.3. CONTEXT

.3.1 GLOBAL CONTEXT

.3.2 REGIONAL CONTEXT

.3.2.1 HISTORICAL CONTEXT

.3.2.2 INFRASTRUCTURE

.3.2.3 SOCIO-ECONOMIC AND PSYCHOLOGICAL CONTEXT

.3.3 URBAN CONTEXT

.3.3.1 URBAN ANALYSIS

.3.3.2 ARCHITECTURAL CHARACTER

.3.4 MICRO CONTEXT

.3.4.1 SITE SELECTION

.3.4.2 SITE ANALYSIS

.3.4.3 CLIMATE

.3.4.4 BUILT FORM
3. CONTEXT

3.1 GLOBAL CONTEXT

3.1.1 INTRODUCTION

The democratic transformation of South Africa in 1994 elevated the country’s economic and political position within the world’s global rankings. South Africa was reborn into a global marketplace dominated by the world’s most powerful nations, which practice neo-liberal market economics and promote their own self-interest. This is a challenge for a small economy like South Africa, and it should not be ignored that other emerging nations are also ‘fighting for their share of the global pie’ (Dorrian 2005:1).

Furthermore Dorrian notes that the world that greeted this new democracy was itself in the process of a global economic revolution, in that the centre of economic gravity shifted to Asia. This created a tripolar economic world, with strategic economic parity between Western Europe, North America and East Asia. It is currently estimated that Asian central banks hold approximately 70 percent of the world’s foreign exchange reserves, a feat not to be taken lightly (Dorrian 2005:30).
There is little doubt that the current South African government aspires to be internationally recognised. Government’s vision is clearly defined in its aspirations for the New Partnership for Africa’s Development (NEPAD), and President Thabo Mbeki’s desire to be seen on the international stage and to have his vision of an African Renaissance embraced by the world at large. (Dorrian 2005:28) In order to determine on how an emerging nation like South Africa is to compete within this global status quo, the country needs to know where it stands in the world, and what its economic capabilities are (Dorrian 2005:28).

Dorrian stresses (2005:75) that South African success and progress cannot be considered in isolation and that it needs to be looked at in relation to the progress made by other countries, as competition is dynamic. Dorrian (2005:2) suggests a twofold approach to unlocking South Africa’s potential, by incubating, nurturing, and developing the country’s actual and potential human capital and in developing a radical and innovative strategic paradigm.
.3.1.2. HUMAN CAPITAL

“The world has entered the era of the knowledge society, where knowledge is the key production resource, as opposed to capital and labour. Labour is still an important resource in creating and utilizing knowledge, but countries with global aspirations need to maintain a proper knowledge infrastructure. For that to happen, knowledge workers need to be developed and they need to be protected as a vital asset of the state. This can be done through the creation, growth and exploitation of cutting edge knowledge in which knowledge workers can play a key role” (Dorrian 2005:23).

In the knowledge economy, a country’s people are considered to be its primary economic drive force, which gives it the competitive edge over its adversaries. The term ‘human capital’ is derived from this concept, in which a monetary value is attached to the value of the human workforce and in the amount of knowledge in which is traded.
Dorrian (2005:39) is of the opinion that the strategic process should causally connect everything in society. It cannot exist by itself. At the heart of this interconnectedness lies human capital. He states that “A society exists in a process of change, and within the societal framework lies that outcome of limitless causal conditions”. This interconnectedness creates a high degree of synergistic energy, whereby both the individual parts and the collective whole benefit. The relationship between the various elements, as identified by Dorrian has been termed “The Global Performance Triangle” (Dorrian 2005:40).

3.1.3. STRATEGY
A more radical and innovative paradigm needs to be implemented in South Africa. This paradigm needs to be based on the principles of strategy, rather than economics (Dorrian 2005:3). Dorrian believes that from a South African perspective, the focus of the strategy should not only be outmaneuvering other emerging economies, but also on positioning South Africa advantageously in relation to the world’s economic giants such as North America, Asia and Western Europe.
Although Dorrian (2005:182) concedes that branding is an important element as a component of any marketing strategy, he stresses the importance of not approaching this strategy solely as a branding exercise. The strategic paradigm is one that needs to be rooted in the truth, and in existing values of the country. This is why the country’s first ambition should be to invest heavily and continually in its human capital. Other aspects of the strategic paradigm have been identified by Dorrian (2005: 183-185) to include the following:

Differentiation
All clients or ‘consumers’ of South Africa such as tourist, investors and graduates need to believe and experience South Africa to be different to other countries in offering better opportunities than found elsewhere.

