SOUTHDOWNS DEVELOPMENT PROPOSAL

DRAFT ENVIRONMENTAL SCOPING REPORT

PREPARED FOR:

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KEY FINDINGS AND PRIORITY ACTIONS

Key findings

â€¢ The site lies adjacent to several urban centres including Irene, Highveld and in close proximity to the Highveld Techno Park and the Centurion CBD. This has given rise to a high demand for residential properties that include the continued expansion of the suburb of Irene and surrounding areas.

â€¢ The site is 244 ha in extent.

â€¢ The approved Local Integrated Development Plan for the area (Planning Zone 1) (March 1999) indicates that the area under discussion should include rural and residential activities that are compatible with the open space system.

â€¢ In addition, the precinct must be developed in such a way as to enhance and sustain the open space network system and create an open space node on the open space system. The LDO therefore clearly identifies the need to conserve the Irene Dairy and protect aesthetical qualities of Irene.

â€¢ An Environmental Management Framework has been initiated by the Gauteng Dept of Agriculture, Conservation, Environment and Land Affairs which includes the study site. This project was at its Draft phase of the preferred state of the environment at the time of submitting this report to the public. Information on the proposed development was provided to the consultants responsible.

â€¢ The proposed development of Southdowns Development Proposal stems from the fact that the Irene Dairy and Farm is unlikely to be sustainable unless a strategy can be found whereby the operational costs can be either minimised or cross subsidised.

â€¢ The proposed Southdowns Development Proposal sets out to create an environment where urban and rural land uses are not in conflict but rather in support of each other.

â€¢ This development proposes agricultural pastures between cells of residential accommodation in order to create a rural atmosphere while securing the sustainable future of the Irene Dairy. In addition, a school and low density commercial area will form part of the layout.

â€¢ The City of Tshwane Main Bulk Outfall sewers run within the Hennops River Floodplain immediately to the north-east of the proposed site. This bulk sewer line has sufficient capacity to accommodate the proposed development.

â€¢ Bulk water with sufficient capacity is located on the northern boundary of the site.

â€¢ The bulk electricity network traverses the south western portion of the site.

â€¢ The site is directly accessible via major provincial and metropolitan road infrastructure in the form of John Vorster Drive (Provincial Road K111), Nellmapius Road and Main Road (Provincial Road P38-1).

â€¢ Traffic is a major concern for the area and is evidence of lack of implementation of planned roads by municipal and provincial authorities over a long period;

â€¢ The proposed services agreement details a number of upgradings to existing road infrastructure and also proposes the construction of a number of other road portions to benefit the area as a whole. This includes the construction of a section of Olievenhoutbosch which will alleviate the traffic in Nelmapius and Main road.

â€¢ Key issues raised during the Scoping Process includes:
  - â€¢ Protection of the Hennops river during construction;
  - â€¢ Traffic problems of the area must be solved;
  - â€¢ Alternatives should be investigated;
  - â€¢ Traffic Flows and Pedestrian movement;
  - â€¢ Protection of biodiversity;
  - â€¢ Pollution and nuisance during the construction phase;
  - â€¢ Dolomite and sinkholes;

  - â€¢ Use of indigenous trees;
  - â€¢ Regional open spaces connectivity;
  - â€¢ Sense of Place;
  - â€¢ Historical preservation.

â€¢ The public is generally in support of the project if their environmental concerns are addressed.

â€¢ The public meeting was well attended and constructive comments were provided by the public.
â€¢ Agricultural land of moderate and high potential is located on the site. 34ha of high and moderate value agricultural land is included in an extensive open space system.
â€¢ All areas with sensitive geology have been incorporated into the open space system which added to the natural areas (listed below) incorporated into the open space system
â€¢ Sensitive faunal habitats and floral habitats identified on the site will be conserved in an open space system. 51.2% (42.2 ha) of identified high quality vegetation units as well as 48.3% (26.7ha) of identified high quality faunal habitats has been incorporated into the open space system.
â€¢ The open space system has been developed by creating a sensitivity map making use of the following parameters: geology, faunal and floral habitats, hydrology and agricultural resources.
â€¢ The open space system makes up approximately 46% (111ha) of the site.
â€¢ The open space system allows for connectivity with other open spaces and open land as well as along all the rivers affecting the site.
â€¢ One Red Data bird species (White-bellied Korhaan) and signs of three Red Data mammal species (Aardwolf, Aardvark and Brown Hyaena) were observed on site. The proposed open space system will mitigate the impact on these species and will allow for the species to move through and around the site. Mitigation measures are also proposed to allow these species to disperse off the site.
â€¢ No Red Data floral species were observed as the vegetation has been impacted upon by extensive farming activities over the last Â± 100 years. The most natural vegetation was observed to the north west and south east which will be incorporated into an open space system. The riverine vegetation is an important habitat that will be protected during construction and rehabilitated over time to prevent major disturbance at any one point.
â€¢ A site specific Environmental Management Plan has been provided that will minimise the environmental impact of the proposed development.
â€¢ The construction of the development will generate direct, indirect and induced economic benefits as a result of construction and ancillary activities. An Input/Output Model predicts that benefits will include: Additional employment, Additional gross geographic production (GGP) and Additional business sales.
â€¢ Estimates from the model include the creation of 5100 employment opportunities over a two year period, an additional GGP of R262 million and business sales of R2.9 billion.
â€¢ The Sense of Place/character of the surrounding and on site areas has been assessed and described. A variety of elements provide a pleasant sense of place in the Irene area including attractive architecture associated with buildings in the area, attractive large exotic trees such as those growing along Main and Nellmapius rds, the rural nature of the Irene Dairy farm, open pastures, natural grassland patches, neat office blocks, golf estates, golf courses and country lodges.
â€¢ The proposed development will maintain the openness which forms an important part of the sense of place while allowing for structures in line with the farm style observed on the Irene Dairy land.
â€¢ The site is located in the refined â€œurban edgeâ€ as is confirmed by the Department of Development Planning and Local Government (May 2002) and the City of Tshwane Metropolitan Municipality IDP.
â€¢ A comprehensive Public Participation process was followed.

Key actions

â€¢ A management plan for the open space system should be developed.
â€¢ Construction activities should strictly abide by the recommended Environmental Management Plan (EMP) included in this report;
â€¢ An independent Environmental Manager should be appointed to oversee the implementation of this EMP.

On the basis of the existing information, including the first scoping report, various addendum reports, as well as additional specialist investigations on the proposed development of an urban agricultural estate in Irene, we conclude that this report, should provide adequate

information to allow the relevant authorities to make an informed decision on.

Our recommendation is that the proposed development be authorised.

The conclusion of this report is based on the accuracy of the information provided to Eco Assessments at the time of writing the report.

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Report	**Area 1**	**Area 2**	**Area 3**
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R3 Floral Assessment Report School Site Eco Assessments	Flora		
R4 The soils vegetation and fauna of Southdowns Estate, Irene. G Bredenkamp and JHL Smit & Red Data Floral Assessment	Flora Fauna	Flora	 Fauna
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R6 Invertebrate report on the Irene Estate: Extension 3: School area P Roos & G Henning	Invertebrate		
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INTRODUCTION

The **Irene Realisation** Company (Pty) Ltd propose to develop an urban agricultural estate on various parts of the remainder of Portions 1 and 2 and Portion 49 of the farm Doornkloof 391JR. The site is located on the boundary of the Centurion Central Business District (CBD) and lies adjacent to the Irene Dairy and Farm (Map 1 & 2). The motivation for the development stems from the fact that the Irene Dairy and Farm is unlikely to remain sustainable in the urban context unless a strategy can be found whereby the operational costs can be either minimised or cross subsidised. Following an assessment of the status quo conditions on the site, as well as in view of the development trends in the area, it was proposed that a urban agricultural township be established that could serve both to retain the character and sense of place of the site as well as to secure the financial future for the Dairy within the context of this farm now being a â€œcity farmâ€ within an established and growing urban landscape.

A previous application known as Irene Estates was submitted for the area to the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs. Following a review of the document, the DACEL issued a negative Record of Decision (RoD) listing a number of concerns that required further investigation. Issues that were raised in the GDACEL documentation for the Irene Estates included concerns on:

- â€¢ Lack of appropriate Open Space System
- â€¢ Potential impacts on the Hennops River
- â€¢ Inadequate assessments of Alternatives
- â€¢ Change in Sense of Place
- â€¢ Loss of Agricultural resources
- â€¢ Lack of Invertebrate Assessment
- â€¢ Additional information needed on the Farming Assessment
- â€¢ Concerns on increased Traffic Impact
- â€¢ Lack of an Environmental Management Plan

The Southdowns Development proposal was subsequently initiated which would address the concerns raised by GDACEL as well as look at development on a larger area. This would allow for a more strategic approach and a more integrated and comprehensive open space system.

The previous Irene Estates application is located on Area 1 of the Southdowns Development Proposal (Map 2). Areas 2, 3 and 4 forms the rest of the study area (Map 2). Area 4 comprises the floodline areas of the Sesmylspruit to the north of the site and extends over Nellmapius Road to include the flood areas at the Irene Country Lodge. These areas will not be developed but will be maintained as is and are therefore indicated on many of the maps as â€œNot mappedâ€. This area will however form an important open space connector across the Nellmapius road to strengthen the link with open space system of the Hennopsriver to the north.
Eco Assessments cc, as independent ecological and environmental consultants, was appointed to facilitate the required environmental management for the proposed project.

The report that follows includes a complete description of the intended development as well as detail on the scoping process and inputs that have been received from interested and/or affected parties and the relevant authorities. The report further addresses concerns raised by

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the GDACEL and also includes a specific environmental management plan (EMP) that can be used to minimise the impact of the proposed development on the environment.

Terms of Reference

The terms of reference for the study included compiling an environmental scoping report according to the DEAT guideline document (1998) for the proposed development activity.

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SECTION ONE - DESCRIPTION OF THE PROJECT

1.1 Need and Desirability of the Project

The proposed development of Southdowns stems from the fact that the Irene Dairy and Farm is unsustainable unless a strategy can be found whereby the operational costs can be either minimised or cross subsidised. The site lies adjacent to several urban centres including Irene, Highveld and in close proximity to the Highveld Techno Park and the Centurion CBD. This has given rise to a high demand for residential properties that include the continued expansion of the suburb of Irene and surrounding areas.

The Irene Dairy presented the following facts in support of the application:

- â€¢ The farm has been in operation for over 100 years;
- â€¢ It has been a constant source of food and jobs to the local residents;
- â€¢ It was in the past a traditional and extensive farm type;
- â€¢ This farming type has been affected by development in the area;
- â€¢ Factors that contributed to the failure of extensive operations include stocktheft, annual veld fires, increased trespassing, stray dogs, vehicle traffic, and increased municipal rates;
- â€¢ Restructuring of the farming operations was required. This include relocating the beef cattle operation, mielie operation, and grass operation to a farm in Rayton;
- â€¢ The remaining land was sold to a Realization Company in order to encourage a sustainable development;
- â€¢ This development was to include the City Farm concept (Appendix A);
- â€¢ Continuous development pressure in the surrounding areas has increased with a consequent increase in frequency of the failure factors;
- â€¢ Additional factors also now include the degradation of the Hennops (or Sesmylspruit) and severe traffic along Nellmapius Road.

With this in mind, the landowner, **Irene Realisation** Company (Pty) Ltd, saw the

increasing potential that development on a farm portion adjacent to the Irene Dairy held. Furthermore, the escalating pressure of increasing rates and taxes, risk of stock theft and crime and costs associated with the current operation of the Dairy prevent its continued existence and operation. The proposed establishment of the Southdowns development will therefore ensure for itâ€™s continued existence by means of cross subsidisation and financial support.

The local and regional planning criteria that have been set for the area include that the

developers had to consider an integrated mix of land use that is consistent with the retention of the sense of place of the area. This currently includes the Irene Country Club & Golf Course, the Irene Dairy Farm and the open space corridor of the Hennops River. Consequently, the proposed township consists of low-density residential sites and â€œResidential 2â€ cluster sites (10 units per ha) which are to be developed around green pastures and natural open space, which will be utilised for biodiversity and grazing purposes by the Irene Dairy. This was designed in an attempt to retain and complement the existing character of the Irene Dairy. In addition a business and education zone will be created as supported extension to the mixed land use corridor along John Vorster Drive extension.

The proposed Southdowns development represents a unique mixed land use proposal,

which came about as result of a broad consultative process between various stakeholders with interests in Irene and its surrounds. A complete environmental planning process was undertaken to facilitate a process in terms of which sustainable and optimal utilization of land was identified within the context of physical and environmental sensitivities. This ultimately resulted in a development proposal that ensures that natural and agricultural resources are sustained within the context of a unique private sector development.

The proposed development at Southdowns will consists of a subdivision of land to accommodate the following land use zonings:
Table 1

Southdowns lanuse zoning

Zoning	Land Use	No. of Stands	Area of Stands ha	Percentage Of Land
Residential 1	Single Residential erven	489	49.05	23%
Residential 2	Low Density Cluster Development (@10 units per hectare)	10 19.56		9%
Agricultural	Land reserved for conservation and agricultural purposes	8 111.5		46%
Educational	Private School	1	6.0	3%
Business 1	Convenience Shopping Center	1	4.9	2%
Business 4	Low density Office Park	1	2.57	1%
Private Road	Private Streets within residential estate	1 41.10		19%
Public Road	Extension of Provincial Road K111 (John Vorster Drive) and small portion of Proposed K54	2 9.55		5%
Total			**244.23ha**	**100%**

Responsible planning and contemporary development policy dictates that developments should be mixed in nature to ensure sustainability. The Southdowns development is considered unique in terms of the proposed mix of residential, agricultural and other land uses. The land owner, and owner of the Irene Dairy, considers the development of this land and simultaneous reservation of a substantial portion of agricultural land, as essential to secure the future of the city farm to the benefit of Irene and Tshwane as a whole.

1.2 Summary of applicable legislation

The Constitution in South Africa (Act 200 of 1993:Section 29) gives every person the right to an environment that is not harmful to his or her health and well being. That is, everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -

- â€¢ Prevent pollution and ecological degradation
- â€¢ Promote conservation; and
- â€¢ Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

In addition, and according to the National Environmental Management Act (Act 107 of

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1998), the State must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities.

Below is listed and described some of the pertinent environmental legislation that gives effect to the above mentioned rights:

1.2.1 Development Facilitation Act (DFA)

The Development Facilitation Act (Act 67 of 1995) has three main objectives. These include:

â€¢ To provide for a coherent policy framework for land development, land registration and planning;

â€¢ To speed up and facilitate the approval of land development applications; and

â€¢ To provide for the overhaul of the existing planning and land development framework.

Basically the DFA introduces extraordinary measures to facilitate and speed up the implementation of reconstruction and development programmes and projects in relation to land. The Act further includes general principles governing land development including nationally uniform procedures for the sub-division and development of land in urban and rural areas so as to promote the speedy provision and development of land for residential, small-scale farming or other needs and uses.

1.2.2 Environment Conservation Act (ECA)

In terms of the Environment Conservation Act (Act 73 of 1989), it is required that the likely environmental effects of activities are taken into consideration before decisions in this regard are taken. The objective of such an assessment is to promote sustainable development, thereby achieving and maintaining an environment that is not harmful to people's health or well being.

Sections 21, 22 and 26 of the ECA strive to integrate environmental impact management with development activities with the aim to ensure more responsible and environmentally sensitive development.

Section 21 of the ECA lists a number of activities that could potentially detrimentally affect the environment, while Section 26 provides regulations with regard to the content and procedure for compiling an impact report.

1.2.3 National Water Act (NWA)

According to the National Water Act (Act 36 of 1998), it is necessary that the water resource, along with the associated natural environment, be protected from developments that could potentially significantly alter their natural structure and function. The NWA includes some of the following objectives:

â€¢ The sustainable use of water for the benefit of all users;

â€¢ The protection of the quality of water resources; and

â€¢ The need for integrated management of all aspects of water resources.

