THE PHENOMENON OF THE URBAN EDGE AS A PLANNING TOOL FOR COMPACT CITIES: AN INTERNATIONAL AND LOCAL COMPARISON

ELIZELLE JUANEE PEKELHARING

B.Art et Scien (Planning)

Dissertation submitted for the degree Magister Artium et Scientiae at the North West University, Potchefstroom Campus

2005

Supervisor: Prof. C.B. Schoeman

November 2005

Potchefstroom

The Phenomenon of the Urban Edge as a Planning Tool for Compact cities: An International and Local comparison.

...Voorwoord...

" I cannot conceive how a man can look up into the heavens and say there is no God..."

Alles is genade.

Dit wat uiteindelik op papier staan is maar 'n fraksie van die belewenisse, kennis, ervaring, mededeling en leerskool. Die omvang van so 'n studie is moeilik om te verduidelik...gelukkig is daar die wat verstaan – omdat hulle wel ook tot 'n deel van hierdie 150 bladsye bygedra het.

Aan Prof Calie...vir die leiding, entoesiasme, perspektiewe, ondersteuning en bydrae tot my mens-wees...Baie Dankie...

Aan Mam en Dads...Dankie dat julle altyd daar is vir my...
my vertrou en oneindig lief het...

Aan Tonnie...omdat jou huis in Nederland ook my huis kon wees...

Die NHTV en in besonder Neeltje Bekkers...dankie vir die geleentheid om 4 maande in Europa te studeer...

Oom Thinus en almal by PLANcentre...vir die laaste paar hupstote, hulp en glimlagte...

Aan Oc...vir geduld...en al jou liefde...LJBMS

Vir Liewe Jesus...met my lewe sal ek U dank...

Stort U seen oor my uit
Vergroot my grondgebied
Neem my onder U beskerming
Weerhou onheil van my
Sodat geen smart my tref nie
- Jabes -

Elizelle Juanee' Pekelharing
Noord-Wes Universiteit
2005

...Preface...

" I cannot conceive how a man can look up into the heavens and say there is no God..."

Everything is out of His mercy...

The words that eventually is written on paper, is a small part of all the experience, knowledge, adventure and practice. The scope of this research is hard to explain... luckily there are some people that will understand this – because of their contribution to these 150 pages. .

To Prof Calie...for the guidance, enthusiasm, perspectives, support and your contributions...Thank you very much...

To Mom en Dad...You are always there to support me...thank you that you trust and love me endlessly...

To Tonnie...that your home in Netherlands could also be my home...

The NHTV and in particular Neeltje Bekkers...thank you for the opportunity to study in Europe for 4 months...

Oom Thinus and everyone at PLANcentre...for all your support and smiles....

To Oc...for patience...and all your love...LJBMS

To my Lord...I will thank You with my life...

Send Your Blessing upon me
Expand my territory
Protect me
Keep evil from me
That no grieve will come my way
- Jabes -

Elizelle Juanee' Pekelharing
Noord-Wes Unversity
2005

The Urban Edge Concept

Page

Abstract i
Uitreksel iii

Chapter 1 - Introduction:
1. Introduction 1
1.1 Problem statement and substantiation 1
1.2 Research aims and objectives 2
1.3 Basic hypothesis 2
1.4 Methodology applied in the research 3
1.5 Demarcation of the Study area 4
1.6 Limitation of the research 4
1.7 Conclusion 4

Section A: Literature Study and Theoretical Background.

Chapter 2 – The Urban Edge concept:
1. Glossary 5
2. Theoretical founding: International theory and spatial development principles . 7
3. Urban Morphology: The metropole 8
4. Forces of metropolitan growth 9
5. Models of urban structure 12
6. Urban form 15
7. Urban containment 16
8. Phenonemon of urban sprawl 17
9. Rural-urban fringe: A frontier of urban expansion 18
10. Local accepted theory and spatial development principles. . . . 19

Section B: Empirical Study - International Perspective.

Chapter 3 – United Kingdom - Perspective:

1. Overview 25
i. Concept and definition. 26
ii. Descriptive models used in the UK 27
iii. Processes that plays an important role

2. National Level
a. Current planning system. 29
b. Development control 30
c. Environmental planning 30
d. Planning policies – The Green Belt 31

3. Local Level
A: Case Study: Kentdowns 36
1. Overview 36
2. Dominant features op planning in Kentdowns . . . 37
3. The Green Belt concept in Kentdowns 38
4. Conclusion 38
B: Case Study: Havering
1. Overview 39
2. Dominant features op planning in Havering 39
3. The Green Belt concept in Havering 40
4. Conclusion 40

Chapter 4 – Europe – The Netherland's Perspective:

1. Overview
   - i Concept and definition 42
   - ii Descriptive models used in Europe 42
   - iii Processes that plays an important role 43

2. National Level
   1. Netherlands as part of the European territory 44
   2. Netherlands is changing 45
   3. Dutch public organization in general 46
   4. Planning systems 46
   5. National Spatial Policy 48
   6. Green Structures and Urban Planning 49
   7. Development Planning 50

3. Local Level
   Case study:
   - A. Breda
     1. Overview 52
     2. Dominant features op planning in Breda . . . 53
     3. The Urban Edge concept in Breda 54
     4. Conclusion 55
   - B. Utrecht
     1. Overview 56
     2. Dominant features op planning in Utrecht . . . 57
     3. The Urban Edge concept in Utrecht 60
     4. Conclusion 62
   - C. Uden
     1. Overview 63
     2. Dominant features op planning in Uden . . . 66
     3. The Urban Edge concept in Uden 74
     4. Conclusion 76

Chapter 5 – Europe – The Belgium Perspective:

1. National Level
   1. Dealing with complexity 81
   2. Contrasting definitions of "nature" 81
   3. The importance of nature 81

2. Local Level
   A: Case study: Antwerp
   1. Overview 83
   2. Dominant features op planning in Antwerp . . . 84
   3. The Urban Edge concept in Antwerp 88
   4. Conclusion 90

Section C: Empirical study – Local perspective:

Chapter 6 – South Africa - Perspective:

1. Overview
   i. Concept and definition 91
   ii. Descriptive models used in the SA 92
   iii. Processes that plays an important role 94

2. National Level
   a. Spatial Planning and Institutional context before 1994 94
   b. Policy Context since 1994 98
   c. Legal Context since 1994 101
   d. Institutional Context since 1994 103

3. Local Level
   A: Case Study: Gauteng
      1. Overview 105
      2. Dominant features op planning in Gauteng . . . 106
      3. The Urban Edge concept in Gauteng 119
      4. Conclusion 125

Section D: Conclusions and Recommendations:

Chapter 7 – Conclusions:

1. South African cities today 128
2. Urban Edge as a Transition Zone (Alternative approach) 132
3. Integration of local and international Urban edge concepts . . . 136
4. Conclusion 138

Chapter 8 - Spatial planning lessons learnt:

1. Spatial planning lessons learnt 139
2. Recommendations 142

Appendix:

1. Location maps 146
2. Interview questions and details 147
3. Matrix for comparison 148

Bibliography:

1. References 149
2. List of figures 154
3. List of tables 156

The Urban Edge Concept – An Introduction:

Urban Growth Boundaries are one of the most popular urban containment tools worldwide. In South Africa, this has found expression in the recent (2001) implementation of the Gauteng Urban Edge. (Barker, 2004 [Email interview]). Many urban conurbations are experiencing severe symptoms of urban sprawl resulting from the development of industrial manufacturing cities in the 19th century, and mass transport modes that facilitated movement away from city centers during the 20th century. Today, major urbanized areas such as Boston, Chicago, San Francisco and London exhibit exhaustive urban sprawl.

International experience: Policy makers responded to these experiences as early as 1947 when the Town and Country Planning Act in the United Kingdom suggested as policy objective, the containment of growth of major conurbations and large cities. The policy found expression in the implementation of greenbelts around these cities, which at the time proved to be the most effective form of containment policy. Since then, the concept of an urban growth boundary has become one of the most popular urban containment tools, and has been implemented in sprawled urban areas such as London, Copenhagen and the often cited example of Portland, Oregon.





Figure 1: Photographs of the Urban Edge concept
Source: Google Pictures (2005 [Web:] www.agf.gov.bc)

National experience: Deliberate government policies during the pre-1994 Apartheid regime effected that, South Africa, as a developing country, exhibit wide disparities between richer urban areas, and poorer rural settlements. As a result large numbers of the population migrates to city centers. The influx of people are usually accommodated on the (cheaper) periphery of the city, and consequently, all South African cities have one important feature in common - that urban growth has taken the form of dispersed residential accretion at the city edge. (Department of Development Planning and Local Government, 2002:1).

In response to National legislation, the Development Facilitation Act of 1995, which promotes urban densification and infill development, the Provincial Government of Gauteng drafted a spatial framework in 1999, which aimed to steer all spatial trends in Gauteng. One of the proposals in this Spatial Development Framework was to strive towards a more compact urban form. The process of delineating the Gauteng Urban Edge was initiated and the policy implemented in 2001. The purpose of this paper is to review and assess the origin of the Urban Edge and to finally draw some conclusions from this specific case study, on the lessons learnt from International case studies, concerning Urban Growth Management in South Africa.

Focus of this study:

- To integrate existing planning knowledge and approaches in order to answer to the research questions.
- To gain and unlock new knowledge in the research area, to describe the current trends.
- To integrate the theoretical founding and empirical realities mentioned, and to apply the knowledge and findings in the South African context.
- To communicate professionally with Professional Planners, Scientists and the community, to stimulate further debate and to publish the results of the research.

Structure of the document:

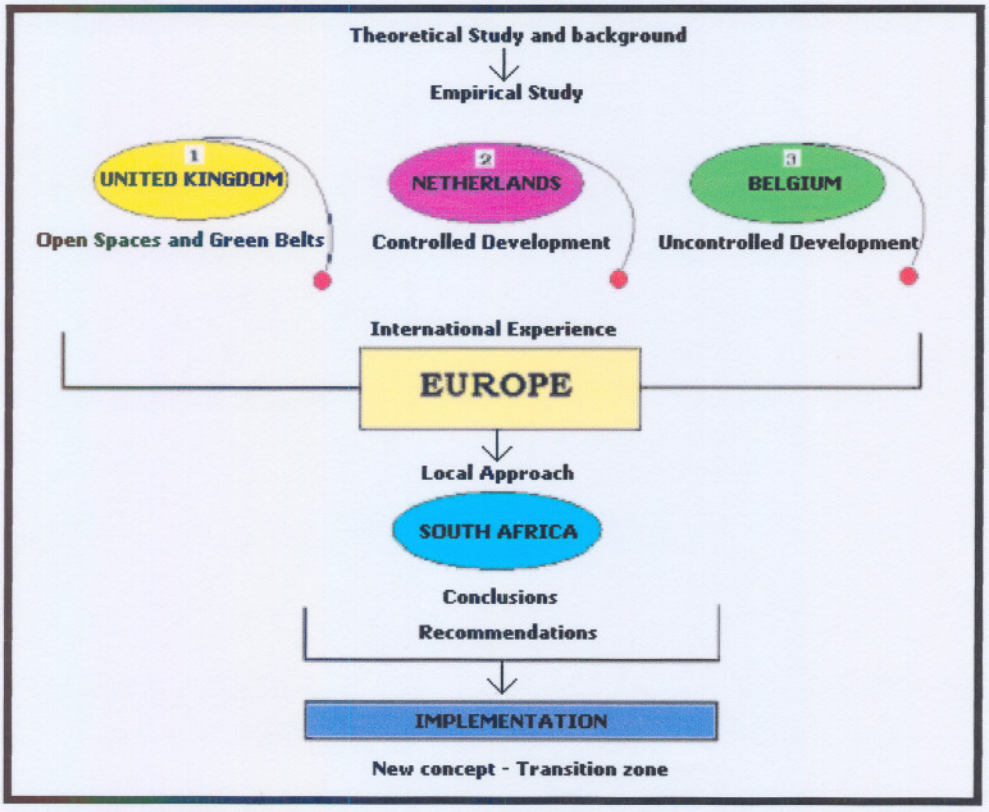


Figure 2: Structure of the document

Source: Own creation

Die Stedelik Grens Konsep – Inleidend:

Die Stedelike Rand is een van die bekendste initiatiewe om stedelike groei te beheer. In Suid-Afrika het hierdie konsep die lig gesien met die totstandkoming van die Gauteng Stedelike Rand in 2001.

Vandag word stede ruimtelik gekenmerk deur oor ontwikkeling wat selfs tot in die landelike areas strek. Dit is die gevolg van die industriele ontwikkelings van die 19de eeu, wat gepaard gaan met die vervoer modesse van die 20ste eeu, wat juis ontwikkeling weg van die stedelike kerne af fasiliteer. Daarom is stedelike sprei sigbaar in meeste van die groot stede vandag.

In teenwerking hiermee is daar al in 1947 in die Verenigde State begin met 'n voorgestelde raamwerk vir beplanning, om sodoende groot stede se uitbreiding te beheer en beperk. Hierdie beleid is geimplimenteer via die Groen Belt konsep – groot oop ruimtes rondom die stede. Op hierdie stadium was dit die effektiefste oplossing. Van toe af het die konsep selfs meer waarde begin dra, juis omdat dit so effektief was. Hierdie konsep het een van die beste elemente geword om stedelike uitbreiding te beperk en beheer in groot stede soos London, Copenhagen en Portland, Oregon.

Wat behels die verskynsel van die stedelike grens? Dis 'n strategie wat fokus op die stedelike grens (rand) om sodoende lang termyn koordinasie te verkry tussen stedelike en landelike gebiede met die implementering van verskeie initiatiewe

Stedelike dele in Suid-Afrika is gedesentraliseerd en hoofsaaklik as gevolg van die Apartheidsera. Dit het veroorsaak dat daar groot ruimtes was tussen die ryker stedelike areas en die armer landlelike vestigings. Dit het weer tot gevolg gehad dat groot hoeveelhede mense gemigreer het na die stedelike dele. Die armer bevolking is dus gevestig op die buitewyke van die stedelike rand. Daarom word alle Suid-Afrikaanse stede ook geken aan die verspreide residensiele vestigings op die stedelike grens.

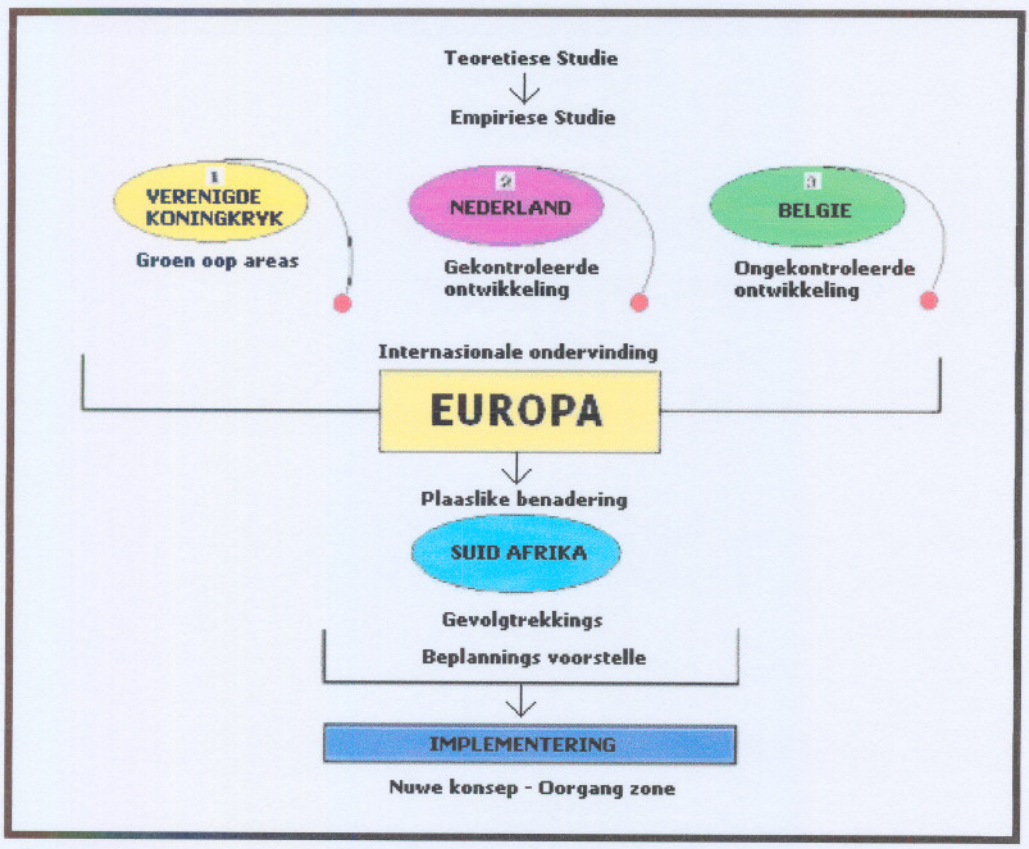
Nasionale Wetgewing, naamlik die Ontwikkelings Fasiliterings Wet van 1995, bevorder die kompaktheid van stede. Daarom het die Provinsiale Owerheid van Gauteng 'n ruimtelike beleid in 1999 opgestel wat alle ruimtelike ontwikkeling in Gauteng in 'n seker rigting stuur. Een van die bepalings was dat dit Gauteng moet lei na 'n kompakte stedelike vorm. Daarom is die Stedelike Rand ook bepaal en geimplementeer in 2001.

Die doel van die studie is om die Gauteng Stedelike Rand te evalueer binne in die huidige ontwikkelings inisiatiewe en om dan seker gevolgtrekkings te kan maak vanuit hierdie studie – om sodoende die Stedelike Rand te kan onderhou as volhoubare beplannings inisiatief ten einde kompakte stede tot gevolg te he.

Uitkomste volgens die Noord-Wes Universiteit Jaarboek:

- Integreer huidige beplannings kennis en vaardighede om die navorsings vrae te antwoord
- Om meer kennis op te doen in die navorsingsarea, asook die huidige tendense te omskryf.
- Integreer die teoretiese en empiriese realiteite genoem, en pas hierdie kennis toe binne die Suid-Afrikaanse konteks.
- Professionele kommunikaise met verskeie Stadsbeplannings, Wetenskaplikes en die gemeenskap, ontlok verder debatte en publiseer die resultate van die navorsing.

Struktuur van die dokument:



Figuur 1: Struktuur van die dokument

Bron: Eie verwerking

Chapter 1

Introduction

1. Introduction:

Development is increasing in all the cities of the world. There are various planning tools that are used to contain this growth, and also to ensure compact cities. Over the last seven years very little has been done in addressing the existing dispersed spatial pattern, rather it has been reinforced by existing spatial planning practices placing untold pressures on existing engineering infrastructure, bulk services and public transport. (GSDF, 2000:26). The phenomenon of the Urban Edge concept was introduced in order to ensure sustainable development within the compact cities.

This has a major influence on the surrounding area, and the development within. The Urban Edge concept is, however, applied differently al over the world. Some countries have a strong urban edge development policy, and other countries are not so focused on the implications thereof. In South Africa, and especially the study area of Gauteng, the urban edge concept was implemented in order to ensure effective and sustainable development within the urban edge. This concept has various positive contributions that it can offer, if it is implemented correctly, and is supported by policy and planning regulations. Therefore research was undertaken to compare local and international concepts and the approaches of the urban edge. The various international comparable study areas were used to provide the positive and negative issues of the urban edge concept, as it was interpreted spatially in the specific location. This is a guide of how the different planning structures was set out for the different countries, and how they implemented the concept of the urban edge as planning tool.

1.1 Problem statement and substantiation:

Development in South Africa, and especially Gauteng, increased extremely since 1994. An urban edge was identified for Gauteng in order to contain this urban development. The Gauteng Spatial Development Framework (2000) set the principle for the establishment of the urban edge and provided certain criteria for its delineation. However, issues such as where exactly to locate it, how to define it, the process of delineation, management of the edge and management of the rural area beyond, still need to be finalized. This can only be evaluated if it is measured against the international standards and concept of the urban edge. There are form-giving elements within the spatial context. The urban edge must be implemented within this context, adhering to the new Gauteng Development Planning Bill, corridor developments, the Gautrain impact and spatial planning initiatives.

The focus of this research is to unlock the present knowledge and describe the planning phenomenon and approaches related:

- What are the determining factors for the delineation of the International urban edge concepts?
- What are the determining factors for the delineation of the South African urban edge concept?
- How does the Urban Edge Concept in South Africa compare to the International concept of the Urban Edge?
- What lessons can be learnt from the International study of the urban edge concept?
- How can these principles be implemented into the current Gauteng Urban Edge?
- How can South Africa benefit from the International approaches?
- What will be the outcome of this integrated approach?

To evaluate this situation an international comparison was done, to compare the different approaches of this concept. The local phenomenon of the urban edge was measured against the international context.

1.2 Research aims and objectives:

- Evaluate the modern planning principles and the urban edge concept as a planning tool.
- Do a local and international comparison of the concept of the urban edge and its influence.
- Compare the variables that determine the urban edge in all the study areas.
- Evaluate the integration of all aspects of the rural and urban area.
- Evaluate spatial impacts and corridor development.
- Set the advantages that can be drawn from the international study.

1.3 Basic hypothesis:

This study compares the local and international concepts of the Urban Edge, and other similar tools that are used to contain urban sprawl. It also states how South Africa can implement and benefit from the successful principles of the international study. A new concept, the transition zone, is proposed within the current planning environment.

1.4 Methodology applied in the research:

1: Literature study.

A wide variety of sources were studied to obtain a broad theoretical basis for this study, in order to understand the basic principles of an Urban Edge, including fundamental National and Provincial legislation and policies. The Urban Edge compels a wide variety of spheres and elements. This makes research complex in its nature.

2: Case studies.

This is the basis of the empirical study. Case studies are conducted to determine the lessons learnt to obtain success stories and failures for other cities and urban considerations. Therefore the study area Gauteng is evaluated and compared to Uden, Breda, Utrecht, Antwerpen, Havering and Kentdowns, as explained above.

3: Interviews.

The definition of the Urban Edge is very broad. The implementation of the urban edge concept is just as broad. Interviews were scheduled with stakeholders that are familiar in this field of research and development. Specific question was set and based on the outputs received, the researcher was able to formulate research conclusions and recommendations.

4: Situation analysis and recommendations.

An analysis was made of the study to identify some present theory and phenomenon practices, to be able to formulate recommendations in answers to the research questions. Chapter 8 attempts to provide a framework with strategies and recommendations to assist Gauteng and all South African cities in their unique difficulties that arise from the phenomenon of the Urban Edge.

1.5 Delineation of the Study Area:

This study will focus on the phenomenon of the urban edge as a planning tool in compact cities. Two components exist: International and local. International case studies were done in: Uden, Breda, Utrecht – in the Netherlands, Antwerpen – in Belgium, and Kentdowns and Havering – in the United Kingdom. Netherlands was chosen because of the strict development control. In contrast to this, Belgium has no development control. The United Kingdom has a different form of urban edge – the Green Belt concept. With these case studies a wide research field was covered. The local case study was done in Gauteng – South Africa. Accessibility was the determining factor for choosing this area. Maps of these areas are included in the appendix.

1.6 Limitations of the research:

An international and local comparison was made on the concept of the urban edge or similar methods used to contain urban sprawl. The local study was, however, limited to a specific area in Gauteng. This illustrate the planning tools that are normally used in South Africa, but note that all regions are different, and thus only the elements and impacts present, are of importance for other metropolitan areas in South Africa.

1.7 Conclusion:

The international comparison will illustrate the elements and impacts of the urban edge concept, as well al the spatial implications. This must be compared to the local approaches in order to optimize the current development and implementation trends. The international phenomenon of the urban edge can be a guide for future sustainable development within compact South African cities.

Section A

Literature Study and Theoretical Background

Chapter 2

The Urban Edge Concept

1 Glossary:

The following are important definitions of certain development and planning terminology, that will be used in this research document. These concepts are implemented within a spatial context as their meaning will show respectively. These definitions have been formulated to relate to the context of the Spatial Development Frameworks and the Integrated Development Plans. It refers to exising Policy and Legal frameworks applicable to the research.

Compact	A compact urban form increases efficiency in the way people can use the city. More people live in a smaller area in a compact city and this higher density allows for efficient provision of public transport, social and other services. The antithesis of a compact city is urban sprawl.
Containment	Containment refers to limiting the geographic spread of development, i.e. the horizontal. The city form can be enhanced by guiding spatial development. Containment takes place at two levels: (1) Containing development within a defined urban boundary prevents urban sprawl. (2) The physical spread of *nodes* is contained to enhance the performance of the nodes and to protect the surrounding areas.
Corridor	A long narrow passage. Strip of territory, giving access to somewhere. A long narrow strip of land belonging to one country that passes through the land of another country.
Density	Gross residential density is the overall number of dwelling units divided by the total size of the area. Net residential density expresses the number of dwelling units divided by the size of the area that is taken up by residential use only. This is expressed as the number of units per hectare. Higher residential densities are encouraged along arterials and around nodes as they make the provision of services and public transport viable.
Fragmented development	Urban development that takes place in an *ad hoc* fashion without being integrated into, or related to, the surrounding areas. It results in a break in the urban fabric.
Growth management	A term that encompasses a whole range of policies designed to control, guide, or mitigate the effects of growth.
Infill development	Development on gap sites in a tenement frontage or a gap created by the removal of a building (or a small number of buildings) in a street frontage or corner site. It does not include land within the curtilage of villas.

Integrate	Combine parts into a whole. Bring into full membership in a community. Combine two things in such a way that one becomes fully a part of the other.
Nodes	A node is a place where both private and public investment tends to concentrate. Nodes are usually associated with major road intersections, or with public transport nodes such as railway stations and taxi ranks. It offers the opportunity to locate a range of activities, from small to large enterprises and is often associated with mixed-use development including high-density residential use. An important element that influences the notion of activity nodes is density. An advantage of high-density nodes is that economies of scale can be exploited in terms of public infrastructure provision and private investment. Nodes differ in size, the types of activity that occur within them, the size of the areas served and the significance within the city.
Rural Character	Rural character consists of qualities such as horse farms, lakes, pastures, farms, estates and undisturbed roadsides. Areas contain mature and natural landscape with informal placement of trees and indigenous vegetation is characteristic of the area.
Sustainable developmemt	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (Brundtland Commission in Our Common Future, 1987:47)
Urban	A city or a town. Can be closely tied to the density of development and the nature of the services required for that development, specifically central water and sewer and other municipal-type services.
Urban Fringe	A demarcated line that serves to direct and control the outer limits of urban expansion. Outside the continuous urban development of the metropolitan core area, urban development should only be permitted within small towns and rural nodes, and in areas where the environment and agriculture are not compromised.
Urban sprawl	An undesirable situation in which the geographical size of the city keeps expanding to include development of new areas. Costs of providing and maintaining services to far flung areas is high, public transportation is not efficient and access to urban opportunities minimal. The antithesis of a compact city.

Source: Own construction from existing policy and legal frameworks applicable to the research theme.

(Cross reference: Chapter 6).

The research in this document focus on the urban edge concept, implemented in the urban environment. Before evaluating the concept of the urban edge, the environment in which it must function, should be defined, as well as the urban morphology, structure and form. This affects the effectiveness and implementation of the urban edge concept. Metropolitan areas has certain characteristics that the urban edge must respond to. There are conflicting forces such as urban sprawl that needs to be evaluated and measured against the impacts of the urban edge concept. The structure of the remaning part of this chapter is as follows:

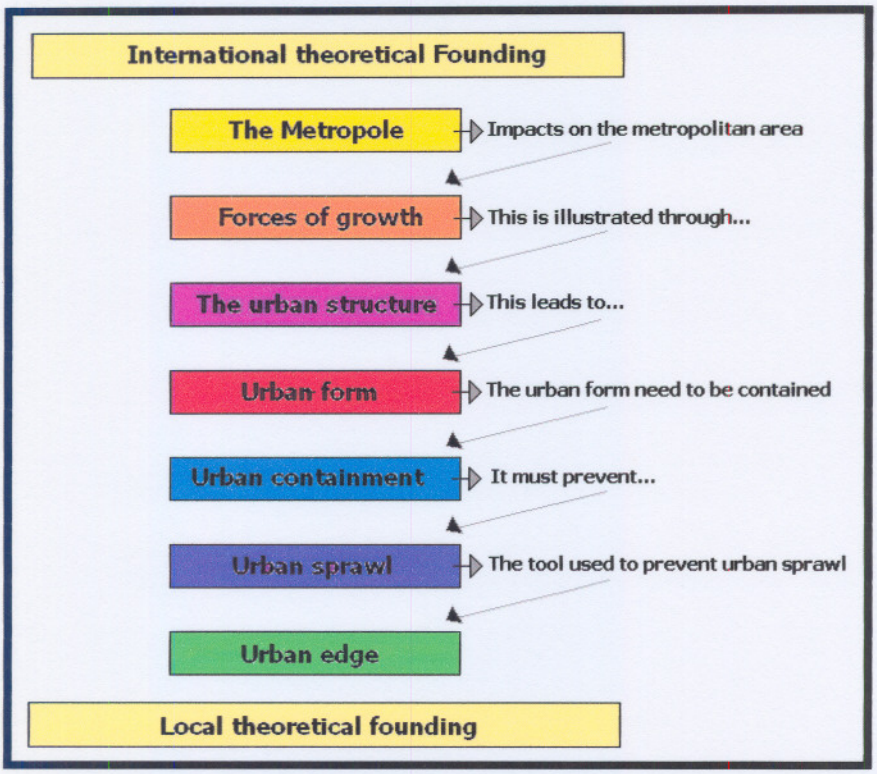


Figure 1: Structure of the chapter

Source: Own creation

2 Theoretical Fouding: International theory and spatial development principles:

Although Western Europe cannot claim to have produced the very first cities, it was the first world region to establish a true urban system and the first to experience urbanization and masse. (Stanley and Williams, 1993:85)

The dominance of the European vision of compact cities as ideal places to live has been questioned by Jenks and Burgess (2000:11) in relation to its relevance and sustainability. The terms "urban intensification" and "consolidation" was introduced, which relate to the range of processes which make an area more compact and according to the European vision, more sustainable.

