature of impact	Increased stormwater flows resulting in downstream erosion and sedimentation of the adjacent wetland and watercourse.			
Reversibility of impact	Medium			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Downstream landowners such as the Huddle Park Golf Course			
Magnitude	<i>Extent</i>	Regional – 3		
	<i>Intensity</i>	High–5		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Likely–3		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+3) \times 5 = 80$ High		H
	<i>With mitigation</i>	$WOM \times ME = WM$ $80 \times 0.4 = 32$ Low – Medium		L – M

Mitigation measures:

- A detailed Stormwater Management Plan must be developed and implemented for the proposed Huddle Township Development. The Stormwater Management Plan must include the following:
 - Retardation and containment of water on site in numerous containment structures that have permeable swales or walls to allow for slow but constant release of water into down-slope structures;
 - Consideration of stormwater structure integration with landscaping on the development;
 - Where the potential for erosion exists, stormwater dissipating structures (such as gabion mattresses and rocky swales) to reduce water velocity must be implemented and maintained;
 - Release of water from stormwater structures into down-slope structures that have been planned and will take into account the adjoining Huddle Park Golf Club; and
- Stormwater attenuation facilities, such as the proposed attenuation ponds and swales, must be maintained to ensure the minimum freeboard is available to attenuate high flows associated with high rainfall events.

Significance of the impact:

The significance of this impact without mitigation is regarded to be high due to the sensitivity of wetlands to disturbance. Implementation of the mitigation measures will decrease the significance of the impact to low-medium.

F-4.1.4 Loss of groundwater recharge area within the temporary wetland buffer**Source and nature of the impact:**

The south-western corner of the proposed Huddle Township Development encroaches into the temporary wetland 30m buffer. The area of encroachment is approximately 1 109m² in extent. Wetland buffers are important areas as they serve as key recharge areas.

Table 24: Loss of groundwater recharge area within the temporary wetland buffer

Impact source(s)	Proposed Huddle Development and associated hard surfaces such as roads, buildings and parking areas.	Status	-
Nature of impact	Loss of surface area for groundwater recharge due to the establishment of hard surfaces.		
Reversibility of impact	Medium		
Degree of irreplaceable loss of resource	Medium		
Affected stakeholders	Downstream landowners such as the Huddle Park Golf Course		
Magnitude	<i>Extent</i>	Regional – 3	
	<i>Intensity</i>	High–5	
	<i>Duration</i>	Permanent – 5	
	<i>Probability</i>	Likely–3	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+3) \times 5 = 80$ High	H
	<i>With mitigation</i>	$WOM \times ME = WM$ $80 \times 0.2 = 16$ Low	L

Mitigation measures:

- This portion of the proposed development that encroaches into the 30m wetland buffer must be earmarked for “soft” development such as landscaping and gardens. No hard surfaces, buildings or structures should be developed within this portion.

Significance of the impact:

The significance of this impact without mitigation is regarded to be high due to the sensitivity of wetlands to disturbance and the critical role of wetland buffers as recharge areas. Implementation of the mitigation measure will decrease the significance of the impact to low and water infiltration will take place.

F-4.2 Socio-Economic Environment**F-4.2.1 Increase in ambient noise levels (impact of the proposed development on the existing noise climate)****Source and nature of the impact:**

Typical noise levels associated with residential developments, such as vehicles moving along the road network, people walking and talking within the estate, maintenance activities (such as regular mowing of lawns, etc.), etc.

Table 25: Increase in ambient noise levels

Impact source(s)	Typical residential neighbourhood noises associated with vehicles, people and pets.		Status	-
Nature of impact	Increase in ambient noise levels			
Reversibility of impact	The impact is irreversible but can be mitigated to a large extent			
Degree of irreplaceable loss of resource	N/A			
Affected stakeholders	Adjacent landowners and occupiers of land			
Magnitude	<i>Extent</i>	Site – 2		
	<i>Intensity</i>	Low – 1		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Definite – 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+1+5+5) \times 1 = 13$ Low		L
	<i>With mitigation</i>	$WOM \times ME = WM$ $13 \times 1.0 = 13$ Low		L

Mitigation measures:

The impact is not believed to be significant, thus mitigation measures are not necessary. However, the following mitigation measures can be implemented and will only serve to further decrease any potential noise that may specifically emanate from the proposed development during the operational phase.

