DESIGN FACTORS

INTRODUCTION

As the proposed site is located outside of an urban setting, one must look at the overall macro environment that will then influence the design of the building. With no other buildings and streets to take into account the spatial frameworks prepared by the local town councils become the primary source of information and evaluation of the site location.

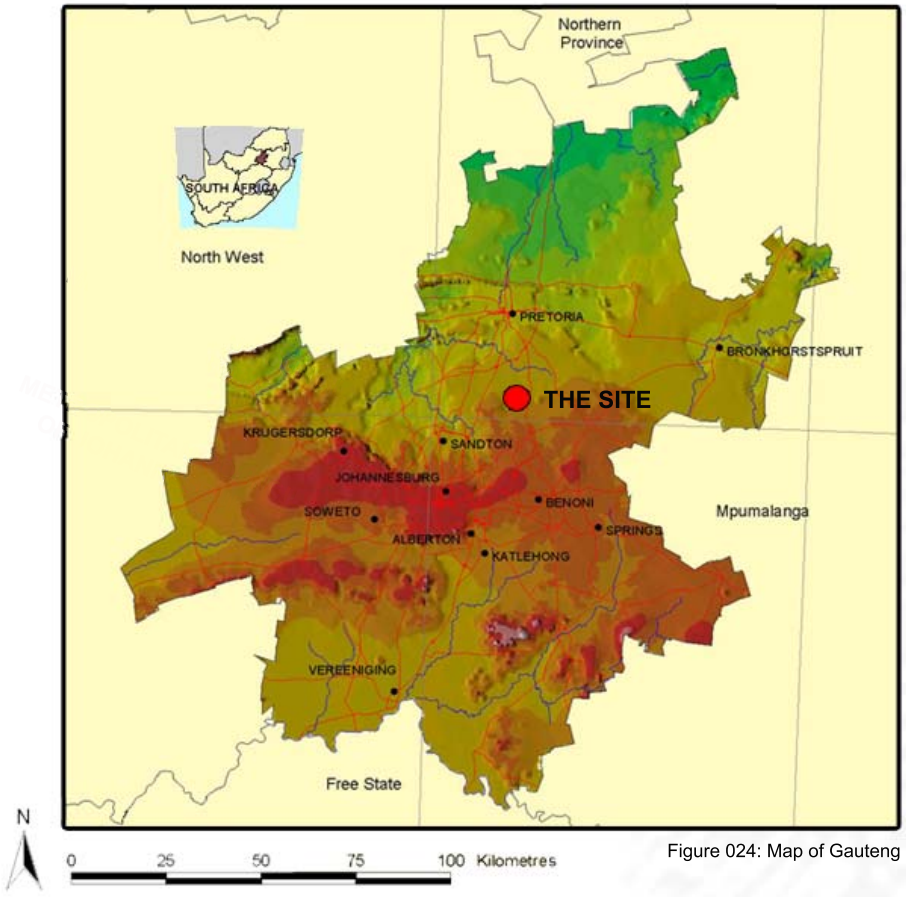

Figure 024: Map of Gauteng

The proposed site is situated relatively centrally within the province of Gauteng. This province is the most populated and economically active province in South Africa with an estimated population of 5 million people [34].

Footnote : [34] www.demarcation.org (2003), access 20 March 2003

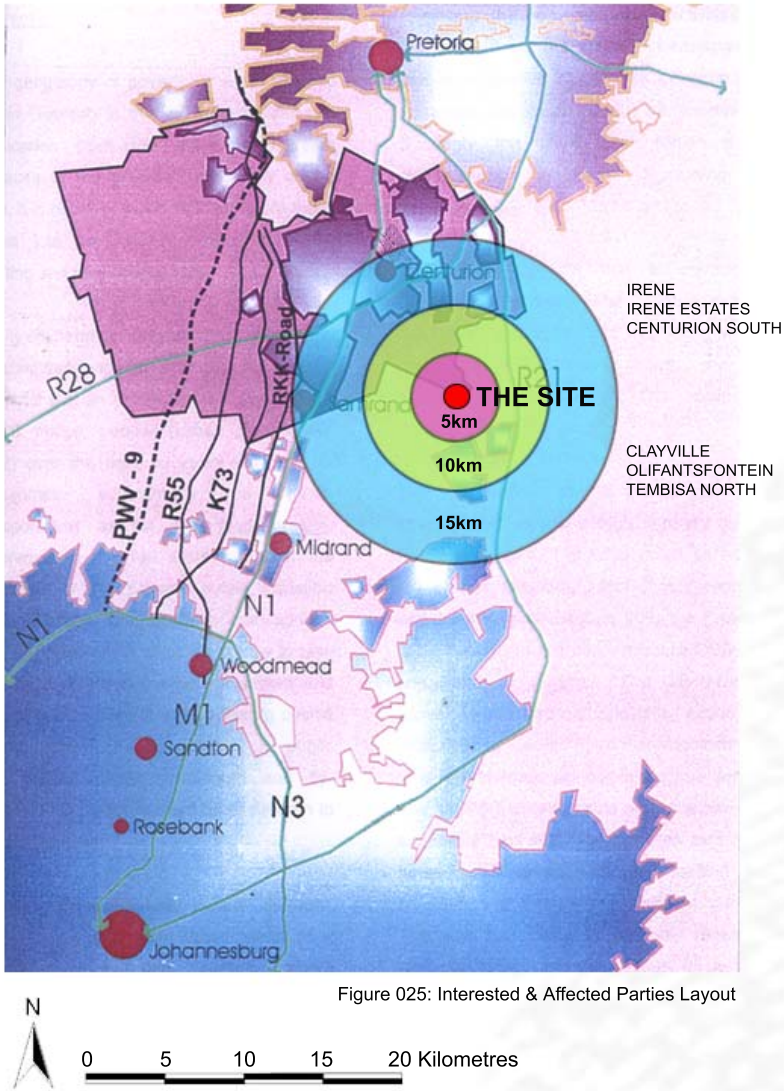

Figure 025: Interested & Affected Parties Layout

A series of affected and interested parties need to be identified with the most immediate being within a 5km radius and progressing further out to a 15km radius. The immediate communities that need to be consulted are the suburbs of Irene to the north and Clayville to the south. Smaller rural communities within these designated areas have the right to be part of the overall process.

LEGISLATION PERTAINING TO THE CONSTRUCTION AND OPERATION OF A CREMATORIUM

National Heritage Resources Act (act no. 25 of 1999) - Stone Bridge
this act must be looked at for the preservation of the historical IMR stone bridge that exists over the Olifantspruit river, even though the structure has not yet been declared a national monument.

Health Act (act no. 63 of 1977) - Working Conditions
this act must be looked at from the working conditions of all people employed on this project from the construction workers to the final crematorium operator staff.

Human Tissue Act (act no. 65 of 1983) - Mortuary & Crematorium
this act looks at the way in which bodies are to be handled, for medical or other purposes.

Births & Deaths Registration Act (act no. 51 of 1992) - Mortuary & Crematorium
to regulate the registration of births and deaths and to provide for matters connected to it.

Inquest Act (act no. 58 of 1959) - Mortuary & Crematorium
to provide for the holding of inquests in cases of deaths or alleged deaths from other than natural causes.

Extension of Security of Tenure Act (act no. 62 of 1997) - Full Development
to provide for measures with state assistance to facilitate long-term security of land tenure.

Cemetery & Crematoria Ordinance (no. 37 of 1989) - Full Development
to make provision for the establishment of cemeteries and crematoria for the control, management and regulation of these facilities.

Environmental Conservation Act (act no. 73 of 1998) - Full Development
to ensure that the environmental effects of activities are taken into consideration through sustainable means.

National Building Regulations & Building Standards Act (act no. 103 of 1977) - Full Development
to ensure that the building or structure complies with all minimum safety and health standards.

National Water Act (act no. 36 of 1998) - Full Development
this act relates to the control, conservation and use of water.

Town Planning & Township Ordinances (ordinance no. 15 of 1986) - Full Development
this legislation regulates all aspects of town planning in respects to land use, sitting of buildings, building standards etc [35].

Figure 026: South African Coat of Arms

Footnote : [35] Buff, Alan, Head of Cemeteries and Crematoria, Metropolitan Council of Johannesburg, 28 February 2003, Personal Communication

HISTORICAL BACKGROUND OF OLIFANTSFONTEIN

Olifantsfontein developed due to the presence of clay and the processing thereof, which lead to the establishment of processing plants and porcelain factories in the vicinity of the quarries. Gradually a small township was established and became self-sufficient [36] .

HISTORICAL BACKGROUND OF IRENE

The growth of Centurion is directly linked to the development of Pretoria.Irene was established in 1902 as a residential extension to Centurion due to its close proximity to the railway station. However Irene was already on the map due to the lime works established in 1893 by A.H. Nellmapius. To date Irene has in large remained a small rural residential area even after the closing of the lime works in 1967 [37] & [38] .

HISTORICAL BACKGROUND TO THE STONE BRIDGE

The old stone bridge fell into disuse after the original line was doubled and electrified in 1938. The Imperial Military Railways (IMR) constructed the current bridge in 1901 after a flash flood destroyed the original one in November 1901. This bridge was reconstructed using sandstone from the Witwatersrand series and is the only one of its kind standing from the imr period [39] .

Footnote : [36] - Greater Olifantsfontein Development Framework & Stratagy (1998:33)
[37] - Revised Integrated Development Plan for Centurion (1999:42-43)
[38] - Searle, R (1998:10)
[39] - Searle, R (1998:10-12)

GAUTENG SPATIAL FRAMEWORK

The most note worthy element of this current framework with respect to the proposed site is that it is located within the envisaged urban edge of Gauteng, and that the site is situated along the proposed corridor of development [40].