A sustainable compact city requires denser forms of new development, and the intensification of existing urban areas. This also implies effective spatial planning and development which integrate all other spheres – transport, infrastructure, social aspects, services etc. This process may be driven by policies through the formal sector, or happen through the efforts of the informal sector. (Breheny, 1992:241).

Compactness must adhere to the urban morphology, urban structure and form, because these concepts will have a visa-versa effect on one another. The urban environment and its functions must be fully understand, in order to formulate a tool, within the urban structure, that will ensure compact cities.

3 Urban Morphology – The Metropole:

For the purpose of this study, the main focus is on Metropolitan areas. Metropolitan areas are defined by the Wikipedia free encyclopedia (2005 [Web:] www.wikipedia.org) as an area with a large population center consisting of a large city and its adjacent zone of influence, or of several neighboring cities or towns and adjoining areas, with one or more large cities serving as its hub or hubs. A metropolitan area usually combines an agglomeration with peripheral zones closely bound to the centre by employment or commerce. These zones are also sometimes known as a commuter belt, and may extend well beyond the urban periphery depending on the definition used. (Berry, 1993:12).

If several metropolitan areas are located in succession, metropolitan areas are sometimes grouped together as a megalopolis. A megalopolis consists of several interconnected cities between which people commute, and which are so close together that suburbs can claim to be suburbs of more than one city. (Wikipedia, 2005 [Web:] www.wikipedia.org)



Figure 2: Megalopolis
Source: Google Pictures (2005 [Web:] http://flatrock.org.nz).

A metropolis is properly the chief city (but not necessarily the capital) of a country, state, or region, but the term is often loosely used to refer to any large city. The metropolitan area is generally regarded as a central city and peripheral jurisdictions plus all surrounding territory (urban and rural) integrated with the central city. (Stanley and Williams, 1993:3).

4 Forces of metropolitan growth:

The metropolitan area is expanding, and this leads to various planning and spatial problems. The most common spatial problems of metropolitan areas are traffic congestion, housing obsolescence, frictions among shifting population groups, the need for parks and outdoor recreation areas, governmental fragmentation, the relative shortage of land and difficulties in the provision of services. This also includes excessive size, overcrowding, shortage of urban services, slums and squatter settlements, traffic congestion, lack of social responsibility, unemployment and underemployment, racial and social issues, enviromental degradation, urban ecxpansion and loss of agricultural land, administrative organization, stagnation and no growth and consequences of global restructuring. (Stanley and Williams, 1993:32-35).

In developed countries the rates of industrialization and urbanization continue more or less in parallel, but in developing countries the increasing differential between the two rates is leading to tremendous problems. (Patricios, 1973:vi).

Competition for land between real estate developers and non-urban users helps to determine the spatial sizes of cities. In this sense, land conversion is guided by the economist's "invisible hand," which directs resources to their highest and best use. Although the allocation of land is governed by competition between urban and agricultural uses, the outcome has increasingly tipped in favor of urban use, leading to substantial spatial growth of cities and prompting criticism of urban sprawl. Economists believe that three underlying forces are responsible for this spatial growth. The first underlying force is population growth. Two additional forces are rising household incomes and improvement in transportation infrastructure, especially freeways, which lead to lower commuting costs. (Brueckner, 2000:162-171).

Transportation not only stimulates economic development but also helps structure space. The relationship between transport and spatial organization can be considered from three major geographical scales; the global, the regional and the local. (Rodrigue, 2005 [Web:] http://people.hofstra.edu).

Global Spatial Organization: The nature and spatial structure of these flows can be considered from two major perspectives that seek to explain global differences in growth and accessibility:

- Core / periphery. This basic representation assumes that the global spatial organization favors a few core areas that grow faster than the periphery.
- Poles. These poles are subject to centrifugal and centripetal forces that have favored geographical concentration of some activities and the dispersion of others.

Regional Spatial Organization: Three conceptual categories can be observed:

- Central places models try to find the relationships between the size and the geographic distribution of cities in a region. Many variations of the regional spatial structure have been investigated by the Central Place Theory. Transportation is particularly important as the organization of central places is based on minimizing the friction of distance.
- Growth poles where economic development is the structural change. This is caused by the growth of new industries. The location is the catalyst of the regional spatial organization. Growth poles first initiate, then diffuse, development. Growth gets distributed spatially within a regional urban system, but this process is uneven with the core benefiting first and the periphery eventually becomes integrated in a system of flows. Transportation is a factor of accessibility which reinforces the importance of poles [Perroux, 1955].
- Transport corridors represent an accumulation of flows and infrastructures of various modes and their development is linked with economic, infrastructural and technological processes.

Local Spatial Organization: Important elements in shaping the local urban spatial organization:

- Employment zones. The growing dissociation between the workplace and the residence is largely due to the success of motorized transport, notably the private automobile.
- Attraction zones. Attraction zones linked to transport modes are areas to which a majority of the population travels for varied reasons such as shopping, professional services, education and leisure.

Transport thus contributes to the local spatial organization, however, it must also adapt to urban morphologies. Transport networks and urban centers complement and condition each other. (Rodrigue, 2005 [Web:] http://people.hofstra.edu).

The development of transportation networks commonly leads to the creation of corridors. A model has been developed by Taaffe, Morrill and Gould (1963) to explain this process. Six phases summarize the model: (Rodrigue, 2005 [Web:] http://people.hofstra.edu).

- Phase A. Small trade ports are established along a coastline. They are connected to a wider network of trade and provide access to locally supplied resources.
- Phase B. Trade lines accessing the hinterland are constructed permitting the development of new resources. The ports grow in proportion to the new traffic generated.
- Phase C. The hinterland of penetrating lines is further expanded.
- Phase D. The transport networks gradually become interconnected.
- Phase E. As the level of connectivity increases, traffic tends to concentrate in the most connected ports, implying that several less well connected ports decline or disappear.
- Phase F. Economies of scale favor the concentration of the traffic along the most efficient links, supporting the emergence of transport corridors. Links having lower volumes can even be closed down. The regional transport system has thus reached a phase of maturity and the structure of the network is unlikely to change unless of significant economic or technological developments. (See figure 3).

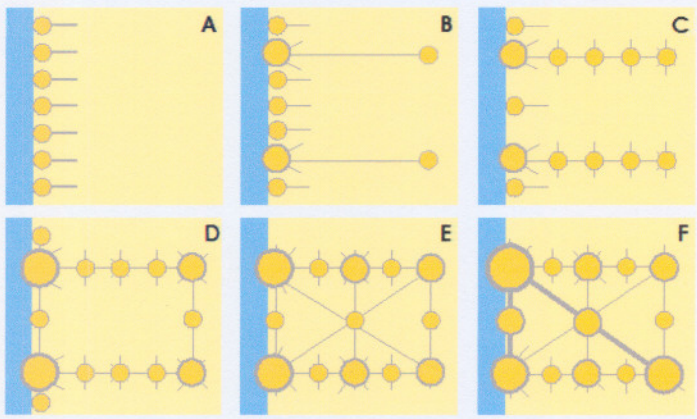


Figure 3: Corridor development

Source: Rodrigue (2005 [Web:] http://people.hofstra.edu/geotrans/index.html)

All of the above forces were taken together and integrated into a concept model. Governmental and private corporations have entered the picture to revitalize downtowns, to build townhouses and condominiums, and to finance new towns and settlements, all in an attempt to create or recreate living spaces that are more liveable, that is, places to work, shop, recreate, or retire as figure 4 illustrates, the contemporary and future metropolitan landscape (Stanley and Williams, 1993:490).

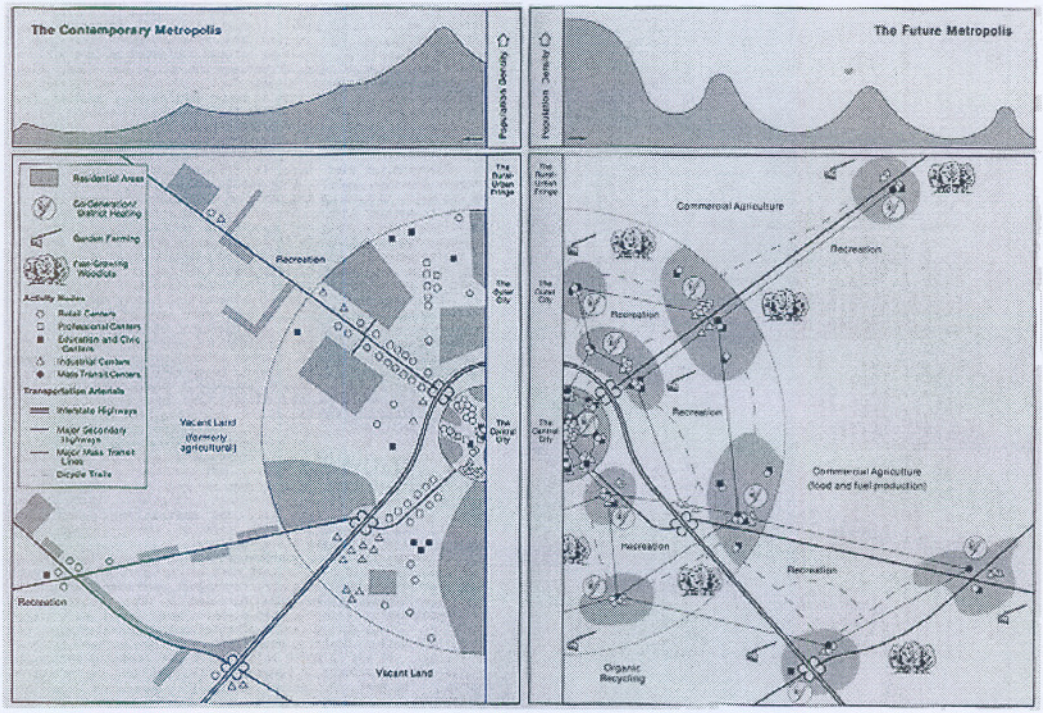


Figure 4: The contemporary and future metropolitan landscape.
Source: Zeigler (1980:16).

5 Models of Urban structure:

A varietty of theories have been developed to describe the pattern of land uses within cities. The most accepted theories that analyze the internal spatial structure of cities are the concentric zone theory, the sector theory and the multiple nuclei theory.

A) Concentric Zone theory: Burgess model (1925):

The best known classical model is the concentric circle or zonal concept of Ernest W. Burgess (1925). The key feature of this model is that as a city grows it expands from its centre to form a series of concentric zones of different character.

In 1925, E.W. Burgess presented an urban land use model, which divided cities in a set of concentric circles expanding from the downtown to the suburbs. This representation was built from Burgess's observations of a number of American cities. According to this model, a large city is divided in concentric zones with a tendency of each inner zone to expand in the other zone. Urban growth is thus a process of expansion and reconversion of land uses. For instance on this figure zone II is expanding towards zone IV, creating a transition zone with reconversion of land use.

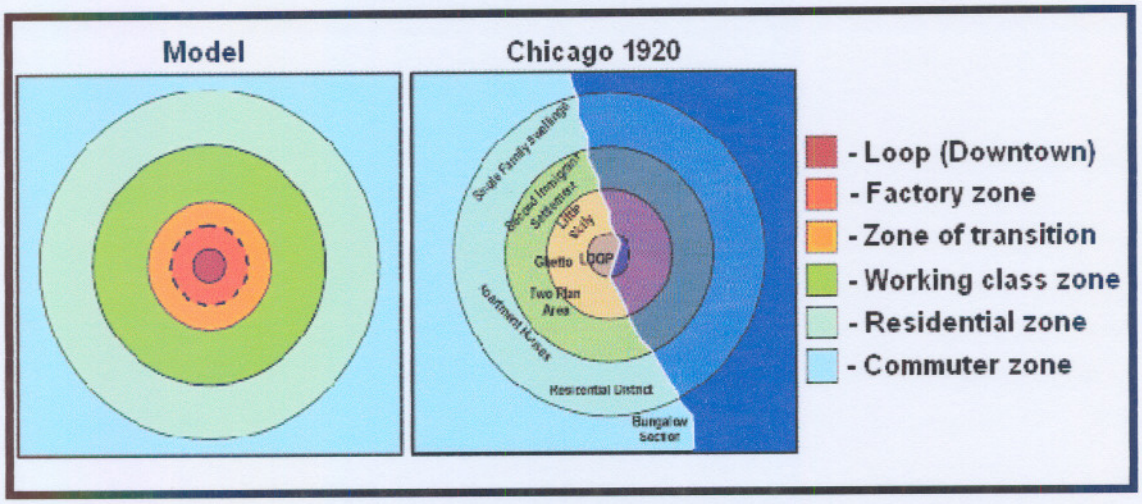


Figure 5: The Burgess Model
Source: Burgess (1925)

Burgess's (1925) model, as a summary descriptive device in the sence referred to above, rapidly gained acceptance as a useful generalization on the typical pattern of urban forms found in North America.

As Scott (1980:69) observes, these assumptions regarding the social processes responsible for urban form in the Burgess (1925) model have often been overlooked by geographers, when they are in fact crucial to the model's explanatory schema. For the purposes of this study the concept of the transition zone is of great importance, as the South African cities must be evaluated in terms of this structure.

B) The Sector theory: Hoyt model (1939):

The wedge or sector model was then formulated by Homer Hoyt (1939) which is in essence that if one sector of the city first develops as a high, medium, or low rental residential area, it will tend to retain that character for long distances as the sector is extended outward. According to this model, the city develops in a series of sectors, not rings. Certain areas are more attractive for different activities. In the center is the Central Business District.

As the city grows, activities expands in a wedge, or sector, from the center. Once a district with "high-class" housing is established, the most expensive houses is built on the outer edge of that district further from the center. Industrial and retailing activities develop in other sectors, as well as low-class and middle-class residential sectors. (Hoyt, 1939).

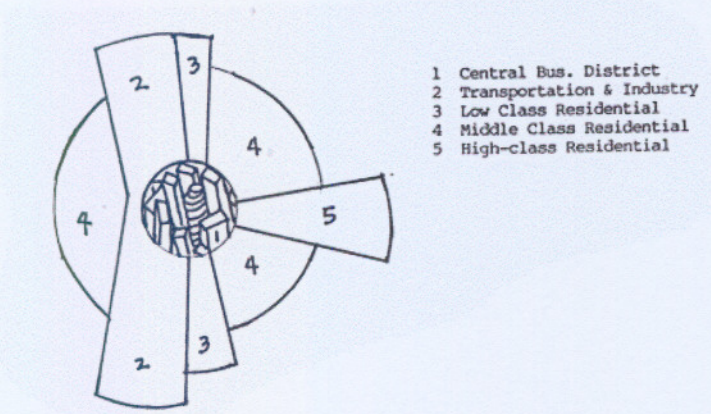


Figure 6: The Hoyt Model

Resource: Rubenstein (2000)

C) Multiple nuclei theory: Harris and Ullman model (1945):

A third model, the multiple nuclei, was formulated by Harris and Ullman (1945) in which the land use pattern of a city grows around several nuclei, and not just one central core. A study of residential areas done by Hoyt (1939) in the North American context concluded that the land use pattern was not a random distribution, nor sharply defined rectangular areas or concentric circles, but rather sectors. Thus the effect of direction and time was added to the effect of distance. Communication axes, such as rail lines and major roads, are mainly responsible for the creation of sectors, thus transport has directional effect on land uses. Cities would thus grow along major axis. The sector representation also includes concentric transitional processes observed by Burgess, which is occurring along axis.

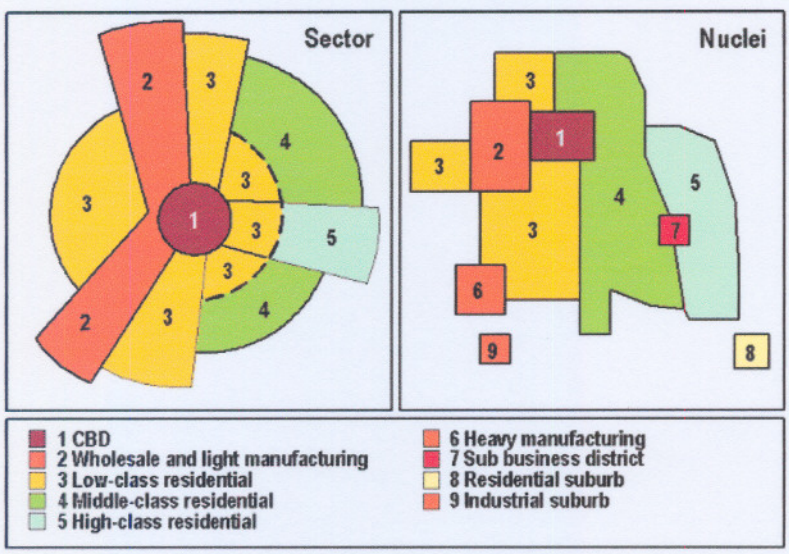


Figure 7: The Harris and Ullman Model

Source: Carter (1995)

Following Hoyt's development of a sectorial city, Harris and Ullman (1945) introduced a more effective generalization of urban land uses. It was brought forward that many towns and nearly all large cities do not grow around one CBD, but are formed by the progressive integration of a number of separate nuclei in the urban pattern. (See figure 7).

This model was the first to represent the fragmentation of urban areas, specialized functions as well as suburbanization. (Harris and Ullman, 1945). This three models deliver a certain urban form. Metropolitan areas have different forces of growth, and this is illustrated and described in the theories. Depending on the forces within the metropolitan area, a certain urban form can be predicted. The typical West European city is illustrated in figure 8. It is evident that some of the concepts and forces of the previous three models were integrated and active in this area. The forces determine the urban form. For research purposes the South African city structure must also be evaluated against these models and theories.

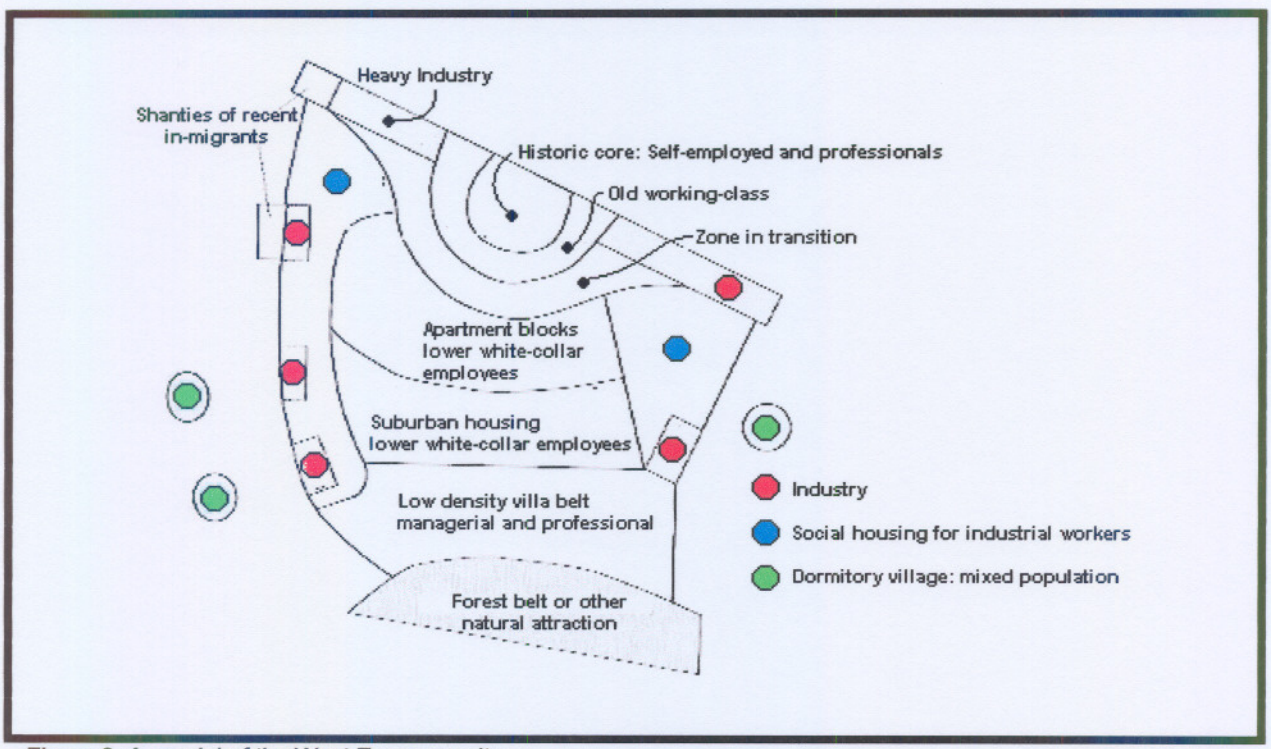


Figure 8: A model of the West European city
Source: White (1984:188)

6 Urban Form:

The horizontal and vertical dimentions describe a city's morphology or form. One city may be linear, for example, bacause of its locations in a valley or along a river, while another may be compact and clustered. Population densities may be highest in city centres. Low densities of sprawling suburban or squatter settlements may be in fringe locations.

The central business district is not easily identified in the urban horizon by the clustering and high densities of office and retail units. The urban form is likely to change over time with increased population, improved transportation and additional functions. (Stanley and Williams, 1993:4) Urban form is about the shape of our cities and unincorporated areas, not simply in terms of appearance, but more importantly in terms of the defining characteristics: how they are designed and structured, where development occurs, what type of developments are likely to be built, what types of public and green spaces are available, and how all the areas are connected to one other. Then it's vital that the region has a good urban form.

Good urban form requires good, co-ordinated planning. This is the interface between environmental management, spatial planning, development goals and the requirements set by the Agenda 21. From the glossary and definition of urban containment, it can be derived that the compact city will ensure this good urban form and sustainable development. The suggested urban form is the compact city and urban containment.

7 Urban containment:

The Dictionary of Geography defines urban containment as "the policy of limiting sprawl by restricting out-of-town development." It is true that urban containment aims to limit sprawl, and that it does so by restricting development outside of a designated zone. Contemporary compact city approaches have become one form of achieving sustainable urban development. (Jenks & Burgess, 2001:9)

The current resurgence of interest in policies for compact cities dates from the late 1980s and has largaly been propelled by the search for the global sustainability goals on climate change and resource use embodied in the Brundtland Commission Report (WCED, 1987) and the UNCEDA Agenda 21 proposals (1993).

Modern planning initiatives are focused on the compact city approach. The containment of cities is in direct oposition towards the phenomenon of urban sprawl, an undesirable situation in which the geographical size of the city keeps expanding to include development of new areas. The antithesis of a compact city. (Johannesburg, 2005 [Web:] http://www.joburg-archive.co.za). Development and planning initiatives need to answer to the problems of the phenomenon of urban sprawl. There is a need to identify a tool that can contain the urban sprawl.

8 Phenomenon of urban sprawl:

Sprawl is a pattern and pace of land development in which the rate of land consumed for urban purposes exceeds the rate of population growth and which results in an inefficient and consumptive use of land. (Pfister, 2004 [Web:] http://cgis.towson.edu)

At a conference held at Southern Illinois University on urban sprawl the objections to this kind of development were described as: (Gottman and Harper, 1967):

- It makes the metropolis too big, spatially and socially, there is a long and unpleasant trip from the built-up area to the countyside, society and government lose their virtues.
- Disorderly, wasteful of human values. Thus there is a lack of planning in making urban development orderly and harmonious.

Effects and forms of urban sprawl:

The Center for GIS at the Towson University formulated forms and effects of urban sprawl. These forms of urban sprawl exists within the metropolitan areas. Containment of the urban environment implicates to contain these different forms of sprawl.

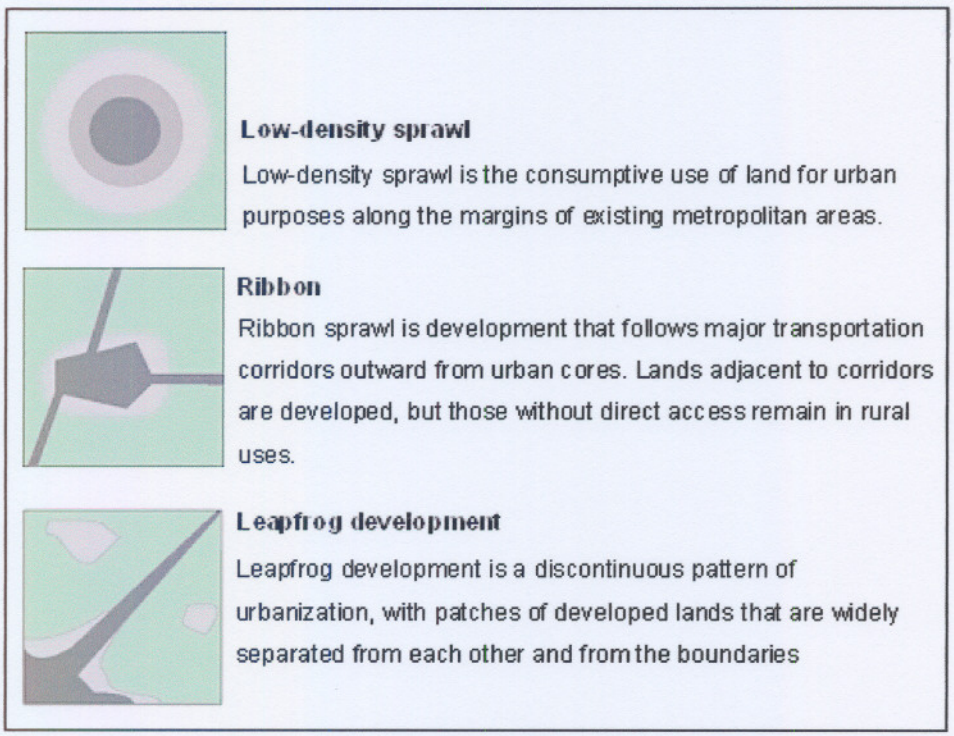


Figure 9: Forms of urban sprawl
Source: (Pfister, 2004 [Web:] http://cgis.towson.edu)

Favorable assessments of urban sprawl	Unfavorable
Reducing the housing gap between blacks and whites	Loss of community spirit and values
Providing housing opportunities for minorities	Traffic congestion
Increasing the affordability of housing in suburbs and cities	Higher costs of providing infrastructure
	Monotonous suburban landscapes
	Loss of a sense of place
	Negative environmental impacts

Figure 10: Positive and negative impacts of urban sprawl
Source: Own creation

Mega-cities in developing countries represent the most extreme examples of urban sprawl that planners there have to deal with. In figure 10 it can be seen that there are positive and negative aspects of urban sprawl. This study focus on the containment of the urban areas, and thus find the effects of urban sprawl negative in terms of spatial development and planning. By comparing the development of cities with similarly sized urban centers in South Africa, it is possible to draw conclusions.

There are various tools that are used for containment of the urban area and urban sprawl. The researcher focused on the urban edge as a planning tool for compact cities. In the metropolitan area, where there are various forces of growth that forms an urban structure, the urban area needs to be contained in order to limit urban sprawl, and the tool that is evaluated is the urban edge.

9 The rural-urban fringe: A frontier of urban expansion:

Urban expansion is an encroachment of the urban system on to the surrounding rural areas. This front zone of urban expansion can be recognised in the rural areas. A general description of the space use of the 'rural-urban fringe' shows that the wide range of activities can be split up into two categories. On the one hand, there are the activities that are excluded from the city, such as cemeteries, airports, purification plants, incinerators and on the other hand, the activities that require plenty of space and therefore are situated on the periphery, like big sales surfaces, sport fields, parks or certain ground-intensive agricultural activities. (Vanneste *et al,* 1999). This reality is reflected by the bid-rent curve. (See figure 11) Over half a century ago, Heinrich Von Thunen developed a rationale for the distribution of land use and land rents around a central market based upon observation of conditions in his native Germany.