- The proposed layout plan allows for a portion of open space between residential stands and the existing Huddle Park Golf Course (along the western and northern boundaries), which will assist in dampening any noise from the proposed development as sound decreases over distance; and
- Implement speed limits on internal roads.

Significance of the impact:

Noise levels along Club Street are greater than the suggested daytime SANS 1013:2008 level of 50 dB(A) and the typical noise levels at the boundary of a residential development (such as the proposed Huddle Township Development) are unlikely to exceed the recommended daytime value of 50dB(A), thus the daytime impact of the proposed development on the neighbouring residential area is likely to be **none or very low** (Noise Impact Assessment in Appendix 6).

F-4.2.2 Visual impact of operational activities on visual receptors**Source and nature of the impact:**

The existing woodland character of the site will be altered by the removal of existing vegetation as well as the implementation of buildings and widening of roads. New indigenous trees will be planted in landscaped areas and private gardens of the estate to restore some of the lost character. Once the new vegetation is established the development will blend in better with its surroundings. The **intensity** of the impact on visual receptors during the operational phase is considered to be **medium**.

Table 26: Visual impact of operation activities on visual receptors

Impact source(s)	The completed development (residential/retail) and perimeter wall		Status	-
Nature of impact	Views of the abovementioned development			
Reversibility of impact	The impact is permanent			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding land owners, motorists travelling along Club Street and recreational users of the Harvey Municipal Nature Reserve.			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	Medium - 3		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Highly Likely - 4		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+5+4) \times 4 = 60$ Medium - High		M-H
	<i>With mitigation</i>	$WOM \times ME = WM$ $60 \times 0.6 = 36$ Low - Medium		L-M

Mitigation measures:

- Draw up a set of architectural, landscape and aesthetics guidelines for the estate, to which each tenant/ owner must subscribe;
- Retain as many large trees as possible (bearing in mind the presence of exotic species) during the planning of each site and the development as a whole;
- If there are noteworthy exotic specimens (i.e. large and beautiful trees), then efforts should be made to protect these – they have social and aesthetic value, and help to buffer the visual impact in the short term, especially when the new planted trees are establishing;
- Ensure that internal streets are planted with street trees and are landscaped appropriately;
- Ensure that parking areas are planted with shade trees and landscape appropriately;
- Replace as many trees as possible in order to restore the existing woodland character;
- In order to reduce the visual imposition of large buildings it is recommended that the colour scheme selected for the walls of buildings in the retail/ business zone is of a nature that would visually break up large surfaces;
- Make use of architectural and landscape strategies to create a comfortable pedestrian-scale environment along public routes and streets;
- Ensure that an aesthetics committee is set up to monitor/ control/ approve building plans;
- Do not allow unsightly services (i.e. air-conditioning ducts, satellite dishes, etc.) to be visible on any buildings;
- Ensure that backyards of buildings are not visible from public spaces, or that these are adequately screened;
- Ensure that the perimeter of the development is landscaped and maintained, and that street trees are retained, replaced/ established so as to contribute to the public realm;
- Where possible matt paint must be used on walls in order to reduce reflection;
- Roof material should not be silver or glossy (e.g. unpainted corrugated iron);
- Where direct views of the development occurs, such as along Edward Avenue and Margret Rose Street, screening techniques such as earth berms and/or dense vegetation (with screening characteristics) must be implemented;
- All buildings, infrastructure and exterior spaces must be maintained. Repair damage and do not allow the facility to fall into disrepair; and
- Monitor all areas for rehabilitation failure and implement remedial action immediately.