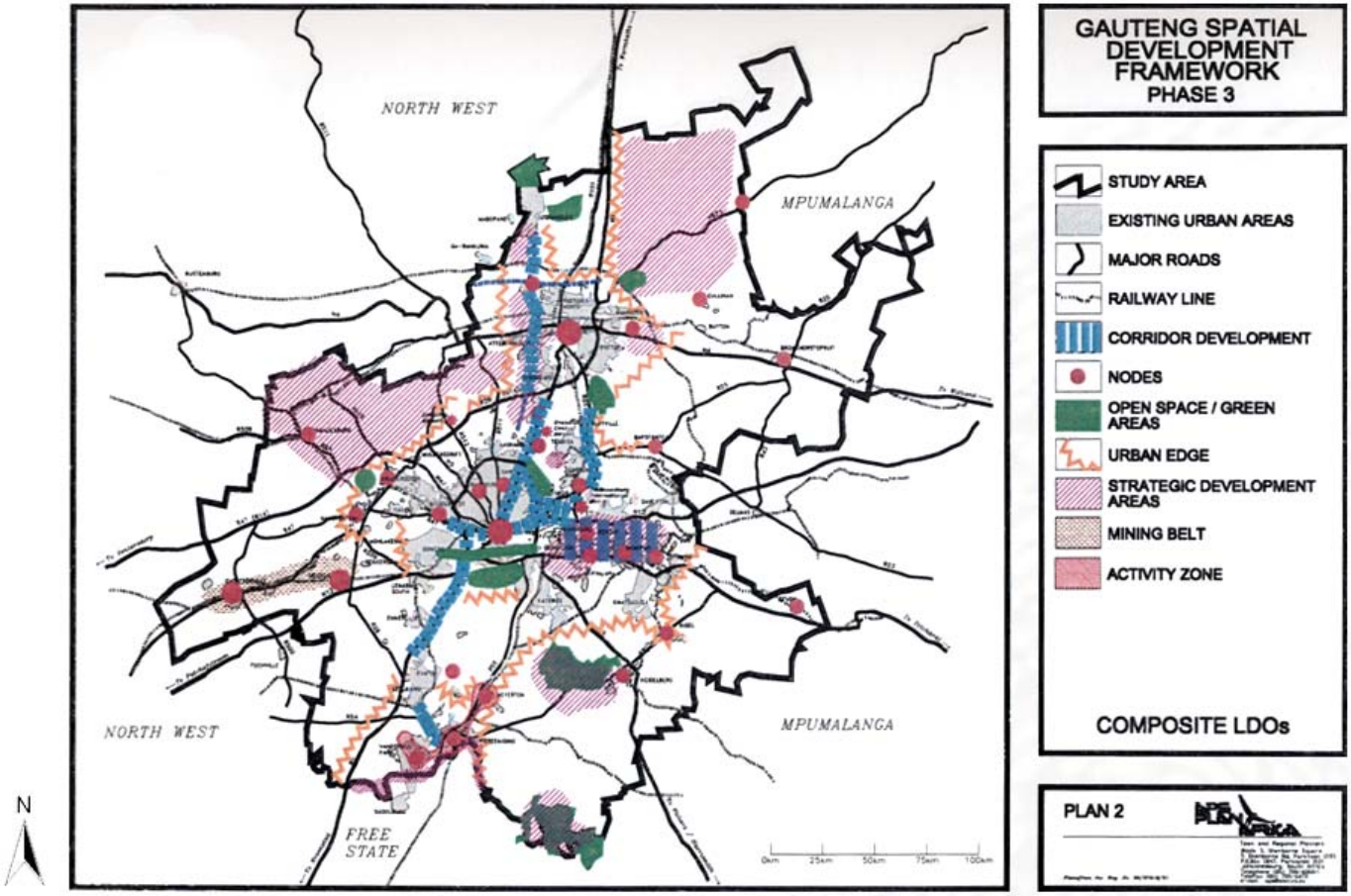

Figure 027: Gauteng Spatial Framework

Footnote : [40] Olifantsfontein Spatial Framework (1998:10)

CENTURION SPATIAL FRAMEWORK

The proposed site is situated to the most south eastern corner of the Centurion Spatial Framework. Within this framework it has been identified that the area is to remain as a low-density rural residential area, with the provision of limited services [41].

The Centurion Metropolitan Council however are currently in the process of revising the existing February 1999 spatial framework, and to date no information is available on this new Framework [42].

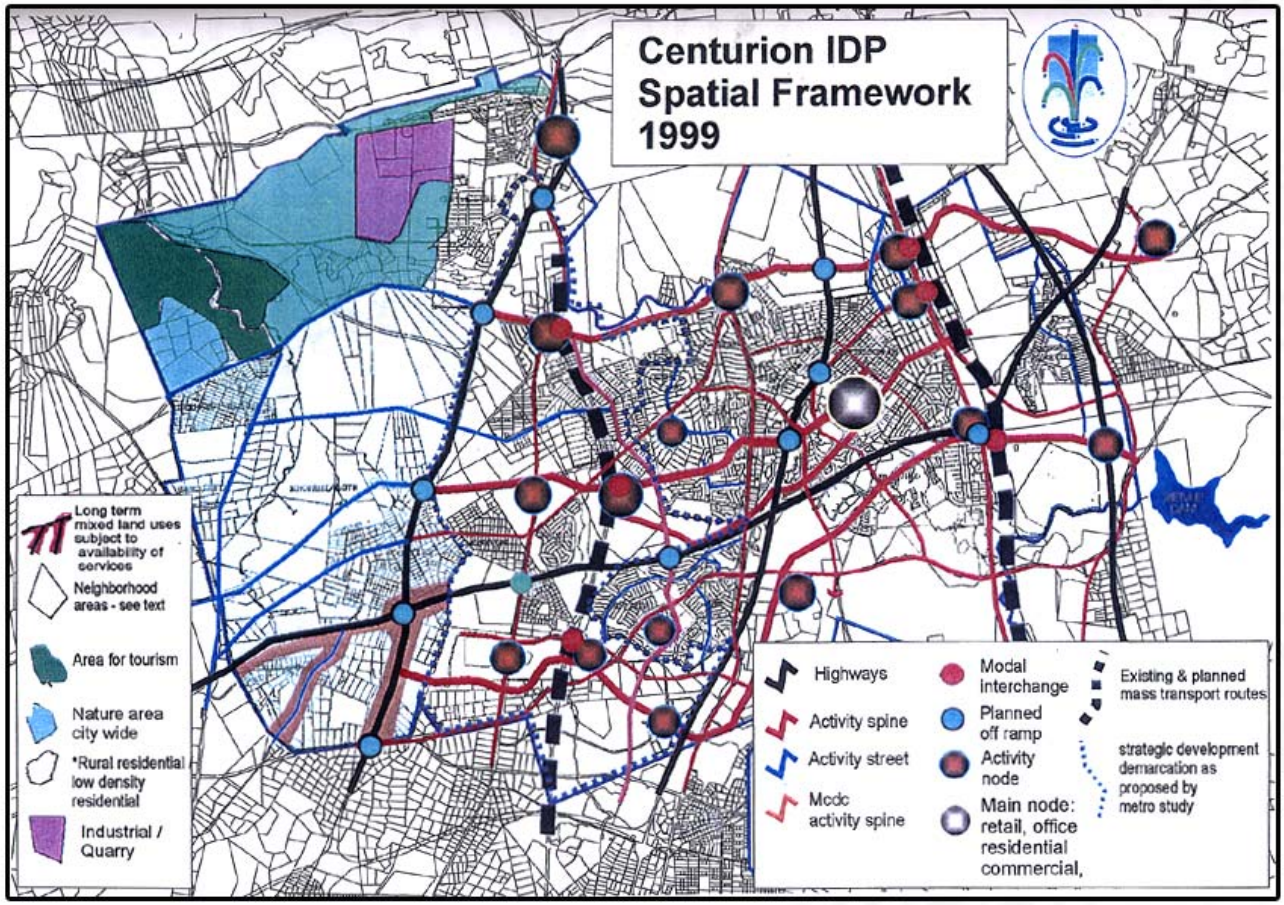

Figure 028: Centurion Spatial Framework

Footnote : [41] Centurion Spatial Framework (1999:135)
[42] Grove J. Head of Town Planning for Irene. 7 February 2003. Personal Communication

OLIFANTSFONTEIN SPATIAL FRAMEWORK

The proposed site is situated to the most north eastern corner of the Olifantsfontein Spatial Framework. In this framework it has been identified that the area is to remain as a low-density rural residential area, with limited services. A gateway element has been identified to this same area [43].

The Kempton Park Metropolitan Council is currently in the process of revising the existing June 1998 Spatial Framework, and to date no information is available on this new Framework [44].

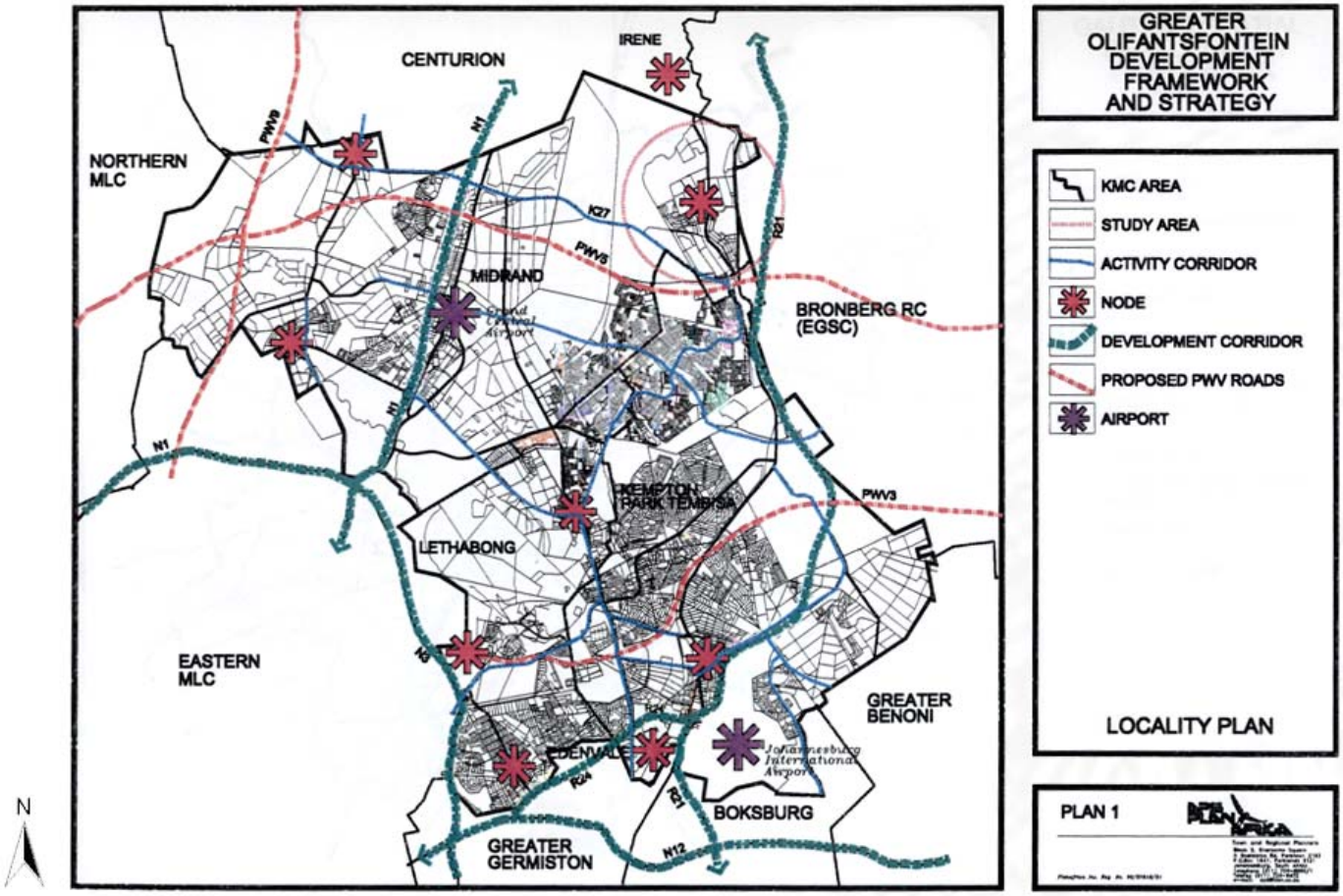

Figure 029: Olifantsfontein Spatial Framework

Footnote : [43] Olifantsfontein Spatial Framework (1998:9)
[44] Cronje. Head of Town Planning for Olifantsfontein. 7 February 2003. Personal Communication

GATEWAYS - LEGIBILITY ELEMENTS

A gateway element has been identified to the southern most portion of Irene, and hence opportunities exist for the crematorium structure to act as this gateway element [45].