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The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, manage and controlled in ways which take into account:
â€¢ meeting the basic needs of present and future generations,

â€¢ promoting equitable access to water whilst redressing the results of past racial and gender discrimination,
â€¢ promoting the efficient, sustainable and beneficial use of water in the public interest,
â€¢ facilitating social and economic development,
â€¢ providing for growing demand for water use,
â€¢ protecting aquatic and associated ecosystems and their biological diversity,
â€¢ reducing and preventing pollution and degradation of water resources,
â€¢ meeting international obligations,
â€¢ promoting dam safety, and
â€¢ managing floods and droughts.

1.2.4 Minerals Act (MA)

The Minerals Act (Act 50 of 1991) regulates the prospecting for and optimal exploitation, processing and utilisation of minerals. The Act also provides for the safety and health of persons concerned in mines and works, and regulates the orderly utilisation and the rehabilitation of the surface of land during and after prospecting and mining operations.

As a means to understanding and planning for the envisaged environmental impacts of mining, an environmental management programme report is required for authorisation.

1.2.5 National Environmental Management Act (NEMA)

The National Environmental Management Act (Act 107 of 1998) seeks to provide for co-operative environmental governance by establishing principles for decision making on matters affecting the environment. Furthermore, the principles of The Act include that environmental management must place people and their needs at the forefront of it's concern, and serve their physical, psychological, developmental, cultural and social interests equitably.

[NEMA] gives 20 environmental principles that guide decision-makers on how best to manage and protect the environment. This further includes requirements for public participation, legal liability and financial accountability.

Proposed amendments to this act are presently being finalised.

1.2.6 National Heritage Resources Act (NHRA)

The National Heritage Resources Act (Act 25 of 1999) aims to promote good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed to future generations. The national estate may include, but not be limited to, places, buildings, structures and equipment of cultural significance, landscapes and natural features of cultural significance, archaeological and paleontological sites, graves and burial grounds.

A series of 7 general principles are provided in the Act to ensure adequate heritage resources management. Among these is section 5 (7) that requires the identification,

assessment and management of the heritage resources of South Africa.

1.2.7 Town Planning Schemes, Land Development Objectives and Integrated Development Plans

Existing legislation provides for forward planning and municipal budgeting so that a set of Land Development Objectives (LDOâ€™s) is compiled for each portion of a Local Authorities area of jurisdiction. This together with Local Integrated Development Plans (LIDPâ€™s) sets a framework for developers and other property practitioners to plan and develop within a preconceived regional vision and more importantly within the budgeting

system of the local authority.

1.3 Land Development Objective of the area

1.3.1 Vision Statement

The approved Local Integrated Development Plan for the area (Planning Zone 1) (March 1999) indicates that the area under discussion should include rural and residential activities that are compatible with the open space system (Appendix K). In addition, the precinct must be developed in such a way as to enhance and sustain the open space network system and create an open space node on the open space system. The IDP therefore clearly identifies the need to conserve the Irene Dairy and protect esthetical qualities of Irene.

Components of the existing open space system and open space node in the study area include the Irene Golf course, the Irene Dairy and the Hennops River. The proposed agricultural/residential development with itâ€™s low-density pastures and open spaces is proposed to complement this open space node in Irene & Centurion.

1.3.2 Emerging trends

The emerging trends in the area include the almost continuous establishment of additional residential properties (essentially townhouses and cluster houses) immediately north west of the site in the suburb of Highveld and Irene View. Similarly there is the almost continuous construction of new offices in the area of Highveld and Irene. Another important trend in the area is the increased traffic congestion and it is proposed that the development would vastly assist in solving these problems with the aid of the Tshwane Municipality.

According to the City Farm Document (Appendix A) and a review of other similar examples of urban agriculture, the proposed solution to the Irene Dairy problem is to develop a mixed use estate along the lines of an agricultural/rural village.

1.3.3 Intended Spatial Development Framework

The proposed development falls within the designated Urban Edge, as adopted by the Provincial Executive Council on 15 May 2002, in this part of the Gauteng Province. Furthermore the development takes cognisance of the unique character and rural elements of the Irene Dairy and proposes a development whereby a half of the total extent thereof will be retained exclusively for agricultural (rural) and natural open space use. In this regard, it is motivated that the proposed development is desirable from both the local communityâ€™s and the local authorityâ€™s points of view.

The Centurion Planning Zone 1 of the IDP indicates the study site to be suitable for -

â€¢ â€œRural residential activities compatible with the open space systemâ€.

It also indicates two â€œOpen space nodesâ€ on the map (Appendix K).

Personal communication with Ms Madelein Oosthuizen from the Centurion Town Planning Division was initiated in order to establish the exact explanation of this zoning proposal. The Centurion Open Space Network was also investigated for this purpose. The following points came out of the discussion:

- The Hennopsriver (Sesmylspruit) is a primary waterway network in Centurion;
- Nellmapius road forms part of the secondary parkway (road) network;
- The one open space node (large green dot) was placed where Nellmapius road and the Hennopsriver cross as this is where people would be able to access the waterway open space. GDACEL has since approved a development in this area;
- The size of the green node is only schematic and detailed planning will have to be done in order to determine the activity and extent of the node;
- The second open space node (smaller green dot) on the proposed development site should be interpreted differently. This node should be read with the proposed land use on the map. It does not refer to a specific site but to the total area affected by the proposed landuse mentioned above.

It is clear that the zoning proposal was determined in consultation with the Irene Dairy Farm and the local community. The intension was to allow for development on the site while protecting the character and sustainability of the Dairy Farm within a rapidly changing urban environment.

Planning guidelines are provided by the Tshwane Metropolitan Municipality â€“ Centurion Administrative Unit in the Environmental Management Framework report. This report provides the following information for the Sesmylspruit/Hennopsriver site (see Table 2).

Table 2. Relevant planning information on the Sesmylspruit.

Parameter	Status	Sensitivity	Comment
Natural habitat	Low Diversity	High	Assess the impact on the habitat. Development must take the open space value of these habitats into account.
Potential Pollution Sources	Undetermined	N/A	-
Cultural/Historical features	None	N/A	-
Geohydrology	Poor Quality water	N/A	-
Road buffer	Outside road/rail buffer	N/A	-
Geology	Chert/Chert breccia/Chert rubble	N/A	-
Hydrology	Natural River Floodplain â€“ natural or semi-natural open space	Very high	No development should be allowed in the floodplain. Maintain as natural and especially bird habitat. Boardwalks must be constructed where high-density traffic is expected. The visual impact on the river must be assessed and appropriate and effective preventative and mitigation measures must be taken before any development is allowed on the borders of the natural floodplain.
Land use	Parks, Sports and Recreation	High	Retain and enhance the recreational value for surrounding residential areas.
IDP corridors and nodes	Undetermined	N/A	-
Sensitive planning features	Rural/Agricultural Precinct	High	Conserve agricultural land. Maintain sense of place. Development here will need authorization from DEAT. An environmental impact assessment must be completed.
Soils	Hu3/R Hutton	N/A	These soils are completely inappropriate for waste disposal, agriculture, landscaping and for use as construction material. It is slightly more suitable for urban development.
Topography	Valleys		Use valleys for storage and dissipation of floodwater. Prohibit buildings and any alteration in natural topography and ground cover within the 1:100 year floodline.
River buffer	50 meter buffer	High	A 50 meter administrative buffer should be kept on both sides of the permanent water courses.
Vegetation	Golf Course	N/A	Retain natural patches in as an undisturbed a state as possible. Control the spreading of exotic lawn

grasses.

IDP Zones	Rural residential	N/A

In summary, the proposed land use for the Southdowns Development Proposal site is considered to be rural residential activity compatible with the open space system. With the present agricultural orientated layout of Southdowns and the close proximity of the open spaces of the golf course, the Sesmylspruit and the Irene Dairy farm, the area will be considered as an open space node that includes natural, recreational and agricultural open spaces.

1.4 Proposed Development Plan

The proposed Southdowns development sets out to create an environment where urban and rural land uses are not in conflict but rather in support of each other. This development proposes agricultural pastures and natural open space between cells of residential accommodation in order to create a rural atmosphere.

A similar residential estate in South Africa that has succeeded in integrating rural and residential land uses is Steinberg in the Western Cape where a residential estate was developed in and around vineyards.

1.4.1 Regional locality

Irene is situated approximately 3.0km east of Centurion, a city that lies almost midway between Pretoria, Kempton Park and Johannesburg in the Gauteng Province. The site for the proposed development is located adjacent to the existing Dairy in Irene (Map 2). Regional access to the site is provided along the N1 freeway from Johannesburg and

Pretoria. The R21 from Pretoria and Kempton Park allows regional access from the east.

The main roads that provide access to the site include:
â€¢ Nellmapius Drive (M31) linking Irene with Rooihuiskraal;

â€¢ Goedehoop Road (or M57) â€“ linking Elardus Park and Waterkloof AH with Clayville East and Olifantsfontein;
â€¢ Glen (Main) Road (or the M18) linking Irene with Clayville (Provincial Road P38-1). And
â€¢ John Vorster Drive (Provincial Road K111) linking Nelmapius Drive with the N1 National Freeway (Â±1,7km) and Centurion CBD (Â±3km)

The site is located immediately to the west of the Johannesburg / Pretoria Commuter Railway line with Irene and Pinedene Commuter Railway Stations being within walking distance of the site.

Future roads that could provide access to the site include the extension to the K111 that will link Midrand with Centurion, via Highveld and the K54 that will link with Irene and Rooihuiskraal / Olievenhoutbosch.

Furthermore the proposed Gautrain will also be located within close proximity of the proposed Irene Estate.

1.4.2 Proposed layout and Design

The proposed development includes the establishment of a low-density residential township that is developed around green pastures and natural open space that will be utilised for grazing purposes by the Irene Dairy. The core focus of the intended development is to retain the character and sense of place of the existing Dairy by means of appropriate architectural design, open space planning and township layout (Map 3). It needs to be pointed out that the proposed layout in no way effects the Sesmylspruit and has been developed and designed above the 1:100 flood line level. The low density housing is mostly positioned on portions of the existing pastures and grassland, all of which have been farmed for over 100 years.

The land owner intends to establish a development of both residential and agricultural land uses in favour of both. The intended aim is to ensure the continuous existence and utilisation of the agricultural resource base occurring on the site.

The total site extends an area of 244 hectares.

A description of each of the proposed land use components follows:

Residential

The specific segment of the residential market to be addressed in the Southdowns development together with density restrictions as result of geological conditions results in clearly a low density residential profile. The minimum size of residential erven is 1 000mÂ². The sizes of residential stands range between 1 000mÂ² to 1750mÂ² and averages around 1300mÂ². All â€œResidential 1â€ stands will be restricted to only allow for 1 dwelling unit with standard outbuildings. The Residential 2 (cluster) stands are again restricted to 10 units per hectare. The overall residential density of the Southdowns development is 3,2 units per hectare (i.e. 489 erven plus 195 units on 213,79 Ha).

Agricultural

A total of 111 Ha (46% of 244Ha) of land is identified under an â€œAgriculturalâ€ zoning in terms of the Centurion Town Planning Scheme, 1992. This zoning is considered by Councilâ€™s town planning department to be the most appropriate zoning to enable Council to effectively control land use on these properties. Note that the Centurion Town Planning Scheme does not have an appropriate Private Open Space nor a Conservation zoning. The environmental scoping process classified this land in terms of conservation and agricultural use. Those areas identified as â€œconservationâ€ worthy are to be conserved in its natural state while the use of the â€œagriculturalâ€ portions will remain agricultural with rights in favour of the Irene Dairy. These rights are to be protected in terms of servitudes as well as a management and use agreement between Home Owners Association and the Irene Dairy Farm.

Educational

The Southdowns development includes a site earmarked for a school. This land use was identified through consultation with both the Gauteng Department of Education and the City of Tshwane Metropolitan Municipality. It is clear from the figures received from the Department of Education that the development of Southdowns will warrant at least an additional school site for the sub-region. The position of this school site conforms to the identified extension of the mixed land use strip along John Vorster Drive (K111) currently existing along this route in the form of offices, shopping centers, public garages, educational colleges and mixed density residential development. The proposed educational site is relatively high lying in comparison to the rest of the site but will not be silhouetted - considering visual aspects of this site since it is lower lying than the southern portions of the site and on a gradual slope that reaches a high point further to the south of the development area (See Map 7 for topography).

Business

As mentioned above, the strip of land along John Vorster Drive is supported by Council as a mixed land use strip or activity corridor. To date, the corridor has developed up to the John Vorster / Nelmapius intersection and it follows in terms of land use policy that its continuity be supported as the southward extensions of this metropolitan scale route develops over time. Two land use components are included, a proposed convenience retail component (small shopping centre) and a small office park site zoned â€œBusiness 4â€. Both these land uses are anticipated to be relatively low in intensity with height restrictions limiting it to 2 storeys.

1.4.3 Current state of service provision and supply

1.4.3.1 Water

The Doornkloof Reservoir provides bulk water supply to an area extending from the N1 Freeway in the north to Centurionâ€™s southern municipal boundary, which lies far to the south of the study site. Within the reservoir zone, certain bulk water pipes have already

been laid. Directly north of the development site there is a 250mm diameter bulk water pipe along Nelmapius Drive that supplies water to this proposed development. A possible future connection point is located to the south and east of the development (refer to Point 1 and 2 on Map 3).

1.4.3.2 Sewage

There are currently two existing bulk outfall sewers just to the north of the study site. The one sewer is a 300mm diameter pipe and the other is a newly installed 600 mm diameter sewer pipe. Both sewers follow the natural drainage line of the Hennops River, and lie just north of the study site. A section of these sewers traverse the study site (Map 3).
These two sewer lines are designed to serve areas to the east of the proposed

development, up to the eastern boundary of Centurion (i.e. up to the Rietvlei Nature Reserve). The Civil Engineers indicated there is sufficient spare capacity for the proposed development as well as the areas within the watershed to the west and south thereof.

1.4.3.3 Telkom

Telkom have bulk infrastructure along Nellmapius Drive and the internal Telkom network will be served by this infrastructure.

1.4.3.3 Traffic (see Map 4)

Regional

The local authority has appointed ITS Consulting Engineersâ€™ to complete a traffic model of an area that includes the study area. This study is known as the â€œRoad Planning and Traffic Modelling for the South eastern Area of Tshwane (enclosed by the R28, N1, R21 and K220)â€. This study was undertaken because the existing road infrastructure in the area around the study site cannot accommodate the 2006 background traffic (which is the responsibility of the Local Authority). The following intersections require upgrading to accommodate the 2006 background traffic to reduce the current traffic congestion problems in the Irene area:
â€¢ Old Johannesburg Road/Nellmapius Drive;
â€¢ John Vorster Drive/Nellmapius Drive;
â€¢ John Vorster Drive ramps with N1 Freeway;
â€¢ Botha Avenueâ€™s ramp terminals at the N1 Freeway;
â€¢ Main Road/Nellmapius Drive, and
â€¢ John Vorster Drive / Oak Avenue.
The Terms of Reference of this Regional Traffic Study is included in Appendix B.

The objectives of the ITS study are to:
â€¢ determine the capacity of the existing and the planned road network,
â€¢ determine the extent of development which can ultimately be accommodated by taking public transport and the reduction of trips through land use planning into account,
â€¢ develop of a road network which can accommodate the ultimate expected traffic demand,
â€¢ develop implementation plans for the roads, based on the expected rate of

development in the area, and

â€¢ develop a computerised traffic simulation model to assess the impact of all and the most likely developments in the area on a microscopic level.

The methodology followed during the ITS study includes:

â€¢ data collection (status quo road network, existing traffic counts, existing land uses and the future road network),
â€¢ traffic modelling by Tshwane (recalibration of the 2002 interim Emme/2 model, land use and traffic projections for the 2005, 2010, 2015 and 2020 horison years, road upgradings required for these horison years, conclusions and recommendations (traffic generated within the study area will increase by 300% over the next 17 years, major road network improvements necessary to accommodate the additional traffic, apply the sub-area matrices in the sub-area model to test and confirm the intersection capabilities and develop a phased implementation plan of the area),
â€¢ road upgradings required (pages 42 to 49 of the Innovative Traffic Solutionâ€™s presentation),
â€¢ conclusions of the study (the 2020 modelled road network can accommodate the projected land use scenario, land use controls and travel demand management are required, there is a need for public transport, high through traffic through the area (40%), requirements for developments to proceed: finalise local traffic impact and timeous provision of the road network to accommodate the development traffic),
â€¢ funding of roads (year 2010 â€“ R450million â€“ R13850/trip, year 2020 - R1,1billion â€“ R21 000/trip, R140million p.a. over 17 years),
â€¢ funding sources (National Government (SANRAL), Provincial Government (Blue IQ?), Metropolitan Councils and developers),
â€¢ funding principles (public private partnerships, the contribution by developers to be balanced, payment by developers who develop now compared to in future has to be addressed, â€œring fencing of fundsâ€, and
â€¢ funding strategies need to be investigated (i.e. dedicated fund from increased taxes).