Significance of the impact:

The proposed development (retail and residential) will contrast visually with the adjacent Huddle Park golfing facility while the retail component can be considered to be a change in land use and will also contrast visually with the surrounding residential neighbourhoods. However, sloping topography and existing dense vegetation within the golf course, between the development and residences on the southern, western and north-western perimeters will reduce visual impact to a degree. The moderate VAC of the landscape as well as the sheer viewing distance will reduce the impact caused to residents and recreational users (Harvey Municipal Nature reserve) in high lying areas. The significance of the impact caused by the development and associated upgrades without mitigation is regarded to be medium-high. Implementation of appropriate mitigation measures will decrease significance to low-medium.

F-4.2.3 Visual Impact of operational activities on the visual resource**Source and nature of the impact:**

The visual character and sense of place of the site and immediate surrounding areas will be affected by the proposed development and associated road and infrastructure upgrades. The removal of vegetation to make way for the development will result in a loss of local open space. The removal of the mature tree canopy will also impact on the woodland character that provides the site with a sense of place. The leafy streetscape (Club Street) will also be affected by widening of the road and removal of a row of mature trees. New indigenous trees will be planted in landscaped areas and private gardens of the estate as well as next to Club Street to restore some of the lost character. Once the new vegetation is established the development will blend in with its surroundings. The **intensity** of the impact on visual receptors during the operational phase is considered to be **medium**.

Table 27: Visual impact of operational activities on visual resource

Impact source(s)	The completed development (residential/retail) and perimeter wall	Status	-
Nature of impact	Green open space will be lost. The woodland character of the streetscape will be altered.		
Reversibility of impact	The impact is permanent		
Degree of irreplaceable loss of resource	High		
Affected stakeholders	Surrounding land owners, motorists travelling along Club Street and recreational users of the Harvey Municipal Nature Reserve.		
Magnitude	<i>Extent</i>	Regional -3	
	<i>Intensity</i>	Medium - 3	
	<i>Duration</i>	Permanent – 5	
	<i>Probability</i>	Highly Likely - 4	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+5+4) \times 4 = 60$ Medium - High	M-H
	<i>With mitigation</i>	$WOM \times ME = WM$ $60 \times 0.6 = 36$ Low - Medium	L-M

Mitigation:

- Refer to the mitigation measures presented in F-4.2.2.

Significance of the impact:

The proposed development will reduce open space in the local area. The development will also have a negative effect on the woodland character of the site and surrounding streetscapes through the removal

of mature trees and other vegetation. Successful rehabilitation and landscaping can restore the lost woodland character to an extent, but the open space taken up by the development footprint will be lost. The significance of the impact caused by the proposed development and associated upgrades without mitigation is therefore regarded to be medium to high. Implementation of appropriate mitigation measures will decrease the significance of the impact to low-medium.

F-4.2.4 *Increased traffic congestion and altered traffic patterns*

Source and nature of the impact:

The Traffic Engineer has confirmed that prior to the proposal to construct the Huddle Township Development, several of the intersections along Club Street were already experiencing unacceptable levels of service or require upgrading before the development can be introduced. These intersections are:

- Club/Civin/Linksfild intersection during the AM Peak;
- Civin/Chauncer/St Christopher intersection during the AM Peak;
- Club Street and Donne Avenue;
- Club Street and Shelley Street;
- Club Street and St Andrews Street;
- Club Street and Byron Street; and
- Club Street and King David School Access.

Table 28: Increased traffic congestion and altered traffic patterns

Impact source(s)	Use of the existing road network by residents of the Huddle Township Development and those accessing the retail centre		Status	-
Nature of impact	Impact on existing problems with traffic flow patterns			
Reversibility of impact	The impact is reversible through appropriate mitigation			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Surrounding land owners and road users			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Short – Medium Term - 2		
	<i>Probability</i>	Definite – 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+2+4) \times 5 = 60$ Medium - High		M-H
	<i>With mitigation</i>	$WOM \times ME = WM$ $60 \times 0.8 = 48$ Medium		M

Mitigation measures:

The Traffic Engineer has proposed the following road upgrades to mitigate operational problems:

Club Street

- An upgrade of Club street south of the development to a two lane per direction road from the Club Street/Linksfild Road/Civin Drive intersection to a point 60m south of the Club Street/Huddle Park Golf Course access is proposed.