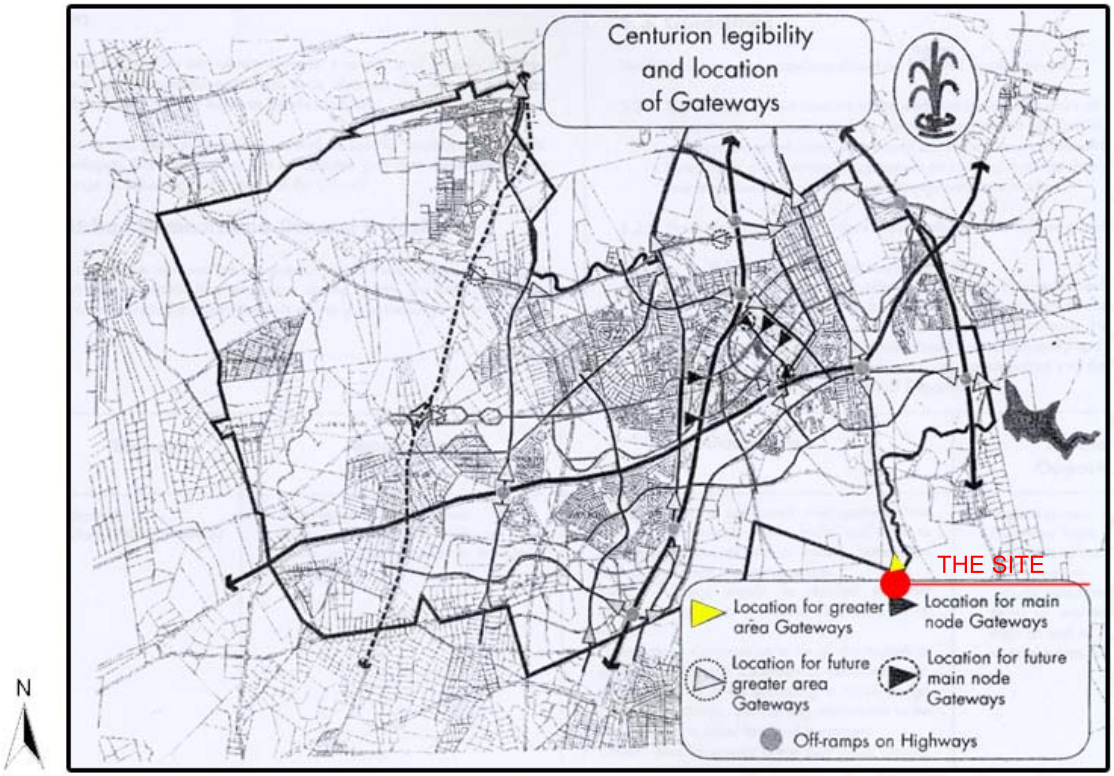

Figure 030: Centurion Gateways

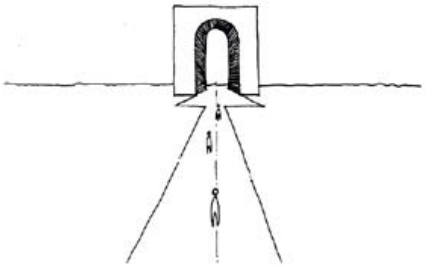

Figure 031: Gateway Approach

Footnote : [45] Centurion Legibility & Identity Implementation Report (no date:16)

SITE ZONING

ZONING - OLIFANTSFONTEIN

The area within and to the south of the proposed site has been zoned as rural residential, as that of the Irene area. A rural character is to be maintained [46].

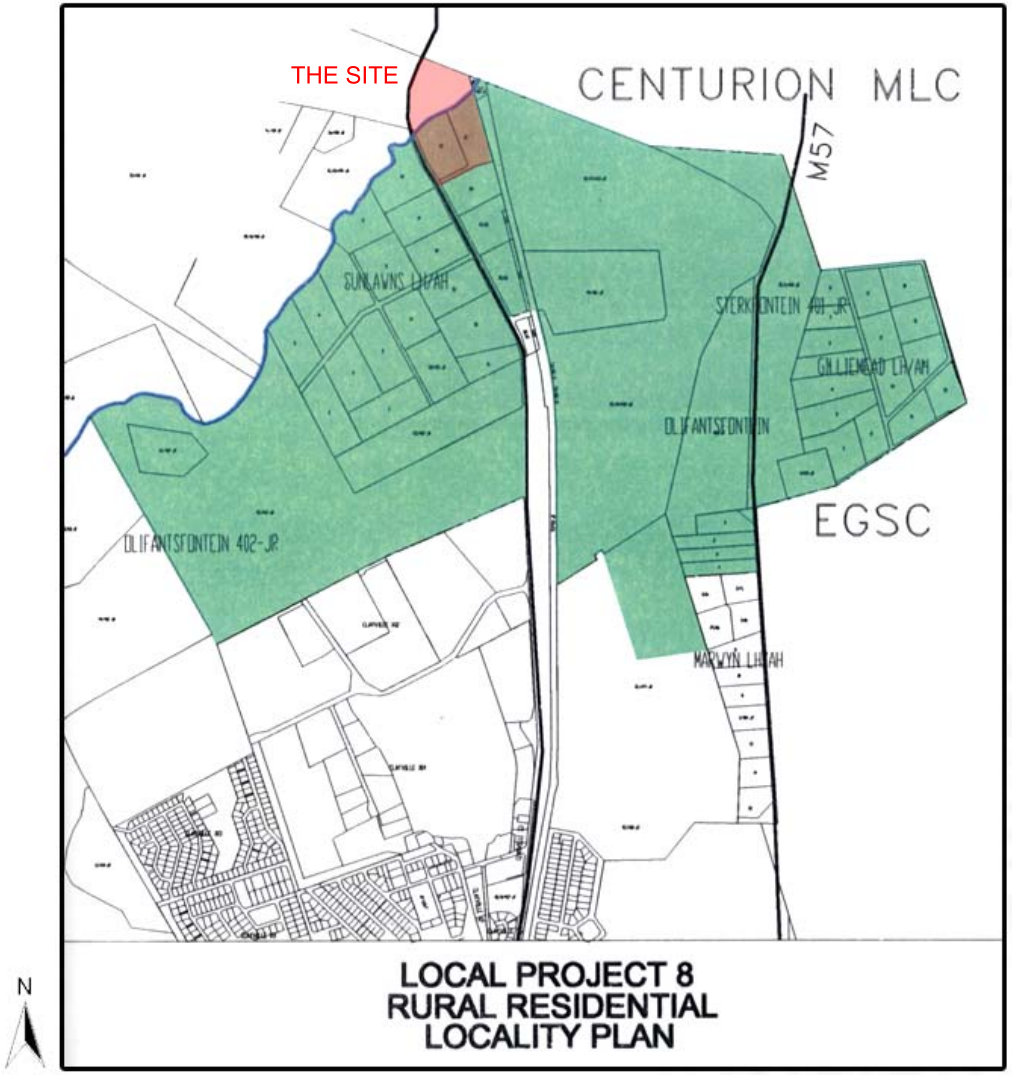

Figure 032: Olifantsfontein Zoning

Footnote : [46] Olifantsfontein Development Framework (1998:91)

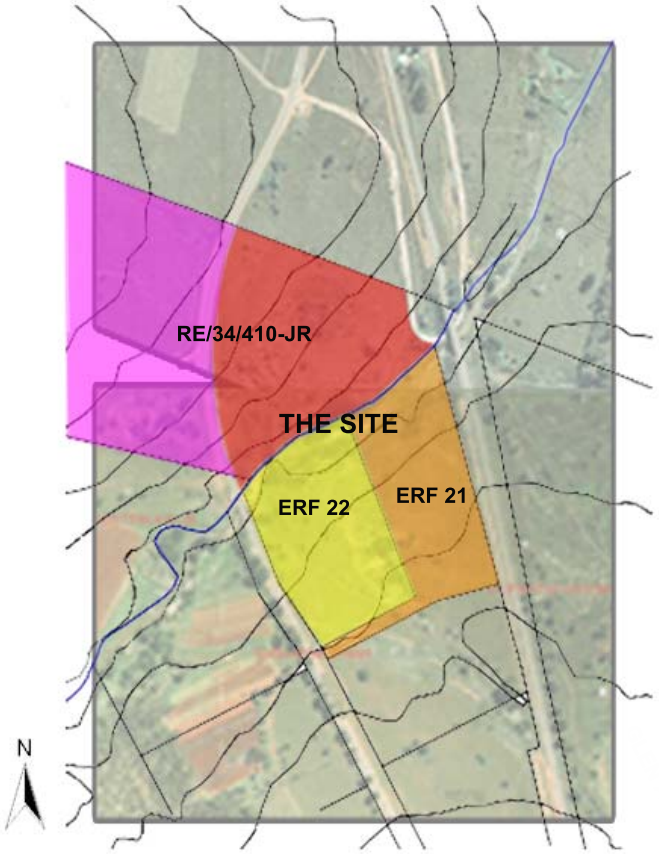

Figure 033: Property Breakup

Currently Erf 21, Erf 22 and RE/34/410-JR are all zoned agricultural and hence have no building line restrictions and other town planning stipulations.

RE34/410-JR

This site has a total area of 73,6148 hectors, a small portion of land east of Glen Avenue is cut off from the balance of the site by this road and thus justifying expropriating it from the balance of the site
Site area expropriated : 76 206m2
Current owner : Bondev Ontwikkelings Pty Ltd
Current zoning : agricultural / farm

ERF 21

This site is adjacent to the north south rail way lines and is currently accessed through a pan handle access.
Site area : 44 572m2
Current owner : Estate Sunlawns Pty Ltd
Current zoning : agricultural / farm

ERF 22

This site is adjacent to Glen Avenue to the west and the Olifantspruit River to the north.
Site area : 45 424m2
Current owner : Estate Sunlawns Pty Ltd
Current zoning : agricultural / farm [47].

REZONING REQUIREMENTS & POSSIBLE STIPULATIONS

All three sites would need to be consolidated into one Erf, zoned Special for a Crematorium, building lines to Glen Avenue of 16m could be imposed and 10m building line parallel to that of the railway lines.

Height restrictions of 2 storeys would be tabled so as in keeping with the rural feel of the area.

A bulk factor of 0.3 is applicable, with a coverage factor of 20%. again this is in keeping with the rural aspects of the area [48].