The fundamental point to be noted is the key determinants of profitability per unit area and sensitivity to transport costs that forms the basis of the bid rent curves and patterns of land use and land rent. (McCarthy and Smit, 1984:27)

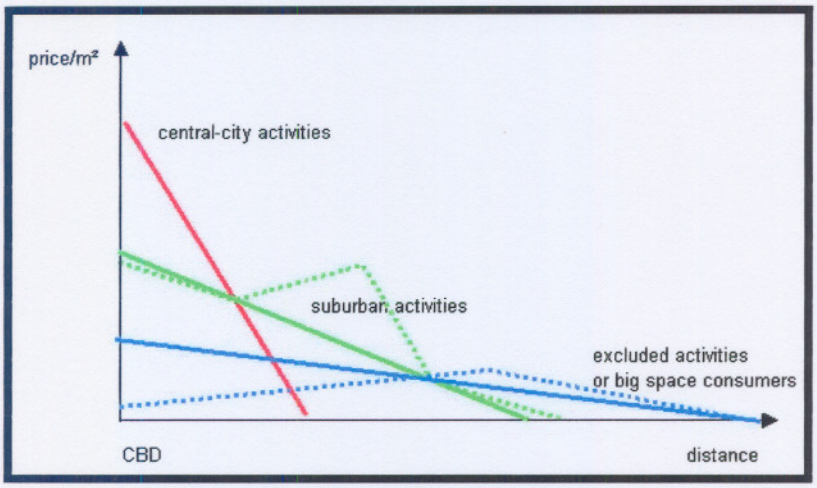


Figure 11: The bid-rent curve for non-residential activities
Source: Von Thunen (1966 [Web:] http://faculty.washington.edu)

It is also important to examine the fringe zone in the perspective of evolution. Space use in the urban fringe can be characterised as a continuously changing pattern where we observe a rapid residential expansion with low to average densities. We also observe a supply of infrastructure and services that tries to keep pace with the inhabitants but is still unsatisfactory. (Carter 1976: 305-306). In growing cities this pattern moves quickly in an outward direction, incorporating the inner side into the urban settlement and it then becomes absorbed by the urban body. Some elements of the fringe zone (e.g. villa or farm) remain behind as artefacts, whether or not with a different function. (Vanneste *et al,* 1999)

The urban edge is a tool that is used for containment of urban environments. The implementation and effectiveness of this concept will be evaluated in the empirical study as various case studies will be done.

10 Local accepted theory and spatial development principles:

Currently it is estimated that some 54% of the total population is urbanized. (South Africa, 1996a). That figure is increasing rapidly as farm-workers continue to be displaced through increasing mechanisation in the commercial farming areas, and as the fragile economies and resource based of the overcrowded homeland or communal subsistence farming areas continue to disintegrate. In terms of both in-migration and natural increase, processes of urban growth are contributing to a rapidly growing pool of the urban poor.

Social relations in South Africa are not so different from those in the USA and Western Europe and it is quite possible that many borrowed theories will provide useful frameworks around which historically and geographically specific theories can be constructed. (McCarthy and Smit, 1984: 184).

If the South African cities are compared to the theoretical models of Burgess, Hoyt and Harris and Ullman, certain similarities can be seen. A concept model for Johannesburg was formulated by Hart in 1960. This structure can be compared to the international accepted models.

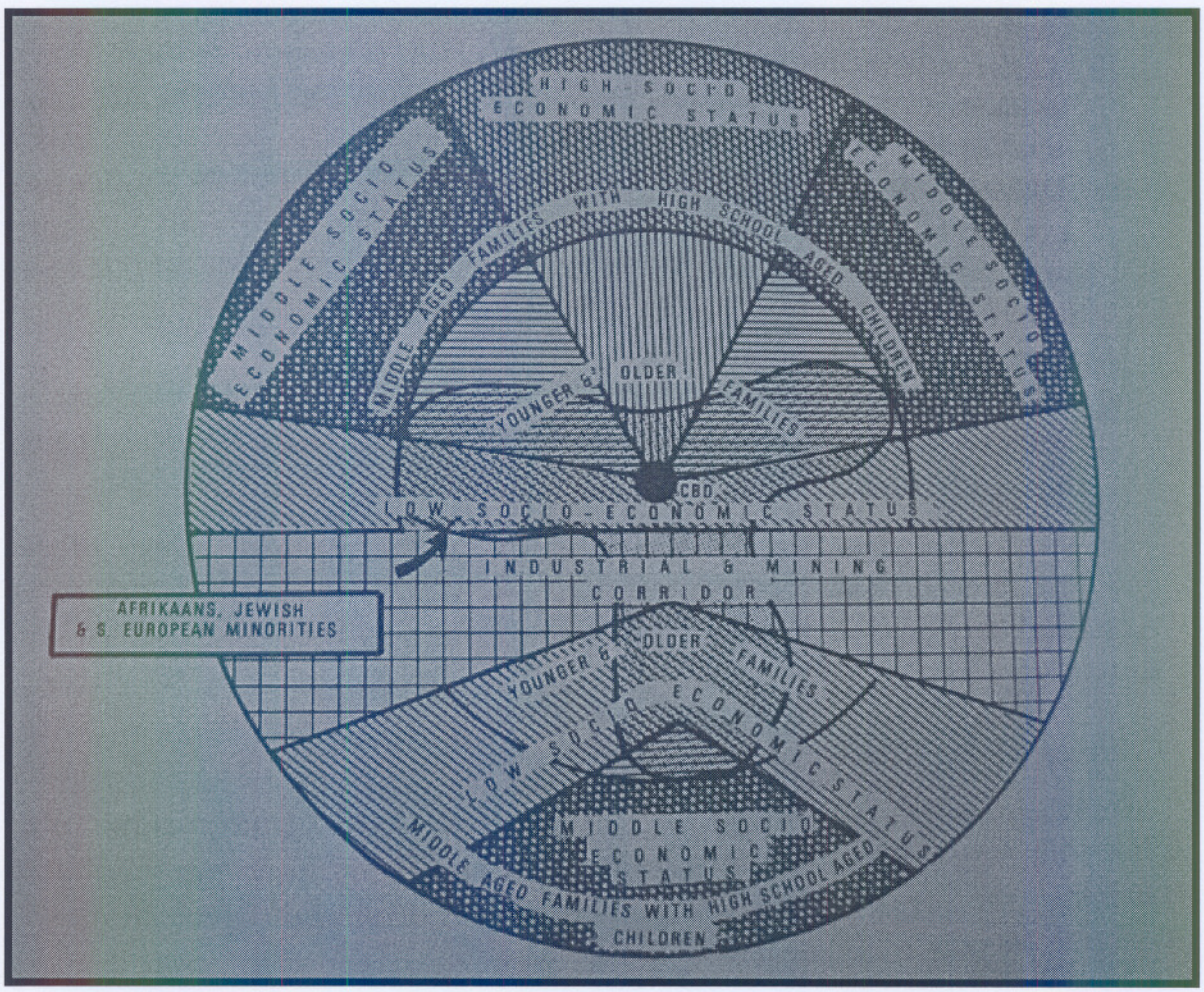


Figure 12: The spatial structure of Johannesburg in 1960
Source: McCarthy and Smit (1984:21)

The spatial distribution of different subcommuniteis of white residents in Johannesburg was formulated by Hart in 1960. Hart succeeded in identifying three major patterns of residential differentiation.

1. Differentiation by socio-economic status which is organized sectorally with the northern sectoers highest in status.
2. Differentiation according to stage in the life cycle or family status organized zonally or concentrically with the old and young childless families in the city centre and the middle-aged families with school-ages children in the suburbs.
3. Differentiation according to ethnic status which reached its highest levels within nodes distributed throughout the city. (McCarthy and Smit, 1984: 22-23).

The structure and form of South African towns and cities have been shaped historically by two ideologies:

- The first is the ideology of modernism. Dominant city planning and management systems and policies have been almost entirely imported from the United Kingdom, Europe and the United States, and have strongly entrenched the urban characteristics of modernism.

- The second major form-giving ideology was the policy of apartheid. Spatially, the apartheid model had at its core the separation of racial groups.

Significantly, the precepts of modernism and apartheid were compatible. The combination of these forces has resulted in the three spatial characteristics of low-density, fragmentation and separation, which fundamentally describe South African cities and towns.

The Relevance of the Compact City Approach in South Africa:

The first calls for greater urban compaction were made almost 25 years ago and grew increasingly vociferous from the late 1980s onwards. In 1995 the state formally committed itself to compaction policies with the publication of the Development Facilitation Act, Moving South Africa, The White and Green Papers, Urban and Rural Development strategies etc.

Analysis undertaken by the National Development and Planning Commission (Department of Land Affairs, 1999) indicate that generally there is little understanding at the level of local government of the meaning of urban compaction in South Africa and other related principals or about how they can be achieved.

The major social and environmental consequences that stem from the structure and form of South African cities suggest that the current pattern of urban development is entirely unsustainable, and that urban compaction is an essential condition for improved urban performance. However, compaction is a sufficient condition but it needs to be accompanied by substantial urban restructuring. Furthermore, directed residential infill, which is primary a policy instrument for achieving greater compaction, cannot be applied ubiquitously – it needs to be used to reinforce positive structural change.

South Africa is a developing country with scarce human and financial resources and with constant conflict between First World and Third World standards and policies. For many countries, economic development occurs unevenly across space and time.

In response most countries, especially Third World countries, exhibit wide differences in levels of income and economic activity between urban and rural areas, between large cities and small and between central regions and the periphery. In many instances such disparities are widening and in response national populations are on the move, migrating from poor regions to areas of economic growth. (Department of Development Planning and Local Government, 2002:1).

Instead of accommodating this inward migration of people from rural surroundings using densification techniques, urban expansion was promoted by making more (less expensive) land available for development on the periphery of the city (particularly in efforts to house the urban poor).

In the process big cities are growing larger in terms of surface area and at relatively low densities; a phenomenon referred to as urban sprawl which is influenced by First World trends in terms of private car ownership, and associated land use patterns which dictate a low density urban landscape.

This trend is constantly making it more difficult for the historically disadvantaged and poor to cope in an urban environment that has become less and less conducive to public transport.

However, in first world cities where a concerted effort was made to promote public transport, the city authorities have been successful in maintaining a dense, compact urban form. In the case of South Africa, all cities have one important feature in common - that urban growth has taken the form of dispersed residential accretion at the city edge.

Much of it has been the result of either a deliberate government policy of land acquisition for large scale lower income development, or spontaneous and often unauthorized settlement by these communities seeking proximity to urban labour markets; these all being the legacy of the formation of the South African apartheid city.

It is now widely accepted that this form of dispersed urban growth has adverse financial, social and environmental impacts, and that it is not sustainable in the medium to longer term. (Department of Development Planning and Local Government, 2002:1).

Management of urban growth in South Africa:

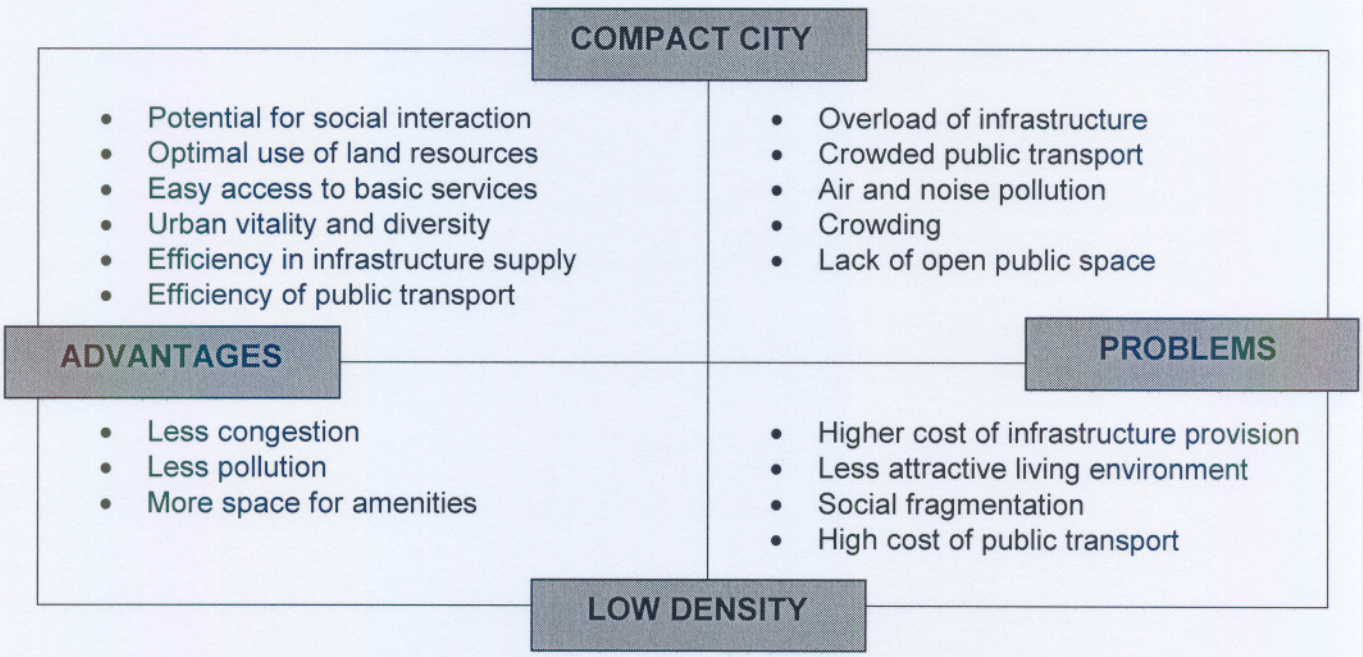


Figure 13: The problems and opportunities in compact city environments.
Source: Van der Merwe (2004 [Email interview])

Conflicts in the urban fringe are known all over the world since sub-urbanisation is a world-wide phenomenon. Nevertheless, the South-African situation is particular in a sense that the natural progress of the urbanisation of the countryside due to urban growth has been interrupted by the apartheid policy.

As a result, the spread of urban structures is flooding the rural pattern very fast. Since the socio-economic profile of the new and the old population is very different, it seems difficult for the old population to adjust to the new situation.

Therefore, a spatial conflict situation (pressure on the land) is going side by side with social friction, inducing a completely different spatial and community pattern.

As well in policy as in scientific literature is argued that urbanisation and urban expansion, connected to the removal of spatial separation of social groups, form one of the biggest challenges of the new South Africa (The Urban Foundation, 1991; Dewar, 1994). The relation between political and policy changes on the one hand and on the other hand its spatial implication, requires some study in depth of the dynamics in the urban fringe since the urban planning and city management seem to be running behind the facts. (Vanneste *et al,* 1999)

Since the hard reality of strong migration flows of the black population to the cities occurred only quite recently, South African cities, and especially the rural-urban fringes, give evidence of a socio-economic profile and of a pattern that shows many resemblances to other cities in the Third World (Dewar 1992: 243).

There are different forms and interpretations of an urban edge. Therefore an international comparison was done. The concept of the urban edge (as known in South Africa), was evaluated against planning initiatives in the United Kingdom and Europe. Following is the descriptions and conclusions.

Section B

Empirical Study – International Perspective

Chapter 3

United Kingdom

1 Overview: United Kingdom's approach towards the urban edge – Green Belts.

The urban edge as a planning tool for compact cities – this is the concept that needs to be evaluated. The United Kingdom has a different form of urban edge. It is known as Green Belts. This concept of the Green Belts is similar to the concept of the urban edge, in terms of containment of the urban environment. A detailed analysis will state the principles and implications that this concept has in the urban environment. For the purpose of this study, the elements and planning initiatives are of great importance, in order to draw comparisons between the local and international concepts of the urban edge.

i. Concept and definition: Green Belts

A green belt is an area around a city, composed mostly of parkland and farmland, in which development is strictly controlled. Its purpose is to prevent the outward growth of the city, preserve countryside for farming, wildlife and recreation, and, often to prevent two or more cities from merging to form one huge urban area. (PPG, 2005 [Web:] www.odpm.gov.uk).

It has been said that green belt policy is probably the planning policy that is best known to the public at large, but the one that is least understood! Any "green", undeveloped piece of land, especially in the urban fringe, is likely to be regarded as "green belt", but land that is not demonstrably green is not. The converse is equally true - land that once was not green, but now is, is likely to be regarded as a candidate for inclusion in a green belt. (Turner, 1992:365).

The reality is that green belts were conceived as an element of urban policy, to contain sprawl and encourage regeneration, or to protect the setting of historic towns. The strategic role of green belts as stated in by the Campaign to protect Rural England.
(2005: [Web:] www.cpre.org.uk):

- To assist the regeneration of urban areas by encouraging the recycling of urban land;
- To preserve the character of historic towns and manage urban form and urban sprawl;
- To safeguard the countryside from encroachment and improve the degraded urban fringe;
- To provide access to the open countryside, to protect agriculture, forestry, and related uses.

To meet any or all of the above objectives, green belts must be viewed strategically, and form an integral part of the (regional) settlement strategy. The concept of the Green Belts are introduced on national level, thus, the whole of the United Kingdom must adhere to these principles. Implementation of this concept is organized by the provincial and local authorities, with the focus on inter- and intra- regional integration.

ii. Descriptive models of the United Kingdom approach:

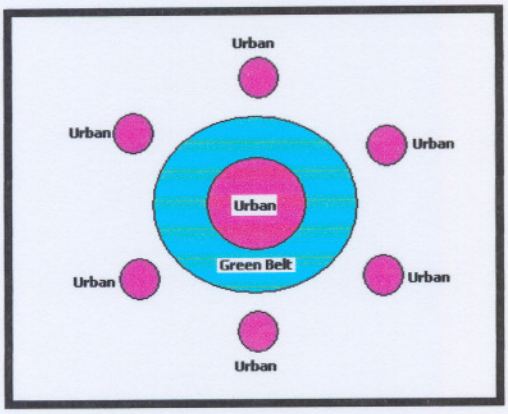


Figure 1: Concept of the Green Belt Structure
Source: Own creation (2005)

Figure 1 illustrates a simplified concept of the Green Belt theory. It illustrates that urban areas are developed in "isolation" to one another, connected by the open areas around their urban core – the Green Belt. This only illustrates the planning approach and spatial concept that is intended. Transport corridors and development pressure was the reasons that this model needed to be re-evaluated. As stated in Chapter 2, transportation not only stimulates economic development but also helps structure space. (Rodrigue, 2005 [Web:] http://people.hofstra.edu).

In a personal interview with Stella Bandu, Town and Regional Planner in the United Kingdom, Local municipality of Kentdowns (2005), the researcher was able to draw conclusions regarding the positive and negative aspects of the implementation of the Green Belt concept. Currently the Green Belt model strives towards: "no development unless there are exceptional circumstances". The general opinion under Town Planners is that this approach must be something more positive and more flexible. There are two drivers:

- First, more relaxed attitudes to development in the countryside generally, prompted by the economic imperatives, need to be reflected in green belts. There is no need for, or logic in, more restrictive policies in green belts than in adjoining areas of countryside.
- Secondly, there need to be sufficient development value in green belts to fund their environmental enhancement. "Openness" need not mean "no built development". National policy might paint the broad picture, while leaving room for local discretion and flexibility.

Present green belt policy in England is set out in *PPG 2 (*1999 [Web:] www.odpm.org.uk]*).* It describes the role and purpose of green belts, and follows this with a range of mainly restrictive development control policies, designed to guard against "inappropriate development" in the green belt.

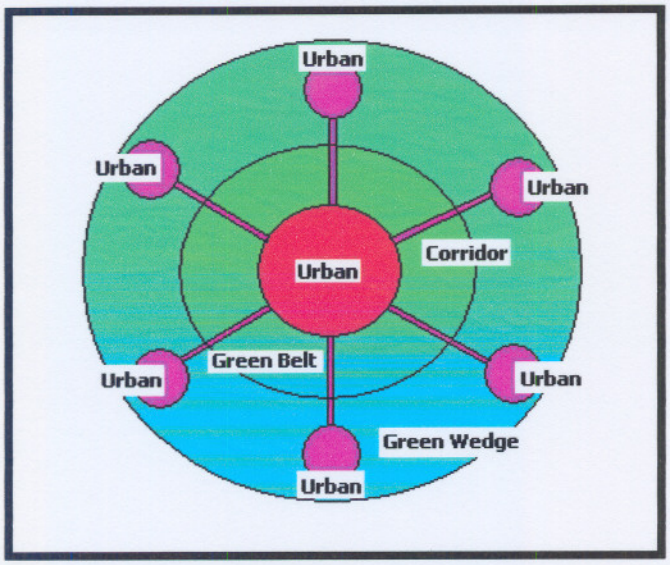


Figure 2: Development within the Green Belts
Source: Own creation (2005)

iii. Processes that plays an important role:

To this end, topography, and substantial features such as motorway or railway embankments, should be used to much better effect than they have often been in the past. Where this is done, green "wedges" may prove just as efficient as "belts" in achieving the visual separation of settlements. An added benefit is that settlement patterns are likely to be more sustainable. While preserving visual separation where this is necessary, and without compromising the strategic objectives of the green belt, additional areas of land may be available for development. (See figure 2).

This can help maximize the use of the available local infrastructure, produce more compact settlement patterns, and reduce the overall need to travel. Whatever the resultant local shape of the green belt, it remains important that its boundaries are based on clearly defined features – natural or man made – so that they are readily recognizable, and remain defensible for the plan period.

Green belts have an important role to play in effective spatial planning, from the strategic to the local level. The overriding principle is the need for green belt to be an integral policy of the spatial planning strategy, not one that has a life of its own.

Figure 2 illustrates a more practical concept of the Green Belt. Development corridors are not restricted to the Green Belt. Corridors integrate the different urban areas and therefore play an important role in shaping the spatial area. This is a developed country and therefore human resources, as well as social resources are not limited to specific areas. A natural, radial spatial pattern is possible. This might not be relevant to the South African perspective, but for the purposes of this research it is important to evaluate the effectiveness of the Green Belt, if it would be introduced as an urban edge, with the function of urban containment.

2 National Level

Development will be promoted where it is most desirable, and where it can be achieved in the most sustainable way. But if development is to be encouraged without allowing further encroachment on the Green Belt or internal green spaces, the urban environment has to become more densely populated and densely developed.

The greatest challenge is thus: how to accommodate substantial growth in the economy and population, but at the same time creating a more open and equitable society and also improving the heritage and environment. The strategy to achieve this necessarily involves a multi-stranded approach, one which integrates commercial and residential development, transport and communications infrastructure, and the promotion of vigorous local communities. Spatial growth must adhere to the development pressures, but also seek to contain the urban environment. The Green Belt concept has proven to be successful in containing the urban environment, but now pressure for development is questioning the necessity of this concept. (PPG, 2005 [Web:] www.odpm.gov.uk])

This research however, does not intend to answer to the development pressure seen in the United Kingdom. It focuses on the concept used to contain urban sprawl and ensure compact cities, a theme that South Africa needs to evaluate and implement where possible. In this context of urban containment, the Green Belt concept is leading.

Issues that are in direct opposition to the Green Belt concept are transport and development corridors. This needs to be coordinated. Spatial policies cannot be considered in isolation from their links to existing and proposed transport accessibility and capacity. A good example is London. London benefits from a well developed public transport network, which includes the Underground, National Rail services and an extensive bus network, which provide a high level of transport accessibility. A programme of public transport improvements has been developed to address current problems of movement and support expected spatial growth.

None of these development strategies or sub-regional priorities works in isolation. The London Plan articulates a fundamentally integrated vision of the city's future development, creating a more compact city in which each part of London fulfils its most effective role in a way that is complementary to the roles of other parts.

a) The current planning system:

- National Planning:

There is no National Plan although national legislation and Planning Policy Guidance notes issued by central government provide the national framework for other plans and planning procedures.

- Regional Planning:

As part of its devolution agenda, the Labour government has set up eight Regional Development Agencies that are expected to provide a similar framework and based on a membership that is more representative of the region it serves.

- County level:

At the level of the English counties Structure Plans provide a planning framework for a 15 year horizon.

- Local authority level:

District or Local Plans apply at the local authority level and cover a 10 year time horizon.

In drawing international comparisons the UK is unusual in several respects:

- The UK does not have a codified constitution that protects citizens' rights. The success of Green Belt policy in England may in part be dependent on the 'absence' of these kinds of rights.
- Constitutions also often allocate powers to different tiers of government but in the UK there is no such constitutional safeguarding of the autonomy of different tiers of government.
- In general, planning in the UK has not been concerned with social aspects of planning
- Unlike plans in many other countries, plans in the UK are not legal documents; they guide development but are not legally binding.
- Public participation includes opportunities to comment on plans and development applications. The procedures are very formal, often limited to the end of the process.

b) Development control:

This is the process that determines the outcome of planning applications. Development control has been a responsibility of all Local Planning Authorities since 1947. Development control in Green Belts is exercised at the local level. Overall however Green belts are regarded as having been successful at containing urban growth but poor at promoting positive land uses.

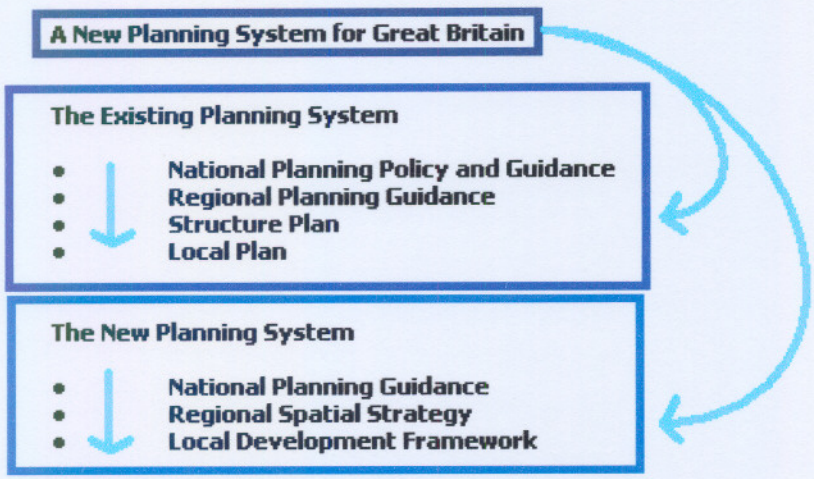


Figure 3: Planning system for Brittain
Source: Own creation (2005)

c) Environmental planning:

The criteria associated with a more ecological approach to planning, provision and management with a greater appreciation of user expectations and increased potential for community involvement is implemented.

The criteria include:

- Vision and strategy: benefits of greenspaces; a published strategy for greenspaces.
- An active programme of public consultation.
- Partnerships for involving local organizations.
- Improving accessibility; an investment strategy.
- Networks of green spaces integrated with other landuses
- Spaces contributing to the regeneration of areas and improving the quality of people's lives.

The main environmental feature in the United Kingdom that also sets the principals for development and planning, are the Green Belt concept. This is the same concept as the urban edge concept of South Africa, with different approaches and consequences – and thus beneficial for the study of the urban edge concept.

d) Planning Policies – the Green Belts:

Green Belts have been established around major built-up areas in England, (such as London) since 1947. They can shape patterns of urban development and help to ensure that development occurs in appropriate locations in accordance with development plans. They help to protect the countryside, be it in agricultural, forestry or other uses and can assist in moving towards more sustainable patterns of urban development. Bandu, 2005 [Personal interview – England].

The Government attaches great importance to Green Belts, which have been an essential element of planning policy for some four decades. The purposes of Green Belt policy and the related development control policies set out in 1955 remain valid today with remarkably little alteration. The first official proposal "to provide a reserve supply of public open spaces and of recreational areas and to establish a green belt or girdle of open space" was made by the Greater London Regional Planning Committee in 1935.

New provisions for compensation in the 1947 Town and Country Planning Act allowed local authorities to incorporate green belt proposals in their first development plans. The Green Belts approved through structure plans now cover approximately 1,556,000 hectares, about 12 per cent of England. Planning Policy Guidance Note 2 (PPG2, 1999) *Green Belts*, explains that the fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open. The Government recognizes that there is widespread concern about the threats to the Green Belt from development pressures. It wants to ensure that inappropriate development in the Green Belt remains an exception.

The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the most important attribute of Green Belts is their openness. Green Belts can shape patterns of urban development at sub-regional and regional scale, and help to ensure that development occurs in locations allocated in development plans. They help to protect the countryside, be it in agricultural, forestry or other use. They can assist in moving towards more sustainable patterns of urban development.

Purposes of including land in Green Belts:

- Check the unrestricted sprawl of large built-up areas
- Prevent neighbouring towns from merging into one another
- Assist in safeguarding the countryside from encroachment
- Preserve the setting and special character of historic towns
- Assist in urban regeneration, by encouraging the recycling of urban land.

The use of land in Green Belts: (PPG, 2005 [Web:] http://www.odpm.gov.uk).

- To provide opportunities for access to the open countryside for the urban population
- To provide opportunities for outdoor sport and outdoor recreation near urban areas
- To retain attractive landscapes, and enhance landscapes, near to where people live
- To improve damaged and derelict land around towns
- To secure nature conservation interest
- To retain land in agricultural, forestry and related uses.

Designation of Green Belts:

The essential characteristic of Green Belts is their permanence. Their protection must be maintained as far as can be seen ahead. Once the general extent of a Green Belt has been approved it should be altered only in exceptional circumstances. Where existing local plans are being revised and updated, existing Green Belt boundaries should not be changed unless alterations to the structure plan have been approved, or other exceptional circumstances exist, which necessitate such revision. Where detailed Green Belt boundaries have not yet been defined, it is necessary to establish boundaries that will endure.

Wherever practicable a Green Belt should be several miles wide, so as to ensure an appreciable open zone all round the built-up area concerned. Boundaries should be clearly defined, using readily recognizable features such as roads, streams, belts of trees or woodland edges where possible. When drawing Green Belt boundaries in development plans local planning authorities should take account of the need to promote sustainable patterns of development. They should consider the consequences for sustainable development (for example in terms of the effects on car travel) of channelling development towards urban areas inside the inner Green Belt boundary, towards towns and villages inset within the Green Belt, or towards locations beyond the outer Green Belt boundary. (Hall, 1996:108).