The traffic model includes an extensive future road network, which has been planned by the Gauteng Provinceâ€™s Department of Public Transport, Roads and Works. These roads include (refer the Map 4):

â€¢ K109 that will link Midrand with Centurion;
â€¢ K111 that will extend John Vorster Road to Midrand;
â€¢ K105 to augment P38-1;
â€¢ PWV 6 to the north of Irene;
â€¢ K54 to replace Nellmapius Drive, and
â€¢ K220 that will link Rooihuiskraal and the R21 Freeway.

Site specific

Two traffic impact assessments were undertaken by Civil Concepts (2001 & 2002) (Appendix B) which evaluated the traffic impact of the old Irene Estates applicationsâ€™ 500 high income residents and 165 cluster housing units. The developers would have been responsible for the following road upgradings:

â€¢ New road link â€“ Olievenhoutbosch Road, between John Vorster Drive and Alexandra Road (from bulk contribution)
â€¢ New road link â€“ southward extension of John Vorster Drive to the development (from bulk contribution)
â€¢ Road upgradings â€“ the Agricultural Research Council access road between Main Road and the Unisa Parkâ€™s access raod;
â€¢ Road upgradings â€“ Unisa Parksâ€™ access raod, between the ARC access raod and the entrance 3 to Southdowns Development site.

In comparing Irene Estates with the newly proposed Southdowns residential component, the numbers are approximately as follows;

â€¢ 550 high income residences (50 trips or 10% more than that of Irene estate)

â€¢ 160 cluster housing units (5 trips of 3% less than that of Irene Estate).

Southdowns trip generation will therefore be 69 (or 7.4%) peak hour trips more than that of the old Irene Estate application. These additional trips will be distributed between various intersections and therefore their impact will be insignificant.

This ITS traffic model has already taken the trip generation of the residential component of Southdownsâ€™ development into account. The local authority has further approved the Irene Estates traffic assessments based on the Traffic Modeling that was completed by the Local Authority at that stage. The traffic generated by the school and commercial developments will however first have to be measured against the traffic model before the traffic impact can be approved.

1.4.4 Proposed internal & external infrastructure and requirements

1.4.4.1 Proposed Water Supply

The City of Tshwane, as part of the bulk service contributions for Southdowns Development Proposal, require that the following bulk water pipes be laid:

a) a new 315mm diameter pipe along the proposed extension of John Vorster Drive (K111) to the main entrance at the western side to Southdowns
b) a new 400 mm diameter pipe along Main Road from the existing 450mm diameter pipe at the intersecttion of Main and Nelmapius streets to the eastern entrance of Southdowns. As development in this area proceeds, the above pipes will be extended to eventually form a ring network (Map 3).

The above pipes form part of the Master Plan for the Doornkloof Reservoir Zone and will serve the area to the southern boundary of Centurion, Southdowns and all future development in the immediate area.

1.4.4.2 Proposed Sewer Network

Water borne sewers from the site will link into the existing Tshwane (Centurion Council) bulk sewage system. The bulk sewerage system has sufficient capacity and therefore no further bulk sewers are required for Southdowns. Only the internal sewers need to be installed.

1.4.4.3 Proposed storm water network

The proposed network comprises a combination of underground pipes and open

concrete channels draining to the Hennops River. The underground pipes will be spigot and socket with rubber rings, thereby ensuring a water tight system. The concrete lined channels will have sealed movement joints to ensure water tightness. All low lying areas will be landscaped to ensure all surface water runs off into the stormwater network and that no ponding of water takes place. In the engineers opinion, this proposal is the most suitable for dolomitic areas. Both pipes and channels are flexible. Allowing for any movement which may take place, and the sealed joints will ensure that no water can be released into the substrata. The proposed system is also considered to be environmentally friendly.

The storm water release points into the river are all below the 1:50 flood line level and the necessary precautions will be taken to prevent erosion within the flood line. These will include measures such a flow dissipaters, gabions and concrete linings/loffelstein blocks to support the banks.

1.4.4.4 Solid Waste (incl. domestic waste)

Solid waste generated during the construction phase of the project will be removed by the responsible contractor. Domestic waste generated during the operational phase of the project will be collected using the established refuse collection system of the Tshwane (Centurion) City Council.

1.4.4.5 Electrical Supply

Electrical power for the township will be provided by the City of Tshwane (Centurion) via the Eskom service that is available.
The existing Kentron 132/11KV substation and infrastructure just south of the N1 is fully

utilised and committed to serving both the centurion CBD as well as adjacent Highveld Techno Park.

The NIVS 132/11KV substation is located 2km to the west of the site and was specifically constructed and positioned to service the existing developments directly north of Nellmapius, as well as all future developments south of Nellmapius, such as the Southdowns Development Proposal.

In addition to the above, the bulk service feeders were carefully co-ordinated with the officials of Centurion Electricity department in order to allow for future planned development around the proposed development site.

1.4.4.6 Open Spaces

The envisaged focus of the proposed development is to create â€œan agricultural - natural villageâ€ theme. This not only includes the use of appropriate architecture, but also by ensuring that the layout of the township supports the theme. This has been achieved by ensuring that approximately 46% of the area (Map 5) is to be used for both agricultural and natural open spaces. This is essential to ensure that adequate land is available for the continued functioning of the Dairy & Farm as well as that all important natural and agricultural resources are conserved.
Besides the intended retention of the appropriate agricultural and natural areas, the

proposed development will also be used to facilitate the continuation of a green belt / Open Space that will be developed along the Sesmylspruit as part of the regional development of an open space node in Irene/Centurion (Map 13). A detailed description

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of how the Open Space System was developed and how it fits into the Regional Open Space system is provided in Section 3 below.

Distances of at least 60 meters ranging up to 100 meters are kept free between the Sesmylspruit and the residential houses at any specific area. The Tswane Metrolopitan Municipality proposes 50 meters and the GDACEL Landcare program proposes a guideline of 100 meters to be kept free along rivers. The proposed layout is generally speaking in line with these guidelines.

1.4.4.7 Proposed Access

The layout plan for Southdowns makes provision for three (3) access points to the development. These are referred to as:

Access 1 â€“	Approved access point off proposed Provincial Road K111 (John Vorster Drive extension)
Access 2 -	Secondary access point off proposed intersection on P38-1 (Main Road) in the vicinity of the Main Road / Proposed K54 intersection, and
Access 3 -	Access to North-Western quadrant of development area at approved intersection off proposed Provincial Road K111 (John Vorster Drive extension).

It should be noted that Access 1 is intended to be the main access to the residential part of the proposed development and the construction of John Vorster Drive up to this point is required. Agreement has been reached with Council and Gautrans that the standard of this road will be â€œprovincialâ€ by design, but the road will be constructed as a â€œmetropolitan roadâ€. This will result in one of the designed dual carriage ways being constructed up to Access 1 to the same standard as the existing John Vorster Drive at the Nellmapius / John Vorster Drive intersection. The K111 will probably soon be developed further towards the recently approved development of Midrand Estates (Bondev Development) since this development requires the linear extension of this important road for access to its future phases. It is therefore conceivable that the K111 will be fully constructed up to Midrand Estates within the next 5 years. Thereafter, its further extension past Grand Central Airport (proposed Midrand CBD) and Kaalfontein /

Ivory Park becomes eminent.
A new alignment of Provincial Road K54 has recently been proposed by the Gauteng

Department of Public Transport and Roads (Gautrans) to the position indicated on the attached layout plan. This road represents another alternative to relieve traffic congestion on Nellmapius Drive and is considered an important piece of future transportation infrastructure in the sub-region. This road is placed on the medium priority list.
Lastly, in terms of roads and access, it should be noted that Council will be in a position

to construct Olievenhoutbosh Road as short term priority to relieve traffic congestion in the area. Agreement has been reached between City of Tshwane and Centurus (Pty) Ltd that a portion of the bulk services contributions of the proposed Southdowns development will be applied to the construction of Olievenhoutbosh Road between John Vorster Drive and Botha Avenue to the north of the Centurion Golf Estate (Highveld Extension 7).

During construction phases, it is anticipated that Entrance 1 will be used for residential access while Access 2 will be used solely as a construction and labour entrance.
Pinedene Station is located to the south of Irene along Main Road (P38-1) and is

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accessible via Access 2. The South African Rail Commuter Corporation indicated in preliminary discussions that they will reopen Pinedene Station should the development go ahead to enable convenient access for workers to and from the site.
Adequate funding and provisional bulk service agreements have already been provided

as part of the proposed development planning.

Summary

The City of Tshwane Main Bulk Outfall sewers run within the Hennops River Floodplain immediately to the north-east of the proposed site. Bulk water with sufficient capacity is located on the northern boundary of the site. The bulk electricity network traverses the south western portion of the site. The site is directly accessible via major provincial and metropolitan road infrastructure in the form of Nellmapius Road and Main Road. The proposed services agreement details a number of upgradings to existing road infrastructure and also proposes the construction of a number of other road portions to benefit the area as a whole.

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SECTION TWO - DESCRIPTION OF THE ENVIRONMENT

2.1 Geology

The information presented below serves as a summary of the geotechnical report compiled by Intraconsult CC Consulting Engineers and Engineering Geologists) in September 2001 (Appendix C â€“ Geotechnical Report).

Boreholes sunk on the site yielded the following lithology (Table 3). A number of the boreholes intercepted the bifurcated synetic Pretoria Dyke as well as smaller dykes or sills of the principal dyke. The majority (91%) of the boreholes intercepted dolomite bedrock at depths greater than 7m.

Table 3. Lithology of the site and the surrounding area.

Lithology Lithostratigraphic	**unit**
Silt, sands, gravels, pedocretes	Recent deposits of mixed origin
Silts, clays and gravels	Alluvium
Clayey sands	Intrusive
Clayey silts (wad), clays and sands	Chuniespoort Group
Chert	Monte Christo Formation, Chuniespoort Group
Dolomite	Monte Christo Formation, Chuniespoort Group

The site is located on dolomite and chert of the Monte Christo Formation, Chuniespoort Group, Transvaal Supergroup. The Pretoria (syenite) Dyke bifurcates (splits) and strikes north-south through the central portion of the site and northeast-southwest through the eastern sector of the site.
The major central area of the site is characterised as a â€˜plateauâ€™ of undulating dolomite

bedrock, varying in depth from trough to ridge in the north-south striking lineaments. This area excludes the deep gravity low, dyke and the fault areas. Dolomite depths range from 7m to 36m.
Based on the geological, geophysical and geohydrological data gathered during the

investigation, the stability of the site can be described in terms of six Dolomite Stability Zones (Table 4)(Map 6).

Table 4. Dolomitic Stability Zones of the site.

Dolomite Stability Zone	**Characteristics**
1	Potentially reflecting a low to medium risk of sinkhole and doline formation with respect to water ingress (Class 1 to Class 2)
2	Potentially reflecting a medium risk of sinkhole and doline formation with respect to water ingress. During the construction stage exposed areas of shallow dolomite bedrock will be mapped as Zone 2a â€“ (Class 4 with pocket of Class 5)
2a	Largely reflecting a medium to high risk of doline and sink hole formation with respect to water ingress (Class 5)
3	Largely reflecting a medium risk of doline and sinkhole formation with respect to water ingress (Class 4)
4	Largely reflecting a medium to high risk of doline and sink hole formation with respect to water ingress (Class 5 and 7)

5	Largely reflecting a high risk of doline and sinkhole formation with respect to water ingress (Class 7 to Class 8)

Opportunities for residential development over the site is given below.

Table 5. Characteristic Development Potential of the site

Sub-Area Characteristic	Development Potential
3P	Residential development not permitted (unsuitable dolomitic conditions)
2P D2/D3 [(H1/C-C1/S) d1-d2]	Dolomite sub-areas developable for residential use. Potentially active and collapsible soils between sections of hard rock outcrop and scattered outcrop
2P D3 [(H1/C-C1/S) d1-d2]	
2P D2 [(H1/c-C1/s) d1-d2]	
2PD3 (H-H1/C/S) d1-d2	Dolomite sub-area developable for residential use. Potentially active soils between sections of (hard) rock outcrop and scattered outcrop
2PD3 (H1/C/S1) d1-d2	Dolomitic sub-areas developable for residential use. Potentially
2PD2 (H1/C/S1) d1-d2	active and compressible soils between sections of (hard) rock outcrop and scattered outcrop
2PD2/D3 (H1/C1-C2/S) d1-d2	Dolomite sub areas developable for residential use. Potentially active and highly collapsible soils between sections of (hard) rock outcrop and scattered outcrop
2PD2/D3 (H2/C/S1)	Dolomitic sub areas developable for residential use. Potentially
2PD3 (H2/C/S1)	compressible and (highly) active soils. Isolated perched
2PD2 (H2/C/S1)	groundwater conditions may be encountered.

Table 6 indicates appropriate development and related requirements:

Table 6. Appropriate Development Options relative to the Dolomitic Stability Zones of the site.

Dolomite Stability Zone	Appropriate Development options
1	Suitable for residential, commercial, light dry industrial or agricultural use. Strict water precautionary measures will need to apply
2	Suitable for residential, commercial, light dry industrial or agricultural use. Strict water precautionary measures will need to apply.
2a	Suitable for certain residential types, commercial, light dry industrial or agricultural use. Not normally recommended for residential use owing to stringent remedial and water precautionary measures. Detailed stability investigations required for Residential 2 and 3 developments.
3	Suitable for residential types, commercial, light dry industrial or agricultural use. Strict water precautionary measures apply. Detailed stability investigations required for Residential 2 and 3 developments.
4	Not suitable for Residential development Swimming Pools not suitable in this zone; Suitable for commercial and/or light (dry) industrial development with appropriate foundation Suitable for parks, public open space, agricultural use
5	Suitable for selected agricultural use, parks, public open space Swimming pools not suitable within this zone

Ground water management must form an integral part of the Dolomite part of the Dolomite Risk Management Strategy. Any local or artificial lowering of the groundwater may impact negatively on the stability of portions of the site and the surrounding densely

developed Centurion Area.

2.1.1 Foundations

The geotechnical report (Appendix C) specifies founding requirements for the relevant geotechnical zones and sub-areas. These include the use of rationally designed reinforced concrete raft foundations for all residential units located with in the sub-area designated 2PD3.
In the case of zone 2PD2, the foundation design will have to include a modified normal,

soil raft or stiffened strip or stiffened cellular raft foundation.

All zone 4 and 5 areas were included into the open space system (Map 5).

2.2 Hydrology (surface and ground water resources)

Surface water hydrology

A tributary of the Hennops River, known as the Sesmylspruit, traverses the site in the north. The Sesmylspruit originates at the Rietvlei Dam approximately 4.0km east of the site. The Olifantspruit, that originates in Glen Austin, and which has the Kaalspruit as a tributary from Tembisa feeds into the Sesmylspruit immediately south east of the Irene Country Club (Map 7 and 13).
The Sesmylspruit bisects the land of the Irene Country Club before it flows just west of

the Dairy Farm. A furrow, that was used to irrigate fields and crops, has been constructed along the stream in the vicinity of the site. The stream exits the study area under a low water bridge just south of the Irene Golf Club and drains north-eastward toward the Centurion Lake located in the Centurion CBD (Map 13). The Sesmylspruit becomes the Hennops River approximately 7.5km west of the Centurion Lake when the Sesmylspruit and Rietspruit join together.

The silting of the Sesmylspruit has had severe ecological implications. Not only has the depth of the river been reduced drastically but the silt has also changed the nature of the riverbed. This has impacted negatively on the fauna of the slow flowing pools in the river. The physical change has also had a negative impact on the biodiversity of the river as well as the turbidity of the water. If these changes continue unabated, the river could soon be a sterile stream (DDL Submerged Solutions report).