Footnote : [47] Kempton Park Metropolitan Council (2003). Town Planning nformation Office
[48] Pohl, F. (town planner). 2003. Personal Communication

SITE CONTOUR PLAN LAYOUT

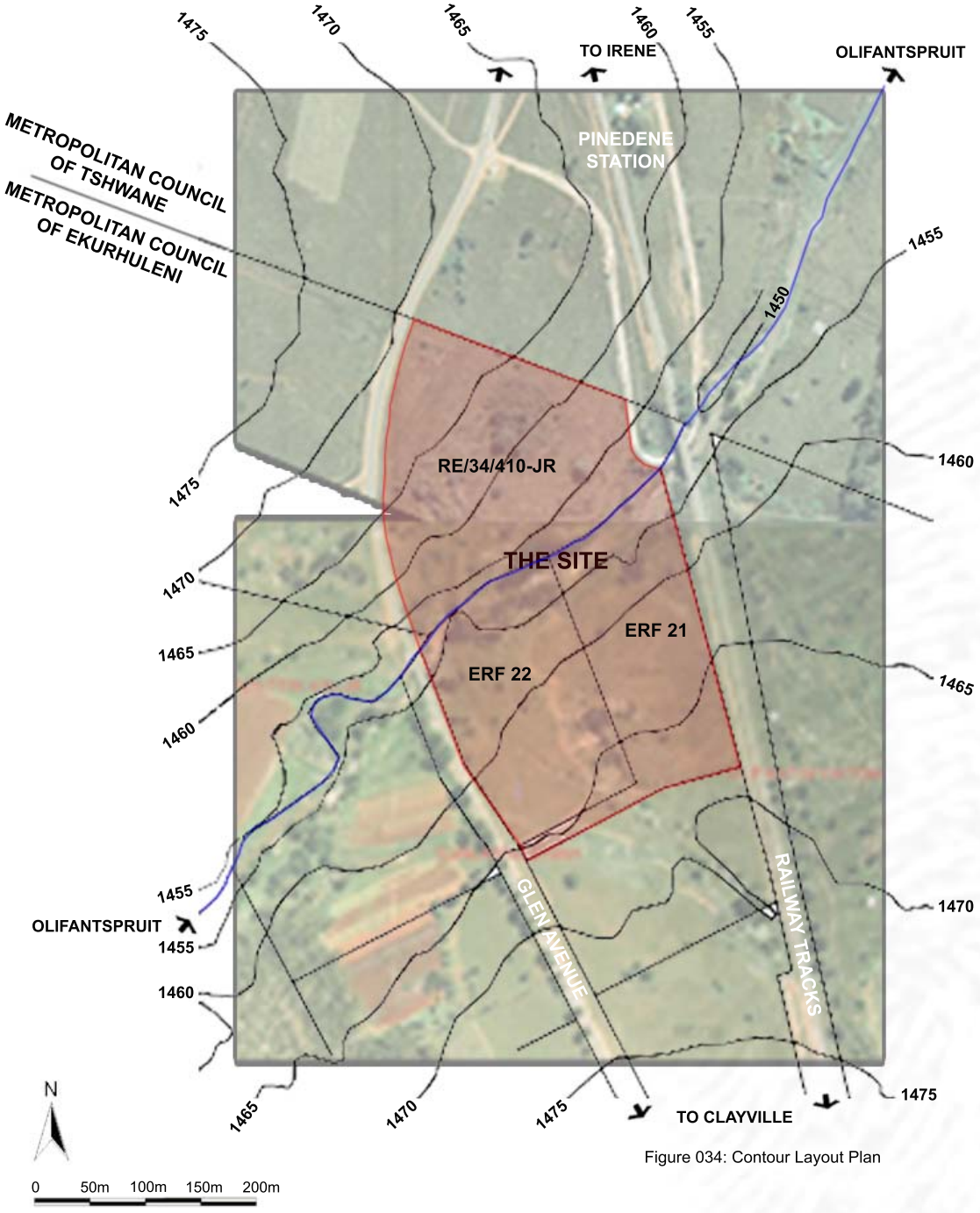

Figure 034: Contour Layout Plan

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SITE CONTOURS

The Gauteng Surveyor Generals 5m contour plan reflects that the site has a generous fall towards the Olifantspriut River. An average fall to the north of the river is 1:15, and the average fall to the south of the Olifantspriut River is 1:30.

The very good fall towards the river will aid in the quick disposal of storm water directly into the river area.

GEOLOGICAL - CLAY CLASSES OF TOPSOIL

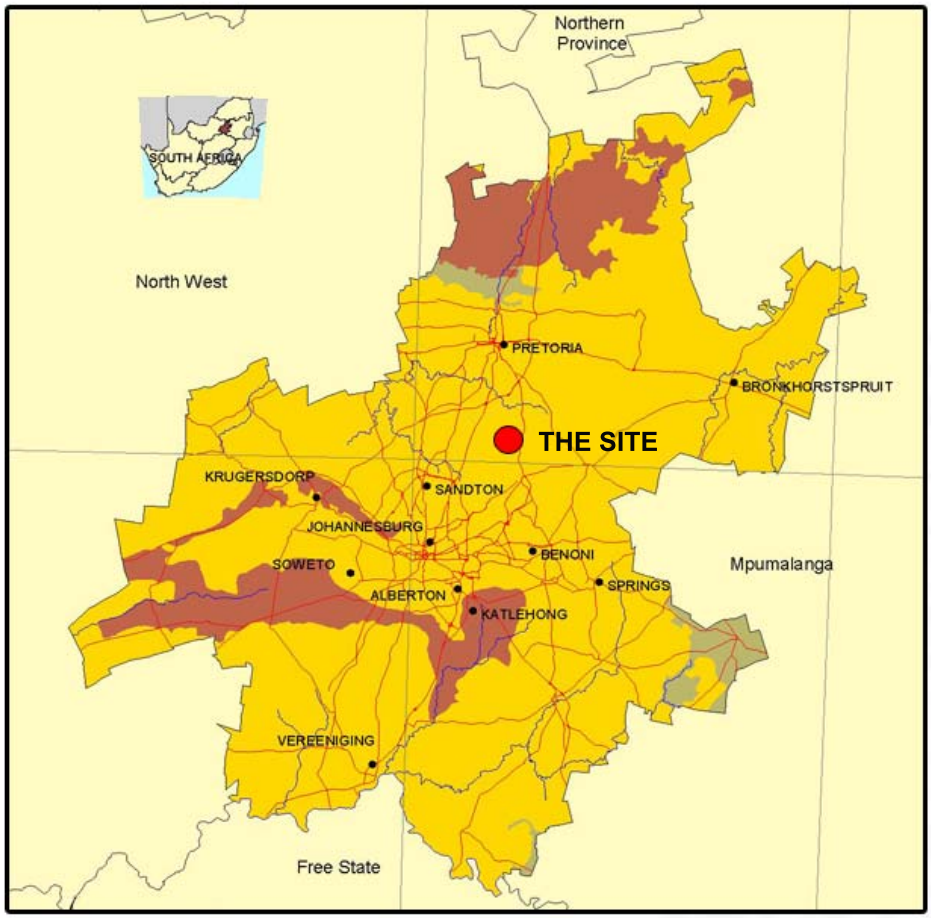


Figure 035: Map of Gauteng

CLAY CLASSES OF THE TOPSOIL

The site location has a moderately high levels of clay soil, foundation selection will be critical for the overall design.

GEOLOGICAL MAP OF CENTURION

The site is situated in a predominantly Dolomitic region, resulting in sinkhole formations. The Syenite band that runs north to south cuts off underground water movement and restricting it to the eastern side of centurion resulting in a high water table [49].

Dolomitic soils are unsuitable to build on so the selection of foundations and the rehabilitation of the soil under the building area must be considered.

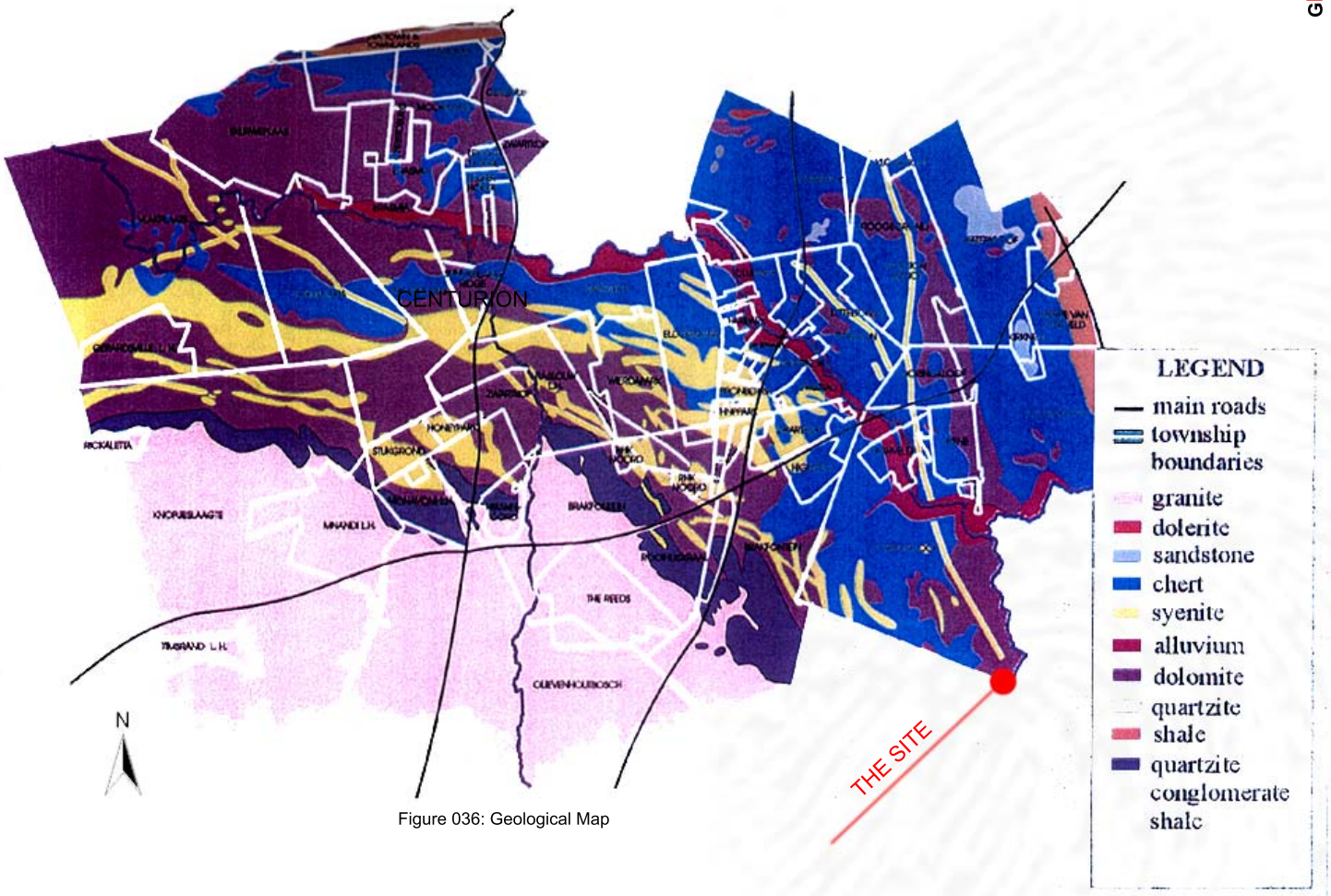


Figure 036: Geological Map

Footnote : [49] Centurion Revised Integrated Development Plan (1999:55)