Club Street/Civin Drive and Linksfild Road Intersection

- North approach: 100 m exclusive right turn lane, 2 through lanes and the existing left turn slip lane, 100 short exit lane;
- South approach: 3 through lanes, 2 exclusive right turn lanes (60m) and an exclusive left turn slip lane;

- East approach: 2 through lanes, 2 exclusive right turn lanes and 1 left turn lane; and
- Revised signal phasing.

Civin Drive, Chaucer Avenue and St Christopher Drive

- Signal optimisation is proposed to meet the high demand on the south approach;
- A short 60m receiving lane is proposed on the north approach;
- An extension to 120m of the proposed short 60m accepting lane on the north approach is proposed to accommodate future traffic.

Club Street and St Andrews intersection

- A Traffic Signal is proposed at this intersection.

Club Street and Huddle Park Golf Club Access

- It is proposed to consolidate this intersection at the location of the entrance by providing a protected exit right turn lane with the four lane cross section at this location. Traffic will be able to exit under priority control because of the gaps created by the proposed St. Andrews/Club Street signalisation.

Development accesses

- The developer will construct the Huddle Crescent public road with access onto Club Street at intersection 4 and 9 of the new proposed signalised intersection to the retail centre (intersection 8). All these intersections will require signalisation;
- A roundabout with a mountable internal circle 20m diameter and outer circle diameter of 28m is proposed for the northern residential access on Huddle Crescent;
- A stop control T-junction is proposed for the res. 3 and westernmost residential access off Huddle crescent (Intersection 10 and 12); and
- Three entrance lanes and two exit lanes are proposed for each of the security access controlled residential estate access points. The entrance stoplines should be at least 30m set back from the Huddle Crescent intersections and at least one of the lanes should be 4.m wide and 5m high to allow emergency vehicle access.

Significance of the impact:

Due to the nature of the impact (as described above) the significance of this impact, without mitigation is regarded to be medium-high. Implementation of the mitigation measures will decrease the significance of the impact to medium.

F-4.2.5 Increase in crime/ criminal activity within the community**Source and nature of the impact:**

Community members believe / perceive the proposed development to increase the level of crime or criminal activity within the community. There is the perception that the proposed development will attract new people into the area as a result of the neighbourhood node/ retail/ business component of the development. There is also a concern that an increase in crime may materialise with the associated increase in the number of workers (such as domestic workers, gardener's, etc.) coming to the area, and the likely growth in the number of taxi's.

Table 29: Increase in crime/ criminal activity within the community

Impact source(s)	Increased number of residents, workers, visitors and number of taxi's to the area.		Status	-
Nature of impact	Increase in local crime/ criminal activity levels within the community			
Reversibility of impact	NA			
Degree of irreplaceable loss of resource	NA			
Affected stakeholders	Local community members including schools and businesses			
Magnitude	<i>Extent</i>	Regional – 3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Likely – 3		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+5+3) \times 5 = 70$ Medium		M – H
	<i>With mitigation</i>	$WOM \times ME = WM$ $70 \times 0.8 = 56$ Low		M

Mitigation measures:

- The Neighbourhood Node within the proposed development must be secure. Security guards should be present and visible to deter any criminal activity. Security cameras should also be installed.
- The proposed development is access controlled and security as these access points should be monitored for effectiveness and should security be lacking, measures to increase security must be implemented immediately by the HOA.

Significance of the impact:

The impact without mitigation is predicted to be medium-high, and due to the fluid nature of the Neighbourhood Node/ retail/ business component and the changing groups of people that it will attract, the impact is expected to marginally reduce to a medium significance if appropriate security is implemented at the proposed Neighbourhood Node.