Global reach
South Africa needs to have a strong and consistent brand image and influence all through the world.
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing responsibility</td>
<td>The governing body of the country should be made aware of the marketing responsibility that their international and national policies carry. Decisions made on government level have the power to change international investor’s opinions of the country’s potential.</td>
</tr>
<tr>
<td>Internal alignment</td>
<td>It is important that the vision and ambitions of all the parts of the social infrastructure have the same vision and goals for the country as a whole.</td>
</tr>
<tr>
<td>Human capital investment</td>
<td>A conscious effort needs to be implemented and maintained towards harnessing and developing human capital in order for South Africa to grow towards a globally competitive market.</td>
</tr>
</tbody>
</table>
Emotional influence  South Africa needs to aim at generating an emotional influence on its potential customers in order to create brand loyalty and continuous development.

Innovative energy  “Countries need to take existing knowledge and develop innovative thinking to create new knowledge, which then contributes to the creation of a competitive advantage” (Dorrian 2005:24). It is therefore vital that an environment that is conducive to innovative thinking is developed within South Africa.
3.1.4 CONCLUSION
As South Africa needs to implement a strategic paradigm towards becoming a globally competitive entity, Lydenburg will have to apply a similar strategy as well. This approach ties in with the holistic view of interconnectedness and synergy of the collective sum of the parts. It is also important that the vision that Lydenburg has for its future and economy, associates itself with the vision of South Africa. This is why a key focus of Lydenburg’s strategy is proposed to be aimed at developing a knowledge economy as well.
3. CONTEXT

3.2 REGIONAL CONTEXT

3.2.1 HISTORICAL CONTEXT

3.2.2 INFRASTRUCTURE

3.2.2.1 Roads

3.2.2.2 Railway

3.2.2.3 Airway

3.2.2.4 Water

3.2.2.5 Dams

3.2.2.6 Settlements

3.2.3 DEMOGRAPHIC CONTEXT

3.2.3.1 Population

3.2.3.2 Socio-Psychological Context
3.2 REGIONAL CONTEXT

3.2.1 HISTORICAL BACKGROUND

Lydenburg (‘Town of Suffering’) is a historic town in the province of Mpumalanga, in an area that was previously known as Transvaal. The town was founded in 1850 by the companions of Voortrekker leader Andries Potgieter after they had abandoned their first settlement, Andries-Ohrigstad, 50 km to the north. Located in a valley between the Steenkampsberg and Maugsberg on the Mpumalanga escarpment, Lydenburg was originally a Voortrekker settlement. The town is situated 1424 m above sea level, and the new inhabitants found the climate to be gentle and energizing. Lydenburg proved to be the malaria-free settlement the Voortrekkers were looking for after living in malaria-ridden Ohrigstad. It was from the ordeal suffered in Ohrigstad that Lydenburg derived its name.

In the indigenous tongue, the town was, and still is, known as Masising (‘Place of the Long Grass’) (Bulpin 1989: 64). The Lydenburg district was home to early (400–1500 AD) and late (1500–1800 AD) Iron Age settlements, of which remains have been found. The ceramic Lydenburg Heads, about which very little is known, are unique.
Replicas, along with Stone Age (1.5 million –30 000 years ago) artifacts, are on display at the local museum.

Lydenburg was one of several republics established in the Transvaal because of dissention among the early Voortrekker leaders about the political destiny of their followers north of the Vaal River. In 1856, Lydenburg seceded from the Transvaal Republic headquartered in Potchefstroom and joined the Republic of Utrecht the following year. In 1860, both these republics rejoined the Transvaal Republic. Lydenburg played an important role in Transvaalers’ early attempts to find a route to Delagoa Bay and a port free of British control (Lydenburgse Eeufeesgedenkboek, 1950: 77).