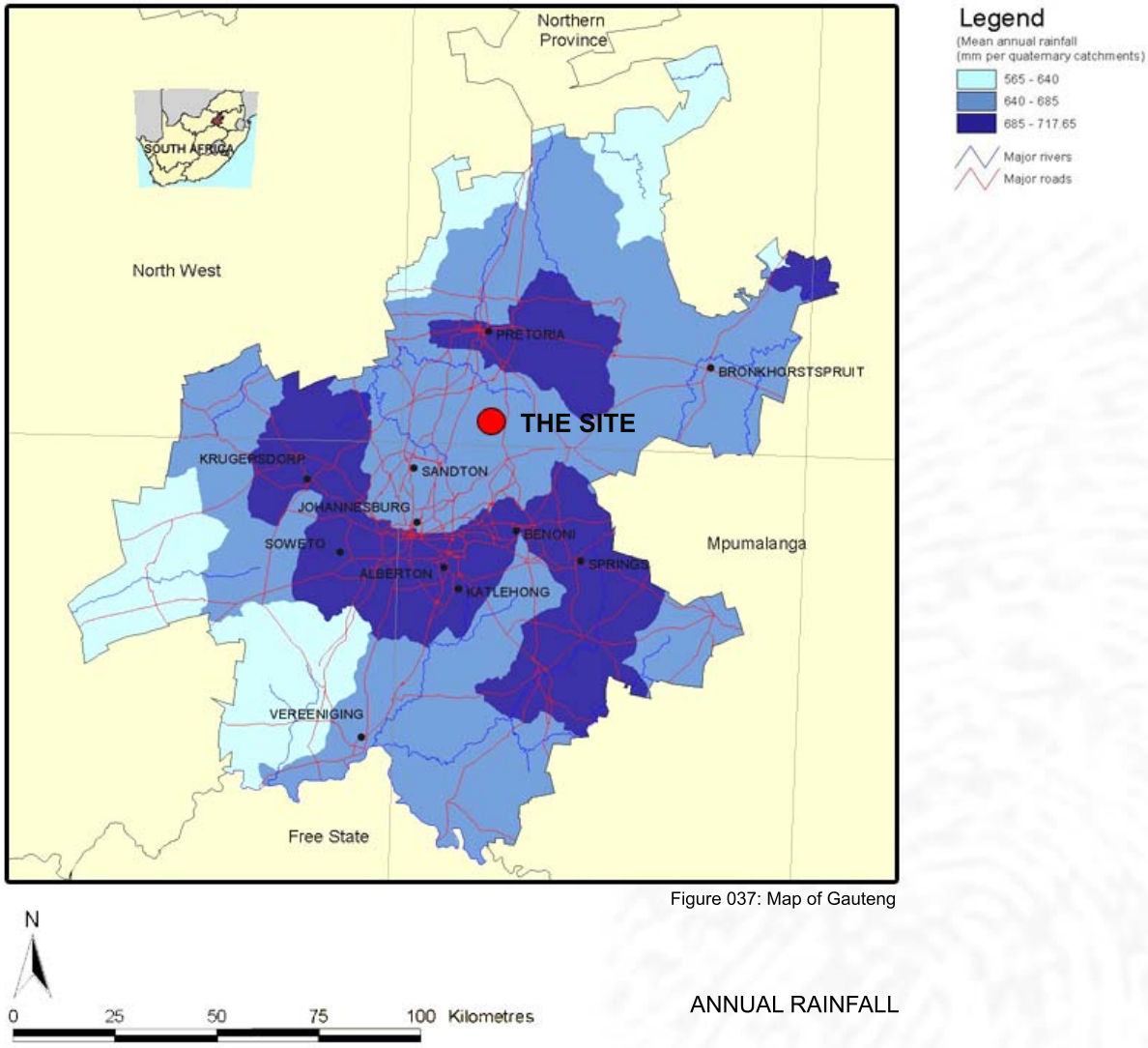


Figure 037: Map of Gauteng

ANNUAL RAINFALL

The site location is within an area that has a moderately high rainfall figure together with a high water table, this provides design possibilities for rain water harvesting for the development.

ROADS AND STORMWATER

The GPMC is responsible for bulk services and metro wide roads, while the Centurion and the Kempton Park Town Councils are responsible for local infrastructure and reticulation.

The site is accessible from a single lane tarred road (Glen Avenue), however no piped storm water systems exist. Due to the dolomite in the area, storm water drainage is a critical issue [50].

REFUSE REMOVAL

The local councils are responsible for the removal and collection of refuse in urban areas, however in smallholdings the provision of this service still does not exist and thus provision for the recycling and removal of refuse from the site must be dealt with in the design of the crematorium.

Footnote : [50] Revised Integrated Development Plan (February 1999:45 & 46)

Currently the only fresh water supply within the area of the site is a 700 diameter Rand Water pipe. This pipe however cannot be tapped into and alternative means of obtaining water will be required. Water harvesting is an alternative to piping water in from Pinedene Station.

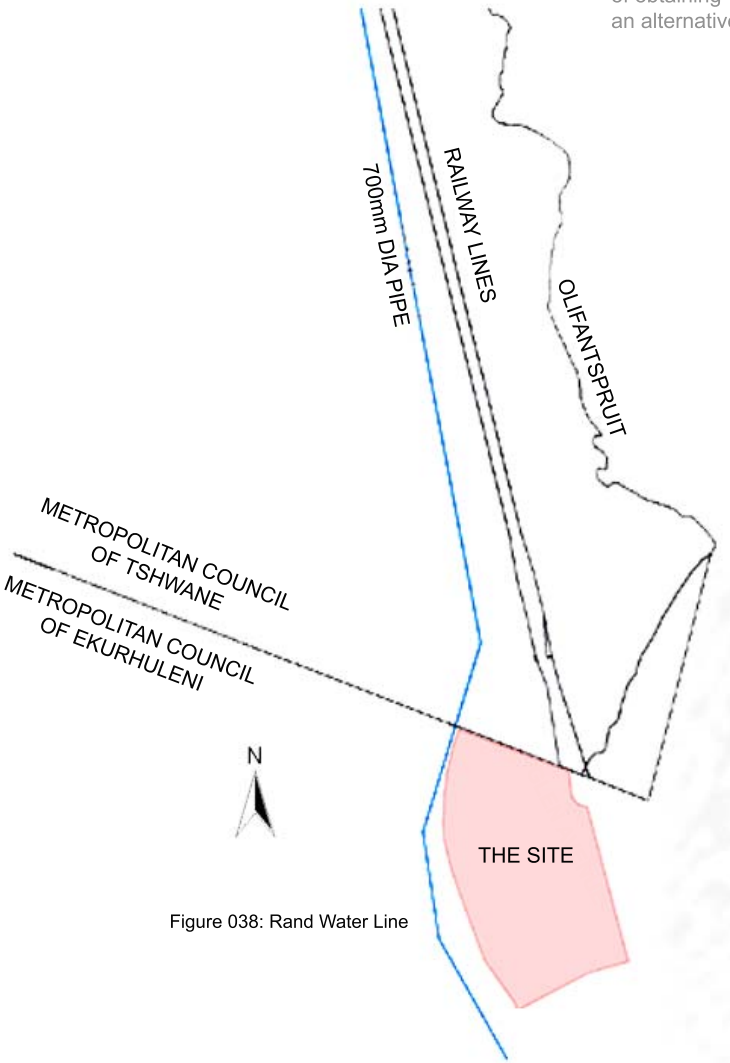


Figure 038: Rand Water Line

WATER PRIORITY

Individual water connections are the norm, with exceptions to the rural areas, where bore holes are extensively used [51].

The site is situated in an area deemed by the Centurion Council as being of minimum importance and low priority, thus the development must allow for the harvesting of rainwater and the use of bore hole water.

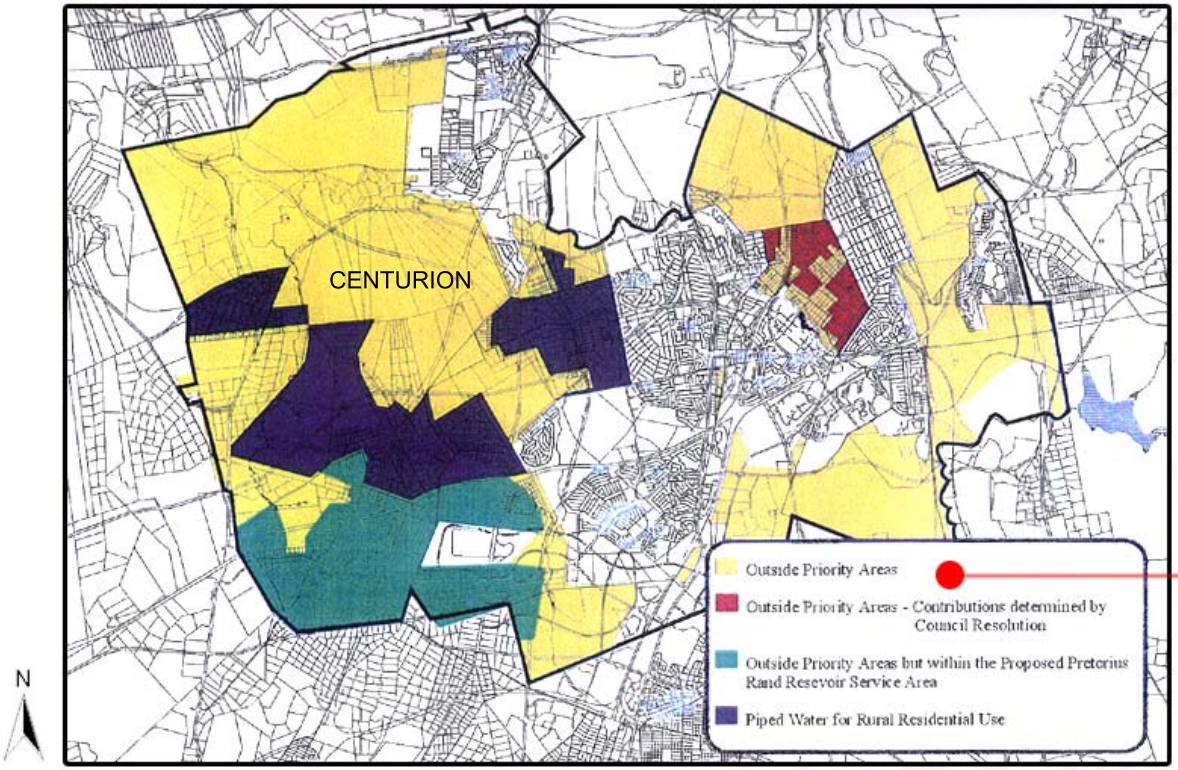


Figure 039: Water Priority

Footnote : [51] Centurion Revised Integrated Development Plan (Febuary 1999: 46 & 49)

SANITATION PRIORITY

Waterborne sewerage are systems provided for the urban areas. Smallholdings rely on septic tanks [52].

The site is situated in an area deemed by the Centurion Council as being of minimum importance and low priority, thus the development must allow for the treatment of its own sewerage.

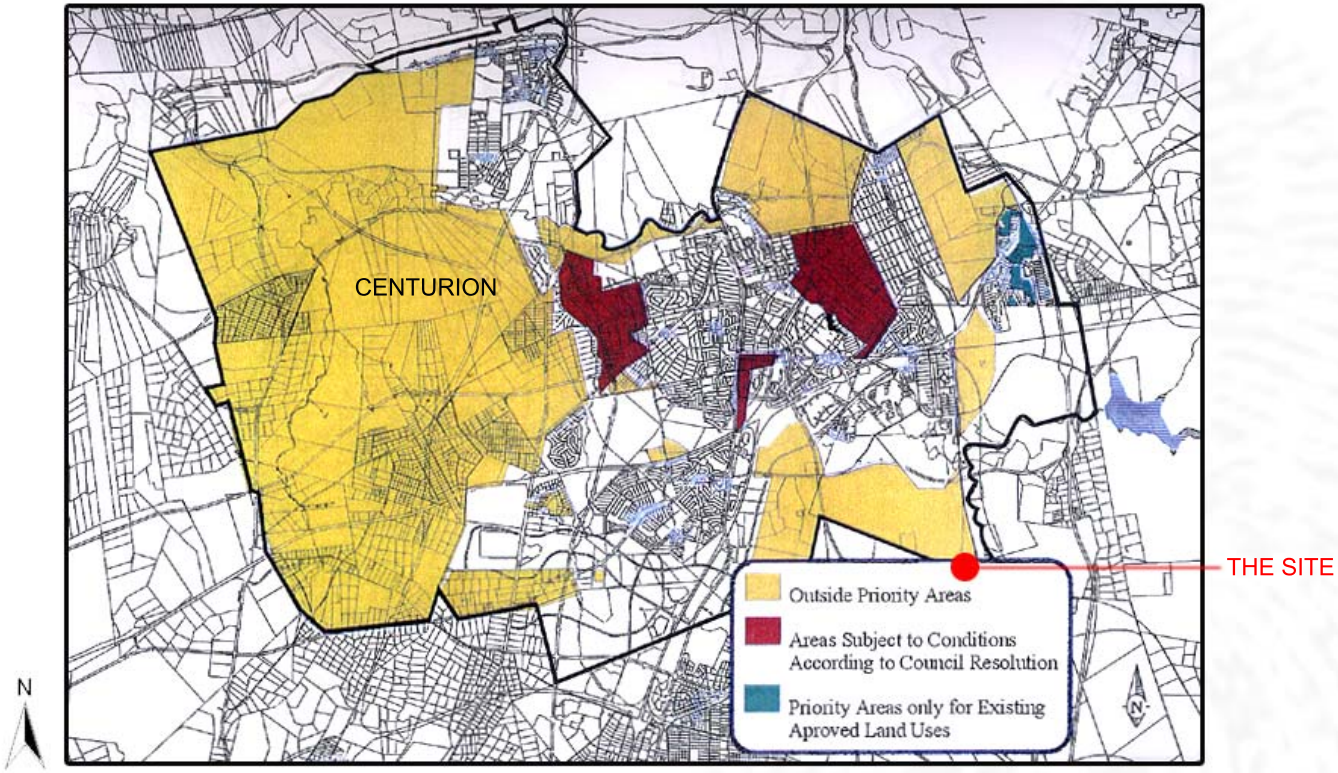


Figure 040: Sanitation Priority

Footnote : [52] Centurion Revised Integrated Development Plan. (Febuary 1999: 46)

ELECTRICITY INFRASTRUCTURE

Electricity is purchased from Escom and the City Council of Pretoria. Most properties have individual connections. Escom is responsible for reticulation of the eastern smallholdings [53].