Strategic gap and green wedge policies in structure plans:

Local designations such as strategic gaps, rural buffers and green wedges were first referred to in planning guidance in PPG7 *The Countryside* in 1997. The guidance states that in reviewing development plans local authorities should re-assess the function and justification of such policies, at the same time recognizing that they can contribute to urban form and the shaping of urban areas.

The House of Commons Environment Select Committee report on *Housing* recommended that the Government should support local planning authorities who wish to maintain their own local designations. In its response the Government stated its willingness to consider whether local designations which perform the same function as green belts and have the same objectives and purposes, should formally enjoy the same status. The survey of structure plan authorities, carried out by Oxford Brookes, in early 1999, revealed that 17 Counties had some form of strategic gap, green wedge or similar policy giving higher levels of protection than normal countryside policy.

- They are smaller in extent than most Green Belts
- The largest areas being just beyond the outer edge of the Metropolitan Green Belt.
- District and county councils have given strong support to strategic gap and green wedge policies, often seeking to extend them, and to adopt stronger development control policies within them.

The basic purposes of the designations are as follows:

- **Strategic gaps:** they are to protect the setting and separate identity of settlements, and to avoid coalescence; retain the existing settlement pattern by maintaining the openness of the land; and retain the physical and psychological benefits of having open land near to where people live;
- **Rural buffers:** to avoid coalescence with settlements (including villages) near a town until the long-term direction of growth is decided; and that they are an interim policy for towns which are exceptionally fast growing, are probably only likely to be used sparingly.
- **Green wedges:** to protect strategic open land helping to shape urban growth as it progresses; to preserve and enhance links between urban areas and the countryside; and to facilitate the positive management of land, delivering a wide variety of desirable outcomes, to become a successful future model for the urban fringe. (Steenberg, 1999:4).

The Overlap of the Green Belt and Other Strategic Restraint Policy Purposes:

An analysis of how far strategic gap and green wedge policies overlap with Green Belt policy has been conducted. The purposes are categorized according to those listed in the relevant structure plan policies. There are five main points to be made here.

- The main overlap in purposes is in the area of preventing the coalescence of settlements.
- All have the purpose of avoiding coalescence between large built-up areas.
- The policies do not have the purposes of checking unrestricted sprawl.
- They have the purpose of protecting the setting and historic character of the two cities.
- The protection of important open land

Table 1 illustrates the essential features of the strategic gaps, rural buffers and green wedges.

Table 1: Essential features

	Strategic Gaps	**Rural Buffers**	**Green Wedges**
Purposes	Avoidance of coalescence and protection of the setting of urban areas	Avoidance of coalescence and protection of the countryside	Protect important open land to help shape growth of town/city
Location	Between *substantial* urban areas	Around major town/city with high propensity for growth, between the town/city	Around town and city; penetrating into town/city
Size	Generally up to two miles wide	Up to five miles wide	Green wedges within urban areas may be up to one mile wide
Permanence	Same duration as the structure plan	Can be revised at reviews of the structure plan	The duration of the structure plan
Development control	Strict controls, allowing for area to be kept *predominantly* open, similar to Green Belt.	Restricts major development, allows for small-scale rural development	Green Belt prescription, or similar

Source: ODPM. (2005 [Web:] www.odpm.gov.uk).

General conclusions and observations can be drawn from the National perspective of the Green Belt concept in the UK. This was formulated in a matrix form.

Table 2: Matrix of the United Kingdom's planning approach.

Important research issues	As manifested in the United Kingdom
Legislative Framework	The National level set the PPG framework. On Regional level this framework is transformed to have specific outcomes. Each country then defines a structure plan and this leads to the individual District and Local Plans.
Urban Edge concept	The United Kingdom introduced Green Belts. The focus is on environmental quality and containment of urban sprawl. The Green Belts are known for its permanence. The Green Belts are well defined and protected. The implementation of this concept is more realistic in the form of Green Wedges, if the development and transport corridors are also taken into account. It is successful in containing the urban area.
Significance of the concept	Metropolitan areas have growth forces. Therefore the area will always have pressure to expand. The Green Belt concept is a tool that contains the urban environment, and because of the strict control development, it is proven to be successful.
Spatial planning principles and spatial context	The role of the Green Belts stipulates the function of urban containment and limiting of urban sprawl. The Green Belt concept is an effective tool for compacting cities. Spatial principles include positive land uses. The Green Belts shape patterns of urban development.
Social-economic objectives	There are no specific citizen rights in the United Kingdom. Development and planning is more concerned on the environmental protection, than on social upliftment. There are public participation, but in a small scale.
Spatial lessons learnt: Impacts on Town Planners	Visual separation of areas is important. This can be obtained through defined edges. Natural edges ensure effectiveness and sustainability. The Green Belt ensures compactness of the urban environment. Compactness ensures positive spatial implications such as minimizing travel distances, maximizing local infrastructure and enhancing of the surrounding quality. Town Planners must approach this concept in an integrated manner.

Source: Own creation (2005).

3 Local Level.

The spatial effectiveness and implementation of the Green Belt concept can be evaluated in the two case studies that were done in the United Kingdom:

A – Kentdowns municipality: Area of Outstanding Natural Beauty

B – Havering Local Municipality

A Case study: Kentdowns.

1 Overview:

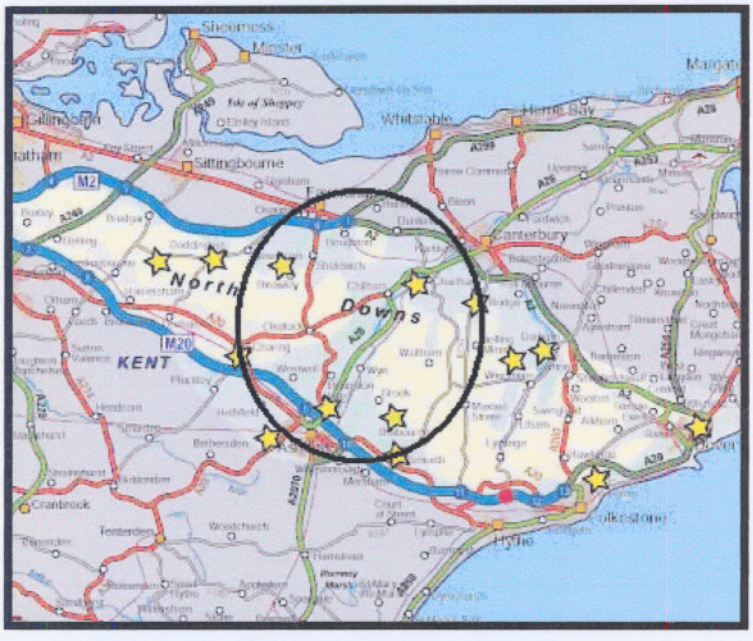


Figure 4: Kentdowns and the Green Belt

Source: Kentdowns Municipality (2005 [Web:] http://www.kentdowns.org.uk)

The urban edge concept is evaluated against the Green Belt concept of the United Kingdom, for research purposes. The Green Belt concept is of great importance in Kentdowns, because the area is characterized as an area of outstanding natural beauty. A large area of Kentdowns is situated within the Green Belt, and therefore the management of this area has various spatial implications. Kentdowns are a unique 'gateway landscape' lying between London, the South East and the heart of Europe. (Kentdowns municipality, 2005: [Web:] www.kentdowns.org.uk). Without the green belt, the contiguous built area would certainly have been much larger than it is today. However, as figure 4 shows, the success in controlling outer urban development has been limited. Permanent open areas have been structured. Built development has occurred right across the outer metropolitan area, in a fragmented form, interspersed with green areas.

2 Dominant features of planning in Kentdowns:

Management Plan Structure

The landscapes of Kent are important because of the impact they have on the quality of life of those who live, work and spend time in the county. The benefits include:

- Supporting the economy of rural areas and encouraging tourism and investment
- Contributing to people's enjoyment, education, health and well-being
- Maintaining natural systems which contribute to daily needs such as water catchments
- Preserving the relationships with nature. (Bandu (2005 [Personal Interview]).

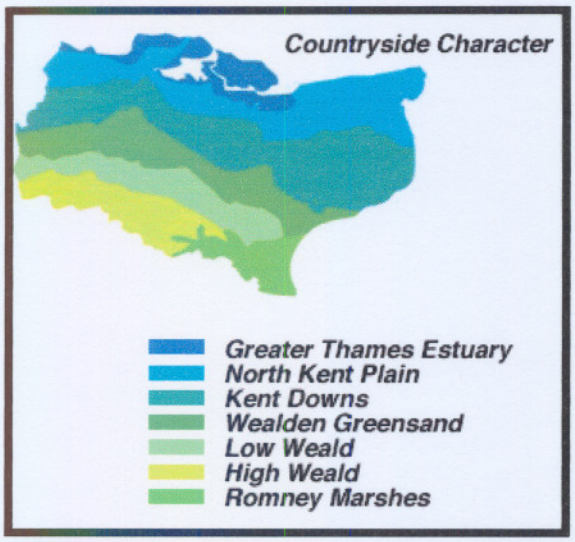


Figure 5: Areas of Outstanding Natural Beauty, Heritage Coast and Special Landscape Areas
Source: Kentdowns Municipality (2005 [Web:] www.kentdowns.org.uk)

The primary objective in this area is to protect and enhance the landscape character and natural beauty. Urban development must enhance the natural environment. Urban compaction is of great importance, in order to limit urban sprawl. Major commercial, mineral or transport infrastructure developments will not be permitted unless it can be demonstrated that:

- There is a proven national interest.
- There are no alternative sites available or the need cannot be met in any other way.
- Appropriate provision can be made to minimize harm to the environment.

The Green Belt concept is a strict development control tool in this regard. It answers to the environmental and compaction requirements. Development that is essential to meet local social or economic needs should be permitted, provided that it is consistent with the purpose of the Areas of Outstanding Natural Beauty. (Kent Country Council, 1996:106).

3 The urban edge concept in Kentdowns: The Green Belt.

Local Planning Authorities set strategies for ensuring effective environmental management and high quality design for Green Belt areas, particularly in Kentdowns where new developments are proposed. (Kentdowns municipality, 2003 [Web:] www.kmsp.org.uk).

- The maintenance or enhancement of landscape and urban character
- The safeguarding of land for public access and the provision of recreational networks

4 Conclusion:

The spatial conclusion drawn from the Kentdowns case study was formulated by the researcher in the form of a matrix. This will be used to evaluate the local perception.

Table 3: Matrix of the Kentdowns case study.

Spatial Issues	Kentdowns
Spatial reality	Kentdowns has a unique spatial character. It is characterized as an area of outstanding natural beauty. It is situated mainly within the Green Belt.
Policy and Legislative frameworks	• Planning Policy Guidelines • Local Development Framework
Connectivity corridors and mobility	Strict development control measures exist. Transport and infrastructure corridors will only be developed if it has national interest and no other sites are available. Environmental protection has more importance than urban development.
Regional integration	Regional integration should not affect the environmental quality. Green areas integrate the various urban environments.
Nature of the urban edge	The Green Belt forms the urban edge. This leads to open areas with strict development control measures.
Principles related to the urban edge	• Environmental protection • Natural boundaries formed by the topography • Quality enhancement in the total area.
Management	Strict development control frameworks. Any new development initiatives must prove to be sustainable and environmental friendly.
Successes	• Environmental management and beauty • More environmental rights than citizen rights
Failures	Environmental issues are more important than development and urban structure. No social focus.
Spatial planning conclusions	Green Belts are a successful tool for containing the Kentdowns area. The natural environment determines the spatial pattern and related context.
Recommendations	Development should not degrade the current natural area. Develop holistically. Open areas, in the form of Green Belts, contain urban development.

Source: Own creation (2005)

B Case study: Havering.

1 Overview:

Havering is the third largest London Borough and is located in North-east London. The River Thames forms the southern boundary to Havering. It is a prosperous Borough with a diverse and successful economy although there are local pockets of social deprivation. More than half of the Borough is in the Green Belt with significant areas of the remainder mainly suburban in character and appearance.

All local planning authorities, including Havering Council, have to prepare planning policies which set out the authority's policies and proposals for the development and other use of land. The Havering Unitary Development Plan (UDP) has provided the statutory planning framework for Havering since its adoption in 1993.

2 Dominant features of planning in Havering:

The Planning and Compulsory Purchase Act 2004 requires Havering to replace its UDP with a Local Development Framework (LDF). The new arrangements are intended to make the planning system more responsive to changing circumstances.

Local Development Framework

The LDF is a tool for the Council to set out how it will manage the preparation of its planning policies. This is Havering's first Unitary Development Plan. It replaces all the previous local plans and planning policies, and it is the sole statutory development plan for the London Borough of Havering.

The Plan will guide development proposals so that they help to safeguard and improve the environment and to meet the needs of those living and working in the Borough. Different parts of Havering have their own distinctive character, but in many ways the future of Havering is closely bound up with the future of the rest of London. For example, 50% of Havering's working population is employed in other parts of London. British Rail and Underground rail services, and the A12, A127 and A13 trunk roads, pass through the Borough and are heavily used for travel to inner London. Features such as the Green Belt and the River Thames are crucially important to London as a whole. The Havering Unitary Development Plan must therefore be co-ordinated with the Plans for other London Boroughs.

3 The urban edge concept in Havering:

As mentioned before, the urban edge concept in the United Kingdom, as in Havering – is known as the Green Belt concept.

The purpose of the Green Belt in Havering:

- Limited the continued outward spread of the built-up area;
- Contributing to the coalescence of towns and villages in the Greens Belt;
- Adversely affecting the individual character of towns and other settlements in the Belt;
- Materially affecting the open nature of the Green Belt.

The Council will not regard the fact that the land is either unused, underused, poorly maintained, poorly restored after mineral operations or derelict as a justification for permitting development. The Council will seek opportunities to enhance the environment and increase the scope for recreation in the Green Belt. The Council will seek to encourage the retention of high quality agricultural land and protect it from irreversible development.

Mineral extraction will generally be treated as irreversible development unless the land can be restored to, or close to, its former (undisturbed) physical characteristics. The Council will seek to prevent agriculture and associated activities (including farm diversification) having an adverse effect on the environment or the character of the Green Belt.

4 Conclusion:

Policies lay the basis of all development initiatives. As seen in Havering, these policies are of great importance and need to be prepared in a sustainable way. The Local Development Framework of Havering set these principals, and this also need to be incorporated in the South African Development Frameworks.

When development proposals are guided, the environment as a whole will benefit, and will lead to the improvement of the natural area. This will also answer to the needs of the living and working area, as seen in Havering.

The main lesson learnt from Havering is that the region should be developed as a whole, and not isolated parts at a time. All the planning in Havering is also subject to planning initiatives in London.

The spatial conclusion drawn from the Havering case study was formulated by the researcher in the form of a matrix. This will be used to evaluate the local perception.

Table 4: Matrix of the Havering case study

Spatial Issues	Havering
Spatial reality	There is constant pressure from London as main urban node. The urban structure is influenced by the River Thames. The close connection to London city implies the need for accessibility and upgrading of current infrastructure and transport corridors. The area is characterized by social deprivation
Policy and Legislative frameworks	• Planning Policy Guidelines of the National authorities. • Havering Unitary Development Plan (UDP - 1993) • Local Development Framework
Connectivity corridors and mobility	The transport network is outstanding. This ensures optimal accessibility and mobility. Rail and underground transport corridors and freeways are connecting the regional places and urban cores. This manifests within the Green Belt concept and thus must adhere to the principals set by the Green Belts.
Regional integration	Main corridor and connection to London city
Nature of the urban edge	Green Belts that forms open areas around cities
Principles related to the urban edge	• Limit outward sprawl • Coalescence of towns
Management	Enhancement of the environment at all times, but at the same time ensuring the efficiency of the main connection corridor to London city.
Successes	• Regional development and integration with the London area • Holistic approach when planning development and infrastructure corridors • Permanence of Green Belt
Failures	• Urban development and expansion into the open areas • The plans are guidelines, not legal, binding documents.
Spatial planning conclusions	The Green Belt is less important in Havering than it is in Kentdowns. This can also be seen in the current spatial reality where urban sprawl is occurring. Connectivity with the London area overpower the requirements set by the Green Belts.
Recommendations	Consider the area holistic. Economic, spatial and environmental issues must be in balance to one another.

Source: Own creation (2005)

The United Kingdom's approach towards the urban edge is illustrated in the Green Belts. This concept is proven to be successful in containment of urban environments. It requires a good implementation plan and strict development control. For the purposes of this study it is important to identify the Green Belt as a planning tool for compact cities, and evaluate it within the spatial context. The elements and impacts of this concept are of importance. These elements will be evaluated within the South African context.

Chapter 4

Europe - Netherlands

1. Overview: Europe's approach towards the urban edge concept – Green Structures.

The concept of the urban edge manifests in a different form in Europe. This form is illustrated in the Green Structures. The Green Structures are similar to the concept of the urban edge, in terms of containment of the urban environment. A detailed analysis will state the principles and implications that this concept has in the urban environment. For the purpose of this study, the elements and planning initiatives are of great importance, in order to draw comparisons between the local and international concepts of the urban edge.

i. Concept and definition: Green structures

The Urban edge is not only the edge of a city or town, but also the edge of the outside area. It is the connection between urban and rural areas. It is an integration of work, shops and culture. Current planning initiatives is to develop industrial sites on the outer parts of the cities, thus on the urban edges. Agricultural developments also seem to be situated at this part of the city, because of the higher land costs in the urban area itself. (Garreau, 1991:3).

Thus, urban and rural areas are developed with their backsides facing each other, and this is because of the implementation of the urban edge. There are a definite line that distinguish the rural area from the urban area, although these areas are adjecent to one another. The European cities include green structures in their urban environments. This green structures has no particular form, like the Green Belts of the United Kingdom has, but still has a dominant feature within the urban area. The spatial implications and impacts of these Green Structures need to be identified and evaluated.

ii. Descriptive models of the Netherland's approach:

A concept – clustered deconcentration – forms the basis of spatial development in the Netherlands. This concept implies that the government allows people to move out of the big cities, but only to the areas that were pointed out to be growth areas. This ensures that Green Structures are protected from development. (Ministrie VROM, 1999:11).

The strategy is to restructure the area and stimulate growth in pre-selected areas. This will contain urban sprawl and ensure that developments take place along the corridors. It will ensure a development structure and a city center that is close to the green areas. Edges ensure small but compact cities, and this is the aim in the Netherlands.

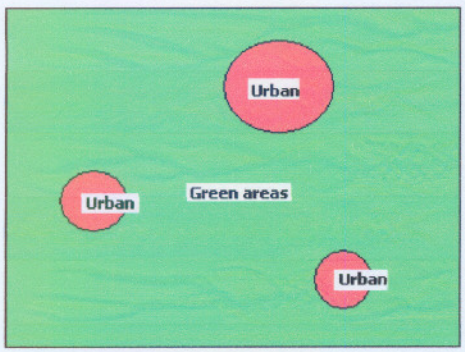


Figure 1: Urban cores within green areas.
Source: Own creation (2005).

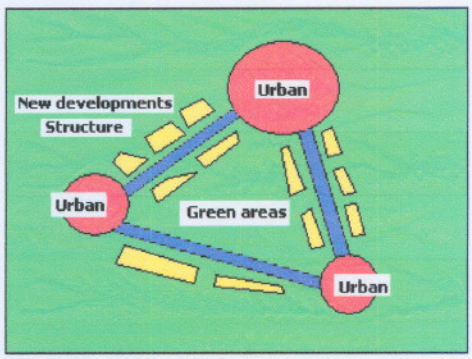


Figure 2: Development structure
Source: Own creation (2005).

The model of clustered deconcentration is illustrated in Figure 1 and 2. There are a main urban node that exists. As this node expands, people feel the need to move out of the urban area. Government authorities respond to this by establishing new urban development centres. (Figure 1). The spatial structure then develops along the transport and development corridors as illustrated in Figure 2. The spatial pattern that evolves can be compared to the Green Wedges that is present in the United Kingdom. Urban nodes with green open structures.

iii. Processes that plays an important role:

There is considerable interest in the layer approach among the Dutch planning community as a new planning method. The layer approach has a prominent role in the analyzing part of 5th National Policy Document on Spatial Planning.(Geertman, 2005 [Personal Interview:Utrecht]).

Each layer is continually changing, but at different rates. The ground layer has a low rate of change and ecological sustainability. The network layer (road, water and infrastructure) has a moderate rate of change and economic efficiency. The occupation layer (land use) has a high rate of change in the battle for space and social justice. (Hajer, 2000:337).

The distinguishing feature of the layer approach is that, unlike traditional approaches in the Netherlands, the prime concern is with land use patterns. It also examines the underlying layers, such as the slower changing ground layer and the networks that influence the dynamic occupation layer.

The current trends of the Green structure features in Europe is:

- There must be green, recreational areas nearby the city centre
- There must be a buffer zone around the city
- There should be safe pedestrian walkways and bicycle paths.

2. National Level.

1. The Netherlands as a part of the European territory:

Europe has a very imbalanced territorial structure. Looking at the territory of the 27 current and accending EU member states, around 32% of the citizens live and work in a core area shaped by the "Pentagon" London, Paris, Munich, Milan and Hamburg. This Pentagon covers only around 14 % of the EU-27 territory but counts for 46,5% of the EU-27 GDP.

IThe Netherlands are situated in the heart of this Pentagon (see figure 3) in the delta of the rivers Rhine, Meuse and Scheldt. It is for this reason that the Netherlands have an important gateway and transit function for Europe, with a key role for the port of Rotterdam and the Amsterdam Airport Schiphol. Fertile grounds, together with this international accessibility have lead to a highly intensive agricultural sector. (Ministry of housing, 2001:11)



Figure 3: Netherlands within the European territory
Source: Ministry of housing (2001:11)

Following this position the Netherlands have the highest density of people, transport, cattle and industry in Europe. This immense pressure on the territory is a transnational problem that is shared with neighbouring areas in Belgium and Germany. The European scale is gaining significance. Coherence between metropolises and logistical networking require international cooperation, as do action programs for water management and 'green' qualities. Coordination of spatial policy between cities and countries are central to this.
(Ministry of housing, 2001:11)

2. The Netherlands is changing:

The Netherlands is changing, both in terms of spatial development and the way in which people use and perceive that space. Spatial policy must respond to all these changes and trends. (Ministrie of housing, 2001:11).

Population and housing:

According to the most recent forecast, the population of the Netherlands will pass the 18 million mark around 2030, the number of inhabitants will subsequently stabilize. In the past, the number of households grew at a faster rate then the population.

Economy:

Due to lack of space and diminishing car accessibility in cities, more and more businesses are moving to the urban periphery or locating along infrastructure routes. Economic activities are expected to continue to spread within urban zones, along the edges of these zones and along the infrastructure links. That area is also known as the 'main spatial infrastructure' of the Netherlands.

Agriculture:

Over the next 25 years, agriculture is expected to grow at a pace slower than the growth of the overall economy, and its share in the economy and employment is expected to diminish further.

Social and cultural developments:

Not the group or family as before, but the individual has become the basic unit of modern society. Individualism also means that the individual's freedom of choice has increased.

Accommodating the demands for space means that by 2030 more than a quarter of the surface of the Netherlands will change in use. Compounding this is the finding that all types of uses besides agriculture will need more space.

The total quantity of space required is larger than all the farmland to combined. This means policy choices must be made. The challenge of policy is to combine the quantitative space requirements with quality gains. Spatial conditions ought to contribute towards a social, healthy life for everyone. Accessibility and safety are important, as are urban environments at a human scale and a contrast between urban and rural areas.

The intense pressure on space, and the objective to enhance the spatial quality of the Netherlands, place particularly high demands on the management of space. That is why a new strategy has been developed which does not seek implementation by dictating spatial development 'from the top down' but rather through coordination, national priorities and concentration: coordination, by ensuring that decisions on all levels are in step with each other, national priorities, so that policy will focus more keenly on components of spatial policy deemed to have national importance, and concentration, since the national government is focusing its efforts more on creating programmatic frameworks and less on interfering with the policy of other levels of government. (Ministry of housing, 2001:12).

3. Dutch public organisation in general.

The three main levels of government therefore are: National - central government, Regional - called provinces (Provincial Council), Local - municipalities (Municipal Council).

Dutch constitutional law says this is not a hierarchical division; these bodies of government have their own powers and competences. Yet there are powers of supervision from one level to the other, based on geographical scale. (Ministry of housing, 2001:19).

4. Planning systems.

The most important legislative basis for spatial planning in the Netherlands is the "Wet op de Ruimtelijke Ordening" (spatial planning act). This is framework legislation which delegates tasks to the national government, the provinces or the municipalities.

Table 1: Planning systems in Netherlands

National level	National spatial planning act (Planologische Kernbeslissing)
Regional level	Regional plan: province-based (Streekplan)
Local level	Structure plan (Structuurplan) Local land use plan (Bestemmingsplan) Urban renewal plan. (Stadsvernieuwingsplan).

Source: (Ministry of housing, 2001:19)

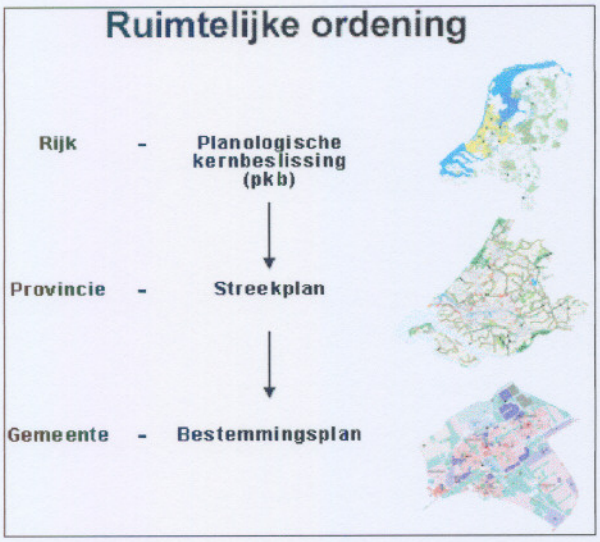


Figure 4: Spatial development structure.
Source: (Ministry of housing, 2001:14).

A "Streeksplan" describes the desired development of a province in principle and corresponding realization phases. It contains, amongst other things, prognoses about the future area need for commercial uses, and gives instructions about the spatial distribution for this growth. If it is established, then its content is binding for the municipalities, which also participate in establishing it.

In a "Struktuurplan", the municipal council shows the future development for an entire area in a municipality, or for part of it. Here also, the desired development of the area concerned is shown as guiding principles and phases. The creation of the "Struktuurplan" is not obligatory and has no legal consequences. (Faling, 2005 [Email interview]).

The "Bestemmingsplan", as directly binding land development plan, determines the kind of utilization and gives, if needed, regulations about the use determination of the plan areas and of the building facilities in these plan areas. The municipal council is obligated to establish a land development plan for the municipal area outside the city limits. Within the city limits its creation is optional. Indirectly, the "Bestemmingsplan" thus also determines the expansion area for settling.

It is stated that it is relatively difficult to reach coordinated and balanced spatial planning with existing planning instruments. This is due to the fact that spatial planning is primarily structured as a top-down process from the national over the regional level to the local levels. (Weerheym, 2005 [Email interview]).

5. National Spatial Policy

The Fifth National Policy Document on Spatial Planning is entitled "Making Space, Sharing Space". This policy document contains the national government's spatial planning policy resolutions for the next few decades.

The document does not contain any decisions on concrete locations, but rather presents policy frameworks within which those decisions can be made. Decisions on detailed spatial layout and design are primarily a matter for the provinces, urban regions and municipalities. The motto of the Fifth National Policy Document on Spatial Planning is: "centralize where necessary, decentralized where possible".

In the past, national policy on spatial issues was set out in separate policy documents. This government has chosen to incorporate as much of the national policy as possible into one single strategy. A single National Spatial Strategy will help to reduce the overlap in the different policy fields and the number of separate policy documents, while offering more clarity and ensuring more coherence in the policy and its implementation.

The National Spatial Strategy sets out national spatial policy up until 2020; the long-term aspects cover the period from 2020-2030. (Ministry of housing, 2001:21).

Fewer rules and regulations dictated by central government, more scope for local and regional considerations, more development planning and less development control planning were among the more frequent suggestions. The changing economic prospects and the problems of creating a liveable environment in the major cities were also reasons to give more weight to the public responses that demanded attention for such issues.

Policy Objectives:

- Strengthening the international competitive position of the Netherlands
- Strong cities and a vibrant, dynamic countryside
- Preserving and developing important national and international spatial values
- Ensuring public safety

The National Spatial Strategy has shifted the emphasis in the policy from "imposing restrictions" to "promoting developments". This approach is anchored in the National Spatial Strategy.

6. Greenstructures and Urban Planning.

Internationally, the Dutch tend to promote themselves because of their progressive role on nature conservation and nature development. Nationally however they stand for the challenging task to accommodate too many land claims for too small a country.

Green areas in the Netherlands which have the best legal protection are those areas within the "Ecological Main Structure". Since the Netherlands is quite densely populated, parts of this structure can be found in the vicinity of cities. Through the 'compensation principle', those who take initiative to build or do certain activities in this Ecological Main Structure will have to compensate for this. (Meeus, 1989:13).

Green structures in the Netherlands are of great importance, especially because space is limited. Land use management is the main consideration when planning the spatial development. Transport corridors are also integrated within this structure, and influence the urban form and structure. Transport corridors depend on the various land uses that are permitted. Thus, it can be stated that all development initiatives are dependant on the land use, and parrallel to this is the open green structures.