On 6 February 1873, several prospectors discovered alluvial gold in the district, and the Lydenburg goldfields were proclaimed three months later. Among the first finds were two large nuggets: Emma (7.65 kg) and Adeliza (7.37 kg); both were bought by President TF Burgers. Today, the gravels of the Spekboom River are still being washed for alluvial gold (Lydenburgse Eeufeesgedenkboek, 1950: 97).
During the Transvaal’s first war against Britain (1880–81), a British garrison under Lieutenant WH Long was stationed in Lydenburg. They built a small fort and named it Mary in honour of the commanding officer’s wife. To counter the two small field guns used by the Transvaalers, the British fashioned a gun of their own from a barrel of a water pump, and it managed to hurl cannon balls of 1 kg at the enemy. After the war, the fort became dilapidated, and in 1889 some of its stones were used to build a powder magazine, which still stands.

The main obstacle along the route was the Drakensberg. In 1871, at the request of President TF Burgers, the Transvaal Volksraad voted for the building of a road over this formidable barrier to the sea. The contract was given to Abraham Espag, and most of the work was done with pick and shovel. The first wagons to use the new road, which followed the route of the old hawepad in numerous places, arrived in Lydenburg from Delagoa Bay in 1874.

The pass used today was inaugurated on 22 July 1953. During this occasion, it was named Long Tom Pass to commemorate a famous skirmish between the Boers and
the British along this route in September 1900.

The province of Mpumalanga (‘The Place Where the Sun Rises’) was created immediately after South Africa’s first democratic elections in 1994. It inhabitants are largely SiSwati- or isiNdebele-speaking, but it also has sizable communities of Xitsonga-, SeSotho-, isiZulu-, Afrikaans- and English-speaking people. Portuguese is fast becoming an essential business language as neighbouring Mozambique consolidates itself as a major trading partner.

Because it is bordered by Mozambique and Swaziland, Mpumalanga has a distinct atmosphere and is different from other rural South African provinces. Mpumalanga has proactively developed strong trade relations with its neighbours, who are capitalising on its medical, technical, retail and specialist manufacturing strengths.
3.2.2 INFRASTRUCTURE

3.2.2.1 Roads
Mpumalanga’s economic wealth lies in the R35 billion Maputo Corridor development initiative. The corridor, which includes major infrastructure projects such as a new road and rail and telecommunication links, is slowly changing the socio-economic structure of the entire sub-region. Although Mpumalanga is still largely a rural province, one quarter of its economy is already based on manufacturing. The corridor is designed to strengthen this trend.
Railway Although the railway runs through town, the passenger service has been defunct for a number of years now. The railway is mostly used to transport mining materials from mines such as Xstrata, the chromium mine situated about 5 km from town.

Airway A landing strip/airfield is situated about 5 km from the Dullstroom entrance of town (south-west).

Water The hinterland of Lydenburg is fed mostly by the Blyde River. The Sterkspruit flows through town and connects to the Dorps River, which terminates in the Olifants River.

Dams The Lydenburg Dam provides the town with water. Two greater irrigation systems are the Blydepoort Dam and the Kwena Dam between Machadodorp and Lydenburg. The denburg Dam’s wall broke during a flood in 2001, leading to four deaths in the community and a great deal of damage to infrastructure and property.
Settlements

Lydenburg’s immediate settlements include Masising and Kellysville, the Indian, coloured and black communities on the western side of the town. Lydenburg is also near Burgersfort, Steelpoort, Dullstroom and Belfast.
.3.2.3. DEMOGRAPHIC CONTEXT

.3.2.3.1. Population

From an informal interview with Mr. Kenneth Van Niekerk from the Lydenburg Council (January 15, 2005), it is determined that out of a population of approximately 40,000 residents, eighty percent are resident in the segregated settlements. Mr. Van Niekerk explained that the only statistics on demographics available date from 1995, and is therefore deemed outdated.