The site is situated in an area were no electricity currently exists, thus applications should be made to Escom for a connection point, however solar powered electricity could be looked into.

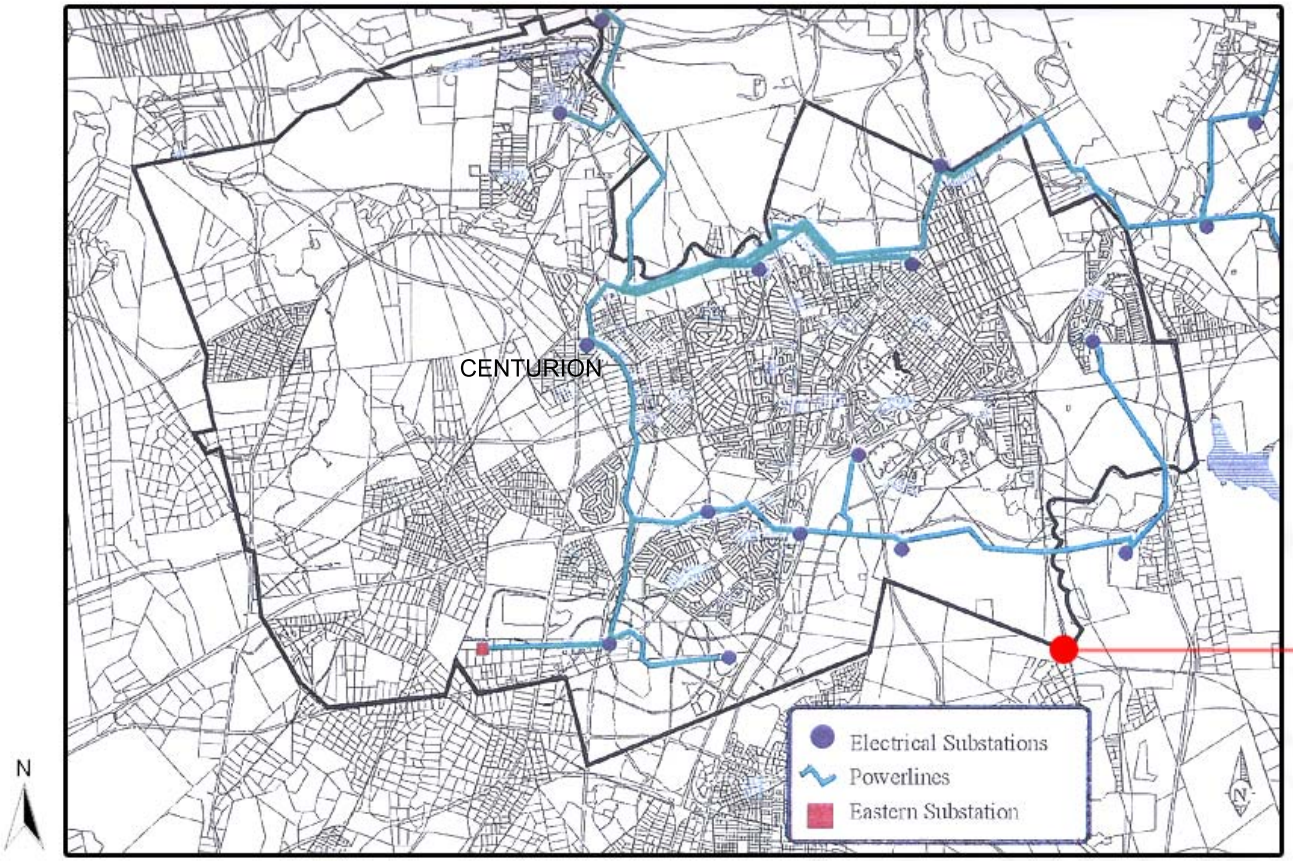


Figure 041: Electricity Availability

Footnote : [53] Centurion Revised Integrated Development Plan. (Febuary 1999: 46)

BUS TRANSPORT

Bus transportation is predominantly used by black commuters. No bus routes currently exist linking Centurion to Kempton Park via Glen Avenue [54].

Currently no plans exist to provide a bus route from Kempton Park to Centurion via Glen Avenue, however a bus stop should be incorporated together with the taxi stop adjacent to the proposed new development.

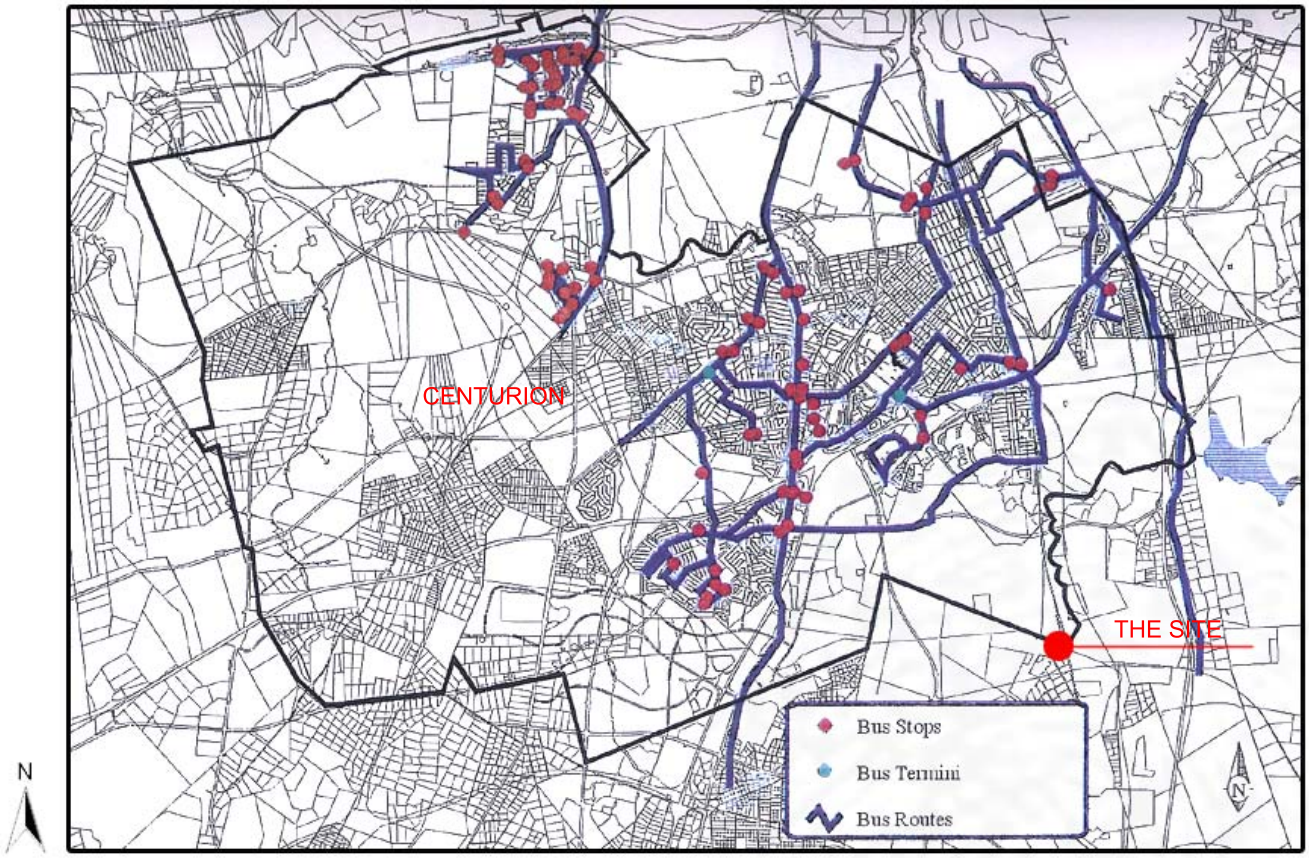


Figure 042: Bus Transport Routes

Footnote : [54] Centurion Revised Integrated Development Plan (1999: 47 & 54)

TAXI TRANSPORT

There are 4 taxi groups operating in the area. The routes are generally north / south linking Kempton Park with Centurion, with an estimated 18000 commuters daily [55].

Provision for a taxi stop adjacent to the proposed development must be incorporated.