Surface water quality

The surface water quality of the Sesmylspruit before it flows passed the Irene Golf Course is rated to be moderate to poor. It was also noted that the river bed at the confluence of the Olifantspruit and the Sesmylspruit was silted up. Similarly, high sediment yields, as a result of upstream activities, have given rise to siltation of the Centurion Lake. This is probably a reflection of erosion and sediment activities higher up in the catchment (i.e. Tembisa) as the Kaalspruit carries similar high loads of sediment especially during the summer precipitation period.

Similarly the high level of pollutants typically found in the Kaalspruit are also found in the Sesmylspruit and this has given rise to contamination of the Centurion Lake (Table 10).

Table 7.

Surface water quality of the Kaalspruit, Sesmylspruit and Centurion Lake over the last eight months.

Parameter	Kaalspruit		Sesmylspruit	Centurion Lake	DWAF Guidelines
Aluminium	**0.99**		0.15		
Ammonia Nitrogen	4.9	0.71 4.18			6.0
Calcium	**34.3**		32		

Chemical Oxygen Demand	16.9 61 36			NA
Conductivity	**79.9**	70		
E. coli	**33665**	500 2500		0
Faecal coliforms	330			0
Magnesium 20.4				30
Nitrate / Nitrite	**6.7**	1.4 2.8		6
Orthophosphate	0.55 0.29 1.05			NA
PH	7.6		6.0	â€9.0
Sulphate 163				200
Total Alkalinity	94.3			NA
Total Dissolved Solids	**485**	450		
Total Hardness	**179**	100		
Total Suspended Solids	20.6			NA

NA â€“ Not Available
Bold â€“ above the DWAF guideline limit

Ground water aquifers
In many instances the ground water level is located within chert and dolomite residuum

of the blanketing layer. It is anticipated that any significant lowering of the ground water level will generate ground movement on site and stability problems in the Centurion Area.
The majority (91%) of the boreholes drilled on site did not intercept groundwater. The

depth of the dolomitic aquifer that was encountered ranged from 10m to 25m below the surface. A perched aquifer was encountered at a depth of 10.8m below the surface.

Ground water quality

The aquifer prevalent in this area comprises that of the Karst aquifer type (Chuniespoort Group). The Monte Christo Formation contains sediments that are chert rich. This aquifer is considered to be the most important aquifer type as it has a generally high to very high storage capacity (storativity) and often highly permeable characteristics. Vertical and sub vertical structures in the form of intrusive dykes serve to

compartmentalise the aquifer and act as barriers to the movement of ground water.

Table 8. Anticipated quality of the ground water aquifer from a total of 223 samples of the Chuniespoort Group (Department of Water Affairs & Forestry, 2000)

Parameter BH1		**BH2**	**Regional Values**
PH 8.0 8.0 7.6			
Electrical Conductivity	57.4 49.8 62.9		
Total Dissolved Solids	352	320	443.6
Calcium	58 50 52.7		
Magnesium	41 36 35.4		
Sodium	9 6 24.1		
Potassium	2.8 3.4 2.3		
Chloride	9 5 37.7		
Sulphate	16 38 70.5		
Total Alkalinity	256 208 177.3		
Nitrate	0.2 1.0 5.6		
Flouride	0.59 0.99 0.3		
Langelier Saturation Index	N/A N/A -0.4		
Sodium Adsorption	N/A N/A 0.5		

Ratio

An examination of the ground water quality for a site north west (BH1 & BH2) of the site, at the Highveld Techno Park, indicates that it is typical of a dolomitic aquifer. The water is characterised by a high pH, high concentrations of calcium and magnesium and a hardness that can be described as hard to very hard (Wates, Meiring & Barnard, 1998). No adverse health effects are expected, although the elevated Dissolved Organic Carbon levels of 8.8 and 6.5 could indicate harmful organic constituents in the water.

2.3 Topography

The site, that is located within the Midrand and Centurion areas, comprises a gently undulating topography without significant rock outcrops, valleys or mountains. The topography of the site ranges from a high point in the north west, at an altitude of 1480m above sea level, to the lowest point in the east along the Hennops River at an altitude of 1420m asl (Map 7).
Prominent hills in the surrounding area include those of Cornwall Hill at an altitude of

1569.4m asl, Olifantsfontein Hill at 1528.5m asl, Smuts Koppie at 1524m asl and the weather station hill in Irene at 1498.4m asl. The proposed site thus lies with in a valley surrounded by these hills toward the east and south of the site (Map 7).

2.4 Climatic Conditions

The site is located on the edge of the Highveld Climatic Zone that experiences cool to cold winters and warm and wet summers. Summer precipitation occurs in the form of convectional thundershowers and averages 717mm per year (South African Weather Bureau Climate Statistics, 1975 â€“ 1990). The majority of rain falls in the summer months of November, December and January. The winter months of July and August usually

receive on average less than 9mm of rain (Weather Station No. 0513385/8 height 1524m above sea level).

Average daily temperatures range from a maximum of 23.7Â°C to a minimum of 9.8Â°C. Summer temperatures reach a maximum of 27.0Â°C in January. The winter minimum is 2.7Â°C in June and July.

Extreme weather conditions include thundershowers, hail and fog. Snowfall is rare.

2.5 Ecological Systems (Rivers, wetlands and Sensitive Sites)

The area is representative of Acocks (1988) Bankenveld and by Low & Rebelo (1996) as

Rocky Highveld Grassland (Appendix D â€“ Report 4 - Soils, vegetation & faunal report and Report 3 - Vegetation assessment of the south eastern corner of the site). The vegetation of the area is typically sour and there may be problems of lack of nutrition for the animals during the winter months. Livestock has intensively grazed the natural vegetation on the farm in recent years. The natural sections of the veld is mostly in fair condition, though signs of over-grazing are obvious. This is reflected by the high frequency of *Hyparrhenia hirta* and other weedy and pioneer species.
The more undisturbed ecological systems on site include the relatively natural grassland

in the northern sector of the site, the longitudinal stretch of Acacia woodland to the south of the site and the riverine vegetation along the Sesmylspruit.

The Hennops River functions as an important open space corridor linking Midrand and Ekurhuleni North with Centurion and Tshwane. It must however be noted that the river is extremely silted up probably as a result of erosion impacts originating from the origin of the river further north along the course of the river (i.e. Kempton Park, Tembisa, Midrand and Olifantsfontein). Similarly many trees, shrubs and exotic forbs have been able to establish along the banks of the river and this has consequently altered the natural ecological function of the river. Nevertheless a number of aquatic birds still make use of the river as habitat.

The quality of the water of the Hennops River is rated to be moderate to poor and this suggests that activities along the river have had a significant impact on the system.

FAUNA AND FLORA

Ecological assessments were completed for different sections of the proposed

Southdowns development site. These sections were referred to as Irene Estates, School site and Commercial site. The layout has subsequently changed and therefore Map 2 indicating Areas 1 â€“ 4 should be used to establish which areas a specific specialist study covered. For easy reference, the faunal and floral reports compiled for the study area are listed below and indicated to which area it refers. In addition, the reports are clearly numbered in Appendix D.

Table 9 Explanation of ecological reports completed and the areas they covered

Report	Area 1	Area 2	Area 3
R1 Vertebrate Fauna Habitat Survey Irene Residential Estate Galago Ventures	Fauna		

Compiled by Eco Assessments

R2 Vertebrate Fauna Habitat Survey Irene Estate X 3 and 4 Galago Ventures	Fauna		Fauna
R3 Floral Assessment Report School Site Eco Assessments	Flora		
R4 The soils vegetation and fauna of Southdowns Estate, Irene. G Bredenkamp and JHL Smit & Red Data Floral Assessment	Flora Fauna	Flora	 Fauna
R5 Invertebrate report on the Irene Residential Estate P Roos & G Henning	Invertebrate		
R6 Invertebrate report on the Irene Estate: Extension 3: School area P Roos & G Henning	Invertebrate		
R7 Invertebrate report on the Irene Estate: Extension 4: Commercial Area P Roos & G Henning	Invertebrate		

2.6 Fauna

A specialist investigation of the mammals and invertebrates was undertaken. These are included as Appendix D (see Map 9). Three separate reports were completed due to the more fragmented approach to the Southdowns site at the time of the assessments. The three reports however cover the largest section of the study site and cross reference to the other reports. A consolidated faunal map indicating sensitive areas were further developed. The land to the north of the Nellmapius road were not covered due to the fact that the area will not be developed at all and will be managed as is namely as short grassland floodplain where cattle could graze.

Three reports were also completed for the Invertebrate assessment. These reports are relatively similar in nature due to the three sitesâ€™ being in close proximity to each other.

2.6.1 Vertebrates

A specialist vertebrate fauna habitat survey was undertaken by Galago Ventures (refer to Appendix D â€“ R1 and R2).

The most important areas on the site, conservation wise, is the open, short grassland on the north western corner of the site, the scattered bush clumps with associated grasslands found on the south eastern side of the property and the riverine bush (See Map 8). These habitats were indicated on a map and informed the sensitivity analysis as well as the open space plan

Avi-Fauna

Five major bird habitats were identified consisting of open grassland, Mixed Acacia Woodland, exotic plantations, open pastures and adjacent riverine bush.

Several bird species were recorded on site even though the time of year when the

assessment was conducted was not ideal. This list included sightings of the Vulnerable Barrowâ€™s (White-bellied) Korhaan. In the past this species used to be more common throughout Gauteng but now only occurs at low densities (Barnes 2000) due to habitat destruction for mainly development. According to Barnes (2000) the low reporting rates in Gauteng probably reflect human-induced population decreases in the intensively

developed areas.
Eight (8) Red Data species, as listed in the Eskom Red Data Book of Birds of Southern

Africa, Lesotho and Swaziland (Barnes 2000), are likely to be found on the proposed development site. The Secretary Bird (*Sagittarius serpentarius* â€“ NT), African Marsh Harrier (*Circus ranivorus* â€“ V), Lessor Kestrel (*Falco naumanni* â€“ V), Three Barrows (White Bellied) Korhaan (*Eupodotis [s.] barrowii (caffra)* - V) and Blue Crane (*Anthropoides paradisea* â€“ V) are likely to make use of the area for feeding purposes and have been observed in adjacent areas in the past.

A Bat Hawk (*Macheiramphus alcinus*) is a rare visitor to the area. The Half Collared Kingfisher (*Alcedo semitorquata*) and the African Finfoot (*Podica senegalensis*) have been observed to the east and west but are restricted to the river system.

Mammals

A list of species potentially occurring on the site as well as signs of species observed on the site have been provided. Mammal species, of which signs were observed on the site are listed in the table below. These include the following species:

Common Name	Scientific name
Scrub Hare	*Lepus saxatilis*
Common Mole Rate	*Cryptomys hottentotus*
Cape Porcupine	*Hystrix africaeaustralis*
Springhare	*Pedetes capensis*
Highveld gerbil	*Tatera brantsii*
Aardwolf	*Proteles cristatus â€“ R*
Brown hyaena	*Hyaena brunnea â€“ R*
Black-jacked jackal	*Canis mesomelas*
Slender Mongoose	*Galerella sanguinea*
Aardvark	*Orycteropus afer â€“ V*
Common Duiker	*Sylvicapra grimmia*

R â€“ Rare; V â€“ Vulnerable

Previous land transformation and urban development have resulted in the displacement of many of the larger antelopes and carnivores from the area. Signs of more resilient medium sized mammals have been found (i.e. duiker, brown hyaena, aardvark, aardwolf and black blacked jackal).
Signs of the Vulnerable species Aardvark as well as the Rare Aardwolf and brown

Hyena were observed. An additional 4 Red Data species may potentially occur on the site and these have a status of Indeterminate. These include the Least dwarf Shrew (*Suncus infinitesimus*), the Makwassie musk shrew (*Cricidura maquassiensis*), the Cape Serotine Bat (*Myotis welwitchii*) and the Peak-saddle Horseshoe Bat (*Rhinolophus blastii*). One other species, the Hedgehog (*Atelerix frontalis*) may occur on the site. This has a status of Rare.

Several species were excluded from the species lists as inadequate habitat for there survival was found on site. This includes habitat such as rocky outcrops. It is possible that water mongoose could use the site as a feeding ground. No golden moles are expected on site owing to the compacted soils. It was unlikely that arboreal mammals such as bushbabies, tree rats and woodland dormice would be found in the stand of Acacia trees as this habitat was considered to be too small.

The various buildings and structures on the site would facilitate the presence of bat species during the appropriate time of year.

Reptiles & Amphibia

Approximately twenty (20) reptile species and approximately seven (7) amphibian species have a high possibility of occurring on the site. A variety of Herpetofauna should occur on the grassy slopes on the northern sections of the site. The moist and shady areas may attract amphibians.

The Giant Bullfrog is listed for the area but the site does not appear to be suitable breeding habitat.

2.6.2 Invertebrates

An invertebrate Impact Assessment was undertaken by P. Roos and G. Henning (refer to Appendix D â€“ R5, R6 and R7). In spite of the season and weather when the assessment was carried out, there were indications that a thriving invertebrate population of mixed species occurred on the site. This was partly attributed to the alternative habitats that are created by mixed pastures. This includes, for instance, the presence of many Hymenoptera (Wasps, Bees & Ants), Coleoptera, Diptera (Flies), Orthoptera (Grass Hoppers), Arachnids (Spiders) and some Lepidoptera (Butterflies). A group of natural invertebrates was found to occur in the veld types used for grazing, and this also included the species of the insect orders listed above. Furthermore a number of host plants occur in this habitat that suggests that additional species were expected to occur on site. This is especially so higher up the slope where there has been less agricultural disturbance, as opposed to lower down the slope.
Below is a list of the insects recorded on site:

Order - Lepidoptera (Butterflies): 16 species

Pontia helice
Belenois aurota
Colias elctro electro
Catopsillia florella
Catacroptera cloanthe
Eicochryysops messapus
Eurema briggitta
Danaus chrysippus
Vanessa cardui
Papilio demodocus
Spialia diomus
Spialia asterodia
Junonia hierta cebrene
Junonia orithyia madagascariensis
Kedestes wallengreni
Zezeeria knysna

Order â€“ (Moths)
Zygaenidae: *Neurosymploca* species
Order â€“ Arachnidae (Spiders)

A few terrestrial spiders were sampled. No baboon or trapdoor spiders were identified. A

search for scorpions yielded only discarded shells. Some of these shells were also found associated with Carrabid species.

Order â€“ Coleoptera (Beetles)

No Cetoniini were caught in any of the traps. It must be noted that the season is a little too early for their appearance but no indications exist on site of their food plants. Some do however feed on nectar of Acacias when in flower. These species occur on site.

Rare and Endangered Species -

No Red Data species were found on site during the survey. From past records there has been reported very few invertebrates that are directly related to Irene. The likelihood of Holms Beetle (*Ichnestoma stobbiai*) occurring on the site is low due to lack of suitable habitat.

2.7 Flora

A specialist investigation of the flora of the site was undertaken by Eco-Agent CC in May 2001 and Eco Assessments in November 2002 (see Appendix D â€“ R3 and R4). An additional report that investigated the potential habitat of Red Data species that was undertaken during the summer months, is included with Appendix D- R4.

The vegetation units identified on the Southdowns site include the following (Map 9):
â€¢ Grassland

â€¢ *Hirundo donax â€“ Digitaria eriantha* disturbed grassland
â€¢ *Eucalyptus* wooded area
â€¢ *Acacia karroo* bush clumps
â€¢ Cultivated land
â€¢ *Acacia karroo â€“ Hyparrhenia hirta* savanna
â€¢ *Hyparrhenia hirta* grassland
â€¢ *Acacia karroo â€“ Rhus pyroides* bush clumps
â€¢ *Acacia tortilis â€“ Cymbopogon excavatus* grassland
â€¢ *Celtis africana - Combretum erythrophyllum* river vegetation
â€¢ Planted or artificial pasture
â€¢ *Eucalyptus camaldulensis* disturbed area

Vegetation units occurring on site

The following list of plant species were recorded during the survey:

1. *Acacia karroo - Hyparrhenia hirta* savanna on shallow red sandy soils

This area covers a small portion of the property and is found in the northern part, south of the Golf Course. Rocks cover less than 5% of this community. This community is found on shallow red sandy soils derived from chert, with stony layers in certain places. Locally deeper, red soils of the Hutton Form may occur. Downslope, towards the house, various exotic trees were planted, notably *Quercus robor*. Rubble dumps are found here. The trees are 2-4 m tall, fairly open with single trees or clumped bushes (2â€“4m tall) with *Acacia karroo* the dominant species. The grassy layer is dense in certain areas and is dominated by *Hyparrhenia hirta*, but weedy species are abundantly present in overgrazed areas. *Hermannia depressa* and *Pseudognaphalium luteo-album* are prominent forbs.