F-5 CUMULATIVE IMPACTS

Cumulative impacts are those impacts that are created as a result of the combination of the impacts of the proposed project, with impacts of other projects or operations, to cause related impacts. These impacts occur when the incremental impact of the project, combined with the effects of other past, present and reasonably foreseeable future projects, are cumulatively considerable. The assessment of cumulative impacts on a site-specific basis is however complex – especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated.

F-5.1.1 Loss of open space**Source and nature of the impact:**

The main element that provides the visual resource (Open Space) with a unique landscape character is the presence of a well-established tree population that defines a strong sense of enclosure which is indicative of a mature landscape. The site can be described as an urban woodland recognised for the dense tree canopy and a lush green appearance. The **intensity** of the impact (in conjunction with other urban development) has on visual resources such as Huddle Park is considered to be **high**.

Table 30: Loss of Green Open Space

Impact source(s)	The completed development (residential/retail) and perimeter wall		Status	-
Nature of impact	Green open space will be lost in conjunction with other urban developments in the area.			
Reversibility of impact	The impact is permanent			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	All observers.			
Magnitude	<i>Extent</i>	Regional – 4		
	<i>Intensity</i>	Medium –5		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Highly Likely – 4		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(4+5+5+4) \times 5 = 90$ High		H
	<i>With mitigation</i>	$WOM \times ME = WM$ $90 \times 0.8 = 72$ Medium to High		M-H

Mitigation measures:

- Refer to Mitigation measures presented in the section above.

Significance of the impact:

Due to the high visual quality associated with open space in urban residential areas as well as ever expanding urban development that is taking place in Johannesburg and other South African cities, there is a need to preserve the few urban green spaces that are left. Therefore the significance of the impact that the proposed development would have without mitigation is regarded to be high. Implementation of appropriate mitigation measures in conjunction with the fact that the site is underutilised and under maintained, the significance of the impact will remain medium to high.

F-5.1.2 Obtrusive lighting**Source and nature of the impact:**

Residential visual receptors of the proposed development will be exposed to an increase in obtrusive lighting at night caused by internal and external lighting of the proposed residences, security lighting on the perimeter as well as street lighting (internal roads). The village centre (retail zone) will also be lit at night for security reasons, the intensity of the impact that lighting will have on the receiving environment is therefore considered to be high.

Table 31: Impact of obtrusive lighting

Impact source(s)	Internal and external lighting of the proposed development as well as security and street lighting.		Status	-
Nature of impact	Intensified obtrusive lighting.			
Reversibility of impact	The impact is partially reversible through the implementation of suitable mitigation measures.			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Residents of adjacent neighbourhoods and recreational users of the Harvey Municipal Nature Reserve			
Magnitude	<i>Extent</i>	Regional – 3		
	<i>Intensity</i>	Medium – 5		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Likely –3		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+3) \times 4 = 64$ High		H
	<i>With mitigation</i>	$WOM \times ME = WM$ $964 \times 0.4 = 25.6$ Low to Medium		L-M

Mitigation measures:

- When and if vertical structures or surfaces are lit, install a down light luminaire fitted with day-night switches;
- Refrain from permanently illuminating outdoor spaces where light is only required intermittently. Lighting can be switched on and off manually or through automatic time switches, synchronised with the time light is required; and
- An Electrical Engineer should be consulted for the design and specification of the lighting in terms of screening sources and low wattage lights. Security lights can be motion activated to lower obtrusive lighting periods.

Significance of the impact:

Due to the contribution of obtrusive lighting by the proposed development in conjunction with lighting from surrounding suburbs the significance of this impact without mitigation is regarded to be medium-high. Implementation of appropriate mitigation measures as presented in the assessment of visual impacts associated with the development will reduce the significance of the impact to low-medium.