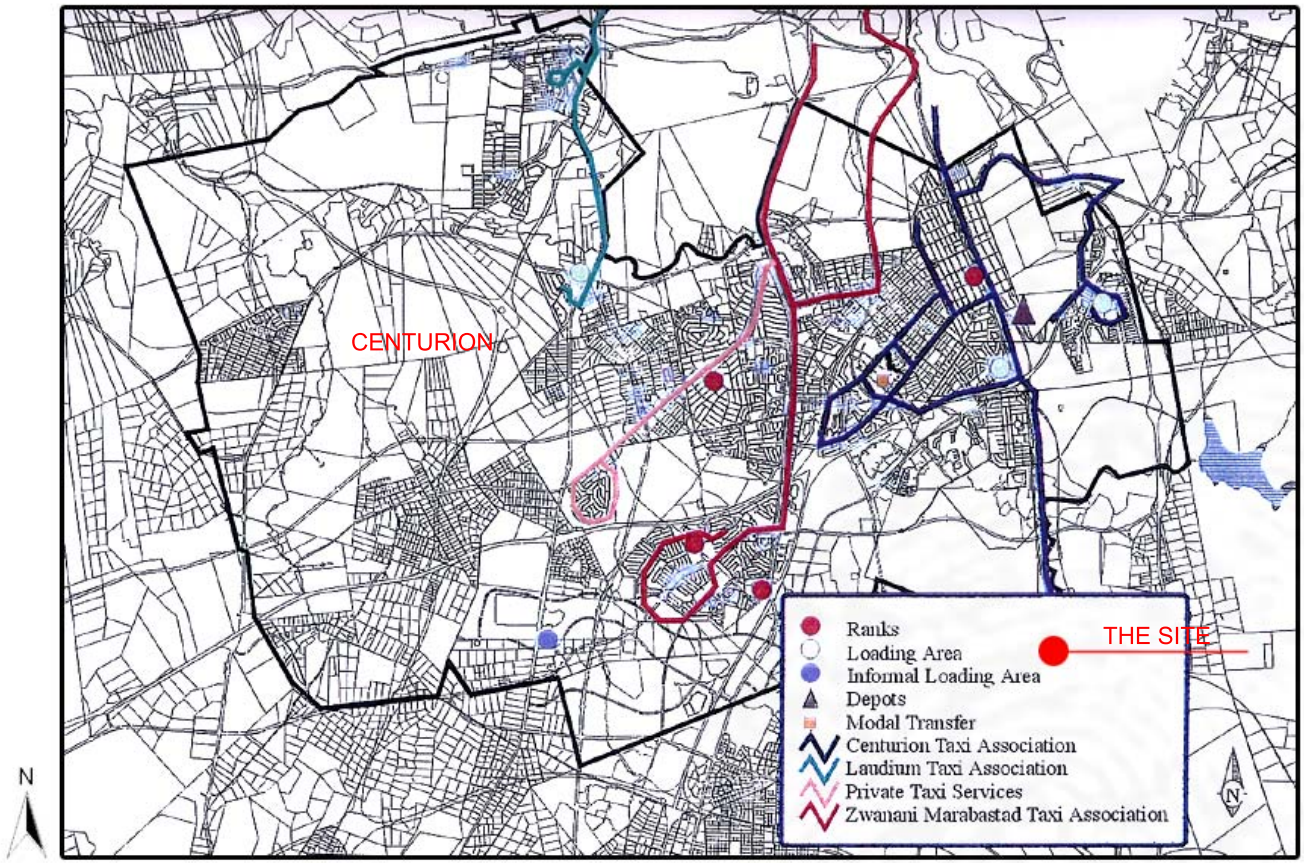


Figure 044: Taxi Transport Routes

Footnote : [55] Centurion Revised Integrated Development Plan (1999: 47 & 53)

RAIL & AIR TRANSPORT

Train services are limited to the main north / south Pretoria Germiston route by predominantly black commuters. Air traffic within the are is limited to military air force bases, however good access exists to Johannesburg international airport [56].

The closest train station to the proposed new development is Pinedene station some 200m from the site.

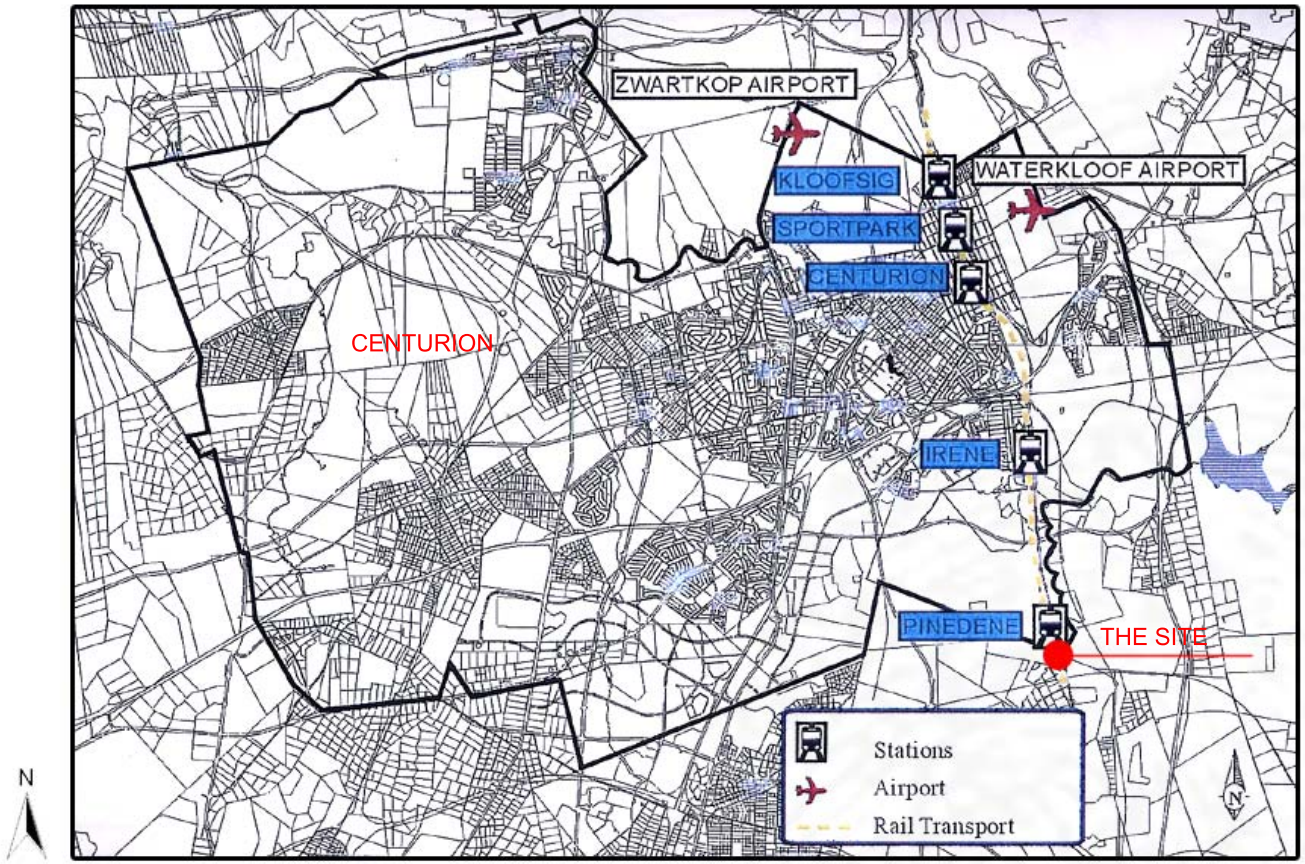


Figure 043: Rail & Air Transport Routes

Footnote : [56] Centurion Revised Integrated Development Plan (1999: 47 & 52)

Figure 045: Map of Gauteng

CONSERVATION AREAS

The sites location is within an area that has no direct environmental conservation value, however the Olifantspruit has been classified as a sensitive area due to the abundance of wild life that habitat it river banks and thus should be considered in the design process.

ENVIRONMENT - REGIONAL PARK

The natural landscape has been highly modified due to the mining activities of the past and thus essential that the remaining natural open spaces be protected. [57].

Both the Centurion and the Olifantsfontein Frameworks note the importance of these green belts linking into the Rietvlei Dam, and as a result the proposed development must take this into consideration.

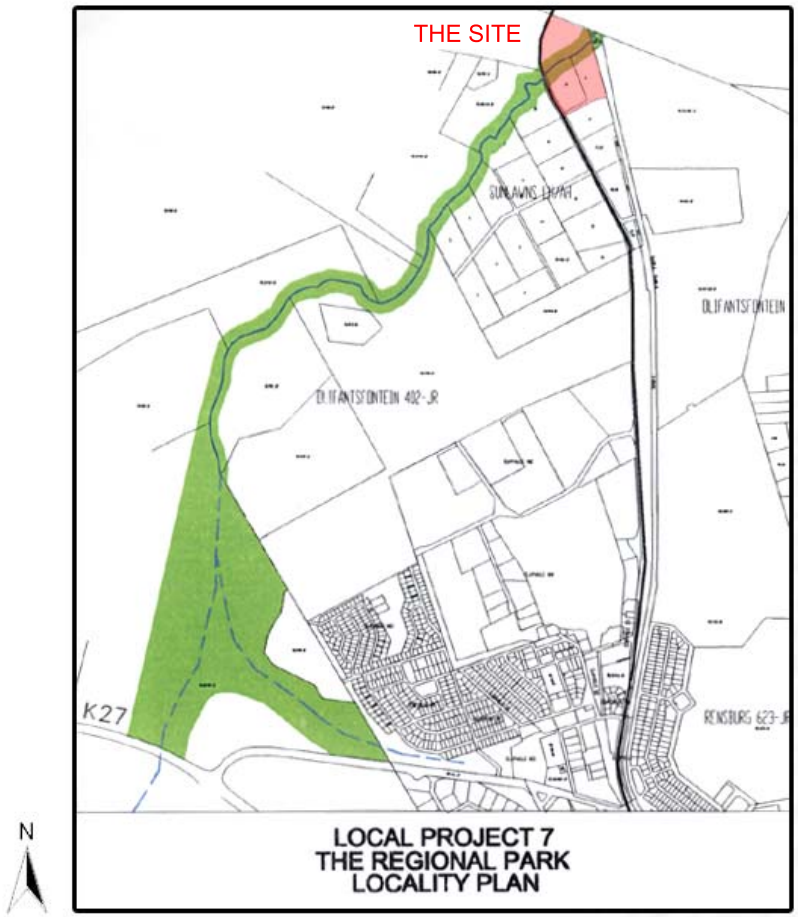


Figure 046: Regional Park

Footnote : [57] Olifantsfontein Integrated Development Plan (June 1998: 89 & 90)

ENVIRONMENT - OPEN SPACES

A distinction between primary and secondary network systems are made in the Centurion Open Space Framework. These two systems are to be linked at places of importance. As indicated in Figure 30 a gateway element should form the entrance into Centurion from the south [58].

The proposed site is situated across both of these two systems and thus form an important ecological focal point.

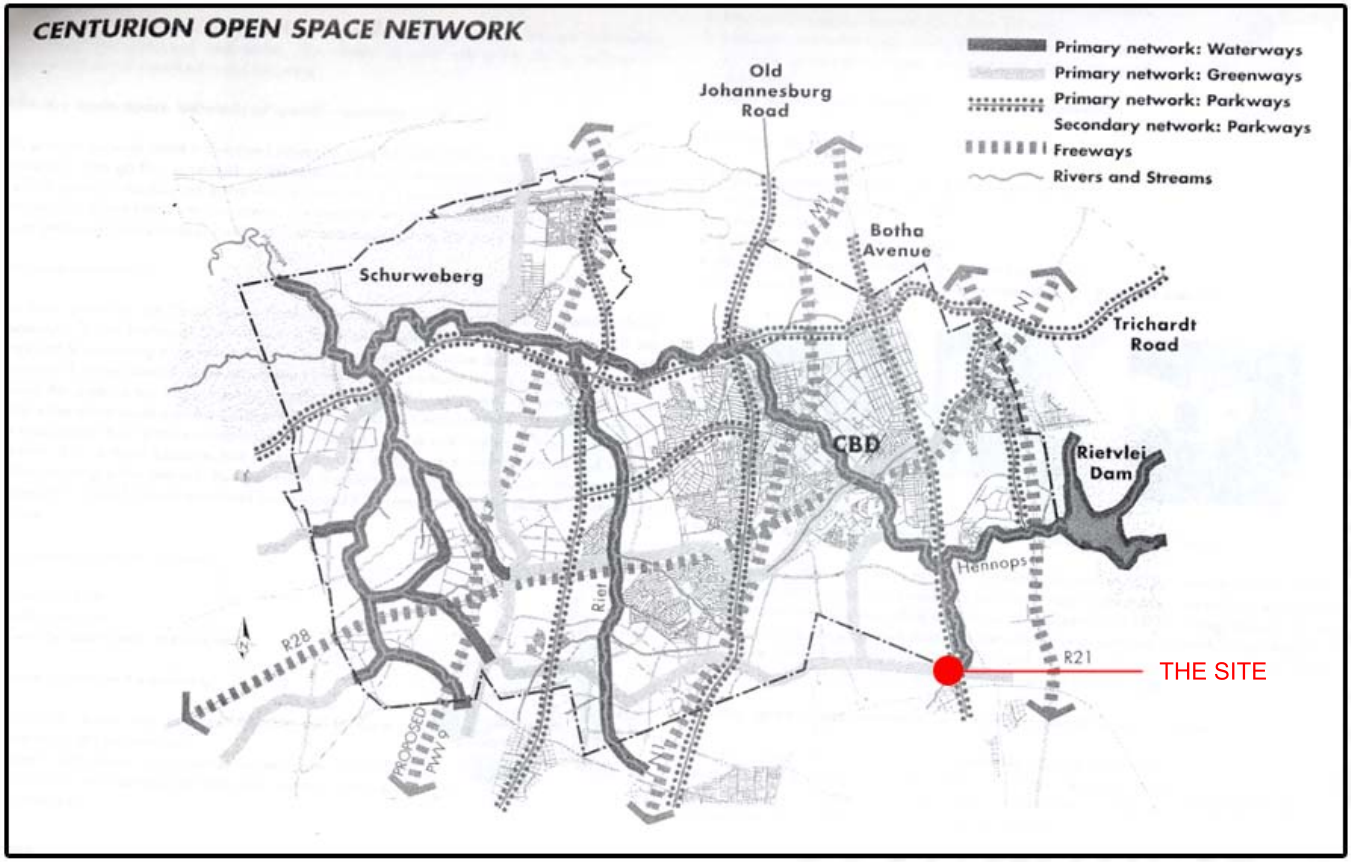


Figure 047: Centurion Open Space Network

Footnote : [58] Centurion Open Space Network (no date: 18 & 19)