This vegetation can be considered as a very old field, which developed into a *Hyparrhenia hirta*-dominated grassland

2. *Hyparrhenia hirta* grassland on shallow soils

This grassland is found on shallow lithosols with the Mispah and Glenrosa Soil Forms dominant, on the underlying dolomite and chert .This area is rockier, with rocks and rocky outcrops covering 10-15% of the soil surface. A few scattered trees and shrubs occur in this community. The following species were noted: *Acacia karroo, Acacia caffra, Ziziphus mucronata* and *Rhus pyroides*. Excavations, covered with a few scattered shrubs of *Morus alba* and *Rhus pyroides* and weedy vegetation are found in this area, close to the house. The grassy layer is dense (70% cover) and is dominated by *Hyparrhenia hirta*. The prominent forbs are *Pseudognaphalia luteo-album, Lippia javanica* and *Conyza podocephala*.

3. *Acacia karroo - Rhus pyroides* bush clumps

This vegetation occurs in a zone of trees and shrubs which is totally dominated by dense bushes of *Acacia karroo* trees with a shrubby layer of *Asparagus sauveolens* and *Asparagus laricinus* and a poorly developed grass layer. Other trees and shrubs that are present include *Rhus pyroides, Ziziphus mucronata, Maytehus heterophyll*, and *Asparagus africanus*. This area was severely trampled and grazed. The herbaceous layer is dominated by grass (40% cover), but weedy species are abundantly present. The most prominent grasses are *Eragrostis curvula, Eragrostis chloromelas* and *Digitaria eriantha*. Prominent forbs are *Teucrium trifidum* and *Lippia javanica.*

4. *Acacia tortilis - Cymbopogon excavatus* grassland

The vegetation is grassland with a few scattered *Acacia tortilis* and *Acacia karroo* trees and shrubs. This community occurs on hard, gravelly, red shallow soils, on chert and dolomite. Individual trees of *Acacia tortillis, Rhus pyroides, Ehretia rigida* and *Acacia karroo* are present. The grass layer was heavily grazed in the past and is dominated by *Cymbopogon excavatus, Hyparrhenia hirta, Eragrostis chloromelas* and *Eragrostis racemosa*. Prominent forbs are *Lippia javanica, Lippia rehmanii* and *Leucas glabrata.*

5. *Celtis africana - Combretum erytrophyllum* river vegetation

This area covers a small portion of the property and is found in the northern part of the site. This community is found on the clay soils of the Valsrivier or Oakleaf Soil Forms, which are restricted to foot-slopes or riverbanks. The riverbank is covered with forest vegetation. Dominant indigenous species are *Celtis africana* and *Combretum erytrophyllum*. Many large exotic trees are also present on the riverbank. Prominent exotic species are *Morus alba, Pyracantha* sp. and *Melea azedarach*. *Rubus* sp. forms dense bush clumps locally. The trees are 4-6 m tall. The grassy layer is poorly developed

6. Planted or artificial pasture

The largest part of the farm consist of various artificial pasture such as lucerne (*Medicago sativa*), kikuyu (*Pennisetum clandestinum*) (Mapping unit 6.2), a mixture of Rhodes grass (*Chloris gayana*), *Digitaria eriantha* and *Eragrostis* spp. (Mapping unit 6.3.) and some exotic winter grass pastures (Mapping unit 6.4). These planted pastures are situated on deep Hutton soils in the central area of the farm/site. Currently ploughed fields also occur in this area.

7. *Eucalyptus camaldul*ensis disturbed area

A dense stand of *Eucalyptys camadulensis* occurs in the north-western area of this site.
8. Grassland

This vegetation unit was observed in a thin slither of land along the southern boundary of the study site as well as in areas located in the powerline servitude. The vegetation was generally considered to be in a moderate to good condition.
Species of note observed here included *Hypoxis hemerocallidea* and *Boophane distycha*. A variety of forb and grass species were recorded including species such as *Brachiaria serrata, Themeda triandra, Trachypogon spicatus Sphenostylis angustifolia, Pollichia campestris, Osteospermum muricatum* and *Elephantorrhiza elephantina*. These are all species characteristic of Rocky Highveld grassland.

9. *Hirundo donax â€“ Digitaria eriantha* disturbed grassland

This vegetation unit was observed in a large patch on the northern part of the study site. The dominant species that occurred in this vegetation unit included the exotic Spanish Reed (*Hirundo donax)* and a sward of the grass *Digitaria eriantha*. Earlier aerial photos suggest that the site was used as a quarry which explains the disturbed nature of the vegetation. The vegetation condition of this vegetation unit is rated to be Poor.
10. *Eucalyptus sp*. wooded area

This vegetation unit was observed on the southern side of the property. The shrub and

herbaceous layer was found to be disturbed due to various human related activities such as old structures and dumping. The dominant species that occurred in this vegetation unit included *Eucalyptus camaldulensis* with some indigenous trees such as *Acacia robusta* in between. The vegetation condition of this vegetation unit is rated to be Poor.

11. *Acacia karroo* bush clumps

This vegetation unit was observed close to the Agricultural Research Council (ARC) boundary on the eastern border of the study site. The bush clumps were dominated by the trees *Acacia karroo* and *Rhus pyroides*. The grasses include *Digitaria eriantha* and *Themeda triandra*. The species richness was found to be low. The vegetation condition of this vegetation unit is rated to be moderate.
12. Cultivated land

This area is located in the eastern most corner of the site and has been cultivated. No indigenous species were recorded on this land.
Red Data Species â€“

Two Red Data plant species and tw Near- Threatened plant species are recorded in the

2528 CC grid and Farm Reference. Suitable habitat occurs on the site for one NT species and one Endangered orchid species. No Red Data plant species were recorded on site during the field survey in May as well as in February 2002. (refer to APPENDIX D â€“ R3 and R4).

Exotic Species -
A number of weedy and/or exotic species were recorded during the survey. Of particular

importance was a dense stand of *Eucalyptus camaldulensis* that is located in the north-western area of the site. Similarly, large sections of planted or artificial pasture, such as lucerne, kikuyu and Rhodes grass are found on the site. In addition, a number of exotic species including *Melia azedarach, Pyracantha sp., Quercus robur* and *Morus alba* occur along the river banks.
All the vegetation types identified were assessed and prioritized and was used to

determine the sensitivity of the site with regards to flora. This also informed the proposed open space system.

2.8 Cultural and Social Features

No cultural or social features are found on the proposed development site.

The surrounding area however contains a number of features. These include:

â€¢ The Centurion Lodge & Golf Estate;
â€¢ The Irene Country Club & Golf Course;
â€¢ The Irene Dairy;
â€¢ Agricultural Research Centre.

More than 10 schools and several churches and other community centres are located within a 5.0km radius of the site. The Centurion CBD is located less than 3.0km north west of the site and includes a number of shops, shopping centres, sports centres, social activities and other community facilities.

2.9 Socio-economic values

A cost benefit analysis was completed in July 2002 for the Midrand Estates development located south of the ARC land (Appendix E courtesy Bondev Developments (Pty) Ltd). In this analysis 336 people from Rooihuiskraal, Highveld, Clayville Industrial, Clayville Suburbs, Winnie Mandela Park, Glen Austin, Hospital View, Midrand, Irene, Kosmosdal, Randjesfontein, Olifantsfontein, Clubview, and Hennops Park completed a questionnaire to assess certain values with regards to environmental resources.

This study is referred to as it includes the views of people living around the Southdowns Development Proposal site and this contributes to an understanding of the values of a certain sector of people on development and conservation.

Findings of this study indicated :

- â€¢ Most preferred land uses are security villages, low density housing, medium density housing, golf estates, shopping centres, institutional services and high density housing.
- â€¢ Less preferred land uses include Rural residential and small holdings, office parks and centers, formal park areas, industrial parks and centres, sub-economic housing, filling station and grassland conservation areas.
- â€¢ Inappropriate landuses for the area were listed as Informal housing, livestock grazing, sub-economic housing, rain feef agriculture, bulk service infrastructures, grassland conservation areas and high density housing.
- â€¢ 54% of respondents indicated that grassland should be conserved of which 9.5% indicated it to be very important, 19% indicated that representative areas should be conserved and 23 % indicated it is of low importance but pockets should be

conserved.

- â€¢ 60% of respondents indicated that the provincial authority should take responsibility for the costs associated with protection of grassland, 22.5% indicated that local authority should also bear the costs where only 4.8% of respondents felt that the local residents should bear the costs and 11.5% that developers should bear the costs.
- â€¢ A partnership between public and private enterprises would be the best solution to conservation of grassland in the long term.
- â€¢ 47% of respondents indicated they are willing to pay for the conservation of grassland. Of these 63% were willing to pay approximately R10 a month and 22% indicated they were willing to pay R20 per month. Only 14.5% were willing to pay more than R20 per month.
- â€¢ See Appendix E for more findings.

2.10 Economic Environment

An Economic Impact Assessment (Appendix E) was completed for the old Irene Estate residential component and should be referenced based on the insight it provides to economic benefits that a residential development will have in the Irene Area. In the proposed Southdowns development, the Irene Estates development is similar in nature than the development proposed in Area 1 (Map 2) and therefore the findings of this Economic Assessment has relevance.

The Economic Impact Assessment indicated that over a two year construction period, the following economic benefits will be generated:

- â€¢ A total of 5100 new direct, indirect and induced employment opportunities
- â€¢ R262 milion in terms of addition GGP
- â€¢ R2.9 billion in terms of additional business sales

The anticipated economic benefits that will be generated annually during the operational phase of the development in the form of total additional community income, personal income tax, employment, services and establishment levies:

Table 10

Anticipated economic benefits that will be generated annually during the operational phase

Variable Value	**(R)**
Total additional community income (R/annm)	120 300 000.00
Total additional personal income tax (R/annum)	31 200 000.00
Property Tax (R/annum)	729 000.00
Sustained employment (domestic workers and gardeners)	730.00
Services levy generated by income earners (R/annum)	384 800.00
Established levy generated b income earners (R/annum)	338 700.00

It is estimated that the community resident in the residential component of Area 1 will

contribute approximately R120.3 million per annum to the economy in terms of total income earned. Of this amount, approximately R31.2 million will be contributed to the national fiscus in the form of personal income tax. The remaining R88.9 million will be available to the local economy in the form of disposable income.

The proposed residential component on Area 1 will generate a spectrum of economic

benefits in the construction and operational phase of the development. The construction phase of the development will generate direct, indirect and induced economic benefits as a result of construction and ancillary activities. After the two year construction period, the residential component will benefit the economy in terms of resident high income households.

2.11 Historic and Prehistoric Features

An archaeological survey of the site was undertaken by The Archaeological Contracts Unit from UNISA in August 2001 (Appendix F â€“ Archaeological assessment).

Several site were recorded for the are of which six sites of archaeological significance were recorded on the proposed site (Map 12) and one site is located on the Dairy Farm. These are indicated in Table 11.

Table 11. Summary of sites of archaeological significance.

Site Name	Location	Significance / Mitigation
1 Circular house foundations	Adjacent to the wooded Bluegum area Medium	
2 Square house foundations	In grassland in northern part of site.	Medium
3 Square and round foundations	150m north of Site 2	Medium / Requires a detailed archaeological record of the site
4 Stilling pond	South of Irene Country Club.	Medium / Should be retained or alternatively requires a detailed archaeological record of the site
5 Four brick and concrete buildings	South of Dairy.	Medium / Requires a detailed archaeological record of the site
6 Isolated mound	Irene Dairy.	Medium / Requires a detailed archaeological record of the site
7* Historic Building	At the existing dairy	N/A
8* Underground cave	2.0km south of the Railway Station	N/A
9* Gully	Surrounding the ARC property	N/A

* Outside the proposed development site.

The general area in which the site is located has a long record of human occupation, dating back to 1826. The most common archaeological evidence on the site falls in the historical period that is characterised by white pioneer occupation of the land, the South African War (second Anglo-Boer War) as well as black labour housing of the early 19th and early 20th century. All the structures seem to be associated with land-use by two prominent families namely, Nellmapius and Van Der Byl, white pioneers in the middle 1800â€™s.

2.12 Land Use on site and on Adjacent Properties

â€¢ Land Tenure

The site is owned by Irene Realization Company (Pty) Ltd. This company was established by the owners of the Irene Dairy to realise the development potential of

their remaining land holdings in the sub-region.

â€¢ Land Use

The land for the proposed development is currently used as grazing land. The lower portions of the site are also used for pastures.

The site is bordered by the Irene Dairy in the east, the Agricultural Research Council

(ARC) in the South and West and the Irene Golf Course in the South East. North of the site is Nellmapius Road and beyond that the Centurion Residential Estate and Country Club. To the north west is the middle income development of Highveld and a new educational land use called Allenby College.

2.13 Visual Environment/Sense of Place

The concern which is referred to as Sense of Place, was raised by the GDACEL in

reviews of the old Irene Estates application and was also listed as a concern by certain I&APâ€™s. An attempt was therefore made in this section to properly describe the Sense of Place from and around the site (Map10).

For the purpose of this study, the sense of place is simply considered as a subjective feeling any person would feel while moving through a specific area. The feeling would be linked not only to the surrounding environment and what it presents in terms of built and natural elements but also the historical experience of that specific person with regards to his or her culture, level of education, understanding of nature etc. The subjectivity of the experience of â€œSense of Placeâ€ which will differ from person to person, makes this a complex exercise. An attempt was however made to ensure that the proposed development would at least accommodate certain features that were present in the area before the development was there.

2.13.1 Landuses around the site

The general landuses that would create a sense of place in the area of the development as well as their characteristic elements are listed in Table 12. Photos were taken mostly from accessible roads around the site as this would be from where people would generally see the area - See Plates 1 and 2. The photos are referenced in Table 12.

Table 12

Sense of place elements

Type Picture	**nr**	**Characteristic elements**
Two Golf Estates (north west and east)	-	Mixture of built up land and manicured open space
Office Parks (north)	8,25	Built up areas. Lack of natural and agricultural areas.
Residential (north west)	10,3	Built up areas. Lack of natural and agricultural areas.
Irene Dairy (north east)	2,23	Farm like environment. Attractive large exotic trees.
Natural and farm land in and around the Agricultural Research Council land (south and west) â€“ especially areas that are visible from the major roads	14, 13	Openness. Natural land. Agricultural lands.

Natural and farm land of the proposed development site itself â€“ especially areas that are visible from the major roads.	5,14, 21	Openness. Natural land. Agricultural lands.

Undeveloped land â€“ neglected. Exotic trees eg. Blue gums.	18	Openness. Large groves of tall exotic trees e.g. Bluegums and Black Wattle.
Irene town area	1,4, 20	Built up areas. Lots of Trees: Attractive large exotic and indigenous trees.

In summary, the Sense of Place in the study area will depend on the â€œenvironmentâ€ created by the above elements. In this case these elements are:

- â€¢ lots of trees including large exotic and indigenous trees (to which the average person would relate better to than a stretch of natural grassland â€“ see Cost Benefit discussion elsewhere in the report),
- â€¢ natural grassland,
- â€¢ agricultural fields,
- â€¢ Neglected natural land â€“ tall exotic species characteristic (often invader species);
- â€¢ developed residential areas,
- â€¢ developed neat office parks.
- â€¢ developed areas around golf courses,
- â€¢ a functional Dairy farm with traditional old farm buildings where the farm animals can be observed from the road.

2.13.2 Proposed development layout

At the planning stages of the Southdowns development, the natural elements and open spaces were first assessed. These areas included the natural and agricultural elements that were identified as important sense of place elements of the study site.