There is a special national policy for green areas in cities. This policy is called "Green in and around Cities".

This Fifth National Policy document on spatial planning (of the Ministry of Housing, Spatial Planning and Environment) introduces the concept of 'green' and 'red' contourlines. Green contourlines are drawn around green areas of national or regional importance. The green contours are drawn around areas with special natural conservation values or units containing cultural, historical or archaeological ancient monuments. Within the green contour, the guideline is preservation and protection, but the dynamics of landscape and nature are given space, a demonstrable contribution is made towards the essential features and values of the area.

Red contourlines will have to limit urban growth. Red contours are to be drawn around existing built up areas. The objective is to locate new construction required for homes and workplaces within these contours by transforming and intensifying land use. The areas can only be expanded once it has been demonstrated that the demand cannot be satisfied within the bounds of the contours.

The areas outside the red and green contours are designed as intermediate areas, where a development-orientated landscape strategy applies. Their landscape and cultural-historical values are protected partly on the basis of existing protection schemes. (Ministry LVN, 1990).

This approach leads to both support and criticism. Quite common is the concern that red contour lines around urban networks stimulate an overactive search for open spaces within the urban system, which would then lead to a deterioration of the quality of urban life. It is therefore that even more recently, the concentration areas were introduced to be part of the Fifth report.

These concentration areas specifically concern the urban networks. The municipalities within the urban networks have to draw their red and green contourlines together. In the definition of concentration areas, special emphasis is put on the maintenance and/or development of open spaces.

7. Development planning.

Development Planning is a method that makes the *implementation* of spatial plans, visions and projects the central consideration.

The objective of development planning is to allow initiatives by the public, companies, community organisations and authorities to be carried out more often and in a better way. This is achievable by making earlier allowance during planning for the actual implementation of the plans.
The National Spatial Strategy also makes the goals of policy the prime consideration rather than the related rules and regulations. This contrasts with the past few decades when rules were often the overriding consideration. (Pienaar, 1994:2).

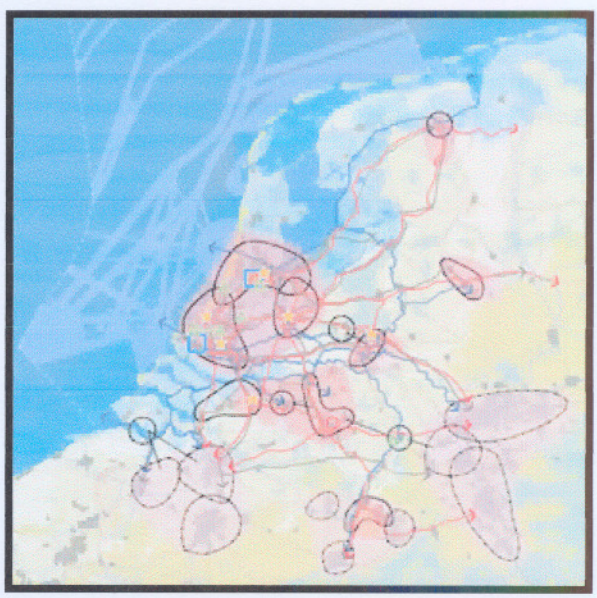


Figure 5: Structure of the space
Source: (Ministry of housing, 2001:15).

General conclusions and observations can be drawn from the National perspective of the Green Structure concept in the Netherlands. This was formulated in a matrix form.

Table 2: Matrix of the Netherland's planning approach

Important research issues	As manifested in the Netherlands
Legislative Framework	On National level the Spatial Planning Act exists. Regional level authorities comply with the Regional Plan and at Local level there are a Structure plan, Land use plan andUrban renewal plan.
Urban Edge concept	The concept in the Netherlands is known as Green Structures. This concept ensures open areas in a developed country with limited space. Red and Green contours define this concept and and distinguise areas for Clustered deconcentration.
Significance of the concept	Metropolitan areas have growth forces. Therefore the area will always have pressure to expand. The Netherlands answered to this phenomenon by identifying growth areas. Buffer zones is developed between the urban environments, and this ensures green cities. Safety for pedestrians and bicycles are important.
Spatial planning principles and spatial context	The role of the Green Structures stipulates the function green open areas within the urban environment. The Green Structure concept is an effective tool for compacting cities, with reference tot he clustered deconcentration concept. Spatial principles include the regional integration and influence of the european pentagon.
Social-economic objectives	Densities in the Netherlands are very high because space is limited. Quality environments are of great importance.
Spatial lessons learnt: Impacts on Town Planners	Space in the Netherlands is limited, therefore cities are compact. Compactness of cities ensures other positive spatial implications such as minimizing travel distances and enhancing of the surrounding quality. There must be less development control but more development planning. Clustered deconsentration leads to structural urban development.

Source: Own creation (2005)

3 Local Level

The effectiveness and implementation of the Green Structure concept can be evaluated in the three case studies that was done in the Netherlands:

A – Breda
B – Utrecht
C – Uden



Figure 6: The Netherlands
Source: Google Pictures
(2005 [Web:] www.hostels-europe.com/info-countries)

A: Case study – Breda

1 Overview:

Breda is indeed an old city, as can be seen within the city centre, and is also relevant in expressing the modern thought of green areas within walking distance from dwelling places. A Structural feature in Breda is making the green-spaces a major component in the image of the city, and in the daily life. This is done by the organization of the city, with the strong contrast between red and green contours.



Figure 7: Breda. Source: Coppens (2005 [Web:] www.historisch-toerisme-bureau.nl)

The water network is a big affair of Breda for the recent years and the future. Water running within the inner city is tob e emphasized and is a relevant element fort he quality of public spaces as well as for a modern identity. This element also impacts of the current and proposed development initiatives in Breda. (Verburg, J.S. & Van den Hurk, A, 1999:269).

The urban edge of Breda has moved over the last couple of years as the city is expanding. Forces of growth is impacting on the area and it is neccessary to answer to this phenomenon. Green structures still remains a dominant feature of development control and planning.

2 Dominant features of Planning in Breda:

1. Inner City: The inner city is the heartbeat of Breda in terms of economic, social and cultural issues. The character of Breda is determined by this. Further focus is placed on the safety, concentration, diversity and intensity. Development and planning revolves around this core feature.
2. Current City: This is the redevelopment of existing places, in order to optimize the culture, living and social aspects of the city. The focus must be on accessibility and public participation.
3. Urban axes: These are the linkages between the urban and rural areas. Its main focus is on the infrastructure development. This includes the bicycle paths and other public transport facilities.
4. Development location: This is to develop the urban area. The main project is named: Vinex-projects. Integration is the main focus here. All to ensure the high, but sustainable quality of the environment.
5. Green and Rural areas: To enhance the linkage between the city and the outer green areas. Recreational areas will be of great value. When the "green" is improved in an area, the quality in a whole will improve.
6. Traffic congestion: This is due to the spatial-economic position of Breda. Traffic congestion is the cause of an economical developing city and a core element for future planning.
7. The Region: The region is developing. Therefore the surrounding networks also need to be strengthened. Accessibility to and from main points in the region, is a dominant planning feature.
8. Quality: This can only be achieved through program management.

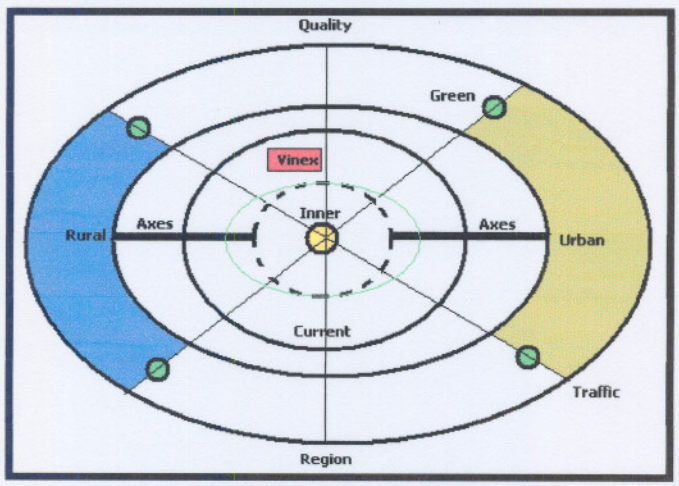


Figure 8: Diagram of development and planning in Breda
Source: Own creation (2005)

At this stage, the city of Breda is enormously improving in scale. The city needs to answer to the questions of current, but also feature developments. There is a positive attitude towards the Spatial Planning Policies, Town Planning Policies, Economic Policies and the Environmental Policies. Negative attitudes are towards the security of the city. The government is responsible for the maintenance and control of the public areas. This includes the green areas and development issues. (Te Winkel, 2005 [Email interview]).

3 The Urban Edge concept in Breda:

In Breda, large expansion occurred after the second world-war, first with high rise buildings set in open space, then with accurate concepts for organically growth and a strategy for greening the city and upgrading the quality of life. The expansion of Breda is parallel to the expansion of the urban edge. The Green Structure Plan for the inner city (1982) expanded in 1986 for the entire city. The Landscape policy plan (1990) also impacted on the urban edge concept, because this policy was permitted to defend ordinary rural landscape. The Regional Ecological Model (1992) worked towards a comprehensive approach of integral planning and green issues. (Meeus *et al* 1989:12).

Tension between green structure strategy, the building and development programs is not calming. The Vinex plan for 1995/2005 is asking for 11 000 new dwellings in Breda, which is supposed to emphasize all facilities offered by the city in order to keep its quality of life. This is, once again, impacting on the urban edge concept and urban sprawl that occur.

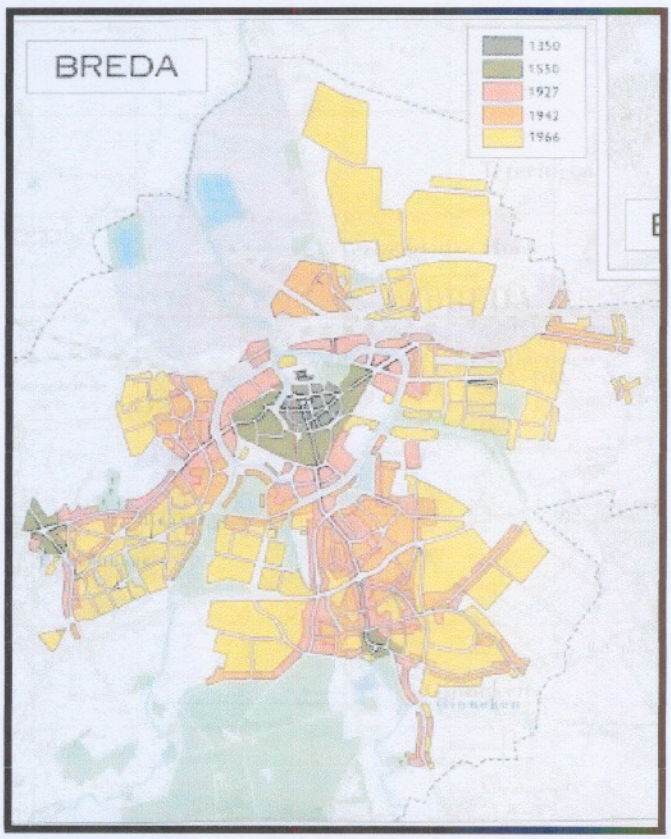


Figure 9: The Urban Edge over the past couple of years.
Source: Pacione (2005 [Web:] http://www.ru.ul)

4 Conclusion:

The spatial conclusion drawn from the Breda case study was formulated by the researcher in the form of a matrix. This will be used to evaluate the local perception.

Table 3: Matrix of Breda's case study.

Spatial Issues	Breda
Spatial reality	The spatial positition of Breda can be classified as spatial-economic, because of its location. Natural features, especially water, is a dominant spatial element.
Policy and Legislative frameworks	• Green structure plan • Landscape policy plan • Regional ecological model
Connectivity corridors and mobility	Urban axes is a dominant feature in the urban structure. This is mainly focussed on infrastructure corridors and transport corridors for public transport modes. These corridors integrate the urban and rural areas.
Regional integration	Development of the urban structure is stimulated by regional corridors that exist and integrate the region. Breda has a spatial-economic location within the region
Nature of the urban edge	Green structures are present in Breda and these structures help to contain the urban growth within the urban edge area. A development boundary was determined for Breda, and as development pressure increases, this boundary is moved outwards, with reference to the green structures that determines the form. This must also incorporate development pressure of the Vinex locations.
Principles related to the urban edge	• Red-green contours are developed • Definite green structures are present
Management	Nodal development ensure effective management of the area, because this ensure isolated urban environments, that are integrated via green structures.
Successes	• Greening the city • Upgrading the quality of the environment • Identifying of nodal development points • Development corridors that integrate the region
Failures	Traffic congestion because of the spatial-economic position of Breda in the region.
Spatial planning conclusions	Nature is a form giving element of the spatial structure in the urban environment. The urban environment is defined by nodal points of development that is connected via development and transport corridors.
Recommendations	Greening the city is a tool that will help to contain urban sprawl. By identifying development nodes, it is also possible to identify open areas for green structures. This will lead to a effective urban structure that is sustainable.

Source: Own creation (2005)

B: Case study – Utrecht

1 Overview:

Utrecht is a river city. Like many Dutch towns, the inner city is surrounded by water and old fortifications. In the nineteenth century these were transformed into a narrow park and walkway, called the Singel, which is now an important element in the urban green structure. (Provincie Utrecht, 1993:1).

The city has grown in a concentric way. Given its central position in the country, Utrecht has become an important road and railway junction. The green planners and many residents suffered a traumatic experience when, in the early 1980s and after a battle of more than ten years, a new motorway was built to the east of the city. Here, indeed, urban development was the enemy of nature. Urban green structure is a new concept that points at the way urban green areas connect to each other and to the urban structure as a whole. The ecological viewpoint is the basis of this case study on Utrecht. The ecological viewpoint is rather process-oriented than object-oriented (Tjallingii, 2000:2).



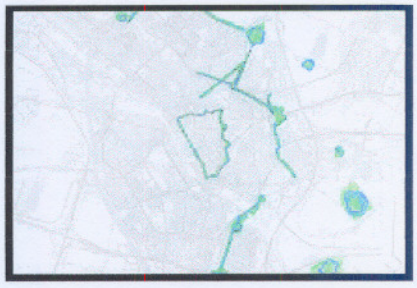
Figure 10. Landscapes of the Utrecht region.
Source: Gemeente Utrecht. (2000:4).

Figure 10 shows the rivers, running from east to west. The brown coloured areas to the east are woodlands. To the north, a landscape of lakes is visible. All the white areas around the city are meadows. The traffic network is in black and the water network in blue. The map further shows the red 3-kilometre distance line and the circle, which indicates the 10-kilometre distance from the built-up area.

2 Dominant Features of Planning in Utrecht:

The green structure of defense works:

The second process that has structured green areas in Utrecht is the history of defense works that have been transformed into parks. Today, the Utrecht citizens speak about the Singels, referring to the walks along the water, surrounding the inner city. Old fortresses and bulwarks are the carriers of green structure around the inner city and in the eastern part of the city.



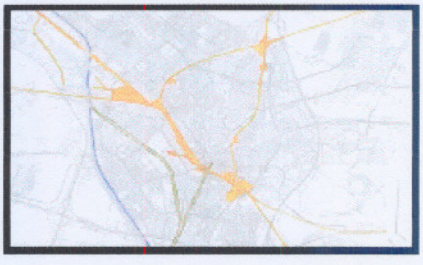
The green structure of streams:

The first and most basic process that structures green areas in the city is the meandering of rivers. Parks accompany the rivers in the outer parts of the city and in the inner city trees line up along the waterways and turn them into greenways. River branches shape the urban green structure and link the inner city green areas to the surrounding countryside.



The green structure of transport networks:

The construction of waterways, railways and motorways has had a major impact on green areas in the Utrecht area. Waterways and railways add new green ways to the existing green structure. (Bruijn and Wassink, 1988:32).



The green structure of public parks:

The next step in the history of urban green areas was the design of new parks as a part of new residential developments. The city has grown in a concentric way. Together, the public parks create a structure of spots rather than a network.

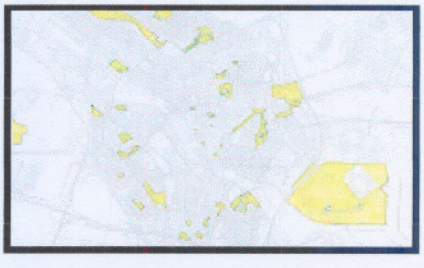


Figure 11: Dominant features of planning in Utrecht
Source: Gemeente Utrecht (1995:24)

Spatial planning in the urban environment is determined by defense works (the historical and monumental areas), the streams (natural environment), transport networks (connection corridors) and the public parks (recreational areas).

Green Structure Planning:

The GSP is a strategic plan based on a consensus on the main policy direction. The strategic plan aims to structure and guide the development of operational plans for concrete physical interventions in the urban landscape. Several issues contributed to the emergence of this structural approach to green area planning, each leading to hypotheses about the role of green structure planning as a tool. (Gemeente Utrecht, 1997:10).

- Tool for defense or integration.
- Ecological networks, traffic and water.
- The links between the strategic GSP and operational projects.

The analysis of green structure planning in Utrecht is based partly on a more recent case study carried out as part of the GREENSCOM project, an EU Fifth Framework research project.

The Utrecht case illustrates the shift in attention from individual green areas to green networks that serves as an Urban Edge. It is interesting to compare the Utrecht case with Breda, a city where green structure planning has played an important role since the early 1980s. The Breda story illustrates a strategic planning approach that started with the GSP and succeeded in giving a prominent role to green areas in an integrated approach to planning urban projects (Verburg et al.,1994; Tjallingii, 1995: 125).

In the Utrecht situation both the Leidsche Rijn development and the Singel project confirm the potential value of the GSP as a tool for integration.

This shows that a Green Structure Planning can act as a tool for strengthening the role of green areas in urban planning. However, it seems as if the tool performs best if it is not used in a narrow, defensive way, but in a more open process to facilitate cooperation and integration between green and red. (Gemeente Utrecht, 1990:52).

Figure 12 shows green structures as different layers represented in the figures are brought together in one map with planning information. Dotted lines indicate planned greenways.



Figure 12: The 1990 Utrecht Green Structure Plan.
Source: Gemeente Utrecht (1990:44).

The Utrecht case confirms that the Green Structure Planning tool has the potential to bring nature back into the heart of the city. Although the hypothesis on joint strategies for green structure and water planning is not supported by the experience of the past decade, it seems that the Utrecht planners were just late in discovering the potential of combined green and water strategies. Other Dutch cities, for example Breda and Drachten (Tjallingii, 1996:114, 256), had taken the lead, but after the successful Leidsche Rijn planning experience Utrecht joined the pioneers in this field. The Utrecht case study shows that the 1990 GSP can indeed be seen as a step towards a coherent view of the connections between green areas. It took a second round of green structure planning to establish a clear link between this perspective and a programme for project implementation.

The Policy Framework for Urban Nature that resulted from this second round became more sectoral, with a narrow ecological orientation. It gained strength but lost the wider perspective. Again, the comparison with the Breda case is illuminating. In the Breda case, green structure planning became an instrument for the emancipation of the green sector and gradually led to the creation of a fruitful climate of cooperation. A broad team of committed politicians and officials from different departments realized a wide range of integrated projects for sustainable urban development. These projects combine water and traffic issues with new habitats for wildlife and other aspects. In 2002, for the third time in three years, Breda won the sustainable city award, a competition between 300 Dutch municipalities. This demonstrates the city's structural commitment to the issues that were put on the agenda by the Green Structure Plan and other strategic documents almost twenty years ago.

3 The Urban Edge concept in Utrecht:

In the first referendum in Utrecht on 15 May 2002, the population opted for Vision A - Spacious City Centre: a beautiful, attractive and vital Station Area in two zones. Utrecht has to become clean, whole, accessible and safe again for everyone. In the summer of 2003 a Master Plan was presented, an elaboration of the selected vision with its two zones: the Centre Boulevard and the City Corridor. The Master Plan provides an answer to the question: what comes where? And this will directly impact on the Urban Edge concept. The centre of Utrecht is actually also the centre of the Netherlands. That is why the Dutch government has designated the station area as one of the New Key Projects. The station area is a project of national interest. This will stimulate the regional development and cross the urban edge that exists. (Gemeente Utrecht, 1995).

The urban edge concept is influenced by the various development initiatives within the urban core area. The demand within the urban area determines the need for development and future expansion, and therefore also the urban edge. Transport and infrastructure are dominant planning tools of the urban edge concept, because accessibility and integration is determined hereby. Regional axis is formed via infrastructure. The city can set its borders and urban edge, but transport will not be as fully subject to this edge, as other elements may be. As the need for expansion grows, the urban edge will move. But space in Netherlands is scares, and therefore this expansions should accommodate the modern planning needs – sustainability, efficiency, effectiveness, integration, accessibility and economic upliftment.



Figure 13: The vision Map.
Source: Gemeente Utrecht (2000)

Figure 13 illustrates the Vision Map. This map illustrates the two main routes from East to West. This development corridors will impact on the urban edge. Together with other modern planning questions, the development pressure is increasing in Utrecht, and therefore the urban edge will expand, as seen in Figure 14.

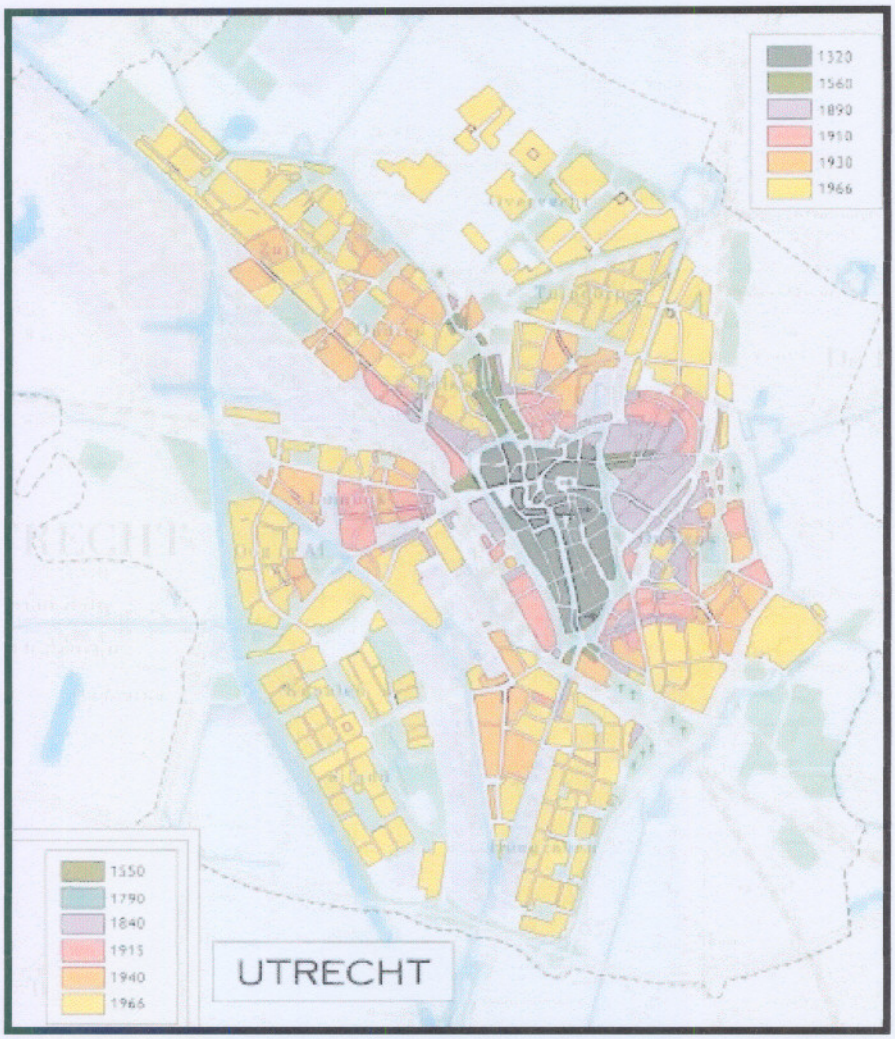


Figure 14: The urban edge and how it moved over the years.
Source: Gemeente Utrecht (2000:19).

4 Conclusion:

Table 4: Matrix of the Utrecht case study.

Spatial Issues	Utrecht
Spatial reality	The centre of Utrecht is also the centre of the Netherlands. Therefore this area is seen as a core development node. This area grew in a concentric way.
Policy and Legislative frameworks	• Master Plan • Vision Map • Green Structure Plan
Connectivity corridors and mobility	The location of Utrecht presents this area with various development corridors to other core nodes in the Netherlands. The new station in Utrecht will enhace mobility and connectivity corridors, and improve the regional accessibility.
Regional integration	Regional axes is developed in the form of infrastucture corridors. Utrecht is located in the centre of the Netherlands, and therefore regional integration is of great importance for Utrecht, but also for upliftment of the whole area.
Nature of the urban edge	Green structure planning stimulates the co-orporation between the red and green contours. Individual green areas are replaced with green networks, and this forms the basis of the urban edge structure in Utrecht
Principles related to the urban edge	• Place nature back into the core urban areas • Determined by defence works, streams, transport corridors and parks • Integration of urban and rural areas
Management	The Green structure planning set the framework for the management of the green structures and urban edge.
Successes	• Co-orporation between red and green contours • Development of green networks • Integration of urban and rural areas • Placing nature back into the core urban area • Developing a spacious city centre
Failures	Regional axis is not bound to the urban edge and green structure planning principles. Regional integration does not help with containing the urban area.
Spatial planning conclusions	Green structure planning integrates all spheres that are present in the urban core, with the focus on open areas that forms a network and thereby limiting urban expansion and sprawl.
Recommendations	The green structure planning place nature back into the core urban areas. Individual green areas must be linked in a green network to be more efficient.

Source: Own creation (2005)

C: Case study – Uden

1 Overview:

After the World War 2, there were too many people in Uden, and no work opportunities. The government started to built large industries, in order to attract businesses. The businesses would provide work for the citizens and stimulate the local economy. This was the case, and this was the start of the new town Uden. A large shopping street was built. This was to attract residents, but also visitors to the city center. The more feet that Uden could attract – the better for the future of this town.

Since 1100 Uden developed from a small hamlet and a small church. Then a small core area developed around the church. Since 1945 Uden has developed from a simple agricultural town into a thriving industry municipality. (Jooste, 2005 [Personal interview: Uden)

The central government supported this development with financial facilities. The municipality wanted to gain more industrial developments and therefore provided the infrastructure therefore. The other core point of Uden, one that influenced all development, is the railway to Germany. At first this was also used to attract large businesses, that utilized it as a transport method for good and materials, but later on it only had agrological value for Uden.

In terms of traffic, Uden was developed to have no through fare of traffic. The "Rondweg" was developed to insure that traffic would flow around Uden, and not through it. The last, but one of the most important features of the area, is the "breukvlak" – fault.

There is a fault in the ground, one that divides the area in a higher and lower part. This is due to movement in the earth's crust. This has many implications not only in Uden, but also in the region as a whole. (Figure 15).

Uden is situated on the higher layer. This brings various complications to development. Water accumulates on this layer and development is influenced by this. Certain areas are left dry, while other are always wet, because of water flowing in certain directions. The focus is, however, to try and keep everything as natural as possible. Thus, they try to accommodate the fault and to develop around it. (Gemeenteraad Uden, 2001:8).

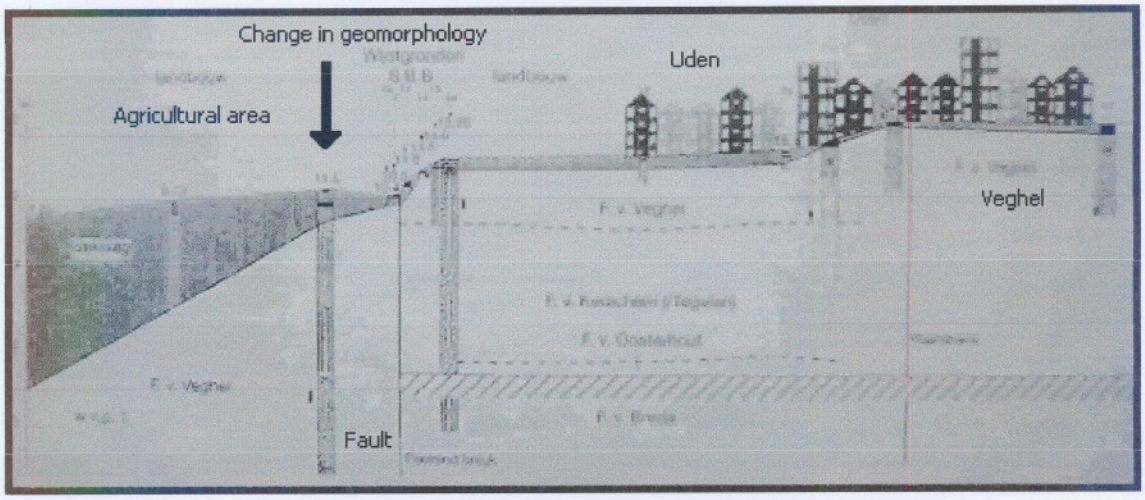


Figure 15: Uden Ground Layer

Source: Gemeenteraad Uden (2001:10)

Characteristics of the area:

Table 5: Characteristics of Uden

	Rural area:	Urban area:
Strength:	Variety and beauty Various small towns with there own character Organized Information available for development	Space to develop Green residential areas Big shopping centre Quality Variety
Weakness:	All of the area is becoming the same Urbanization Agriculture is drying out the ground Disintegrated	No variety in residential area Public transport options
Opportunity:	Combination of nature, agriculture and recreation Restructuring of agriculture	Growth management Identity and character of area strengthened Efficient use of land
Threads:	Urbanization	As town grow there need to be more access to outside area Quality

Source: Own creation (2005)

The quality of Uden is to combine the residential and green area. Uden developed into an industrial core area. In between the residential areas, there is a green structure in place.