F-5.1.3 Impact on the Road Traffic Network**Source and nature of the impact:**

The Traffic Engineer has confirmed that prior to the proposal to construct the Huddle Township Development, several of the intersections along Club Street are already experiencing unacceptable levels of service or require upgrading before the development can be introduced. These intersections are:

- Club/Civin/Linksfield intersection during the AM Peak;
- Civin/Chaucer/St Christopher intersection during the AM Peak;
- Club Street and Donne Avenue;
- Club Street and Shelley Street;
- Club Street and St Andrews Street;
- Club Street and Byron Street;
- Club Street and King David School Access.

Table 32: Impact on the existing road network

Impact source(s)	Use of the existing road network by residents of the Huddle Township Development and those accessing the retail centre.		Status	-
Nature of impact	Impact on existing problems with traffic flow patterns			
Reversibility of impact	The impact is reversible through appropriate mitigation			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Surrounding land owners, residents and road users.			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	High - 5		
	<i>Duration</i>	Long Term - 4		
	<i>Probability</i>	Definite - 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+4+5) \times 5 = 85$ High		H
	<i>With mitigation</i>	$WOM \times ME = WM$ $85 \times 0.6 = 51$ Medium		M

Mitigation measures:

The Traffic Engineer has proposed the following road upgrades to mitigate operational problems:

Club Street

- An upgrade of Club street south of the development to a two lane per direction road from the Club Street/Linkfield Road/Civin intersection to a point 60m south of the Club Street/Huddle Park Golf Course access is proposed.

Club Street/Civin Drive and Linkfield Road Intersection

- North approach: 100 m exclusive right turn lane, 2 through lanes and the existing left turn slip lane, 100 short exit lane;
- South approach: 3 through lanes, 2 exclusive right turn lanes (60m) and an exclusive left turn slip lane;
- East approach: 2 through lanes, 2 exclusive right turn lanes and 1 left turn lane; and
- Revised signal phasing.

Civin Drive, Chaucer Avenue and St Christopher Drive

- Signal optimisation is proposed to meet the high demand on the south approach;
- A short 60m receiving lane is proposed on the north approach;
- An extension to 120m of the proposed short 60m accepting lane on the north approach is proposed to accommodate future traffic.

Club Street and St Andrews intersection

- A Traffic Signal is proposed at this intersection.

Club Street and Huddle Park Golf Club Access

- It is proposed to consolidate this intersection at the location of the entrance by providing a protected exit right turn lane with the four lane cross section at this location. Traffic will be able to exit under priority control because of the gaps created by the proposed St. Andrews/Club Street signalisation.

Development accesses

- The developer will construct the Huddle Crescent public road with access onto Club Street at intersection 4 and 9 of the new proposed signalised intersection to the retail centre (intersection 8). All these intersections will require signalisation;
- A roundabout with a mountable internal circle 20m diameter and outer circle diameter of 28m

- is proposed for the northern residential access on Huddle Crescent;
- A stop control T-junction is proposed for the res. 3 and westernmost residential access off Huddle crescent (Intersection 10 and 12); and
- Three entrance lanes and two exit lanes are proposed for each of the security access controlled residential estate access points. The entrance stoplines should be at least 30m set back from the Huddle Crescent intersections and at least one of the lanes should be 4.m wide and 5m high to allow emergency vehicle access.

Significance of the impact:

Due to the nature of the impact (as described above) the significance of this impact, without mitigation is regarded to be medium-high. Implementation of the mitigation measures will decrease the significance of the impact to medium.

F-5.1.4 Impact on adjacent water resources

Source and nature of the impact:

Given the fact that the proposed development is located in close proximity to the Jukskei River as well as a wetland system, a wetland delineation and functional assessment was undertaken to assess the cumulative impacts the development of the site could have on these ecological resources.