The proposed structures will further add Sense of Place that would be experienced on the Dairy farm as well as in certain parts of Irene. In this regard, Architectural Design Guidelines were developed which would include design Concepts which would have to be adhered to by developers (Appendix H). In addition, a residents design manual has been developed which would further assist to attain the Sense of Place that the Irene Structures presently present and which makes this area a sought after suburb to reside. The proposed development (Map 3) will therefore include elements of all the above

factors that make up the present visual environment around and on the site, excluding the instatement of large exotic trees on portions of the site (indigenous trees on the site will be maintained and indigenous trees will be planted for landscaping purposes) and a golf course (two golf courses are already located in close proximity to the site). Approximately 111 ha will consist of agricultural and natural open space and approximately 133ha will be used for development purposes including residential, school and commercial development.
It can therefore be accepted that not only will the sense of place experienced from

around the site be duplicated on the site, but the new residents on the proposed development site will experience a similar sense of place than which is presently the case around the site. The public passing the site will observe less natural and agricultural fields along short sections of Nelmapius road and Main road, but not a

substantially different scene than the general surrounding area which is a mixture of natural, agricultural and built up areas.

From the ARC land site, the present openness will be replaced by more residential units in a distance. The ARC land is however not entirely natural (See Map 13) and structures and agricultural land as well as cattle pens and a mushroom farm occur on this land. A 100 meter wide powerline servitude is located between the ARC land and the proposed development which will place a natural buffer between ARC and the development and decrease the change in sense of place.

2.14 Agricultural Resources

An agricultural impact assessment was undertaken by Index (Pty) Ltd (Appendix I â€“ Agricultural assessment report).

The site is currently used as grazing by the dairy farm. Most of the land that was

cultivated had to be cleared of rock and made arable over the part six years. Five (5) hectares is planted to maize and silaged. The remainder is planted to rye-clover. Hay is cut from the veld.

A rotational cropping system is practised where pastures are planted in rotation with maize. All crops, however, are intended to supply fodder to the cattle. The pastures consist of perennial rye grass mixed with white clover or kikuyu. All the pastures are produced under irrigation with water that is pumped from boreholes or from the Sesmylspruit. The remainder of the land is undisturbed veld.
The soils of the site are derived from the weathering of dolomite and andesite. This has

given rise to soils that are of variable depth and that normally have a high clay content, or soils that comprise deep red clay-loam, respectively .

Table 13. Soils of the study site

Soil form (and map symbol)	Size (ha)	Description Land	Capability
Hutton (dHu)	15	Soil usually deeper than 900mm with a clay loam texture which means that it is high in plant nutrients. Soil is dark red and largely free of mottling. Soil is fairly stable and not expected to easily erode under normal vegetation cover.	Soil has few impediments to agricultural development.
Hutton, Glenrosa, Rock (xHu)	80	Topsoil consists of variable depth red brown apedal sandy loam that is moderately leached. Rock fragments occur throughout the profile. Depth ranges between 400 to 600mm with fine grained sand or sandy clay texture.	Deeper soils have a moderate potential for crop production while shallow soils should be retained for pastures.
Hutton, Glenrosa, Rock (HuR1))	65	Consists of red brown topsoil that is moderately leached. Rock fragments occur	Poorly suitable for cultivation.

		throughout the profile with abundant surface rock.	
Glenrosa, Mispah, Rock (HuR(2))	12	Similar to HuR(1) but rock outcrops more common.	Not suitable for cultivation.
Rock, Mispah, Glenrosa (R)	12	Rock outcrops.	Not suitable for cultivation.

The grazing capacity of the natural veld is estimated to be 3 hectares per Large Stock Unit (LSU) (Department of Agriculture). A more realistic estimate, taking into consideration the rocky outcrops, would be 3.5 to 4 ha/LSU.

An analysis of the land for different land uses (Table 5 Appendix I) (Map 11) indicates that various portions of the site are best suited for different land uses. The areas with deeper soils (dHu and xHu) would best be suited for crops or pastures or for horticultural land use. Pig farming would not be suitable on any part of the site and Poultry farming would also have a low potential for use. Areas that are moderately suitable for cattle farming include all portions of the property. The above potential land use is however strongly dependent on security measures to prevent stock theft.

A review of the production potential indicates that it is dependent on the availability of water and size of land that is available. Rainfed as well as irrigated production of fruit and field crops are practised widely on the Highveld. Water from the Sesmylspruit ia already used to irrigate crops on the farm. A constraining factor, however, is security problems that farmers in the area experience (e.g. ARC spends on average R70 000 per month on security).

The rural character that the housing development wants to maintain will allow owners to also produce herbs, vegetables and berries as hedges around the erven and in their gardens. Plant berries such as Logan- or Youngberries should be planted as hedges to separate individual crops, the crops from the housing and to separate grazing camps. This will imply that the agricultural potential of the site will be maintained.

Approximately 77 hectares of the total 244 ha will be used for agriculture in the development plan. Of this, 38 ha fall within land that can be used for pastures. Only 8 ha will remain under natural grazing. Consequently only a total of 4 ha of high potential soil will be lost to housing.

Pesticides that are applied on the site all have the potential to significantly effect the ecology of the soil and water. However, in 90% of cases when pesticides have adverse effects on the ecology, the blame can be placed on application, with incorrect dosage, faulty equipment or poor technique. While pesticides will be used in the production of the fodder, judicial use by trained personnel will mitigate against their harmful effects. This can include:

- no spraying of pesticides on windy days, or, if this is totally impractical, spraying should only take place when the wind is bowing away from sensitive areas;
- Avoid products that will contaminate water via drift in close proximity to surface water (Deltamethrin, Dichlorvos, Mancozeb).;
- Provide safe areas for the cleaning of spray equipment and/or disposal of water products and empty containers.

The current position of the pastures in relation to the Sesmylspruit means that the judicial use of pesticides will not significantly impact on the riverine ecology. The wide

buffer strip between the relevant areas and the water course will also minimise the impact of pesticides on the river. It will nevertheless be imperative that an appropriate management plan be implemented to ensure that pesticides do not enter the stream of run-off waters in the pasture areas. This will need to include the points listed above.

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SECTION THREE â€“ SENSITIVITY ANALYSIS AND OPEN SPACE DEVELOPMENT

3.1 Introduction

In order to establish the most sensitive areas as determined by the biophysical

environment, a sensitivity map was created by overlaying a range of sensitivity parameters that is characteristic to the site namely fauna habitat, flora habitat, hydrological features, geological constraints and agricultural resources. These elements were also raised by GDACEL in previous documentation that would require specific attention. The sensitivity map assisted in creating an open space system which would be kept free from development. The sensitivity analysis therefore shows that site features were used, as far as possible, to guide development options for the site.

3.2 Results of Sensitivity Analysis

The following results were observed after completing the sensitivity analysis (see Map 12).

Classes 1 to 4 indicate the sensitivity of the area based on the occurrence or non-occurrence of the various parameters listed above.

The largest most sensitive area is located to the northwest where sensitive geology, natural grassland and habitat for fauna including Red Data fauna was observed. In addition, a sensitive strip is located to the south where faunal and floral habitats are important as well as the soil which results in this area being suitable for agriculture. The Hennopsriver is also a sensitive area from a floral, faunal, agricultural and hydrological point. All areas affected by the higher classes 3 and 4 were included into the open space system.
The remainder of the classes (1-2) indicated lesser occurrence of sensitive

environmental factors as listed above. As can however be observed on Map 2, large tracts of land falling into the lower categories were also incorporated as pastures in the open space system.

3.3 Open Space System

3.3.1 Introduction

From a biophysical point of view, open spaces may be natural, manicured areas or a mixture of both natural and manicured systems. Natural open spaces allow for natural ecological processes to continue and therefore conserve fauna and floral species naturally occurring in the area. Natural open spaces further prevent the fragmentation of natural land to allow movement of species through areas and between populations. This prevents isolation of populations and subsequent inbreeding which is genetically

detrimental to populations. Open spaces may further be manicured by landscaping these areas so that people may relax in a garden type surrounding. From a social point of view, well managed open spaces, and often a mixture of natural and manicured areas, are extremely popular with the city dweller as it provides surroundings which are a visual relief from the urban and built up area which he generally moves in. From an

economic point of view, the value of open spaces are clear but not easily quantified. In this regard drainage lines may function as water retention structure where drainage lines prevent the damage to houses, roads, etc. that would incur costs for repair.

Integration and linking of existing open spaces will broaden the functional potential of open areas and make presently under-utilized areas more accessible for active and passive recreational pursuits. Linking of open space will also provide structure for urban areas, enhancing the image and identity of each area. Over-utlization of open space caused by under supply in a specific area, could ruin the aesthetic conservation or recreational value to such an extent that it could lose its function as a visual or leisure resource. Open spaces on the study site as well as links with surrounding areas were considered.

3.3.2 Regional Open spaces around the study site

The following existing open spaces were identified around the Southdowns Development Proposal (See Map 13): (Important note: The study site is zoned according to the proposed development while the surrounding land is zoned according to existing land uses)

Irene Dairy Farm

The Irene Dairy Farm forms the most important agricultural open space to the north of the proposed development site. A substantial part of the dairy land consists of land that has not been developed and therefore forms an important green lung in the area.

Golf Courses - Active Open Space

The Centurion Country Lodge with associated golf course is located to the north of the site. The Irene golf course is located southeast of the site. Both these areas presently function as active open spaces.

The golf courses are considered green lungs in the urban environment despite the natural vegetation being largely altered. The sites are vegetated which plays an important role in water retention and subsequent replenishment of groundwater. The golf courses further provide some habitat for faunal species especially birds. Active open spaces further have an important social and visual value.
General Drainage line

This small piece of neglected land is located directly north of the site where John Vorster

presently makes a T- junction with Nellmapius road. An unconfirmed rumor indicated that this section of the drainage line will be upgraded to function as a bird sanctuary. Presently this area is an important link between the Sesmylspruit and the Hennopsriver.
Agricultural Open Space

Agricultural Open Spaces refer to land that is cultivated. Sections of the ARC land located to the south and east of the proposed development site falls into this category.
Natural Undeveloped land

This category refers to land around the site which should be used to expand the open

space network for the area as the land is not necessarily in pristine condition, but has not been largely altered by agriculture or infrastructure development.

Servitude

A wide powerline servitude (approximately 120m wide) is located to the south of the site and can positively act as open space if the land underneath the powerlines and in the servitude is left undeveloped;
Other: Developed /Disturbed land

These areas refer to developed areas where the natural vegetation has largely been

affected by infrastructure such as buildings and towns. To the south of the site, large sections of ARCâ€™s land fall into this category as well as the developed area of Highveld, Centurion Country Lodge and Irene to the north and north west.
The ARC land consists of a combination of natural areas, crop lands, areas where

infrastructure such as offices are located, quarantined sections, cattle kraals, manure farming etc. The deep channel dug around the farm many years ago as well as the farming activities and lack of a conservation objective have however impacted negatively upon the natural sections of land.

3.3.3 Proposed Southdowns Development Site Open Spaces

The Southdowns open space system is presented on Map 5. It includes the following open space elements:
â€¢ Agricultural Open Spaces â€“ 47.3ha

â€¢ Natural Open Spaces â€“ 63.1ha
Agricultural Open Spaces

Based on the sensitivity analysis, the agricultural open spaces were created and will primarily function as pastures. Cattle will make use of these areas. Cattle will move between pastures and natural open spaces.

Natural Open Spaces

These areas includes riverine areas and all natural areas identified through the sensitivity analysis. These will be maintained in their natural state and will not be changed to planted pastures. The areas will however be grazed as they are presently being grazed. These areas will continue to resemble the natural vegetation and to a certain extent the floral biodiversity of the area. The riverine area will be rehabilitated over time to prevent excessive disturbance and possible erosion at any one point. A buffer area of at least 60 meters is at all times kept open along the edges of the river.

3.3.4 Regional Connectivity

Various types of connectivity are possible in a landscape. These include:

â€¢ River Buffer Connector â€“ connecting habitats through river corridors
â€¢ Servitude Connector â€“ connecting habitats through servitudes
â€¢ Habitat connectors â€“ where adjoining habitats/land uses are of such a nature that connectivity and movement of species is possible

The proposed Open Space system for Southdowns Development Proposal allows for a variety of connectors with other open space in the surrounding area (See Map 6). These are as follows:

River Buffer Connectors

â€¢ The Hennops river is the most important natural connector on the site. This spruit connects the Irene site with important refuge areas such as the Rietvlei Nature Reserve and the Zwartkop Nature Reserve;
â€¢ The Sesmylspruit which flows from the southwest, is an important connector with the northern side of the study area. The northern part of the study area has further been kept as an open space for biodiversity and geological reasons and extended to connect with the Sesmylspruit to the north of the site.

Servitude connectors

â€¢ A powerline servitude is located to the south of the site and will act as a natural corridor should the area beneath the servitude be kept natural.

Habitat connectors

â€¢ Connectivity between the site and the Agricultural Research Council land to the south and west is considered as a habitat corridor where animals can disperse to should they be disturbed.
â€¢ The Southdowns Development will take responsibility for closing the trench that was dug around the ARC land and which is presently acting as animal trap and affecting movement of species.
â€¢ Habitat connectivity also exists to the south west in the direction of the Kaalspruit.

It should be noted that the construction of roads does affect connectivity to a lesser and greater extent depending on aspects such as the size of the road and the gradient of the land. Wild fauna are however still today observed in urban areas and therefore it is very important to create the connectors and ensure that movement will be possible despite the location of new roads in an area.

SECTION FOUR - PUBLIC PARTICIPATION PROCESS

4.1 Introduction

The public participation process or scoping phase comprises an important step in identifying issues and impacts of the proposed development that may affect the natural and/or socio-economic environment. Comments and concerns raised during the public participation process were used to compile the scoping report.

4.2 Approach to public participation

The scoping that was undertaken by Eco Assessments sought to inform adjacent land

owners and other interested and/or affected parties that included the relevant authorities and community forums, on the proposed development.

4.3 Methodology of public participation

The following process has been used to inform interested and/or affected parties of the proposed development:

â€¢ The project was registered with the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs on the 20/12/2002 and a Plan of Study Submitted for review submitted. The Plan of Study was approved on 3 March 2003 (Appendix J);
â€¢ The Public Participation process was undertaken as per the approved Plan of Study for Scoping;
â€¢ The Scoping Period was 5 weeks long as per an agreement with Mr Gerard van Veele from GDACEL;
â€¢ A notice advertising the proposed development appeared in The Pretoria News and Centurion Rekord on the 13 March 2003 (Appendix J);
â€¢ 5 site notice boards were erected around the site namely at the T junction of Nelmapius road and John Vorster drive, at the entrance of ARC, at the Irene Country Club, at the entrance of the Irene Dairy and on to the western border of the site along Nelmapius road;
â€¢ Letters (Appendix J) notifying the I&APâ€™s of the proposed development were provided to the following list of potential interested and/or affected parties. Adjoining land owners were also notified in writing. A complete list of I & APâ€™s are provided in Appendix J which were incorporated into the process as they registered:

Surrounding landowners

- Irene X2 residents
- Smuts Farm Conservancy
- Irene Dairy farm
- Irene Country Club
- Agricultural Research Council
- Mill Cat
- Twin Rivers Residential Development

- Centurion Residential Estate and Country Club

NGOâ€™s

- Irene Vigilance Association
- Hennops River Catchment Forum â€“ The Chairman;
- Wildlife and Environment Society and Friends of Rietvlei.

Government

- Eskom â€“ Ground Development Manager;
- Telkom â€“ The Regional Manager;
- Gauteng Department of Education â€“ Superintendent General;
- Propnet (Transnet);
- Gauteng department of Health â€“ Regional Director;
- Eskom Pretoria â€“ Client service;
- SA Rail Commuter Corporation â€“ Department of Physical planning;
- GAUTRANS
- Rand Water Board â€“ Administration Board;
- National Department of Health
- DWAF (Petrus Venter)
- Mineral Development Gauteng Region â€“ The Director;
- Sasol Gas;

Local Council

- Tshwane Municipality (Environment and Town Planning);
- Councillor of Ward 65, Centurion;

- Centurion Town Engineer, Roads and Storm Water.