.3.2.3.2. Socio-Psychological Context

Informal interviews conducted with members of the community determined that more than 50% of the marginalised settlements expect that the development will not cause problems in the community. The comparative figure for the residents of the main town is 30%. It needs to be noted that the marginalised residents often mentioned that they expected the development to have a positive effect and that the standard of living in their township would rise.
Most residents in Lydenburg expect the main cause of problems to be the influx of foreigners with habits and lifestyles different to theirs. Areas of community life in which the previously disadvantaged people expect extremely positive developments are political spectrum, employment and education. Seventy-five percent of local residents are confident that the local way of life will not be replaced by that of newcomers to the area, while twenty-five percent display a high level of uncertainty about this issue. Most residents welcome the expansion.
3.3. URBAN AND ARCHITECTURAL CONTEXT

3.3.1. URBAN ANALYSIS
- Town elements
- Figure-ground study
- Areas of development
- Identified weaknesses
- Proposed solutions

3.3.2. ARCHITECTURAL CHARACTER
- Typology
- Elements, Textures and Materials
- Conclusion
F3.3.1.

F3.3.2.

F3.3.3.

F3.3.4.

.3_24.
.3. CONTEXT

.3.3 URBAN AND ARCHITECTURAL CONTEXT

.3.3.1 URBAN ANALYSIS

.3.3.1.1 Town elements

Lynch, in his *Image of the City* (1960) differentiates between elements found in the fabric of the city. These elements include: Paths, edges, districts, nodes and landmarks. An alternative method to distinguish between elements the urban environment was adapted from the 1920’s Bauhaus Gestalt Psychology, where one can identify areas of repose, confusion, permeability and image ability. According to Lynch’s theory, the following elements were determined:

Paths ‘The intersection and conjunction of routes, particularly of different kinds of routes (paths, road, rail, river, canal, sea and air) is of major importance to the establishment and development of towns and cities. Road patterns are often generating and controlling factors of development: influencing if not determining character.’ (Farmer, 1993:24)
ii. Edges  An edge is a natural characteristic, such as topography, rivers and rail. Secondary edges are formed between different phases and are less defined as two regions become interrelated.

iii. Districts  A district is the area bound by edges. A district has a definite character or function.

iv. Nodes  A node is the most strategic area of town by which an observer can enter. Nodes are intensified focal points within districts. A node generally occurs at primary junctions, crossovers of transportation mode, public spaces, or transitional nodes from one structure to another. Another form of node is a concentrated activity area which gains importance from this concentration or special layout, for instance a square.

v. Landmarks  A landmark is an external point of reference. It usually is a physical object, such as a building or a mountain.
3.3.1.2. Figure-ground study

A figure-ground study is a communication tool with which to analyse the relationship between built form and void. The texture of the urban fabric is communicated, and the density and direction of urban grain is identified. In a figure-ground study, figure denotes built form, and ground reads as ground. A ground-figure study is an inverse image of the figure-ground, where built form is read as ground.
3. CONTEXT
3.3.1.3. Expansion rates

According to Ms L Visser (Lydenburg Council, personal communication January 15, 2005, Lydenburg), the number of new residential units to be erected within the next two years is expected to rise to 3 000. This number depends on how quickly services can be put into place. The council is currently negotiating with mines that have already committed themselves to developing residential areas for their employees. The actual number of units remains undisclosed as a great deal of politics is involved among the mines, the private developers and the Lydenburg Council.
.3. CONTEXT

.3.3.1.3. Areas of development

F.3.3.8

F.3.3.9
.3.3.1.4. Identified weaknesses

i. Lack of definition of the river’s edge

ii. Lack of connectors between the river’s edge and the CBD

iii. Vaguely defined places of historical and architectural interest

iv. Lack of tourism focused enterprises

v. Lack of institutions

Institutions are defined as those elements of an urban environment that provide for the common living of people. They arise from three main desires: to learn, to meet, and to serve the well-being of all.

Institutions thus comprise roads, parks, paths and ordered institutional devices, which include post offices, law courts, municipalities, railway stations, churches, civic offices, schools and universities. These institutions create a capital web in and around which all development takes place. According to the general rule, high pedestrian access results in high-order retail and professional services with a consequent increase in demand for the adjacent land, resulting in high land value.
.3. CONTEXT

F.3.3.10

.3_33.
vi. Lack of pedestrian-friendly spaces
Pedestrian movement can mostly be found on the east–west axis in Voortrekker Street because it hosts most of the commercial shops and because the axis is the only link between the townships and the main town. The project will aim at improving pedestrian circulation in a north–south axis, linking with the east–west axis, to draw more visitors to the riverside development.