Table 33: Encroachment of the development into the wetland

Impact source(s)	Encroachment of the development footprint into the wetland		Status	-
Nature of impact	Impacts on storm water runoff patterns.			
Reversibility of impact	The impact is reversible through appropriate mitigation			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Surrounding land owners and the larger community(neighbouring suburbs)			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Short – Medium Term – 2		
	<i>Probability</i>	Highly Likely – 4		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+2+4) \times 4 = 48$ Medium		M
	<i>With mitigation</i>	$WOM \times ME = WM$ $48 \times 0.4 = 19.2$ Low – Medium		L - M

Mitigation measures:

- The 32m wetland buffer is important to the system in terms of recharge area;
- The development footprint has been maintained outside of the wetland except for minor encroachment into the buffer, which is considered to be a negligible impact by the wetland ecologist. Soft development (landscaping and gardens) is proposed in this area of encroachment and should not impact storm water run-off patterns;
- Mitigation measures should focus on preventing water pollution, erosion and sedimentation.
- The stormwater management controls recommended by the Engineer must be incorporated into the development. The wetland ecologist requires that the following aspects be included:
 - Retardation and containment of water on site in numerous structures that have permeable swales or walls to allow for slow but constant release of water into downslope structures;
 - The stormwater management plan must be integrated with landscaping within the development; and

- Release of water from stormwater structures into down-slope structures that have been planned in conjunction with the Huddle Park golf course.

Significance of the impact:

Due to the nature of the impact (as described above) the significance of this impact, without mitigation is regarded to be medium. Implementation of the mitigation measures will decrease the significance of the impact to a low-medium.

SECTION G: CONCLUSIONS AND RECOMMENDATIONS

In accordance with the EIA Regulations (GN No. 543), this section provides a summary of the key findings of the EIA and a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives. This section also provides a reasoned opinion as to whether the activity should or should not be authorised and conditions that should be made in respect of that authorisation, as necessary.

G-1 SUMMARY OF THE KEY FINDINGS OF THE EIA

Due to the fact that the proposed Huddle Township Development is located within an existing urban residential area, the proposal to construct additional housing opportunities correlates positively to the need and desirability for the development. The incorporation of a commercial/retail node may be considered a contrasting land use, but the identified need for retail/commercial land use in this area offsets this factor. The proposed project is therefore located on a site that is suitable for the proposed development.

The findings of the specialist studies undertaken together with the broader environmental assessment conclude that there are no fatal flaws that should prevent the project from proceeding. However, the following key impacts have been identified which will require the application of site and activity specific mitigation measures. These mitigation measures are included within the EMP to ensure that they receive the necessary attention.

Table 34: Summary of the significance of identified impacts without and with mitigation measures

Impact Category	Description of Impact	Significance of Impact	
		WOMM	WMM
CONSTRUCTION PHASE			
Biophysical Impacts	Destruction of natural habitat and vegetation	M	L
	Exposure to erosion	L-M	L
	Increase in invasive vegetation	L-M	L
	Interference with fauna and faunal breeding activities	M	L
	Contamination of the environment	M-H	L-M
	Altered surface water run-off patterns into the adjacent wetland	M-H	L-M
	Disturbance of the wetland and watercourse during the installation of bulk services	M-H	L-M
Socio-Economic Impacts	Increase in ambient dust levels	M	L-M
	Increase in ambient noise levels (impact of the proposed development on the existing noise climate)	L-M	L
	Visual impact of construction of the development on visual receptors	M	L-M
	Visual impact of construction of infrastructure upgrades on visual receptors	M	L-M
	Increased traffic congestion and altered traffic patterns	H	M
	Adverse human health impacts related to possible Anthrax contamination/ infection	L-M	L
	Increase in crime/ criminal activity in the community	M	L-M

Impact Category	Description of Impact	Significance of Impact	
		WOMM	WMM
OPERATIONAL PHASE			
Biophysical Impacts	Surface and groundwater contamination	L-M	L
	Introduction and spread of alien and domesticated animals	L-M	L
	Increased stormwater run-off into the adjacent wetland	H	L-M
	Loss of groundwater recharge area within the temporary wetland buffer	H	L
Socio-Economic Impacts	Increase in ambient noise levels (impact of the proposed development on the existing noise climate)	L-M	L
	Visual impact of operational activities on visual receptors	M-H	L-M
	Visual impact of operational activities on the visual resource	M-H	L-M
	Increased traffic congestion and altered traffic patterns	H	M
	Increase in crime/ criminal activity in the community	M-H	M
CUMULATIVE IMPACTS			
	Increased loss of open space within the greater area	H	M-H
	Obtrusive lighting	M-H	L
	Impact on traffic patterns	H	M
	Impact on adjacent water resources	M	L-M