Today it also has a core function in the region. Infrastructure is one of the most important issues when addressing access and integration of the functions of an area. (Jooste, 2005 [Personal interview]). Figure 16 illustrates the expansion of Uden and Figure 17 illustrates the current spatial pattern. The impact of infrastructure can be seen on these maps.

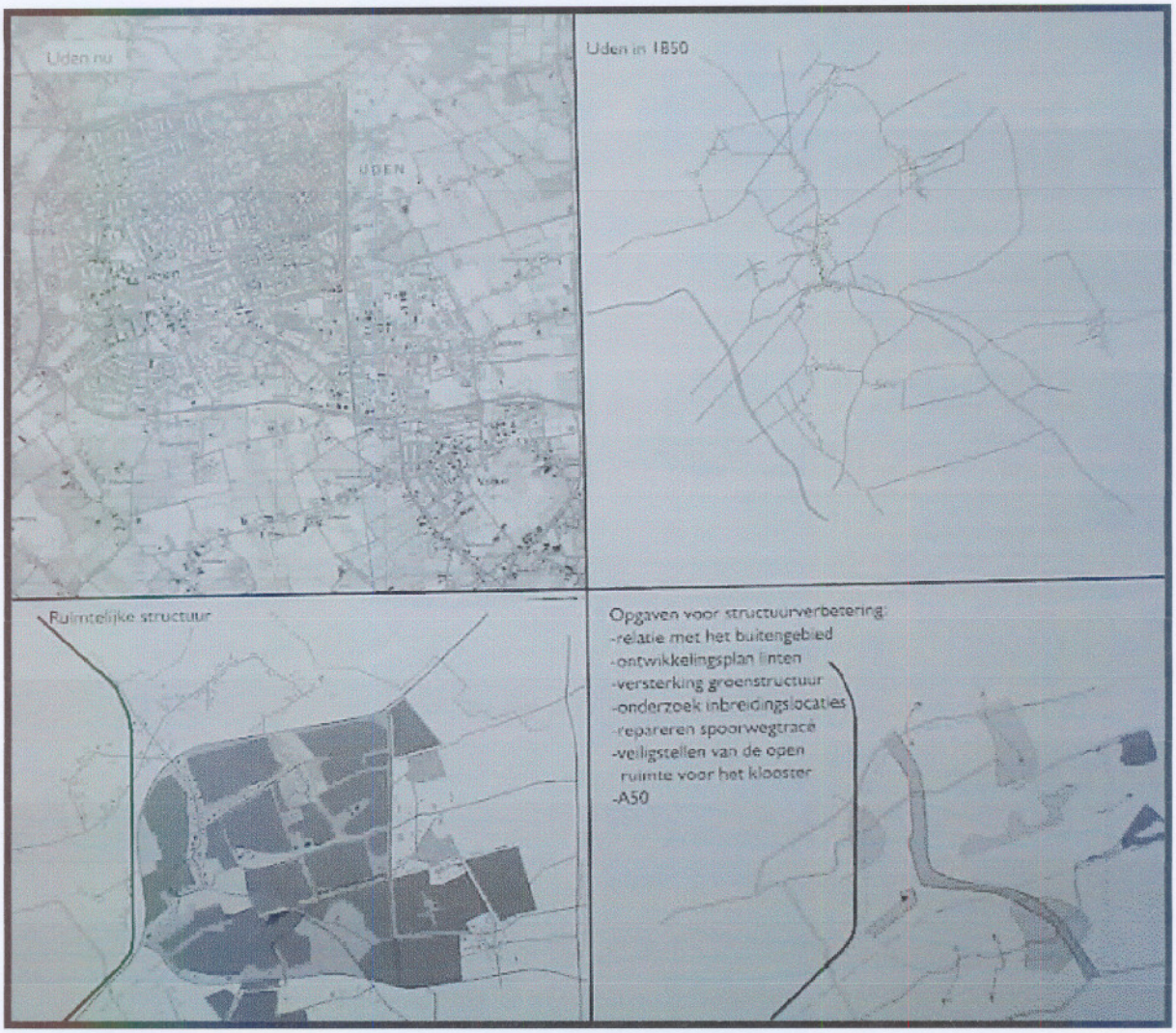


Figure 16: Expansion of Uden

Source: Gemeenteraad Uden (2001:38)



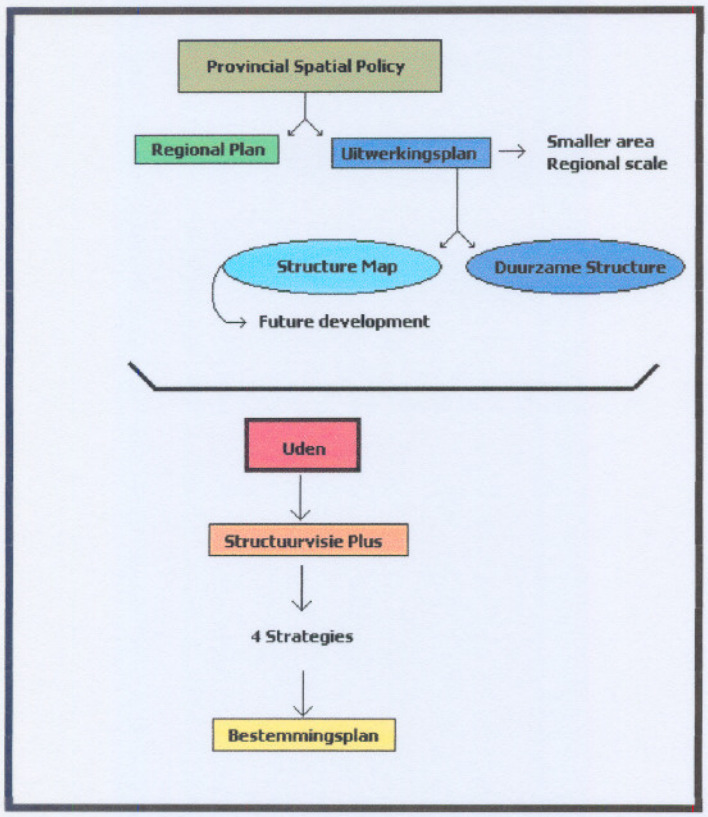
Figure 17: Current Spatial Structure

Source: Gemeenteraad Uden (2001:4)

2 Dominant features of Planning in Uden:

Table 6 illustrates the structure of the dominant planning features in Uden.

Table 6: Development structures in Uden



Source: Own creation (2005)

The Provincial Spatial Policy is delineated from the Regional Plan and the Action Plan. The action plan is delineated from a Structure map, illustrating the current realities in the area, and the Spatial structure of the area. This forms the basic ground for any spatial development in Uden. Therefore the municipality of Uden formulated their own spatial planning framework. This framework take all the regional requirements and principles, and implement it on the local spatial reality of Uden. This is known as the "Structuurvisie Plus" document. Uden authorities developed another document with even more spatial detail. This is known as the "Bestemmingsplan" – a Action Plan, a framework for future development and planning intiatives. Following is a summary of the most important features of these development plans. Figure 18 illustrates the regional integration and interaction. Uden is situated within three core urban nodes, Den Bosch, Nijmegen and Eindhoven. These nodes also had a impact on the spatial development and growth of Uden. This is because of the centripetal and centrifugal forces that exist. A smaller urban node, Veghel, is located close to Uden. In a regional perspective these two urban nodes can function as one.

1 Regional plan:

The Regional Plan is set up to give direction of future growth and development within the Urban and Rural areas of Uden and Veghel.

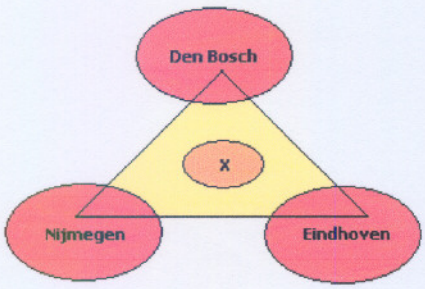


Figure 18: The regional integration
Source: Own creation (2005)

The Regional Plan focus on the bigger environment and development area and how it will impact on the surrounding areas.

2 Action Plan:

The Action Plan was finalized in December 2004. This is a structure plan for a smaller area. It is made up of two aspects.

(1) A structure map that shows the future development potential, also in accordance to the (2) Spatial structure plan. (Development and planning approach).

This plan is a spatial plan on the regional scale level. It forms a framework for all spatial developments and is part of the provincial framework that is judged by the initiatives of municipalities. (Gemeenteraad Uden, 2001: 16)

The plan shows the desired spatial developments and initiatives for the realization thereof. Living and working areas are distinguished here, also the order and tempo of all development. This can be judged on the basis of the plan card. The regional Planning has used space as a principal purpose. It goes about with the spatial policy that will balance the economic, the ecological and the social-cultural issues of Brabant.

Five leading principles are formulated for the provincial spatial policy:

- More attention on bottom layers (water and ground): Geomorphology and water systems are the core elements.It is used in the most natural way, to optimize the green structure.
- Economical space use: Space for housing and businesses should not only be in new developments, but also in restructuring and redeveloping this inner part of the city.
- Concentration of urbanization: Specific areas is selected, and it is preferred that all new developments should be in this areas.
- Zoning of the outer parts: Reconstruction and development plans are drawn up.
- Urban edges and transition: Take note of surrounding environment and nearby towns.

A Spatial Structure Plan (Development and planning approach):

This policy is based on the spatial structure of the region within the edge. (Figure 19). A Regional plan is formulated, illustrating the topography and current land use in the area. (Figure 20).

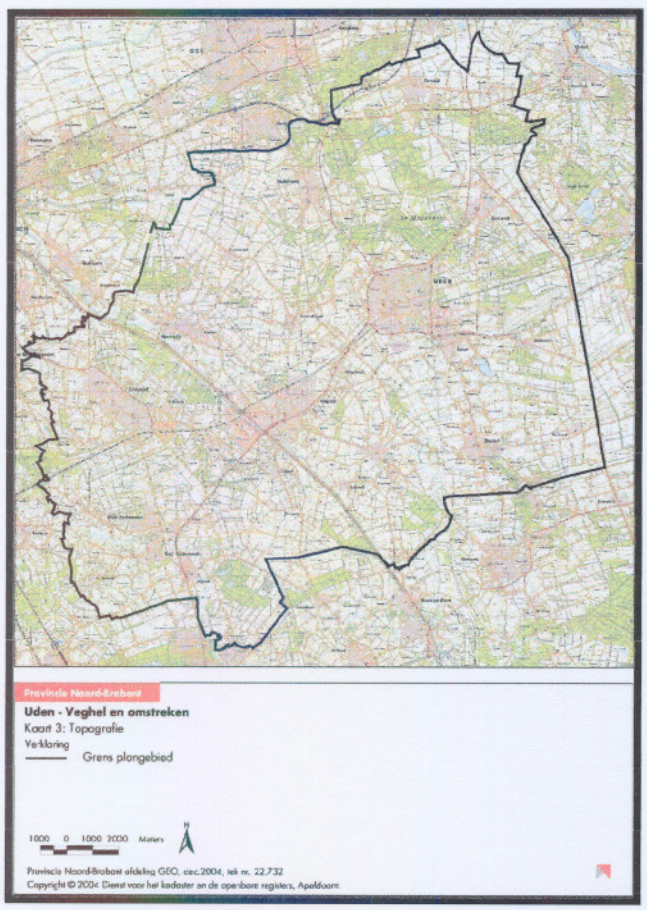


Figure 19: Urban Edge of Uden

Source: Gemeenteraad Uden (2001:18).

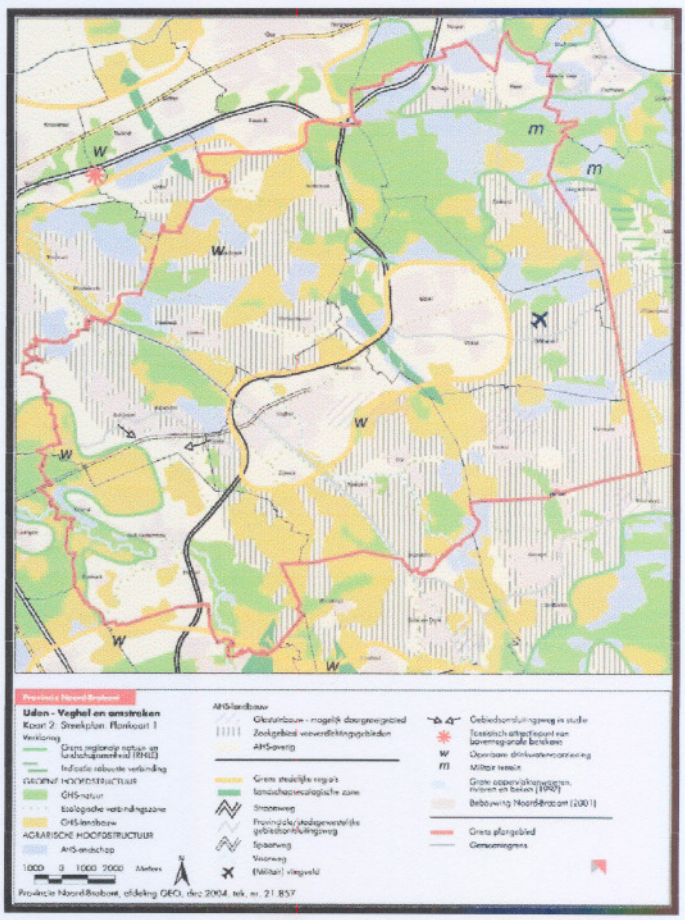


Figure 20: Land use in Uden

Source: Gemeenteraad Uden (2001:6)

This is the spatial structure of the whole region. There are certain issues that are integrated here. Water, cultural issues, environmental, traffic issues, etc. There is still space left for future development. Thus, this is no final plan, but a structure that can be used for optimal development.

The aim is to integrate the urban area and the green structures. Development is allowed only when it can be proven that there is no other space to develop, and that the development will be of great economic benefit to the area. There are also ecological zones integrated. Thus, the region in a whole should be studied, before new development plans is drawn up. This should be beneficial for the longer term and future. One of the important layers is the water. This has a major impact on development in certain areas. Thus, the regional water issues should be known, before any development plans are drawn up. (Jooste, 2005 [Personal Interview: Uden]).

A character of this area is the green open spaces. This is determined by the Provincial nature policy (Figure 21) and the Geomorfology in the area. (Figure 22).

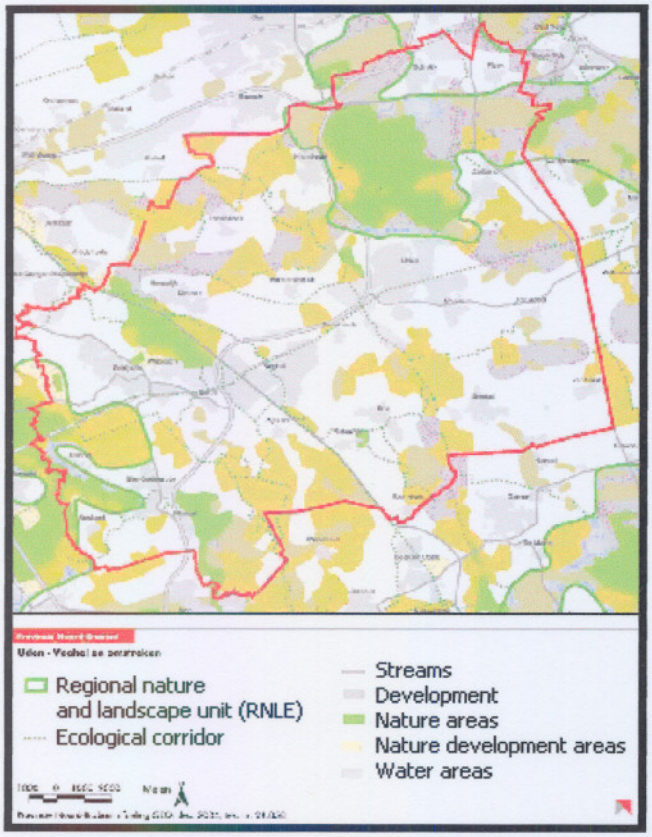


Figure 21: Provincial Nature Policy.
Source: Gemeenteraad Uden (2001:24)

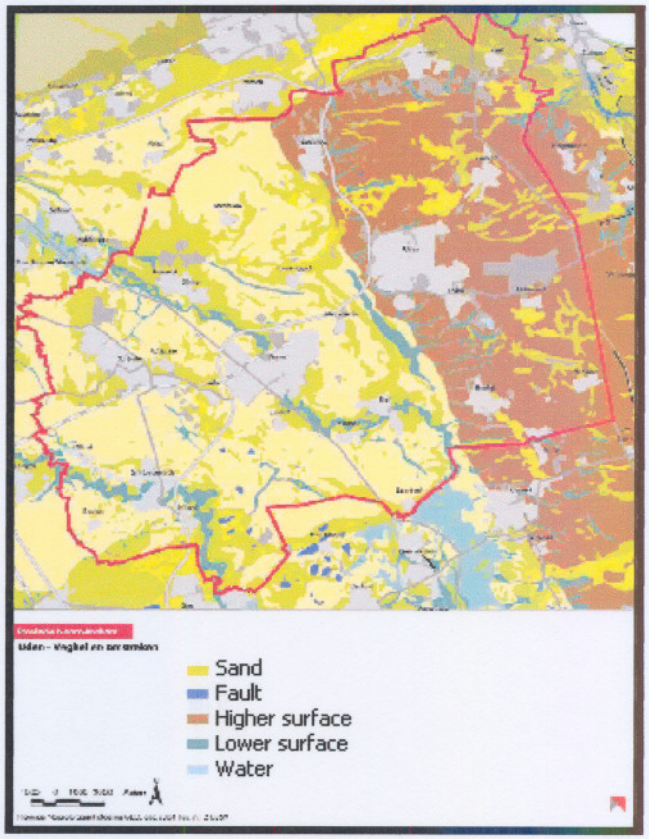


Figure 22: Geomorphology
Source: Gemeenteraad Uden (2001:30)

B Structure Map

This map is on regional scale and show the morphology of the region, including the ground and water structures in the area. This map also illustrates the spatial structure and the areas where development is not allowed. This is mostly used for feature development.

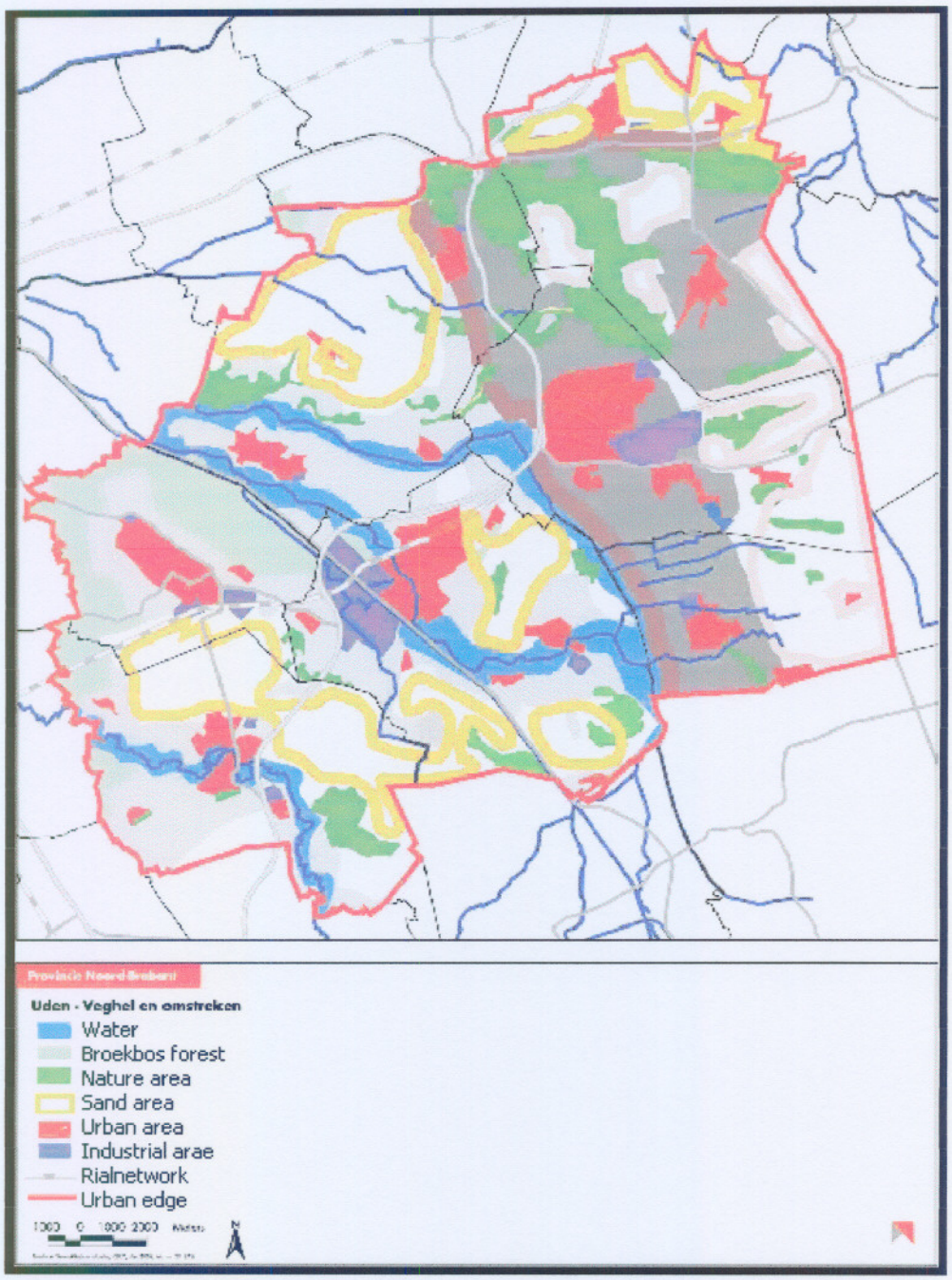


Figure 23: Spatial Structure of the Region

Source: Gemeenteraad Uden (2001:34)

Enhancement of the urban character in Uden and Veghel, this is the aim. Dynamic urban structure is a core element of the city character. This is to integrate the old buildings, with the new structures that are built today.

The urban feature of this area is also improved by the A50, the highway, which run across this area and set accessibility options for various industries and people. Therefore it is also used to enhance the core urban elements.

Once the Spatial Structure (Figure 24) is developed, the final spatial development map will follow.

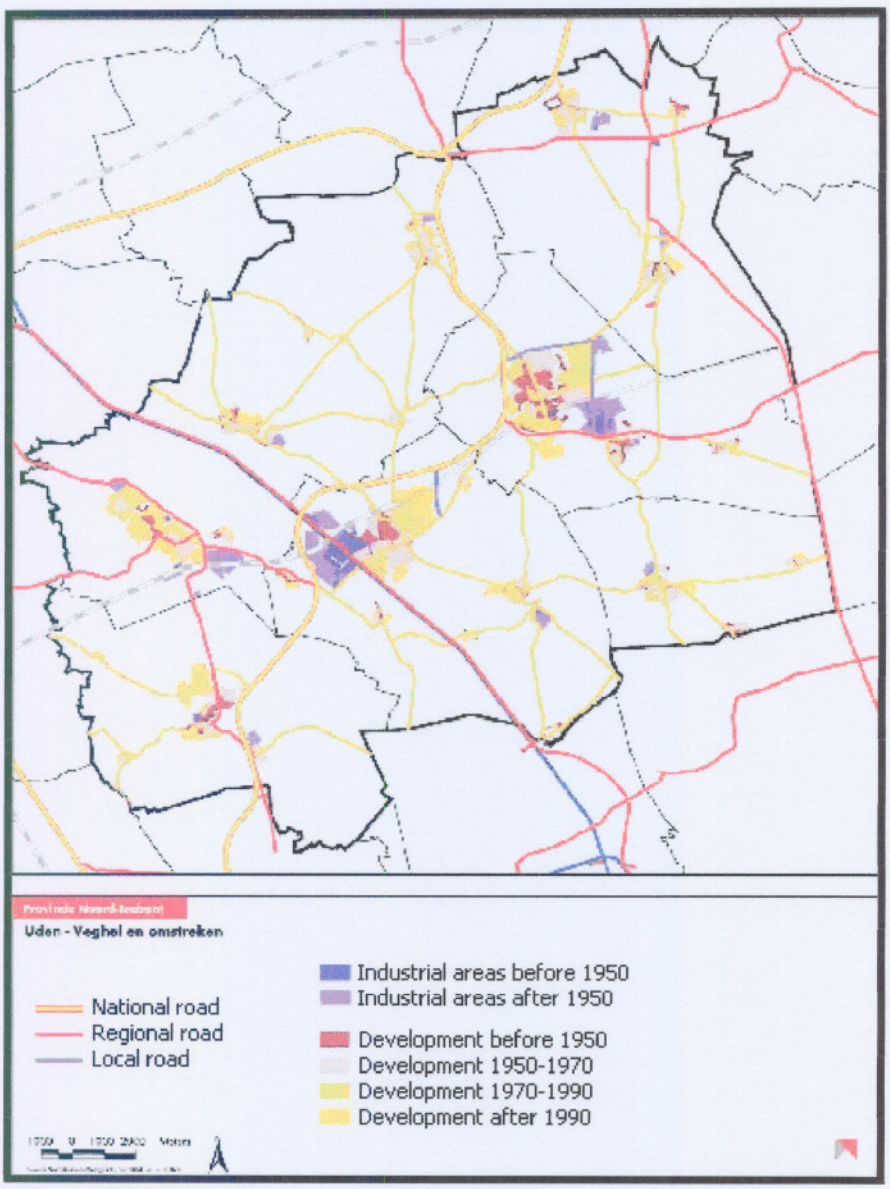


Figure 24: Spatial Structure.

Source: Gemeenteraad Uden (2001:38).

Uden detail development plan:

This plan illustrates the priorities of the government in terms of development and future expansion. It takes these priorities and implement it on a local level that can be developed in the Uden area. The vision illustrates how and where this will be established. Thus, the optimal location for the implementation of these priorities and principles.

In this document the qualities of living, working, infrastructure, agriculture, nature, water and historic monuments were integrated. This will ensure sustainable future development of the Uden area. A quality environment requires a detail development plan, like the spatial structure plan that the local Uden authorities developed.

Future development and possibilities for Uden and Veghel are illustrated in this plan. It was evaluaed in four different spatial strategies. (Uden, 2001:6)

- A yellow strategy that illustrates agricultural uses
- A blue strategy that illustrates the water issues
- A green strategy that illustrates nature and environmental issues
- A red strategy that illustrates residential, infrastructure and working areas

- Yellow strategy: Agriculture

This defines the agricultural aspects. The aim is to ensure the sustainability of current qualities and the development thereof. Ecological quality is important for future development. Space is limited, and therefore optimal development is of great importance.

There should only be expansion if there is no other option, or if there is a really big need for it. The vision is that 50% of all new development should be within the existing urban area (infilling) and that only 50% should be new extensions and expansions. (Gemeenteraad Uden, 2001:8).

Yellow strategy implementation:

- Future perspective develop
- Social-economic development must be enhanced.

- Blue strategy: Water

The important agricultural and ecological qualities are linked to the water system. The focus is to let the water stay in its most natural state as figure 25 illustrates, and not to redirect the flow of water. Blue strategy implementation:

- Sustain water quality
- Keep in natural state

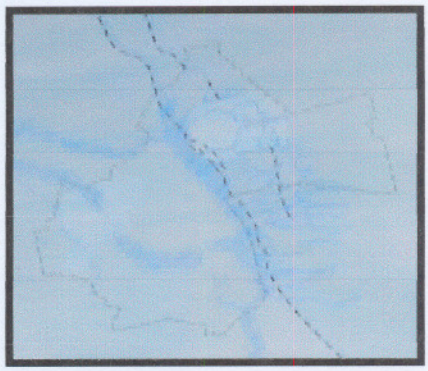


Figure 25: Blue strategy
Source: Gemeenteraad Uden (2001:8)

- Green strategy: Nature and environmental issues

This is to stimulate the development of the agricultural and ecological systems. It is determined by the Ecological Hoofdstructuur (EHS) and Groene Hoofdstructuur(GHS). Green strategy implementation:

- Ecological linkages to the agricultural areas (See figure 26).
- Recreation strategy implement
- Outside area more accessible



Figure 26: Green strategy
Source: Gemeenteraad Uden (2001:8)

- Red strategy: Residential, infrastructure and working areas

This illustrates the future urban development. Thus, the projected future development, and not the preferred expansion. Red strategy implementation:

- Differentiation of residential areas
- Quality ensure through minimizing through fare traffic
- Integration of residential and business area (See figure 27).