.3.3.1.5. Proposed solutions
i. Emphasis on the Sterkspruit River’s edge
It is proposed that the river’s edge be defined through pathways along the edge and through the encouraging of riverside activities such as fly-fishin, picknicking and walking.
.3. CONTEXT

ii. Emphasis on edges from the CBD to the Sterkspruit River
   - Canopy
   - Trees
   - Water furrows
   - Market
   - Historical 'pockets' of interest.

iii. Vaguely defined places of historical and architectural interest
    Define and create historical pockets and routes

iv. Lack of tourism focused enterprises
    The lack of tourism focused enterprises is to be addressed by the Incubation Node and the resultant developments.

v. Lack of institutions
    The lack of institutions is also to be addressed by the development proposal of the Incubation Node.
vi. Lack of pedestrian-friendly spaces

Pedestrian routes
Places to sit
Shade

Safety
Pedestrian movement across the north-south axis of Viljoen Street is treated with special care to prevent the road from becoming a barrier. Paving islands are situated along the road to slow down traffic and to ensure safety.
.3.3.2  ARCHITECTURAL CHARACTER
  .3.3.2.1  Typology
    i.  Street Facades

A study of the street facades of the CBD of Lydenburg reveals a fragmented low-density loose fabric with a maximum height of 2 storeys. A wide variety of architectural styles are encountered. The lack of a definitive wall towards the Sterkspruit River leads to incoherence and makes orientation difficult. A defining landmark or gateway is proposed in the form of a water tower or welcome sign at the node where Viljoen and Voortrekker Streets meet. The north-facing facades are shaded against the sun. South facing facades have a less pronounced canopy.
ii. Typical Lydenburg houses (1850-1940)
The typical historical Lydenburg dwelling has a raised plinth (sandstone) which is entered via four of five steps, and which is covered with a large overhanging eave to form a shaded stoep. The roof is invariably of corrugated metal. Original windows were of the sash-variety. Upon entering the house, a hanging timber floor is encountered, and an unexpected coolness experienced due to the heat absorbing qualities of the high-massed walls.
iii. Modern

A few examples of modern architecture are found in the Central Business district, of which the Lydenburg Municipality is the most prominent. The town’s art deco theatre (bioscope) which changes its program and occupation every year or so, deserves more recognition than it is currently afforded.
iv. Contemporary

Few good examples of contemporary architecture is encountered within the town fabric. This is alarming considering the rapid expansion of the town and the favourable climate which the construction sector is experiencing. A large portion of new developments are quickly constructed low-maintenance face-brick structures with clay tiled roofs and with little attention given to detail, occupant comfort and overall architectural identity. This is partly due to the pressing need for accommodation, and a willingness to feed this need by frantic developers.

An attempt in preserving Lydenburg’s architectural character that is worth mentioning would be the early 2005 commercial complex opposite the chosen site for the Incubation Node. A neo-historical mixture of Victorian, Brooky-lace and the Lydenburg farm-house typology is a romantic acknowledgement to a little bit of everything found within the confines of the Lydenburg township.
The attempt is commendable, although one might find the result to be a little bit misplaced. According to Murdock’s four types of innovation (in Heath (1993:290), mentioned in the second chapter, this type of architectural practice is defined as ‘variation’, as in a slight modification of the existing. I believe that true innovation will result in an architectural language which responds to the environment positively and which makes use of local materials without patronising the past. It is therefore by looking towards textures, materials and elements, rather than style, that a new vernacular and identity can be developed.
3.3.2.2. Elements, Textures and Materials

i. The Corrugated Metal Roof

The corrugated roof is one of the few elements that is still recognisable as a prominent element of the architectural character of Lydenburg. Although it has fallen out of favour in the middle to upper class residential sector (in favour of clay tile roofs), it remains an element which is low in cost, easy to erect and serves its purpose well. It is also deemed perfect for the local climate, especially when teamed with high–massed walls.
iii. Slate and stone

Due to the slate bed found in the Mauch Mountain range eastwards, a few of the earlier settlements are encountered which are built of this material. In older residents, boundary walls of stone and slate are also found. The Sidney Press House, on the farm Coromandel situated approximately 18 km from Lydenburg, is a prime example of stone construction and is discussed as a precedent study in chapter 6.
iv. Wood

Little wood constructed dwellings are found in Lydenburg. The use of wood is limited to supporting structures for roofs. As a renewable resource, and in the light of the close proximity and readily availability of wood in the area (due to the plantations cultivated along the mountain pass), the use of wood in construction should be encouraged.
.3. CONTEXT

F.3.3.21
3.3.2.3. Conclusion

The issue of architectural quality and identity remains a personal one. The greatest test that such an endeavour can undergo will be the opinion of the community, as well as its assimilation into the local vernacular in time. Having ascertained that an integral part of growth and development is dependent on innovation, a bold step is taken towards a new identity.