Having assessed all the potential environmental impacts associated with the proposed development, it is the opinion of the EAP that the proposed Huddle Township Development should be issued with a positive Environmental Authorisation from GDARD for the following reasons:

- Club Street and Linksfield Road have been identified as east-west mobility roads within the CoJMM. To maintain efficient connectivity of the metropolitan to the surrounding areas, these roads require maintenance and upgrade. As part of the proposed Huddle Township Development, a section of Club Street will be upgraded to meet the CoJMM's requirements;
- The area lacks suitable convenience retail and recommends that at least 5000m² of retail floor area is needed. To meet this need, the proposed Huddle Township Development will provide a neighbourhood shopping centre with a maximum floor area of 10 000m²;
- Residential growth in this upmarket suburb is limited by the lack of developable areas. By placing this site on the market, a demand for middle to upper income housing opportunities is likely to be provided; and
- It is envisaged that the proposed development should have minimal impacts on the surrounding suburbs because it is buffered by large open spaces or major roads.

G-2 EAP'S RECOMMENDATION

Having assessed all the potential environmental impacts associated with the proposed development it is the opinion of the EAP that the Huddle Township Development should be issued with a positive Environmental Authorisation from GDARD for the following reasons:

- The Need and Desirability factors as presented in the section above;
- The proposed development is in line with the CoJMM's vision for the area;
- It is envisaged that the proposed development should have minimal impacts on the surrounding suburbs because it is buffered by large open spaces or major roads;
- In terms of achieving sustainable development, the CoJMM promotes a compact city by minimising urban sprawl. The promotion of compact mixed land uses (residential, open space, business and commercial nodes) within an existing urban area by the proposed Huddle Township Development will assist in achieving this goal; and
- The significance of the environmental impacts identified by stakeholders and I&APs during the

Scoping & EIR phase has allowed the specialist studies to investigate and mitigate these impacts to an acceptable level. Consequently, there are no fatal flaws that should prevent the development from proceeding.

To ensure that identified negative impacts are minimised and positive impacts enhanced, the following clauses are recommended as conditions of the Environmental Authorisation:

- The EMPr is a legally binding document and the mitigation measures stipulated within the document and EIR must be implemented;
- An independent Environmental Control Officer (ECO) must be appointed to manage the implementation of the EMPr during the construction phase. Environmental Audit Reports must be compiled and made available for inspection;
- The requirements of the Stormwater Management Plan must be adopted and implemented;
- Prior to construction close to or associated with the activities requiring authorisation by way of a Water Use License, GDARD must be provided with a copy of the Water Use License in terms of Sections 21(i) (e) and (g) of the National Water Act, 1998 (Act No. 36 of 1998) issued by the Department of Water and Sanitation (DWS);
- Only indigenous vegetation is to be used in landscaping open space areas and preferably within private gardens;
- The floral species, *Hypoxis hemerocallidea* which is classified as Declining has been confirmed on site and a plant recovery and relocation plan must be compiled to assist a suitably qualified botanist relocate this specie before construction commences;
- The 32m wetland buffer must be strictly adhered to, and no intrusion is permitted except for the area in the South-east corner of the site. The encroachment into this area is limited to soft engineering structures; and
- Architectural, landscape and aesthetic guidelines must be compiled for the Huddle Township Development.

SECTION H: APPENDICES

Appendix 1: Locality Map

Appendix 2: Photograph plate

Appendix 3: Layout

Appendix 4: Authority Correspondence

Appendix 5: Public Participation

Appendix 6: Specialist Studies

Appendix 7: Confirmation of Services

Appendix 8: Environmental Management Programme