MICRO SITE LAYOUT - 100 YEAR FLOOD LINE

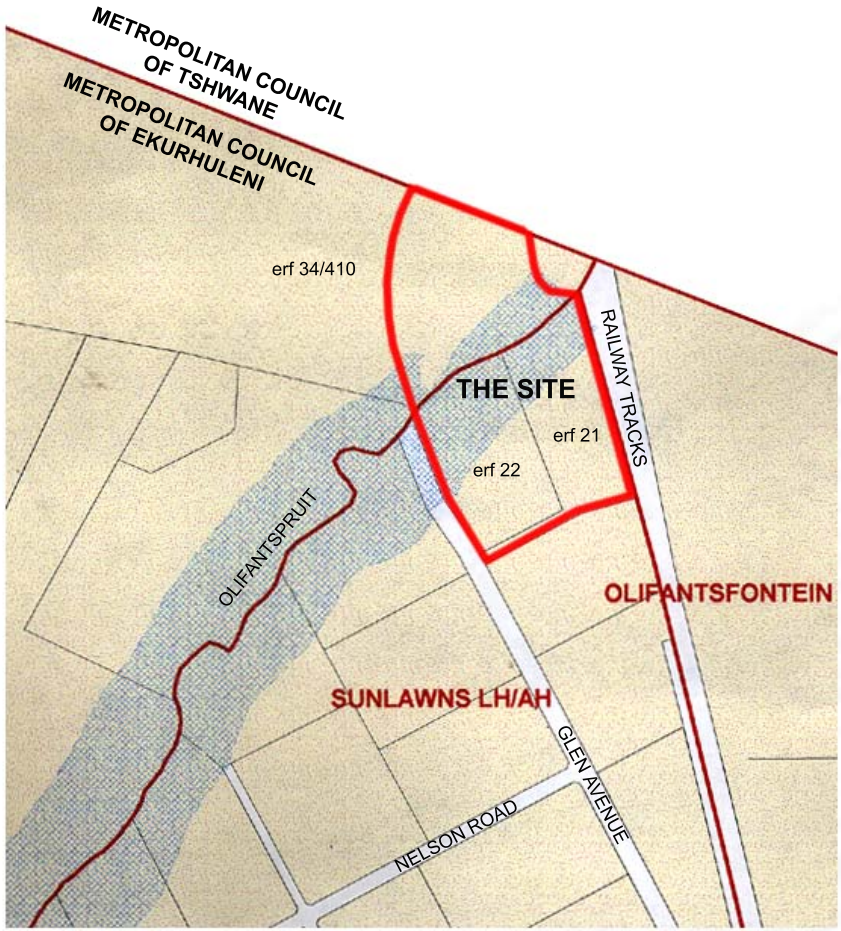
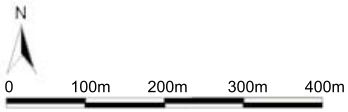


Figure 048: 100 Year Flood Line Diagram



The site is prone to flooding from the Olifantspruit River, the design of all structures should be built beyond the 100 year flood line.

The site is located to the southern most part of Pretoria with a mild year round climate.

TEMPERATURE

The site has an average minimum daytime temperature of 18 degrees Celsius in summer and 5 degrees Celsius in winter. The average maximum daytime temperature is 32 degrees Celsius for summer and 20 degrees Celsius in winter.

RAINFALL

Rainfall occurs generally in the summer months, that of September to February, with an annual rainfall of around 600mm [59].

Footnote : [59] Klimaat van Suid Afrika Deel 8 (1986:14 &18)

THE SITE

Figure 049: Aerial Photograph

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THE SITE

The site is located in an area that is predominently rural in character, except for a small residential community to the north east of the proposed site. This site is surrounded by farming to the south and southeast and limestone mining to the northeast.

SITE PHOTOGRAPHS

Figure 050: View Looking North - Edge of Site

Figure 051: View Looking North - Centre of Site

Figure 053: Site Layout

Figure 052: View Looking South - Edge of Site

KEY SITE FEATURES

Figure 054: IMR Bridge - East Elevation

Figure 055: IMR Bridge - West Elevation

Figure 056: IMR Bridge - West Elevation

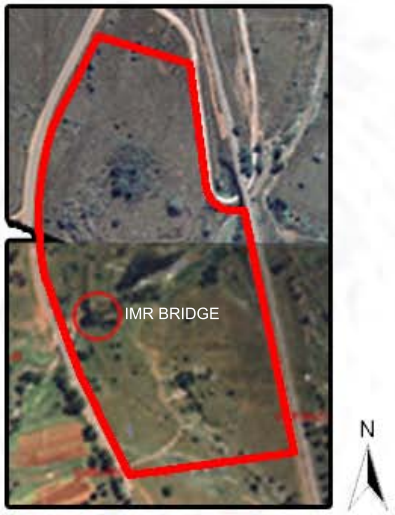

Figure 057: Site Location

SITE PHOTOGRAPHS

KEY SITE FEATURES

Figure 058: View Looking North

Figure 059: View Looking North

Figure 060: View Looking West

Figure 061: Site Location

03.04.07

KEY SITE FEATURES

Figure 062: View Looking East

Figure 063: View Looking North

Figure 064: View Looking North

Figure 065: Site Location

TYPICAL CREMATORIUM LAYOUT

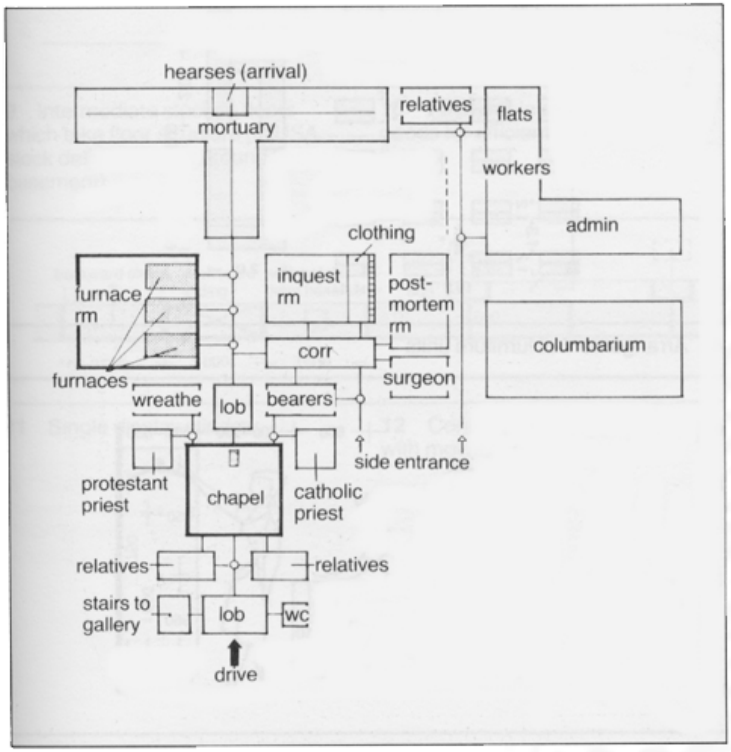

Figure 066: Typical Crematorium Layout

The architects' data handbook of building types as published by Neufert provides an illustration of the workings to a typical crematorium. This diagrammatic explanation of the linkages between functions provides an understanding of how a crematorium should be laid.

A linear and symmetrical approach in the design layout is adopted with the entrance lobby connected to the chapel with auxiliary functions such as priest rooms and viewing rooms attached to this. An anti-chamber area separates the chapel area from the crematorium zone. Again a linear passage connects all functions from the anti-chamber to the cremator room, mortuary and storage facilities all interconnected via a single circulation passage.

CURRENT CREMATORIA STANDARDS

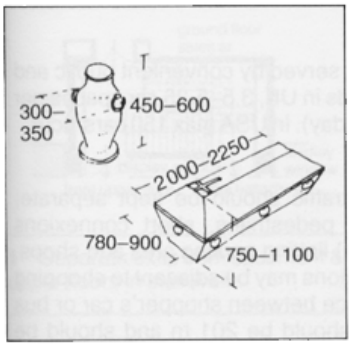

Figure 067: Coffins & Urns

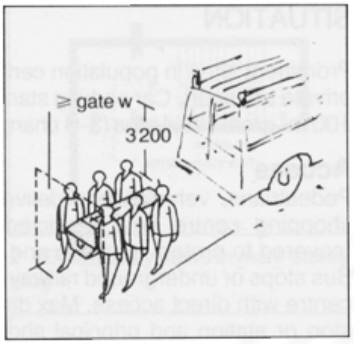

Figure 068: Coffin Bearers

The layout of a crematorium must provide for the provision of minimum standards in terms of functions and dimensioning. These standards must apply to storage facilities for coffins and urns, door-opening widths must accommodate for coffin bearers and coffins to pass through unobstructed. By understanding the functioning of a facility such as a crematorium one is able to design a successfully operational building.

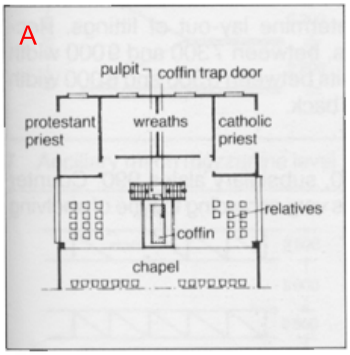

Figure 069: Crematorium Layout A

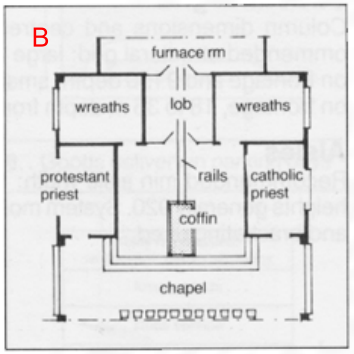

Figure 070: Crematorium Layout B

The following are traditional ways of transporting the coffin after a funeral ceremony from the chapel into the creator room area. Crematorium layout A provides for the submerging of the coffin simulating a burial while layout B allows for a rail or track system to pull the coffin into the anti-chamber area before entering the cremator room