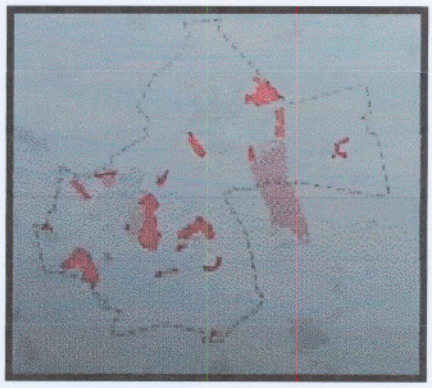


Figure 27: Red strategy
Source: Gemeenteraad Uden (2001:8)

In the Netherlands space is limited. Therefore development must be optimal, sustainable and efficient. Quality is more important than quantity and this also implies to Uden.

The "Structuurvisie Plus" is an intercommunity structure and vision. This is a stepping stone for the Provincial Regional Plan. This is the basis of the implementation of the strategies in Uden and Veghel. Thus, this plan describes Uden and Veghel in the different layers.

The different layers were brought together with the vision for 2020. Afterwards it was given to the Province for approval, and then the 2004 plan followed. (Structuurvisie plus, 2001:28).

3 The Urban Edge Concept in Uden:

The Urban Edge of Uden was actually set even before there were development. This is because of special features that occurred in the area. The fault forms a natural edge. The railway that was used in the earlier days is now a hard urban edge and monumental point of Uden. The residential area was bounded on the one side by the industrial developments. Later, with the development of the A50, Uden was bounded all over. Now there can still be development, but this is restricted to the space left in between these boundaries.

The basis of all the development is the landscape – the form and the composition of the ground and water. Uden is seen as an integration of Urban and Rural areas. Future development will be in the south of Uden, and between the east of the industrial area and the north of the railway.

In the Regional Plan of 2002 a concept, "zuinige ruimtegebruik" was defined as the total use of space in accordance to the economic growth. Space in Netherlands is limited, and therefore development must be optimal to the environment, the people and the future development projects. This concept is divided into 3 parts: "Inbreiding", "herstructureren" and "intensificatie". All developments are, apart of the issues mentioned in the spatial plans, also subject to this concept.

In the year 2000, the municipality of Uden, together with the municipality Veghel, has made a start for the setting up of a new zoning plan for the new "*Bestemmingsplan*" of both municipalities. The present zoning plan for the municipality Uden dates from 1984 with a change in 1994.

Vision of the urban edge concept:

- Strengthening of the activity and service, via expansion and revitalizing.
- Improvement of the design and radiation of the Udense (store) center.
- Improvement of road safety.
- Expansion of the parking areas in the core area.
- Improvement and strengthening of the green character.

The council will set up a document for the improvement of the quality of the area. This will include the expansion options and the qualities of the core urban areas. (Gemeenteraad Uden, 2001:14)

- Strengthening of the rural character and outside territory – by indicating the development possibilities for the agriculture in the area, with regards to the reconstruction plan and zoning plan.
- Strengthen of the rural character of the outside area through the repairing and development of woods, nature and landscape in conformity with the "bosbeleidsplan" and landscapes policy plan
- Strengthening of the rural character of the outside territory through the developing of recreation and tourism.
- Strengthening of the infrastructure for health care by the establishment of a regional hospital in Uden-Veghel

Thus: all new development in this area is subjected to:

1. The fault
2. Topography
3. Historical structure
4. Railway
5. Provincial vision
6. Current residential areas

This elements also determine the spatial development of the urban edge concept in Uden. As development pressure increase, the urban edge will be re-evaluated, but always in relation tot he above mentioned principles. (See Uden Map figure 29).



Figure 28: Uden

Source: Gemeenteraad Uden (2001:18)



Figure 29: Uden Map

Source: Gemeenteraad Uden (2001:9).

4 Conclusion:

Uden is a small town, but certainly an example for all future town planning developments in terms of quality, organizing and efficiency. The spatial structure is developed in relation to the planning and development approach. Detail development plans form the basis of all development initiatives in the area. The area is known for its compaction and efficiency within the region, and this is because of controlled development measures and implementation of green structures in the urban environment.

Uden's first priority, when aiming at future development, is the ground and environment structures. This forms the basis of all the projected developments. The focus is to enhance these features, to keep it sustainable and efficient for the years to come.

Like other cities in the Netherlands, Uden also integrate the Urban areas and the green structures. This is to optimize the quality of living conditions of all the residents, and thus an important issue.

The city is development within its own character. All future development must apply to this specific Uden character and ensure that the existing quality will remain and be sustainable.

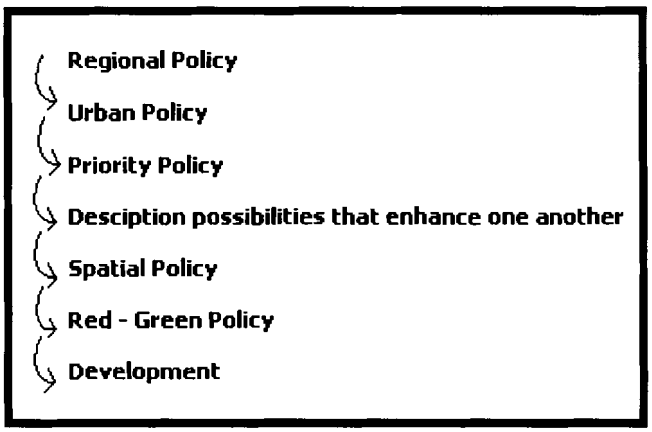


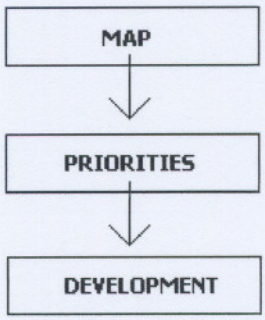
Figure 30: The different policies that is implemented within the Uden area
Source: Own creation (2005)

All the development and planning issues are answered by this procedure. The Regional Policy ensures that the whole region is developed as a unit, sustainable and accessible. The Urban Policy describes the urban needs and future plans, regulations and initiatives. The Priority Policy is the policy of Government that stipulates the different priorities for the area. These possibilities must enhance one another. All of the above form part of the spatial policy, which also integrates the red-green policy of Uden and which leads to optimal, efficient future development.

Again the focus is on quality.

The bottom layers determine the type of development which will occur. Thus, water and ground forms the basis of the development hypothesis. This is also linked to the green structures, and then, seen as a unity, the optimal development initiative will be chosen.

Concentration of the urban area is also important. This is parallel to the zoning of the outer parts of the urban area. If the outer parts (the urban edge) are zoned correctly, this will ensure compactness of the city and urban areas.



A structure map is developed and then certain priorities are set. If these priorities adhere to the regulations of the environment and the bottom layers – then only will development planning be started.

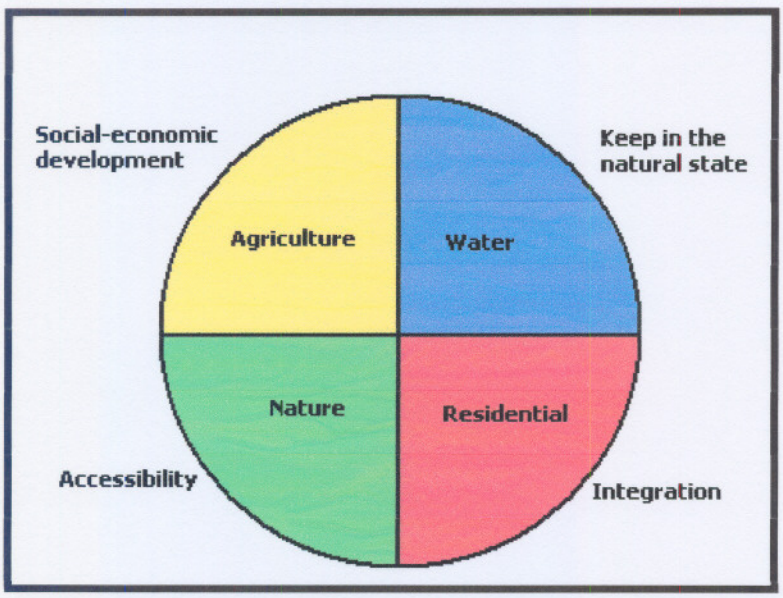


Figure 31: The Development Spheres
Source: Own creation (2005)

This is the development spheres. Agriculture is developed in this area specifically to enhance the social-economic issues. The aim is to keep the water sphere in its natural state, to influence the water features in the area in the smallest way. The nature sphere is also used to optimize the accessibility. The residential sphere must be integrated into these spheres, because this will ensure the quality of the living conditions of the residents.
In summary – the urban edge is determined through nature and environmental issues in the area.

Table 7: Matrix of the Uden case study

Spatial Issues	Uden
Spatial reality	The boundaries of Uden was set even before a urban edge was developed. This is due to the railway and roadnetworks. The fault in Uden is a spatial determining factor for the urban development structure.
Policy and Legislative frameworks	• Provincial Spatial policy • Regional Plan • Structure Map • Action Plan
Connectivity corridors and mobility	The railway and roadnetworks existed even before Uden was a structured city, therefore connectivity and mobility corridors shaped the urban environment.
Regional integration	Uden is situated in a pentagon between Eindhoven, Nijmegen and Den Bosch. Regional integration with this areas are of great importance for the economic development of Uden.
Nature of the urban edge	The urban edge of Uden is naturally formed by the railway on the one side, the A50 freeway on the other side, and the industrial park. The area is contained and urban sprawl is limited.
Principles related to the urban edge	• Topography determines the development potential • Land uses evolves within the edge • Open areas contain the urban environment • Enhancement of the areas with great nature value
Management	Detail development plans integrate the regional principles and objectives and implement it on the current urban structure. All new development must adhere to these measure.
Successes	• Limiting urban sprawl • Co-ordinating the urban edge with natural edges in the area • Effecient use of land – intensive development • Integrating agricultural, water, nature and residential aspects
Failures	Green structures are less important, because the urban edge is determined by other factors as the green open areas.
Spatial planning conclusions	The natural environment determines the future development initiatives. If new development is according to the prescribed land uses, it will be allowed. Altough the urban edge is determined by the transport corridors, the natural environment is still of great importance to ensure quality in the area.
Recommendations	Sustainable development is possible if the natural environment is co-ordinated with the proposed spatial planning and development. Focus should be placed on the land uses and natural edges that exist. Natural edges ensure sustainable compact cities.

Source: Own creation (2005)

Chapter 5

Belgium

1 National Level:

Urban Nature for People – this is the vision on future perspectives in Flanders. To define the kind of nature Belgium want by 2030, they are using scenarios to describe possible futures and focusing on the interrelationship between city and nature.



Figure 1: Flanders Region
Source: Google Pictures (2005 [Web:] www.hostels-europe.com/info-countries)

In order to give an answer to the spatial problems, the Flemish government has decided to carry out a spatial policy based on structure planning. In short, structure-planning stands for action oriented, dynamic and coherent spatial policy. The spatial policy is based on an integral and inclusive approach by trying to balance the needs of the different sectors.

The 1996 Planning Decree (updated in the 1999 Planning Decree) introduces a three-tier system granting planning competences to the regional, provincial and municipal level, based on the principle of subsidiary: the plans drawn up by a lower governmental level have to be in accordance with those of a higher governmental level. Each governmental level uses two kinds of plans: the spatial structure plan and spatial implementation plan.

Although a spatial structure plan has a binding part, it is no destination plan. A spatial implementation plan is drawn up in order to implement the spatial structure plans. The structure plan might contain a direct task to proceed with respect to a certain area or subject. More generally, however, a spatial implementation plan has to be at least in accordance with the spatial structure plan and its principles. The Spatial Structure Plan for Flanders is implemented by spatial implementation plans. One of the instruments used in these implementation plans is the process of delineation for urban areas. (Administratie Planning en Statestiek, 2000:11).

In the delineation process a precise area is selected by involving all actors in which a consistent urban policy, including a variety of urban activities, is applicable.

In such area urban growth, concentration and infill is to be realized. This will be done with a common vision and spatial concepts for the urban area supporting a sustainable spatial development for the urban area itself as well as for its surrounding open areas. The process results in a broad range of actions in the urban area (housing, industrial zones, mobility, city-forests, parks) that will be included in a Spatial Implementation Plan specifying the destination, organization and management for the different action-areas and the way the implementation can take place. Environmental, social, economic and other considerations are thus taken into account and different measures are taken to ensure a good and sustainable balance between them.

1 Dealing with complexity:

The complexity of cities, the interrelationships of aspects of livability and the multiple links with urban greening require: integrated approaches and local level approaches. In this context the complexity of planning and decision making with respect to urban greening needs to be emphasized.

2 Contrasting definitions of "nature":

In two surveys, one on the Dutch population (Buijs and Volker, 1997:32) and another on the Flemish population (Mens en Ruimte, 1999:18), respondents were given a list of more than 30 types of nature and were asked to what extent they found this "real nature", "little nature" or "no nature". It was discovered that the Dutch, as well as the Flemish population, have a wide image of nature. In contrast with the people's image of nature, the definitions used in Flemish policy have a much narrower sense. As a consequence there is a legislative, political and institutional fragmentation with respect to nature. The weakness of this fragmentation is apparent in the Spatial Structure Plan of Flanders.

3 The importance of nature:

In Antwerp the population has declined by 4.5% within the urban core and 2.4% within the whole study area (the urban core and metropolitan peripheries). Within the statistic sectors' neighboring green areas, the population has increased on average by 6.8%. In the other statistic sectors the population has declined by 3.4%. These correlations illustrate the migrating of families that are particularly attracted to the urban fringe locations, and nearby nature. A sociological study concerning the reasons for moving from the town of Leuven provided the following results:

- More than 50% of the families moving out of the city found that there were not enough public green spaces and spaces for playing in the neighborhood.
- A little under 50% of the families found that it was not save for their children.
- 25% of the people were moving out because there were not enough green public spaces.

In Antwerp a significant and positive correlation has been observed between population growth and the immediate vicinity of green areas as figure 2 illustrates.

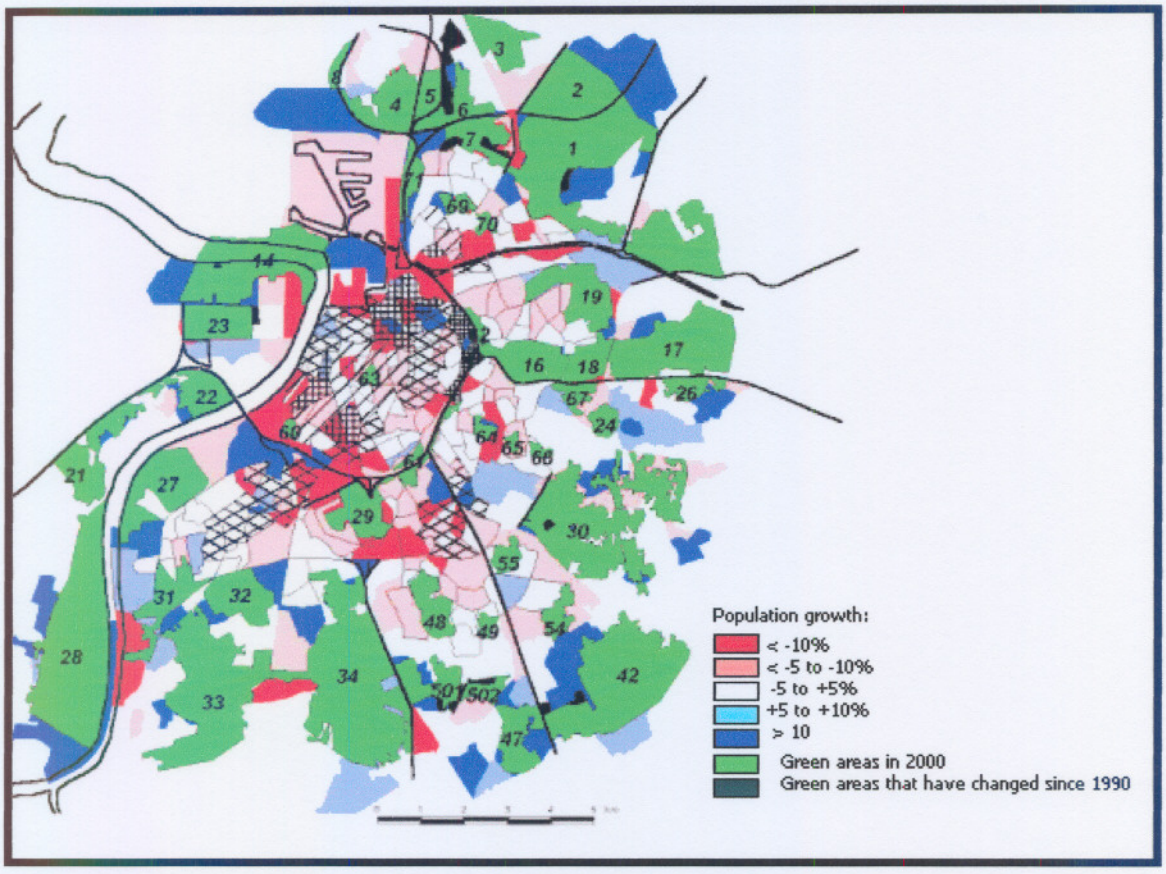


Figure 2: Population growth versus accessible green areas in Antwerp.
Source: Van Herzele et al. (2000[Web:] http://www.map21ltd.com/COSTC11/flanders.htm)

Town and country planning policy has been largely defined by the national town planning act of 1962, which features: the division between areas reserved for living and those for employment. After federalization in 1980, town and country planning and environmental planning came under the preview of the regions. Consequently, since that time the regions have been authorized to set out their own policy and to make laws affecting town and country planning of the environment. Approaches sometimes vary greatly but little Belgium is located at the heart of Western Europe, where economic development, infrastructure and environmental problems are increasingly becoming cross-border issues. (Pelfrene, 2000:87).

General conclusions and observations can be drawn from the National perspective of the Green structure concept in Belgium. This is formulated in the form of a matrix.

Table 1: Matrix of the Belgium planning approach

Important research issues	As manifested in Belgium
Legislative Framework	Spatial structure plans and spatial implementation plans.
Urban Edge concept	An urban development boundary is delineated although development is more based on economic forces, than on planning initiatives.
Significance of the concept	The urban development boundary identifies an area for urban growth, concentration and infill.
Spatial planning principles and spatial context	The urban development boundary integrates all the urban spheres – environmental, social, economic etc.
Social-economic objectives	Belgium does not focus as much on the environmental protection and enhancement, as the Netherlands and United Kingdom does. Economic development and natural development forces give structure to the urban environment.
Spatial lessons learnt: Impacts on Town Planners	Nature is an important issue in development planning. A study in Belgium proved that people would rather live far from work, on the periphery of the urban environment, just to be in close contact to open green areas.

Source: Own creation (2005)

2 Local Level – Case study: Antwerp

1 Overview:

Antwerp is one of those places that define Europe. Consisting of a very dense urban core, with districts of more than 25,000 people per square mile density. The old city has an attractive pedestrian area and an impressive cathedral. Walking around the attractive, historical core, it might be surprising to find out that you are in one of the least densely populated urbanized areas in the world outside the United States.

Despite its high core density, Antwerp would not be among the most densely urban areas in the United States or Canada. (Administratie Planning en Statestiek, 2000:23).

In Europe, the cores of the large urban areas have much greater opportunities for quality high-density living, with the poor often conveniently housed in substandard housing and public housing estates in the inner suburbs. But it is, in fact, in the middle ring and outer suburbs where "things are happening."

Population has fallen substantially in the high-density urban cores, though in most places it seems to have stabilized at this point. Antwerp is well served by freeways. Intercity freeways enter the area from the north, south and east. Brussels is less than 30 miles away, but despite this distance from Antwerp to Brussels, their considerable sprawl does not yet meet.

European suburbs often give the impression of being very old. This can be observed in Antwerp. These suburbs are indeed old, and did not begin as suburbs. In Antwerp an urban area exhibiting all of the urban trends can be found - an attractive core growing less and less important to a metropolitan region growing on its edges.



Figure 3: Photographs of Antwerp
Source: Own observation (June 2005)

2 Dominant features of planning in Antwerp:

Antwerp is ambitious. In and around the city there are many projects ready to be launched, that will bring about radical change. To mention just a few: there are the plans for a park on the former railway site at Dam-Stuivenberg, the new design centre by the Offerandestraat, and the move of the central library to the De Coninckplein. Mobility is another area where we can expect to see major improvement. The Flemish Government, in conjunction with the City of Antwerp, are leading the way. (Antwerp, 2003:2)

These are all major operations that are helping to shape the urban development, the image and the future of Antwerp. In the years to come, Antwerp will undergo a fundamental transformation. Up until now, there has been a lack of an overall vision, to outline the design of the entire city and to blend existing and future initiatives.

The aim of the Antwerp Spatial Structure Plan is to create this total vision. At the same time, the plan outlines the contours of possible future new projects. The document outlining the strategic approach has already been prepared.

Throughout the entire procedure, a great deal of attention was given to working and liaising with people who, due to their activities or their professional occupation, are fully immersed in the reality of Antwerp. But any interested Antwerp residents were also be given plenty of opportunity to contribute. (Antwerp, 2003:3)

The Structure Plan is a strategic plan, which does not pretend to have all the solutions. The plan focuses on a number of key issues or challenges, and the objective is to make improvements through effective short term actions, whilst steadily working towards the long-term vision. (Antwerp, 2003:3)

Antwerp is a city on a river. The city has originated and has grown along the water. Unfortunately, the city's ties with the water have weakened. The Development Plan aims to try and make the water a more visible and tangible part of the city.

A blue-coloured network, as it were. Furthermore, these centers of attraction and facilities are mostly loose fragments, which are not adequately embedded into their environment. This is a problem in virtually all of the suburbs. They appear to be a series of disjointed residential islands, divided by the old main roads, railway lines and parks.

They often lack a clearly identifiable and attractive centre. In the suburbs, the public areas - streets and squares - also have a rather sad look about them. Shopping streets are a prime example of this.

These have usually developed along the historical main roads. They are having a difficult time and are falling into disrepair. (Antwerp, 2003:5)

The City Council is committed to the Antwerp Spatial Structure Plan. To a large degree, the plan sets out the future plans and evolution of our territory. Starting with a cohesive vision of the type of development sought, the plan stipulates a small number of real and feasible actions.

These actions clarify what the city aims to accomplish, which city areas take priority, and which objectives we have to achieve. It goes without saying that the actions have to be well chosen, that they have to occur at strategic sites, and naturally that they must be feasible. In the Antwerp Charter, the City Council outlines what can and what will be accomplished in the years to come.

It is not yet possible to stipulate the main outlines. A great deal more research is required, and the response from Antwerp residents and organizations will naturally help to determine the final selection.

The Antwerp Spatial Structure Plan is not created in isolation. It takes into account the selection made in the Spatial Structure Plan of Flanders and the Spatial Structure Plan of the Province of Antwerp. These policy plans lay down the rules of play on the basis of which Antwerp must draw up its spatial structure plan. Thus, the Spatial Structure Plan of Flanders places the City of Antwerp within the 'Flemish Diamond', the area of major cities between Ghent, Antwerp, Louvain and Brussels. (Antwerp, 2003 [Web:] http://www.ruimtelijkestructuurplanantwerpen.be).

The Flemish Diamond is a densely populated area, it enjoys a healthy economy, and is battling against traffic congestion, as is the case in similar areas such as the Randstad in the Netherlands and the Ruhr region in Germany. The Flemish Diamond is crucial to accommodate the growing population and the economic activity of our region. The Antwerp Development Plan views the role of Antwerp as a cornerstone of this Flemish Diamond.

In order to implement the Development Plan of Flanders, and on the initiative of the Flemish government, the boundaries of the city of Antwerp will be clearly marked out. This demarcation plan is due to be launched. It will state the boundaries of the area of the City of Antwerp and the outlying areas. This demarcation exercise is important. Within the city area of Antwerp, the policy-makers opt to concentrate, for example, the housing, the industrial activity, and leisure. Within the outlying areas, the emphasis is on open space and nature. It goes without saying that the Antwerp Spatial Structure Plan will also take into account this demarcation plan.

Planning Initiatives in Antwerp:

- Port:

The port is the most important economic activity in Antwerp and it is a driving-force for the entire region of Flanders. Antwerp is an outstanding port city. But this is not always obvious to the visitor or the tourist. The city and the port seem to be two quite separate entities. The Antwerp Development Plan is examining this interaction between the city and the port, and is looking into ways of integrating the port better into the city landscape.

- Parks:

The park planned along the railway site in Antwerp North is leading the way. It brings nature into the city, and at the same time it acts as a lever to improve the quality of life in this area of the city.

- Accessibility and quality of life:

Traffic is no longer flowing smoothly along the Ring road or the Singel (city bypass). Accessibility is one of Antwerp's greatest challenges. The Ring road must play a far greater role as a connecting road for (inter)national traffic, and also plays a crucial role in gaining access to the port. Therefore a mobility master plan was formulated.

Mobility Master Plan:

The government and provincial authorities of Antwerp formulated a Master Plan for mobility in Antwerp. Mobility corridors are enhanced around Antwerp. This is done via the main road network that forms a ring around the city.

Objectives of the mobility master plan is:

- Restructure the ring road around the city.
- New infrastructure must be developed to support this road and the transport corridors.
- The issue of road safety must be evaluated and brought into perspective.
- An additional extension of the ring road is necessary - Oosterweelverbinding.

This additional extension will complete the circular form of the ring road and enhance the mobility corridor. The idea is that the Singel (city bypass) should become a contemporary 'green boulevard'. It was determined that is would be much better to separate the international traffic from all the other traffic on the Ring Road in order to accomplish this.

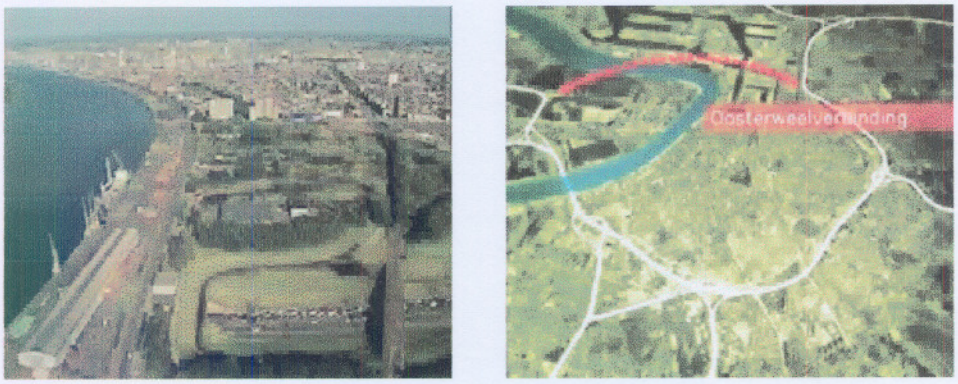


Figure 4: Ring road in Antwerp
Source: Antwerp (2003 [Web:] http://en.antwerpen.be/MIDA).

These and other planned works, such as, for example, the extension of the tramlines, are covered in the Antwerp Master Plan. All these works are more than just infrastructure works, though. At the same time, it is necessary to examine their relationship with surrounding residential areas and/or industrial areas. In brief, changes in traffic and transport arrangements can at the same time also offer opportunities for city development. Such projects must not only improve mobility, but also the quality of life in the city. Planning the transport infrastructure goes hand in hand with the Spatial Structure Planning of the city.

3 The Urban Edge concept in Antwerp:

The concept of the 'compact city' is a leading one, allowing for the preservation of the ecological value and keeping the surrounding landscapes intact. The underlying principles of sustainability emphasize the need for compact construction and 'infill', rather than expansion on the urban fringes.

On the other hand, bigger towns suffer from a continuous flight by young families, while the urban fringes and the countryside remain an attractive place of residence for them. The main reasons are related to dissatisfaction with the built environment: the lack of green areas and space for children's to play. Most people aspire to living in a green environment, in the vicinity of natural areas. This strongly argues against excessive building and de-greening in the city centers. (Van Herzele, 2000:16).

Stimulating the people's desire to live in 'compact' cities is an enormous challenge for urban planning in the future and creative approaches to green design will play a leading role in this.

Green areas form the Urban Edge of the city, as the green belts of the United Kingdom also implies. Belgium has a strong planning principal towards green planning and implementation.

There is a lack of green areas in all cities at the lower functional levels of quarter and neighbourhood. In addition, the qualities vary within the cities and towns surveyed. For example, in Antwerp only a few neighbourhoods have quiet, green areas ("rustig") within reach of the city and/or the district level (Figure 5).

Future scenarios show that the pressure on urban nature is continuing. Therefore, offensive rather than defensive strategies are needed. In order to strengthen the position of greening in influential discussions, the public has to be given the opportunity and, indeed, stimulated to voice their concerns.

Particular attention is drawn to the "unplanned" greening and "wild" spaces in the cities, where children can create their own environment. So in Antwerp they feel it needs to be said: don't plan too much!