The Incubation Node, as an exercise in branding and identity, as well as innovation, will announce its identity through the materials used. The walls are to be of a low-embodied energy material, such as stone or masonry, finished with a low-maintenance surface, such as a packed stone cladding, which will also add to the thermal inertia of the building. Roof structure is to be of a lightweight corrugated sheet-metal finish, painted a matt, light colour.

Shading systems are to be manufactured from wood, and wood should take precedence to steel in structural systems, but only to the point where it is still financially feasible.
The general planning and massing of the Incubation Node should assimilate the low-rise, fragmented and low-density of the surrounding buildings, as to compliment its environment.

### MICRO SCALE: SITE

#### SITE SELECTION

#### 3.4.1. Criteria for site selection

The criteria for the selected site were developed from the weaknesses identified in Lydenburg’s urban fabric. The site should therefore ideally be situated where it lends definition to the river’s edge, connect the river to the CBD and where the location attracts attention to places of historical and architectural interest. Ideally the site should also be within walking distance of the CBD in order to promote pedestrian movement.
3.4.1.2. Site selection

The site is located on the edge of the river on the north–south axis towards the CBD to reconnect the urban fabric to the river’s edge, which plays a large part in Lydenburg’s identity. While a site closer to the segregated communities towards the west would have been more convenient and beneficial for the economic restoration of these communities, situating this pilot project en route to the CBD along an already existing and well-used axis is more feasible. The proposal is that similar developments will then be inserted along the river’s edge in a westerly direction, which will eventually knit these communities together with a strip of economic and leisure activities.
3.4.2. SITE ANALYSIS

3.4.2.1. Location

The site is situated opposite a recent commercial development hosting a steakhouse franchise and small business enterprises such as a hairdresser facility. The terrain is also within walking distance to the CBD (500 m). The largest part of the site is occupied by the Sterkspruit River’s floodplain. The plain is currently being rented out by the municipality to the Department of Correctional Services, and it is being used as a vegetable garden that is tended by the inmates. A Poplar Forest is found in the bend of the floodplain along the river edge and is considered to add ambience to the terrain. The site runs lengthwise in an east–west direction, sloping towards the Sterkspruit River in the south. The slope falls from north to south at a fall of 10% on the western side to 20% on the eastern side. The slope falls 4% from east to west. Two residential Units are found on the site. They are to be demolished.
3. CONTEXT
.3.4.1.3. Geology Highly metamorphosed sedimentary rocks of the Transvaal super group underlie the terrain. The geological structure is highly stable and will have a positive impact during the total life cycle of the project (source).

.3.4.1.4. Soils The soils of the study area were formed by weathering of the underlying morphosed sediments. Soil investigated on an open area is of a red, fine, sandy-clay nature. It has low plasticity and shows little signs of slippage.

.3.4.1.5. Topography The area gently slopes from the northeast towards the southwest. The topography will have an impact on the project because of the gradient involved. Proper mitigation steps are to be taken.
.3.4.1.6. Surface drainage

Because of the close proximity of the river at the southern side of the site, the building line should not exceed the 1:50 year flood line.

.3.4.1.7. Groundwater

Underground water may be encountered on the southern sloping side. In the case of a basement, the tanking method is advised, or else an elevated structure of poles or piles.

.3.4.2.8. Vegetation

Because of the existing structures on the site, little of the site landscape is still pristine. A poplar forest is found in the bend of the flood plain. Veldgrass and water plants are found along the river edge and less-cultivated areas of the veld.
Acocks (1988:112) speculates that the typical veld type of Lydenburg used to be an open savannah of *Acacia caffra*.