Other

- Ms M Mckechnie;
- Dr B Baxter;
- Twin River Residential Development â€“ Chairman;
- Thomas van Viegen, Africon.

â€¢ A public participation meeting to discuss issues and concerns raised during the scoping process was held on the 15 April 2003. A comments and response report on this meeting is provided. See below;
â€¢ Comments received during the Scoping Process (Appendix J) were evaluated as part of the scoping report;
â€¢ Comments received from I & APâ€™s as well as responses are included in the Appendix J. The issues raised by the I & APâ€™s were also addressed in the Scoping Report and the various sections where the issues were addressed are referred to;
â€¢ Copies of a Draft Scoping Report were made available at the Irene Public Library, Irene Dairy and on the Irene Village Web page for 4 weeks.
â€¢ A summary of all comments received are listed below.

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4.4 Contact with the authorities and other Organisations

(see the table below).

Table 14. List of authorities with comments and responses

Party* Responsible	Person	Fax No.	Comment or Concern	Response
Tshwane Water and Sanitation Also Chairperson: Hennopsriver catchment management Forum	Lourens Lotter	012 308 4684	Proposed preventative measures during construction period to prevent silt from construction activities during rain storms to reach Hennops River	The Environmental Management Plan (EMP) provides guidelines on managing potential impacts on the Hennops river.
Tshwane Councillor Ward 65	Dr R Landman	012 664 2590	This is an important development that would benefit the area positively.	Noted.
Gauteng Dept of Education	Gustav Pfeil	011 355 0110	Number of residential stands. 1000 res = 1 primary school of 2.8 ha. 3X primary school = 1 X secondary school of 4.8 ha Request layout plan and memorandum and geotech report.	To be provided.
Sasol Gas	Bruce van den Heuvel	011 617 8368	Sasol Gasâ€™ pipelines are not affected by the proposed development	Noted.
Rand Water	C Visser	011 682 0272	The development affects or is in close proximity to Rand Waterâ€™s services as depicted on the enclosed annotated 1:50 000 scale locality map. Rand Water shall be afforded the opportunity to further comment on and stipulate its requirements an conditions for the protection of its affected services at the appropriate stage in the future.	Noted.
Eskom	Mrs B Nel	012 421 3046	Eskom Distribution assets are not affected and therefore we do not have any objection to the application.	Noted.
SA Rail Commuter Corp	CRP Hahn	011 804 2900	The proposal will have no impact on existing or future rail corridors.	Noted.
Transnet	Burnett Thorne	012 315 2316	The proposed development is adjacent to Transnet property, therefore it affects Transnet property.	A telephonic conversation and confirmation letter of the conservation were provided. The proposed

				development does not affect any Transnet property.
GAUTRANS	Mr T Makou	011 355 7181	Existing rd P38-1 is affected. A 16 m building line restriction measured from the road reserved of raod P38-1 or provincial aod must be maintained. No direct access will be allowed tp road P38-1. Future roads K111 and K54 are also affected. All advertisements should adhere to the SAMOAC document. No advertisements will be allowed within the road reserve of road R38-1. Town planning procedures must apply and approved by the local authority.	Noted and will be adhered to.

*DWAF - Department of Water Affairs and Forestry

4.5 Contact with the Interested and Affected Parties

Table 15.

List of I&APâ€™s with comments and responses

Party	Physical Address	Tel/Fax No.	Comment or Concern	Response or relevant section in Scoping Report
Ms M Mckechnie	64 Kin Street, Irene	012 663 4804 / 083 456 7333	â€¢ I have not received a map of the study area.	A map has been provided. See letter in Appendix J
			â€¢ Is this a DFA application or in terms of the Ordinance?	The application is done in terms of the Environmental Conservation Act of 1989.
			â€¢ Who is the town planner?	Urban Dynamics

Dr Brent Baxter			â€¢ Please indicate when the draft Scoping Report (DSR) will be available for stakeholder comment. Very little information is currently available for review prior to the meeting of 15 April 2003. Is a second meeting planned following release of the DSR.	All I&Apâ€™s will be informed when the Draft Scoping Report is available for scrutiny. The purpose of the meeting on 15 April 2003 was to allow further registration of I&Apâ€™s, to list issues of concern and to provide some feedback on the process followed thus far. A second meeting is not planned.
			â€¢ Your briefing letter does not clarify whether the proponent for	The Southdowns Development Proposal is different to the old Irene Estates development in terms o size and layout. See

	the Southdowns Development is the same as for the Irene Estates development. Your letter suggests this, but does not indicate in any detail how the new proposal differs from the initial unsuccessful submission	Introduction in Scoping Report.
	â€¢ Alternative development options should include comparison of the â€˜no goâ€™ option. Specifically linked hereto evaluation of the current agricultural / economic viability of the Irene Dairy in its current state and after taking the reduced agricultural land area available for farming into consideration should development go ahead	The Irene Dairy is presently no financially viable due to a variety of reasons including less grazing land around the dairy, security problems and access. The no go option were deliberated in the Scoping Report.
	â€¢ Please provide clarification on the extent and scope of the indicated traffic study	A regional traffic assessment is presently being completed by the consultants ITS. This study will affect all developments in the area. The traffic associated with the residential component of Southdowns Development has been incorporated into the ITS regional study and has been approved by the local authority. See Appendix B in the

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		Scoping Report.
	â€¢ How will the developer prevent / manage future conflicts between residents of Southdowns and the Irene Dairy with respect to odours and flies that inevidently form part of an operation dairy, without disadvantaging the agricultural operation?	Potential new owners on the land will purchase a property being very much aware of the concept he or she buys into. Complains will have to be addressed to the Dairy and a management action determined to address bad odours and flies.
	â€¢ All specialists studies carried out during this EIA should be made available for stakeholders review, together with the Draft Scoping Report	The specialist studies are included as Appendices to the Draft Scoping Report.
	â€¢ I am particularly concerned that the amendment proposal, which now includes commercial / business development, will erode the sense of place that is unique to the Irene area. The strategic considerations alluded to in your letter need to be clearly spelled out indicating the need to include business premises as part of the development. On the basis of the information available for stakeholder review, I strongly object to any business rights rezoning on the land in question	The need and desirability of the project as well as a description of the different components of the proposed township is included in the Draft Scoping Report.
Mr E Cassani	â€¢ The loss of grassland, wetland and associated biodiversity must be addressed	A sensitivity analysis of the site was completed assessing all high quality faunal and floral habitats. Approximately 50 ha of natural land will be conserved and the buffer area along the Hennopsriver ranges between 60 to 100 meters.
	â€¢ Sustainability of our water	Water pollution prevention measures are presented in the EMP. The Hennopsriver will further specifically be protected

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			during construction phases. Silt traps will be installed as well as a stormwater management system approved by the local authority.
		â€¢ Must meet the requirements of the Environment Conservation Act of 1989.	The EIA process has been followed according to the DEAT guidelines of 1998.
		â€¢ Concern for the pollution of the Hennopsriver	Water pollution prevention measures are presented in the EMP. The Hennopsriver will further specifically be protected during construction phases.
		â€¢ The trees should be protected	All trees on the site has been referenced and has been indicated on a map. Potential landowners will be subject to a range of site management rules which would include the management of existing and planting of new trees. Only indigenous trees will be use in the public land landscaping.
		â€¢ Not against development if issues are resolved	Noted.
		â€¢ No high density town houses	The geology limits development on the site. The highest density proposed is 10 units per ha.
		â€¢ Plant indigenous trees	Only indigenous trees will be use in the public land landscaping.
		â€¢ A road should be constructed between John Vorster present end and ARC entrance to alleviate traffic.	The proposal is in support of reducing the traffic congestion that is presently being experienced especially along Nellmapius Drive and at the intersection of Nellmapius Drive and Main road. The proposal to reduce traffic here is the construction of: i Olievenhoutbosch Road of which the servitude has been expropriated, and i the proposed K54, which is envisaged in the medium term. Both these roads will provide alternative west to east links. The traffic volumes using Nellmapius Drive would then decrease. It is recommended that traffic calming measures be introduced along Nellmapius Drive to reduce the traffic volumes further.

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Mr C Crosbie M Dunkeld (Wildlife & Environment Society)	083 455 1736	â€¢ No concerns at all.	Noted.
		â€¢ Overloading of access roads	Proper traffic planning was neglected in the Centurion area over a period of time. A regional planning exercise has however now been undertaken by the local authority to assess the additional impacts that new developments will have. In addition, commitments are made by developers to construct roads that will alleviate traffic problems in the interim.
		â€¢ Dolomite and sinkholes	A detailed geotechnical report was completed for the site and development densities and no go zones determined.
		â€¢ Maintenance of biodiversity	A sensitivity analysis of the site was completed assessing all high quality faunal and floral habitats. Approximately 50 ha of natural land will be conserved and the buffer area along the Hennopsriver ranges between 60 to 100 meters.

Mr Bill Price Mr Carl Forssman Mr Ainslie C Smith Irene X2 residents (6,11 Blesbuch Ridge and 12 East Avenue)		012 667 1853 012 667 2188 012 661 1427	â€¢ Detailed comments will only be provided when a detailed Scoping Report has been submitted including the following: detailed general plan showing the development proposal, EIA, detailed Geological Report, Detailed Traffic Impact Study, detailed Access proposals and detailed motivation for the proposed development.	Please see Draft Scoping Report.
Mr Thomas van Viegen	Africon Engineering International Pretoria		â€¢ The area is indicated by the IDP and structure plans as falling in the urban edge. I do not believe that the applicant has taken this into consideration â€“ this also impacts on the regional sense of place and visual aesthetic (see below).	The proposed development site is located inside the urban edge. The sense of place was deliberated in the Draft Scoping Report. The proposed layout will provide all the positive elements that presently make up the sense of place. A specific architecture which reflects the Dairy farm buildings will further be applied. See Appendix A.
			â€¢ Dolomite â€“ I refer to the current problems experienced at Cornwall Hill. Expert review and witness is required in the evaluation of this specialist study, never mind the results of the studies. The cumulative effect of development on dolomite (structural) surfaces as well as the potential impact on the Pinedene aquifer has this been taken into account? Pinedene aquifer which extends under the property is Pretoriaâ€™s emergency water supply.â€	The geological conditions within Cornwall Hill and Southdowns differ. Prior to development sites on dolomite are subjected to detailed stability assessment to determine the risk characterisation and risk zoning. Appropriate development is then recommended in relation to the risk characterisation. One of the aspects of appropriate development in the residential market is stand densities. Areas of favourable stability conditions can be utilised for higher densities of development and less favourable areas for lower densities or "gentlemans estates". The differences in subsurface conditions between Southdowns and Cornwall Hill are reflected in the risk characterisation of the developments. Southdowns is largely characterised as Inherent Risk Classes 1 and 4, hence a higher density of development is permitted. Cornwall Hill includes tracts of Inherent Risk Class 5 and higher. Consequently, in the case of Cornwall Hill larger stands were planned and each stand must be investigated to prove an area suitable for the footprint of the proposed house. The favourable conditions in Southdowns do not necessitate further work on the footprints of houses. It should be noted that in terms of Section 12 of Act 95 of 1998 (Home Consumers Protection Measures Act) a thorough investigation and review process is required prior to approval of a residential development. This process involves: â€¢ The geotechnical consultant gathering the relevant data, assessing the data and compiling a report containing the risk zoning of the site, appropriate precautionary measures and development densities etc. â€¢ The report and findings of the consultant concerning the site are reviewed by the Council for Geoscience. Once the report is approved by the Council for Geoscience, it is submitted to the NHBRC. â€¢ The report is submitted to the Peer Review Committee of the NHBRC for further specialist review of the findings. Only when the NHBRC Peer Review approves the report may the development proceed. Furthermore, during construction on site, the geotechnical consultant must inspect open works to gather additional data. Even at this stage sections of the development may be terminated or additional precautionary measures introduced. The consultant must produce a Completion Report and submit this report to the Council for Geoscience and the NHBRC. Sinkholes and dolines are triggered by ingress of water from surface or through artificial groundwater drawdown. The groundwater level must be monitored to prevent drawdown as part of the compulsory Dolomite Risk Management System. As part of the Dolomite Risk Management process, strict water precautionary measures are applied to reduce infiltration of water from groundsurface or leaking services. By reducing or precluding water infiltration, sinkhole and doline formation can be reduced or precluded. Consequently, the civil engineer designs infrastructure (water, sewer and stormwater systems) to a higher standard than normal and in accordance with the NHBRC's minimum standards to prevent sinkhole formation. The positive consequence of these stability risk management actions is to reduce the likelihood of introducing pollution into the underlying aquifer.
			â€¢ Traffic, of a considerable	Proper traffic planning was neglected in the Centurion area

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significance. Nelmapius, Albert, Main and Alexander are incredibly stressed by local as well as through traffic. This development will obviously exacerbate the situation. I believe that no approval or authorization should be given until the suggested road infrastructure is completed and operational, what are the results of the traffic E.S?â€	over a period of time. A regional planning exercise has however now been undertaken by the local authority to assess the additional impacts that new developments will have. In addition, commitments are made by developers to construct roads that will alleviate traffic problems in the interim. No funds are available for services from authorities and therefore developers are increasingly taking up responsibility for funding services. The ITS regional study has not been completed at the time of finalizing the report. Some information was however obtained from interim results and incorporated into this report.
â€¢ Regional open spaces â€“ cutting off local and regional recreational resources and usage.	A regional assessment of open space connectivity around the site was completed. The proposed development layout will allow for various connections points with the surrounding land and other open spaces. See map 13.
â€¢ Habitat loss â€“ although the predominant part of the development will be on old lands etc what about the edge effects of development on the riverine habitat. What have the faunal surveys shown? Otter is known to occur in this system. Also forming a significant habitat for Galago an other small to medium sized mammals. Has an extensive trapping sampling program been undertaken the verify the unknowns?	A buffer area of 60 â€“ 100 meters will be kept free along the Hennopsriver. Sections of the river has further been incorporated into the development site allow for a holistic management of th affected floodplain on both sides of the stream. The EMP further provides management guidelines. The final faunal survey is incorporated into the Draft Scoping Report. Directorate Conservation has indicated that no trapping or netting needs to be completed on Scoping Report level.
â€¢ Landscape ecology â€“ within the larger regional context this specific area forms a core genertic sink along the Hennops River urban waterway system. The larger â€œpoolâ€ occurring at the	The extensive open spaces on the site will provide a sustainable development option for the area where the most important natural elements will be conserved and add to the natural elements listed for surrounding land.

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origin â€“ Rietvlei dam and associated nature reserve, the Smuts Koppie reserve and then this specific area. The river then passes through large tracts of urbanization till the Swartkops Nature Reserve. Developing the site will deplete another patch along this corridor, rendering the majority of the system sterile. Has the cumulative impact of this been assessed?	
â€¢ Sense of place â€“ Irene and surround has become an incredible popular place to reside, for obvious reasons. Has	Every personâ€™s experience of sense of place differs which makes a final say by any one person on this matter impossible. The Sense of Place or character of the area was however deliberated and the elements that make them up

			this assessment taken the incredible sensitive Sense of Place into account, and if, how?	listed. The proposed development includes most of the positive elements making up the sense of place in and around the site.
			â€¢ Cumulative effect â€“ infrastructure supply oto shopping complexes, filing stations, commercial, retail. The need for peripheral and support service industries will become apparent, has the assessment considered this?	Comments on cumulative impacts are included in the Draft Scoping Report. A regional initiative namely the R21/N1 Environmental Management Framework is however presently undertaken in the area and is the right tool to determine cumulative impacts.
			â€¢ No integrated regional planning in a visually and character (sense of place), historically important precinct â€“ assessed?	Regional influences were referred to and applied in planning the layout (such as open spaces). Proper regional land use planning initiatives are however the responsibility of regional and provincial authorities such as local authorities. The Tshwane Environmental Management Framework was referenced in the Draft Scoping Report. An archaeological assessment was completed for the study area.
			â€¢ Please indicate the PPP, ito where and when advertising took place, as well as when the public meetings will be held. I assume that today is the cut off ito registration and that the process will not be commencing once all relevant I&Apâ€™s have been registered?	The public participation process is fully described in the Draft Scoping Report. The public meeting was held 2 days before the end of a 5 week public participation process to ensure that all the relevant I&Apâ€™s have opportunity to register and be informed about the public meeting. The Public Participation process was completed in accordance with the Plan of Study for Scoping which was approved by GDACEL.