Acocks also identified the eastern variety of Bankenveld in the Lydenburg area. Bankenveld, according to G.Brand, (landscape architecture student) is a transition veld type which needs to be burnt regularly to maintain a balanced ecosystem. The seasonal burning of the veld is to be controlled and incorporated into the design of the Incubation Node.

Vegetation identified by Acocks (1988:112) is as follows:

- *Digitaria brazzeae*,
- *Tristachya rehmannii*,
- *Eragrostis curvula*,
- *E. racemosa*,
- *Perotis paten*,
- *Themeda*,
- *Heteropogon*.
.3.4.2.9. Circulation

The Sterkspruit River is fenced off and made inaccessible to the public. Pedestrian movement occurs along the north-south axis (Viljoen Street). The new commercial development opposite the Incubation Node also encourages public movement between the CBD and the river edge. A footpath runs across the length of the site up to the eastern boundary of the terrain.

Parking

Parking is provided at the commercial development opposite the Incubation Node. The width of Viljoen Street also allows for cars to park at the side of the road. Because of the close proximity of the CBD and the existing parking lot to the site, it is proposed that no additional parking is provided for the Incubation Node. Should a large-scale event be held at the Incubation Node, vehicles can also be accommodated by utilising the rugby field situated 500m to the west along Potgieter Street.
vi. Transport nodes

A lack of formal transport nodes is identified. It is proposed that the Innovation Node becomes a drop-off and pick-up point for major transport services, as well as smaller shuttle services that serve the district. A formal taxi rank is to be incorporated adjacent to the long-distance busstop terminal.
3.4.3. CLIMATE

4.3.3.1. Climate zone

The climate of the area is typically that of the South African highveld, with a Summer maximum rainfall and a dry winter. Distinct rainy and dry seasons exist with large day temperature variation and strong solar radiation. Humidity levels are moderate (Holm (1996: 64)).

4.3.3.2. Location:

Latitude 25.1 South
Longitude 30.4 East

4.3.3.3. Average humidity

56 %

4.3.3.4. Average rainfall

Lydenburg has a summer rainfall of 709 mm/year. Thundershowers often occur during summer, and intense rainfall events can happen. Thundershowers are frequently accompanied by hail.
.3.4.4.6. Temperature difference

Maximum diurnal variation occurs in September.

Average monthly diurnal variation = 11 K

January temperature: 25.6°C
July temperature: 16°C

.3.4.4.7. Wind

i. Summer winds
Primarily north-easterly

ii. Winter winds
Primarily north-westerly

A fair amount of south-westerly wind (Holm 1996: 64)
3.4.4.1. PLANNING

i. Urban planning

Compact with protection for pedestrians against high ultraviolet radiation and summer rains.

ii. Plan form

Winter and summer requirements differ, with a compact plan form and a well-insulated envelope required in winter, as well as solar gain. In summer, external spaces should provide shade for outdoor activities.

ii. Rain protection

Entrances to buildings are to be shielded from sporadic thunderstorms.
.3.4.4.2. BUILDING ENVELOPE

i. Mass
   Thermal mass is advisable, especially when the daily temperature swing is larger than 13 K. This can be provided with massive floors and internal partitions. These measures are effective for approximately half the underheated period and for the entire overheated period.

ii. Insulation
   Lightweight insulated roofs are feasible for this region.

ii. Properties of materials
   All external surfaces should be light-coloured or reflective, but not shiny, to minimize solar heat gain in the overheated period.
.3.4.4.3 SOLAR CONTROL

i. Sun angles
   Solstice 64.9º (21 March and 23 Sept)
   Winter 41.4º (22 June)

ii. Equatorial window
    An equatorial window with an area equal to 19.2% of the floor area is effective for the entire overheated window period. Openings for solar gain should be orientated towards the winter sun and screened in summer when solar control is necessary to prevent overheating.

iii. Ventilation
    Ventilation is effective in alleviating overheating but may be unnecessary if thermal mass is exploited. Night ventilation can be implemented to compensate for insufficient mass.
.3.4.4.4 SYSTEMS

i. Evaporative cooling
   Direct evaporative cooling is effective for control during
   the entire overheated period, but is unnecessary if thermal mass is exploited.

ii. Active cooling
    Air-conditioning is unnecessary unless the building
    function demands it.

iii. Mechanical cooling
    Mechanical ventilation is not required unless the
    building function requires higher ventilation rates.