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Cilliers du Preez	Hamilton 35 Irene	012 667 2213	â€¢ Traffic	Proper traffic planning was neglected in the Centurion area over a period of time. A regional planning exercise has however now been undertaken by the local authority to assess the additional impacts that new developments will have. In addition, commitments are made by developers to construct roads that will alleviate traffic problems in the interim.
			â€¢ Environment preservation	A sensitivity analysis was completed for the site assessing the most important environmental parameters of the site namely hydrology (river), fauna and floral habitats, geology and agricultural resources
			â€¢ Historical preservation	An Archaeological assessments was completed for the site. Sensitive sites will be maintained and rehabilitated.
			â€¢ Copy of Plan of Study pls	Included in the Appendices of the Draft Scoping Report.
			â€¢ Copy of PowerPoint presentation pls	Provided.
Mr J P Oosthuizen Chairperson Irene Vigilance Association/ Member of Ward Committee	Albert Scquare 9 King Street 4 Irene	012 667 4324	Traffic and Environment as per Public Meeting	See comments on traffic above.

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4.6 Contact with GDACEL

Table 15 Communications with GDACEL (Appendix G)

Date and Person	Nature of contact
November 2002	Pre-consultation meeting
December 2002	Submission of Plan of Study for Scoping
3 March 2003	GDACEL approval of Plan of Study for Scoping
10 March 2003 Gerard van Veele Email and Telephonic	Mr Van Veele indicated that the lengthening of the Public Participation process is acceptable.
27 March 2003 Gerard van Veele Letter	Mr van Veele is requested for input on Sense of Place assessments as well as additional information from the GDACEL database.
15 May 2003 Gerard van Veele Letter	A summary of the information provided to SEF for the EMF is provided to Mr van Veele. (Appendix G)
15 May 2003 Gerard van Veele Meeting	A meeting was held with Mr van Veele to indicate progress and procedures followed on the project given the concerns raised on various issues with the Old Irene Estates application. Q: Is GDACEL satisfied with the sensitivity analysis sofar where approximately 50% of the land will be allocated to open space? A: The sensitivity analysis is a standard approach to ensure that development does not take place on sensitive areas. Q: When can a response be expected on the request for guidance of Sense of Place assessments and additional information on GDACELâ€™s database that may affect the project? A: A response is being prepared presently. Q; What would you consider as red flags for this project? A: Endangered fauna and flora, connectivity of open spaces and ridges. Q: How will the Southdowns development and biophysical information feed into the EMF? A: Unsure at this stage. Gerard: The Sense of Place issues raised should be properly addressed in the Scoping Report. Gerard: A clear distinction should be made between the natural and agricultural open spaces and open spaces determined by the sensitive geological areas. Response: All land associated with the 2 highest sensitivity classes will be incorporated into the open space system.
17 June 2003 Letter from Lize Bothma GDACEL	Response to request for information on the site as well as information on sense of place.

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4.7 Comments and Response report

Table 17 Comments and responses provided at the public meeting (See Appendix J for complete report)

Person	Comment	Response
Mr E Cassani	â€¢ The K54 has been on the books for many years and has not been built up to date. Why is it still indicated on maps? â€¢ The K54 should be built before any development is allowed in the area. â€¢ I am not against the development per se.	â€¢ The K54 has been dropped from designs as the alignment of this road will in all probability change. â€¢ At the present time developers are paying for infrastructure associated with development as there is a backlog for service provision by the local authority for this area. â€¢ Noted.
	â€¢ Town planners do not see the bigger picture. The construction of Olievenhoutbosch road will not solve all the traffic problems in the area. â€¢ I want to see it in writing that traffic calming measures will be constructed in Nelmapius road.	â€¢ Noted. The implications of the construction of Olievenhoutbosch will be discussed in detail in the Scoping Report. It was noted that it is the only planned local authority infrastructure that can alleviate traffic pressure. â€¢ This is included in the proposals made for the Irene Estate Traffic Assessment.

	â€¢ Will the natural grassland be protected?	â€¢ Yes, all the prime natural grassland areas have been included into the open space system as identified through the Environmental Sensitivity Analysis.
	â€¢ What guarantees exist that these open areas will not in future be built on?	â€¢ The open space system is usually confirmed in the Record of Decision (authorities decision) provided by Gauteng Environment. In addition, Gauteng Environment provides an authorization for a specific layout. Should this layout change, they will have to be informed.
	â€¢ The Landcare brochure of GDACEL indicates that no development may take place closer than 100 meter from the middle of the river.	â€¢ Eco Assessments will assess this document.
	â€¢ The Pinedene station must be re-opened in order to provide access for workers to the region and site.	â€¢ Noted. To be assessed in the Scoping Report.
	â€¢ A road should be constructed from the present T-junction of John Vorster with Nelmapius to where the road turns off to the Agricultural Research Council. This will alleviate traffic.	â€¢ Noted. To be assessed by the traffic engineer.
	â€¢ Exotic trees should be removed from the Hennopsriver.	â€¢ Supported. This will be included in the Environmental Management Plan (EMP).

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Mr Price	â€¢ Is the Scoping Report completed?	â€¢ No, the documentation that was received by the public was only to request them to register as interested parties and to inform them of the project and the upcoming public meeting.
	â€¢ Who else had access to the Scoping Report?	â€¢ No-one, as it has not been completed.
	â€¢ When will the report be ready?	â€¢ Approximately 3 weeks from the date of this meeting.
	â€¢ We can not as yet provide comments tonight as we have not seen the Scoping Report. We would need to meet again.	â€¢ The public will be provided ample opportunity to comment on the Scoping Report. Written comments can be provided to Eco Assessments. No separate feedback meeting is planned up to date.
	â€¢ How does this application site differ from the previous application.	â€¢ This application includes the original Irene Estate area, as well as the land that was proposed for a school and a commercial site. It further includes additional open spaces across Nelmapius Rd as well as a section of the floodline of the Hennopsriver. A detailed layout plan is available for comment.
	â€¢ Have all the concerns raised by GDACEL on the previous application been addressed in the new application?	â€¢ The concerns of GDACEL was specifically assessed and will be addressed in the new Scoping Report.
Ms Burnice Venter	â€¢ Has the heritage sites been assessed and will they be impacted upon?	â€¢ A Heritage assessment was conducted by a specialist and will be managed according to his recommendations. 7 heritage sites were recorded in the region.
Mr M Muller Irene Country Club	â€¢ The country club has 1400 members. Security is a problem for the club and the proposed development will greatly reduce the security risk for the Country Club.	â€¢ Noted.
	â€¢ The project is further supported by the Irene Country Club since it is anticipated that the proposed development will minimize the risk of squatting near the proposed entrance of the proposed development along Main Road. The Irene Country Club regularly evict squatters from this area.	
	â€¢ The Irene Country Club is also desperately seeking additional membership for it to survive;	
	â€¢ The proposed school is seen as being able to utilize Country Club facilities as part of a sport academy. This will result in the more sustainable use of expensive recreational infrastructure which is there for the Irene Community.	
Mr Celliers du Plessis	â€¢ What will be the minimum stand size and how many stands will be available?	â€¢ The minimum stand size will be 1000 ^{2} and 550 â€“ 690 stands will be available (as per the draft layout plan presented).

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	â€¢ If all these stands are built up and people still make use of Nelmapius road, this will enhance the traffic problem even more.	â€¢ This issue is noted and will be responded to in detail in the Scoping Report. Traffic is one of the most important issues that needs to be addressed.
	â€¢ A traffic study was done in 1984 due to inadequate planning.	â€¢ Noted.
	â€¢ Are the heritage areas included into the development?	â€¢ The heritage areas identified will be managed according to the specialist report that will be included into the Scoping Report.
	â€¢ Has a plan of study been done and will it be available?	â€¢ Yes, it has been done and will be included into the Scoping Report.
	â€¢ Is 80 ha enough for the 150 head of cattle on the farm?	â€¢ Yes, it is enough as an assessment of the fodder indicates that all the feeding needs will be met.
Mr J Braak	â€¢ The pedestrians and traffic along Nelmapius road is very high.	â€¢ Noted. Traffic will be discussed in the Scoping Report.
	â€¢ Big trucks deliver construction material after hours and before the traffic starts. This is a nuisance (noise). Will this be the case with Southdowns should it be approved?	â€¢ The Environmental Management Plan (EMP) addresses these type of operational issues. It is noted and will be assessed in order to provide a solution that will have limited impact on the public.
	â€¢ A pedestrian walkway is needed in Nelmapius road.	â€¢ Noted, although this will be the responsibility of the local authority.
	â€¢ Nelmapius remains the bottleneck for traffic.	â€¢ Noted. Traffic will be discussed in the Scoping Report.
	â€¢ When will Olievenhoutbosch road be built?	â€¢ ITS consultants is presently finalizing a regional traffic assessment to address regional issues. Olievenhoutbosch road will be built at the same time that Southdowns will be developed. In addition, traffic calming measures for Nelmapius have been proposed in the Southdowns Traffic Assessment
Trevor Glass Centurus	â€¢ Bulk contributions will be made by the developer by building Olievenhoutsbosch road.	â€¢ Noted.
Councillor Rentia Landman	â€¢ The tender for the proposed Olievenhoutbosch road is out and residents should note that only through developers will essential infrastructure such as Olievenhoutbosh road be built.	â€¢ Noted.
Ms Marlene	â€¢ Traffic problems are experienced due to the construction of	â€¢ A school is included in the proposed Southdowns

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Nurbal	Cornwall Hill school. Will it not be possible to construct a school at Southdowns in order to get lesser people to drive to Cornwall Hill?	Development and was discussed with the Gauteng Department of Education.
Mr JimmyTaylor	â€¢ The development should be approved on condition that Olievenhoutbosch Road be built.	â€¢ There is a lack of money to construct infrastructure to address bad planning of the past. The developer is therefore going to build a road in order to simultaneously address the traffic of the areas while developing its property.
JB	â€¢ Is a private school proposed?	â€¢ A sports academy is proposed with a broad curriculum.
Frank Reeves	â€¢ What time will be given to review the Scoping Report?	â€¢ 4 weeks.
Henry van der Byl	â€¢ The changes in land use around the original dairy farm has impacted on the farming practices of the Dairy. The land use is not economically sustainable anymore and an alternative land use had to be considered in order to keep the dairy functioning.	â€¢ Noted.
	â€¢ Traffic has specifically impacted on the dairy.	
	â€¢ Council has not done proper pro-active planning for the area and now a traffic problem exists.	

4.8 List of key issues

The following key issues have been identified based on the responses received during the scoping phase.

Protection of the Hennops river during construction;
Traffic problems of the area must be solved;
Alternatives should be investigated;
Traffic Flows and Pedestrian movement;
Protection of biodiversity;
Pollution and nuisance during the construction phase;
Dolomite and sinkholes;
Use of indigenous trees;
Regional open spaces connectivity;
Sense of Place;
Historical preservation.

4.9 Conclusion

Issues raised during the scoping phase are dealt with in the impact assessment section of the scoping report and have been used in compiling the mitigation measures.
It is apparent from the comments and concerns raised by the various I&APâ€™s that they

were not in principle against the application. Concerns that were noted have been addressed in the impact assessment section of this report as well as in the environmental management plan (EMP).
Many of the issues that were raised revolve around the biophysical aspects.

The socio-economic aspects that were raised included traffic, maintaining the character

of the area and impacts during construction (noise, air pollution).
On the basis of the number of letters and documents circulated among potential I&APâ€™s,

the public meeting was well attended and issues were raised that could potentially affect the environment in which they live and reside.

SECTION FIVE - DESCRIPTION OF ALTERNATIVES

5.1 Introduction

The EIA Guideline Document (1998) indicates the need that alternatives for the project be evaluated. An alternative is defined to include a possible course of action, in place of another, that would meet the same purpose and need as the proposal. Alternatives can refer to any of the following, but are not limited thereto:

â€¢ Alternative sites for development;
â€¢ Alternative projects for a particular site;
â€¢ Alternative site layouts, designs, processes and materials.

The option not to act is often used as a base case against which to measure the relative performance of other alternatives. The option not to act might also be taken forward in it's own right for evaluation against the other alternatives.

5.2 Alternatives

5.2.1 Location alternatives

The demand for residential land use in Centurion is very high as is evident by the continued extension of the suburbs Irene, Highveld and Centurion CBD. The proposed development is located in a prime area for residential land use.
The land has been owned by the developers for many decades and has now been

assessed for development options. Due to the fact that the land was owned by them over such a long period, and their development proposal was in line with the IDP planning for the site, no alternative locations were assessed.

5.2.2 Project alternatives

The area surrounding the farm has been subject to tremendous pressure for development. Examples for such development include the Centurion Residential Estate and Country Club, Twin Rivers, Cornwall Hill, Highveld and the densification in Irene. It is with this as a background that the Van der Byl family embarked upon a proposed development that will not only enhance the unique spatial and agricultural elements that makes the Dairy in Irene unique, but will also ensure the agricultural future of the farm.

Alternative land uses that do not consider the character of the surrounding land use and open spaces will, in all likelihood, lead to the degradation of the Irene Dairy and Farm.

The alternative development options that were considered and are as follows:
â€¢ Alternative 1: No-go alternative. This alternative is similar to the present state of the

land i.e. utilizing the land for farming purposes.
â€¢ Alternative 2: Golf Estate. The motivation for this alternative is that it is line with the 2 golf estates on surrounding land adding to the open space character of the larger area.
â€¢ Alternative 3: High density residential and commercial with Open Spaces. This alternative is in line with what is presently the landuse on surrounding land to the

west. A large open space component, similar to the preferred alternative will be conserved.

â€¢ Alternative 4: Intensive agriculture (this alternative is possible and may entail feedlotting and tunnelling for crops, vegetables etc)

â€¢ Alternative 5: Residential and Open Space alternative. This alternative is the preferred alternative due to the fact that the environment (social, economic and biophysical) informed the type of development, layout, density and character of the development.

The following positive and negative aspects of each alternative listed were identified for

all aspectes of the environment namely biophysical, economical and social.

Table 18

Alternatives discussion

Alternative 1 â€“ No Go

Biophysical Positive

â€¢ No nett loss of natural and rural land will occur.

Negative

â€¢ The land may degrade over time due to insufficient funds for management and optimal farming

Economics Positive

â€¢ -

Negative

â€¢ The present farming activities have proved to be financially unsustainable. The current financial status of the Dairy and Farm is rated to be poor to very poor. This means that if alternative action is not taken in the short to near future, then the Irene Dairy and Farm will no longer exist.

â€¢ The audited financial statements over the last three years have shown an increasing net loss. This include a loss of R105 000.00 in 1999, R220 000.00 in 2000 and R304 000.00 in 2001. Rates for the relevant Farm sections have increased by 40% and labour costs are higher as the Farm is located within an urban environment. Mechanisation of the farming operation is considered too capital intensive. The agricultural value of the farm is inadequate to supply the farm operation. An additional farm in Kungwini is used supplement fodder requirements. This has resulted in the shareholders questioning the validity of the operation because of the worsening losses.

â€¢ Should the supplementary income not be found from the proposed development, then the owners will be obliged to purchase additional land in order provide adequate fodder and requirements for the cattle. This is considered to be unfeasible

Social Positive

â€¢ Driving along Nelmapius rd, a rural character is provided by the proposed development site.

Negative

- â€¢ A cost-benefit analysis completed for a site south of the development site and including public groups around the study site has indicated that the public has severe safety concerns for open pieces of land and would prefer partial development and access to control crime.
- â€¢ The proposed development site is presently only partly and visually accessible to the public

Alternative 2: Golf Estate

Biophysical Positive

- â€¢ The site will retain an open space character
- â€¢ The golf estate will provide lots of soft surfaces where water will be retained and runoff will be minimised

Negative

- â€¢ Habitat and natural patches of land will be altered to fit the function and character of a golf course and estate
- â€¢ The agricultural use for grazing will be lost as it will be incompatible with a golf estate

Economical Positive

- â€¢ Golf Estates are popular developments and will be financially speaking very viable
- â€¢ This development will fund the Irene Diary farm to continue functioning as a cit