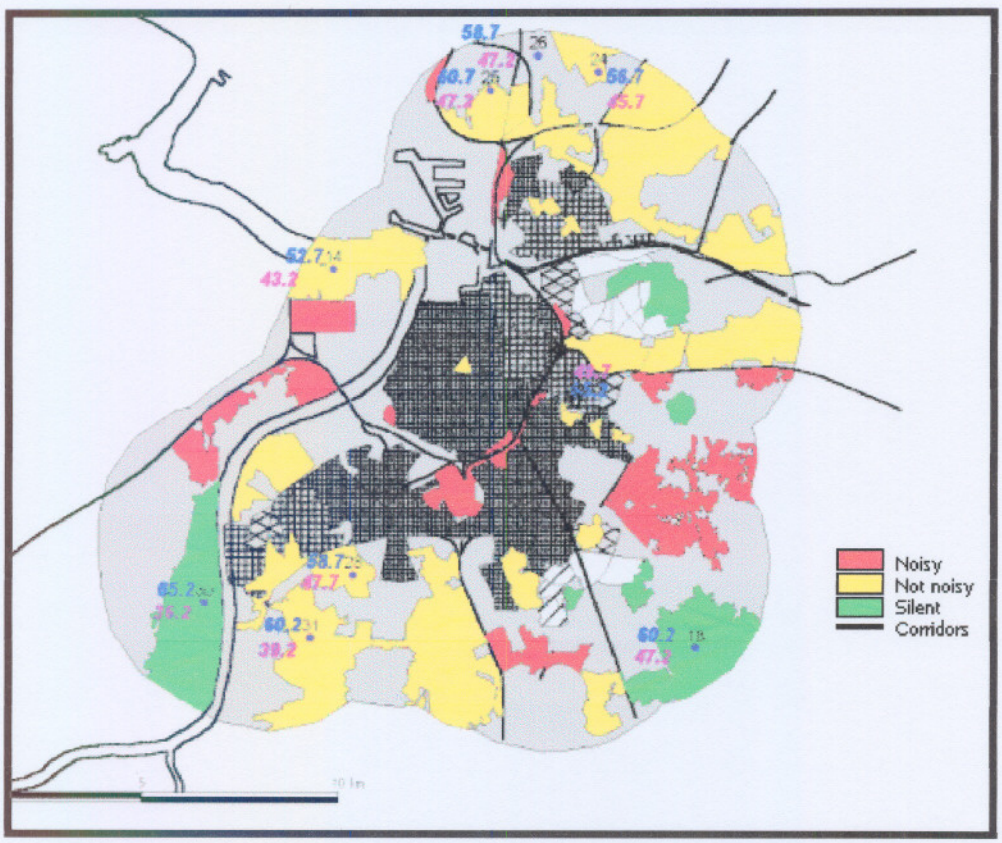


Figure 5: Quietness as a quality of reachable green areas in Antwerp.
Source: Van Herzele et al. (2000 [Web:] http://www.map21ltd.com/COSTC11/flanders.htm)

4 Conclusion:

The spatial conclusion drawn from the Antwerp case study was formulated by the researcher in the form of a matrix. This will be used to evaluate the local perception.

Table 2: Matrix of Antwerp case study

Spatial Issues	Antwerp
Spatial reality	Antwerp is one of the places that define Europe. The city is characterized by urban fragmentation.
Policy and Legislative frameworks	• Spatial structural plan • Spatial implementation plan
Connectivity corridors and mobility	Road networks are well developed, connecting Antwerp and other core urban areas like Brussels. Freeways are the main connectivity and mobility corridors, but the blue network (rivers) are also important features.
Regional integration	Not of much importance to Antwerp, although current development corridors also ensure that regional integration is promoted.
Nature of the urban edge	Antwerp does not have development control measures. There is a dense core and a middle and outer ring that can be identified. Thus, there is more of a transition zone in the urban area, than a prominent urban edge.
Principles related to the urban edge	• Ensure open areas and parks • Established around the current ports • Ensure quality of the environment • Most families are situated on the periphery in search of green areas
Management	Their point of view: Don't plan too much. Natural forces will ensure urban development.
Successes	• Transition zone in the urban area exist • Green planning within the fragmented urban core
Failures	• No strict development control measures • Social impacts of the fragmented city leads to peripheral development
Spatial planning conclusions	There is no strict development and spatial planning initiatives and this can be seen in the fragmented urban areas. Integration of green areas will uplift the urban environment and enhance the quality of the total area.
Recommendations	Natural forces will structure the urban environment.

Source: Own creation (2005)

The perspectives from the case studies done in Europe can be used to evaluate the current situation in South Africa. The spatial issues of the urban edge concept are of importance for the comparing of different containment tools, which can be used in the South African cities. The elements as directed from these case studies will now be evaluated in the local South African context.

Section C

Empirical Study – Local Perspective

Chapter 6

South Africa

1 Overview: The South African approach towards the Urban Edge Concept:

i. Concept and definition:

Urban Edge Concept

The Urban Edge is a definite, theoretical line that is drawn on a map and that divides the Urban and Rural areas from each other. The aim of an urban edge is to establish a clear urban growth boundary that has legal or statutory standing.

The urban edge is not a rigid legislative imperative, but rather a policy statement that is seen as one of the many tools that government uses to achieve the principles of integration and compaction that are entrenched in the Development Facilitation Act. (Ekurhuleni, 2003:1)

An urban edge is the boundary of the city beyond which no urban development is permitted. It is a policy statement that guides and directs development patterns and providing a platform for all the interested and affected parties to reconsider all options. (Ekurhuleni, 2003:3)

The aim is that by clearly demarcating an urban edge, speculation currently driving the urban land market on the edge, will be controlled. (Department of Development Planning and Local Government, 2002:4) The delineation of the urban edge is an integral component of the compilation of the Metropolitan Spatial Development Framework. (Ekurhuleni, 2003:3)

South Africa focus on infill and development within the core area, and thus sets an urban edge to determine where development must be promoted and where it must be restricted.The in document "Refinement of the Urban Development Boundary strategy and its implications for growth management", the Urban Development Boundary is defined as a growth management tool that will:

- Contain urban sprawl
- Promote a compact city that optimally utilises the existing infrastructure and the potential for public transport (high densities).
- Ensure optimum utilisation of public resources by optimising cost-benefit ratios for any council investment and by providing strategic guidance in terms of where the priorities for government investments should be.
- In the case of South Africa it can also be used as a mechanism to correct spatial distortions of the Apartheid past. (Gauteng, 2003:22).

ii. Descriptive Models: Gauteng Urban Edge

In "The Impact of the Concept of the Urban Edge as a Transition Zone, with special reference to the North-West Sector of Gauteng" (Pekelharing, 2004), a detailed study was done on the Gauteng area and its urban edge that exists. Thus, the North-West area of Gauteng will be used as the descriptive model.

The objectives for implementing the Gauteng Urban boundary: (Gauteng, 2003:8)

- To combat urban sprawl and to shift the focus to infill and redevelopment
- To create a compact city and to promote relevant densities and densification
- To provide a mechanism for effective growth management
- To support a multi-modal transportation system
- To protect environmentally sensitive areas, agricultural land and open space
- To promote rural development beyond the Urban Development Boundary

The current situation of the Urban Edge, prescribe different developments inside and outside the Urban Edge. Development within the edge is usually the area of consolidation that enhances the importance of the area or locality. This area is the point of future growth and development areas that is part of the process to establish a structure. Long-term density is part of the future plan within the edge. This includes the sub-division of land, farms and agriculture areas.

Development outside the edge is for land uses that are rural in nature would be more desirable, and should therefore be promoted outside the urban edge rather than inside it. (Gauteng Provincial Government, 2000:71).

In essence, the study proof that the urban boundary brings with it a wide range of changes, some of which can be anticipated and others not. However, it is important to understand that the changes will be extensive and should as best be planned for on an ongoing basis and in an integrated manner.

The boundary is therefore not only a mechanism to manage and direct developments patterns, but is more so a tool to direct public spending towards changing the urban environment as seen in Gauteng. The Gauteng urban edge manifests within the Gauteng Spatial Development Framework. (Figure 1).

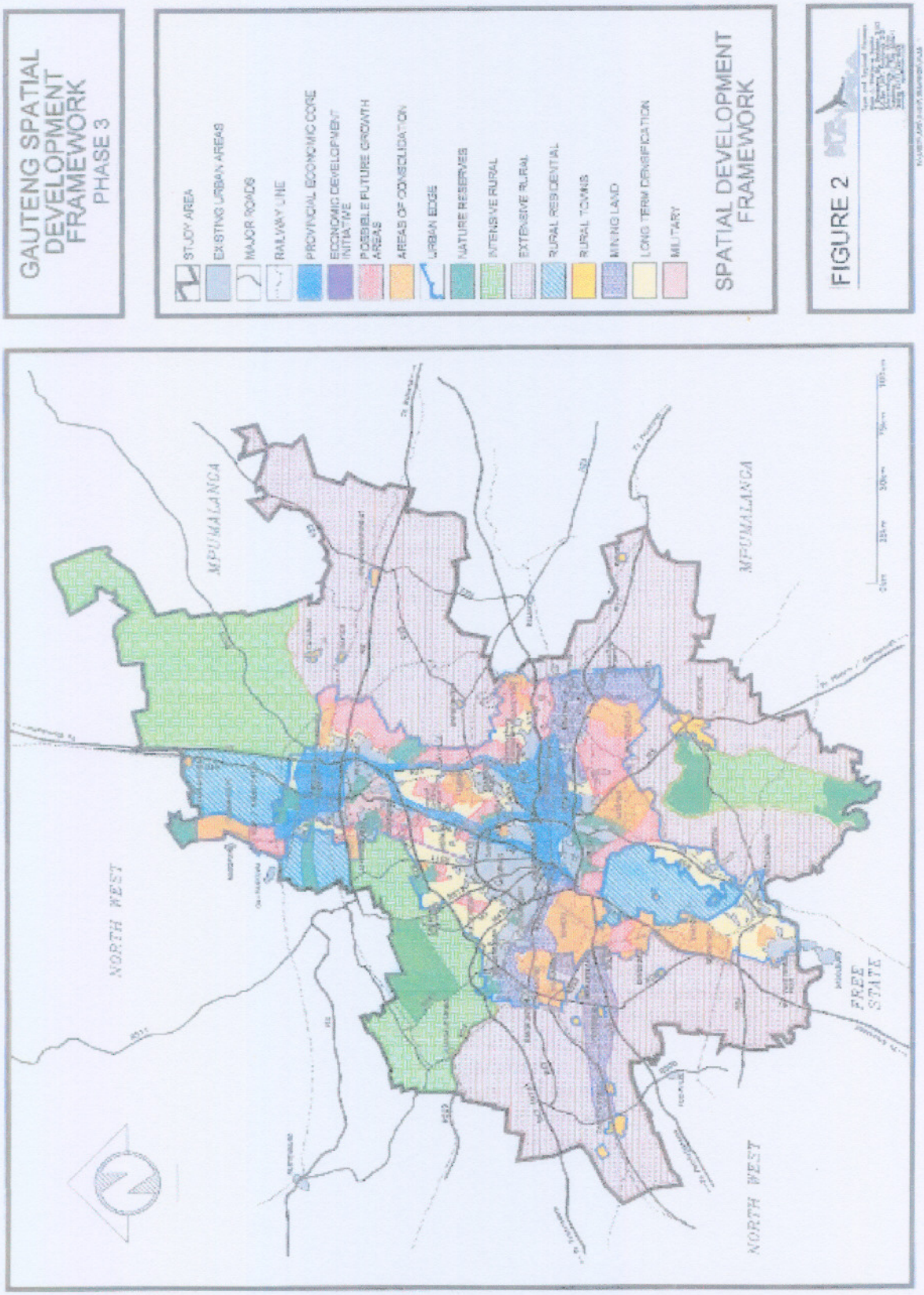


Figure 1: Gauteng Spatial Development Framework

Source: Department of Public transport, Roads and Works (2003: [CD-Rom]).

iii. Processes that plays an important role:

South Africa comes from a history associated strongly with the Pro-planning Approach. The basis for implementing this approach in South Africa was, however, the policy of Apartheid, which required strict regulatory control over urban spatial patterns of development in order to achieve the objectives pertaining to spatial segregation. (Gauteng, 2003:12)

There are two possible approaches towards determining an Urban Boundary. The first alternative is to work out a land use budget to cater for future development needs and then to draw the boundary to include the land required – thus a pro-active perspective, while the second alternative is to draw a tight boundary along the existing line of urban activity, and then to amend the boundary from time to time as and when required, based on the merit of individual cases. In South Africa the second approach is applicable. (Gauteng 2003:23).

There should be distinguished between the urban edge concept and the corridor concept. Corridors in South African tend to disobey the rules of the urban edge. They cross over any urban edge border, and as development follows along these corridors, the urban edge looses its function. The urban edge concept needs to be set in line with the concept of corridors.

2 National Level:

Development is influenced by the Policy, Legal and Institutional frameworks, which are currently present in South Africa. These frameworks must be integrated to enhance the quality of the urban area and lead to optimal development. Following is the policies and legislation that will impact on the development of South Africa and that will transform it in a certain way.

a) The Spatial Planning and Institutional context before 1994:

The planning system which exists in South Africa today, has been shaped by many different governments, each responding to the problems which they defined as the most significant of the day. Since all South African governments before 1994 were elected by a minority, the definition of problems and the planning systems created to address them, primarily reflected minority interests. The nature of these interests varied regionally so that the planning systems we have today are complex, multiple and contradictory. In an article done by Professor Schoeman, Ethics in Planning, (2004 [b]) the following institutional development framework of South Africa, was concluded.

1910 to the 1930s: the spread of British planning influence

Political transformation after the First World War led to the formulation of land administration mechanisms, such as town planning schemes, the introduction of institutional bodies such as the Township Boards, the introduction of public agencies in the housing supply system, and the location of planning administrative and decision making powers within the provincial realm.

The 1930s, the Second World War, and post-war reconstruction efforts

The Great Depression intensified already existing poverty levels. This period saw the consolidation of the control-oriented and fragmented approach to planning already in place and laid the basis for apartheid planning.

The post-1948 era and grand apartheid

The coming to power of the National Party government brought previously oppressive features of planning into the systematic formulation and implementation of a racist planning system.

The period following the Soweto uprising of 1976

The challenges posed to the political and economic control exercised were met with increased control and oppression. The results included rapidly increasing numbers of informal settlements.

Post-1985 late apartheid reforms

More rapid and consistent urbanization, unmatched by sufficient housing, land and services delivery, entrenched the significance of informal housing and economic opportunities in the urban context.

Planning Pre-1994

Planning at the local level was in most cases:

- Racially segregated
- Top-down Apartheid superstructure;
- Sectorally fragmented
- The budget being prepared in isolation
- Silent on issues of environmental sustainability
- Focused on control
- Weak on the facilitation of private sector investment.

Historical perspective on spatial planning and development in South Africa.

The development of the fragmented city in South Africa can historically be subdivided into three spatially related phases: Phase 1: The urban formation phase (1652 to 1948).

Phase 2: The urban separation phase (1948 to 1994).

Phase 3: The urban re-integration phase (post 1994)

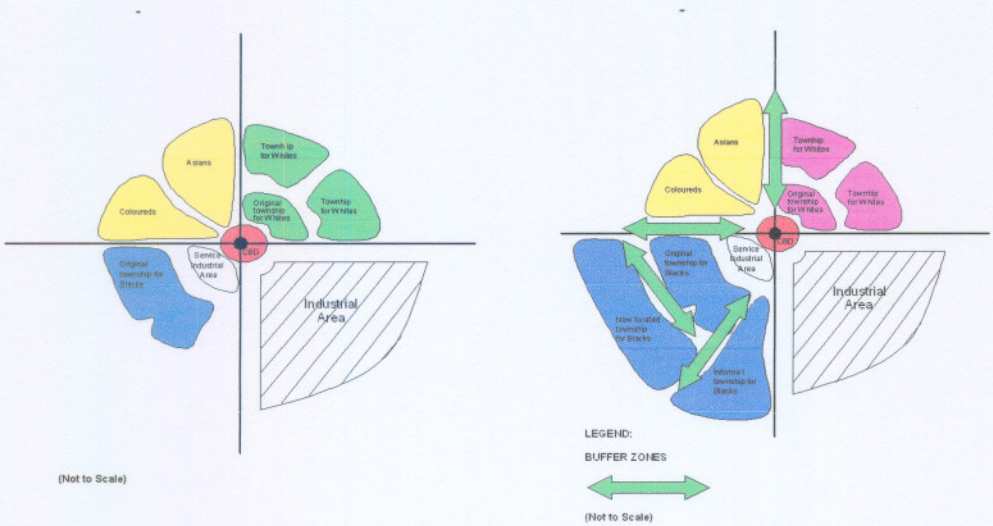


Figure 2: Typical Urban form of the previous South African context

Source: Schoeman (2004:2-8)

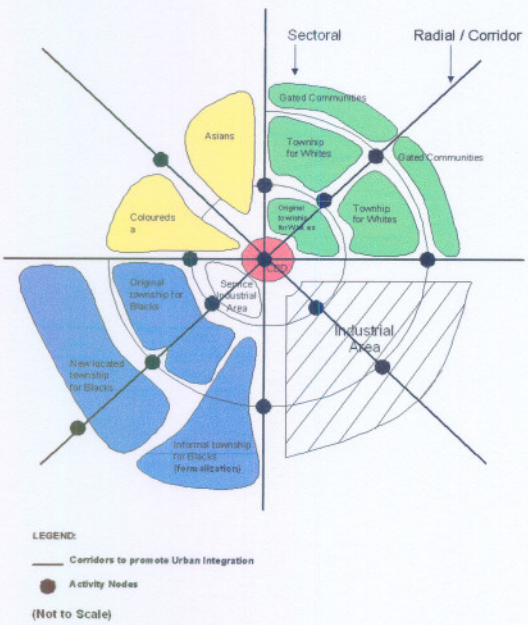


Figure 3: Typical Urban form of the current South African context

Source: Schoeman (2004:2-8)

Urban fragmentation in South Africa is being characterized by the following phenomenon:

- The challenge to address the urban fragmentation still exists after a decade of democracy.
- There is still a continued growth of informal settlements on locational unsuitable land.
- The idea of urban fragmentation is highly complex and multi-functional in nature.
- There are various approaches followed to attain the compact city ideal
- The application of the development corridor concept had been a major feature of the post-apartheid urban planning focus.
- In recent years there has been a significant change in the way in which urban planning has been conceptualized.

The planning scene South Africa is being driven by the following policy and legislative context:

Table 1: Core policy and legislative framework

Core policies	Core legislation
Reconstruction and Development Plan (1994)	Constitution of the Republic of South Africa (Act 108 of 1996)
Growth, Economic and Redistribution Strategy (1996)	The Bill of Human Rights
White Paper on South African Land Policy (1997)	Urban Transport Act (Act 78 of 1977)
Urban Development Framework (1997)	The Local Government transition Act (Act 209 of 1993)
Rural Development Framework (1997)	Restitution of Land Rights Act (Act 22 of 1993)
Green Paper on Development and Planning (1999)	Development Facilitation Act (Act 67 of 1995)
White Paper on National Transport Policy (1996)	Interim Protection of Informal Land Rights Act (Act 76 of 1995)
Moving South Africa (1996)	National Road Traffic Act (Act 93 of 1996)
White Paper on Local Government (1998)	Water Services Act (Act 108 of 1997)
Strategic Environmental Assessment in South Africa (2000)	Prevention of Illegal Eviction from Unlawful Occupation of Land Act (Act 19 of 1998)
White Paper on Spatial Planning and Land Use Management (2001)	National Transport Interim Arrangements Act (Act 45 of 1998)
National Spatial Development Perspective (2003)	Reconstruction and Development Programme Act (Act 79 of 98)
	National Environmental Act (Act 107 of 1998)
	National Development Agency Act (Act 108 of 1998)
	Local Government: Municipal Structures Act (Act 117 of 1998)
	Local Government: Municipal Demarcation Act (Act 27 of 1998)
	Local Government: Municipal Systems Act (Act 31 0f 2000)
	National Land Transport Transition Act (Act 22 of 2000)
	Land Use Management Bill (Final Draft 2003)

Source: Own creation (2005)

Spatial planning in democratic South Africa is thus multi-tasked and disciplinary in nature. It involves the inputs of environment, transport, engineering, social, economic, land, physical and communication as to ensure sustainable development.

b) The Policy context post 1994:

Since 1994 a significant number of policy initiatives, driven by various government departments, with potential bearing on development and planning have emerged. They all focused on improving the quality of live of all South African, and to ensure sustainable future development. These include:

Reconstruction and Development Plan (1994)

The Reconstruction and Development Programme (RDP) is an integrated, coherent socio-economic policy framework. It seeks to mobilize all our people and our country's resources toward the final eradication of the results of apartheid and the building of a democratic, non-racial and non-sexist future. It represents a vision for the fundamental transformation of South Africa.

Growth, Economic and Redistribution Strategy (1996)

A strategy for rebuilding and restructuring the economy is set out in this document, in keeping with the goals set in the Reconstruction and Development Program. In the context of this integrated economic strategy, we can successfully confront the related challenges of meeting basic needs, developing human resources, increasing participation in the democratic institutions of civil society and implementing the RDP in all its facets.

White Paper on South African Land Policy (1997)

Land ownership in South Africa has long been a source of conflict. Our history of conquest and dispossession, of forced removals and a racially-skewed distribution of land resources, has left us with a complex and difficult legacy. The three key elements of the land reform programme - restitution, redistribution and tenure reform - address each of these constitutional requirements.

White Paper on Environmental Management Policy (1997)

The vision of this environmental management policy is one of a society in harmony with its environment. The policy seeks to unite the people of South Africa in working towards a society where all people have sufficient food, clean air and water, decent homes and green spaces in their neighbourhoods that will enable them to live in spiritual, cultural and physical harmony with their natural surroundings.

Urban Development Framework (1997)

The aim is to promote a consistent urban development policy approach for effective urban reconstruction and development, to guide development policies, strategies and actions of all stakeholders in the urban development process and to steer them towards the achievement of a collective vision. A priority is to overcome the separation between spatial planning and economic planning in South African cities. A second priority is to ensure that integrated planning determines projects which are approved and which elements are targeted within urban development, rather than the reverse situation where large urban development projects drive the planning. (Department of Housing, 1997).

Rural Development Framework (1997)

It does not prescribe a specific strategy but shows where inter-sectoral planning and coordination are needed for resources to be used productively for rural development to become a reality in the next two decades. (Department of Land Affairs, 1997).

Green Paper on Development and Planning (1999)

The Draft Green Paper on Development and Planning describes and assesses the historical background to spatial planning in South Africa and the way it has developed since 1994 from a legal, procedural and policy point of view. A key aspect is the Constitution's emphasis on co-operative governance between national, provincial and local spheres of government. (Department of Land Affairs, 1997).

White Paper on National Transport Policy (1996)

The broad goal of transport is the smooth and efficient interaction that allows society and the economy to assume their preferred form. The vision for South African transport is of a system which will: "Provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improving levels of service and cost in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable". (Gauteng, 2003a:1).

Moving South Africa (1996)

The Moving South Africa is a 20-year strategic framework and this initiative has the following main objectives pertaining to public transport. The *Vision 2020* project became '*Moving South Africa'*, which commenced in June 1997 with a mandate to: *"develop a strategy to ensure that the transportation system of South Africa meets the needs of South Africa in the 21st Century and therefore contributes to the country's growth and economic development."* (Gauteng, 2003a:2).

White Paper on Local Government (1998)

Whilst existing government policy provides a great range of inputs for planning and development, the White Paper on Local Government is critical as it places municipalities at the centre of planning for better human settlements. The new municipal planning system is founded on the concept of 'developmental local government'. It emphasizes integrated development planning as a tool for realizing the vision of developmental local government. (Department of Land Affairs, 1997:3).

White Paper on Spatial Planning and Land Use Management (2001)

The most dramatic effect of the White Paper is that it will rationalize the existing plethora of planning laws into one national system that will be applicable in each province, in order to achieve the national objective of wise land use. The White Paper also builds on the concept of the municipal integrated development plan, as provided in the Municipal Systems Act. (Department of Land Affairs, 2001:2).

National Spatial Development Perspective (2003)

The NSDP is expected to guide discussions around policy and programme co-ordination with regards to infrastructure investment and development spending in all spheres of Government. It is proposed that decisions regarding infrastructure and development spending made by national, provincial and local government be monitored through existing reporting mechanisms and that current inter-Governmental forums be used to influence how future spending may be spatially aligned in accordance with the NSDP principles. In this manner, the NSDP will act as an indicative guideline for spatial planning by the three spheres of government within the framework of co-operative governance.

c) The Legal context since 1994:

The core legislation impacting on spatial planning and development in the study area pivots around multiple pieces of legislation. The following legal context is decisive in spatial planning and development.

Constitution of the Republic of South Africa (Gauteng 2001:28)

The Constitution in South Africa (Act 108 of 1996) gives everyone the right:

- To an environment that is not harmful to their health or well-being
- To have the environment protected, for the benefit of present and future generations
- Prevent pollution and ecological degradation
- Promote conservation
- Secure ecologically sustainable development

Bill of Human Rights

This Bill of Rights is a cornerstone of democracy in South Africa. It enshrines the rights of all people in our country and affirms the democratic values of human dignity and freedom.

Urban Transport Act (Act 78 of 1977)

To amend the Urban Transport Act, 1977, so as to delete, define or further define certain expressions; to provide that regional services councils will in certain instances be core cities and may take over certain functions relating to urban transport; to provide for the entering into of agreements with the governments of self-governing territories; to extend the general powers of the South African Roads Board and its powers to utilize funds; to make other provision in connection with the appointment of Metropolitan Transport Advisory Boards, and to alter the constitution of a board; and to provide for the extension of the functions of a core city; and to provide for matters incidental thereto.

Local Government Transition Act (Act 209 of 1993)

The purpose of this legislation is to provide for revised interim measures with a view to promoting the restructuring of local government, and for that purpose to provide for the establishment of Provincial Committees for Local Government in respect of the various provinces; to provide for the recognition and establishment of forums for negotiating such restructuring of local government; for the exemption of certain local government bodies from certain provisions of the Act.

Restitution of Land Rights Act (Act 22 of 1994)

To provide for the restitution of rights in land to persons or communities dispossessed of such rights after 19 June 1913 as a result of past racially discriminatory laws or practices; to establish a Commission on Restitution of Land Rights and a Land Claims Court; and to provide for matters connected therewith.

Interim Protection of Informal Land Rights Act (Act 76 of 1995)

To provide for the temporary protection of certain rights to and interests in land which are not otherwise adequately protected by law; and to provide for matters connected therewith.

The Development Facilitation Act (Act 67 of 1995)

In essence the principles strive towards achieving more sustainable cities. In this regard it emphasizes the integration of historically segregated communities into the urban fabric, and the promotion of a compact city which is characterized by higher density mixed use developments, minimizing distances between places of work and residence, and optimizing the utilization of all physical, social, economic and natural resources in the urban environment. (Republic of South Africa, 1995).

National Road Traffic Act (Act 93 of 1996)

To provide for road traffic matters, which shall apply uniformly throughout the Republic and for matters connected therewith.

Prevention of Illegal Eviction from Unlawful Occupation of Land Act (Act 19 of 1998)

To provide for the prohibition of unlawful eviction; to provide for procedures for the eviction of unlawful occupiers; and to repeal the Prevention of Illegal Squatting Act, 1951, and other obsolete laws; and to provide for matters incidental thereto.

National Environmental Management Act (Act 107 of 1998)

To provide for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of site; and to provide for matters connected therewith.

Municipal Structures Act (Act 117 of 1998)

To provide for the establishment of municipalities in accordance with the requirements relating to categories and types of municipality; to establish criteria for determining the category of municipality to be established in an area; to define the types of municipality that may be established within each category; to provide for an appropriate decision of functions and powers between categories of municipality; to regulate the internal systems, structures and office-bearers of municipalities; to provide for appropriate electoral systems; and to provide for matters in connection therewith.

Municipal Demarcation Act (Act 27 of 1998)

To provide for criteria and procedures for the determination of municipal boundaries by an independent authority; and to provide for matters connected thereto.

Municipal Systems Act (Act 31 of 2000)

To provide for the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities, and ensure universal access to essential services that are affordable to all. (Gauteng 2003:29)

National Land Transport Transition Act (Act 222 of 2000)

To provide for the transformation and restructuring of the national land transport system of the Republic; and to provide for incidental matters. *Integrated transport planning and promotion of public transport Integration of land use and transport planning.* (South Africa, 2003:2).

Land Use Management Bill (Final Draft 2003)

To provide for the uniform regulation of land use management in the Republic; to set principles for spatial planning, land development and land use management in the Republic; to provide for spatial development frameworks.

d) The Institutional context since 1994:

Since 1994 important institutional developments have taken place. These changes have had, and will continue to have, an impact on the manner in which the agents of development and planning are defined, and on the nature and scale of their respective functions.

Local government

While the Constitution allocates powers over planning differentially among the three spheres of government, it also insists on national and provincial action where provincial or municipal spheres cannot discharge their responsibilities respectively. The recently published Municipal Structures Act recognizes that traditional leaders have a role to play in municipal governance.

Conclusions drawn from the South African approach was formulated in a matrix.

Table 2: Matrix of the South African approach

Important research issues	As manifested in South Africa
Legislative Framework	The dominant legislation is the Development Facilitation Act, the Spatial Development Frameworks and in terms of the Urban Edge concept, the Land use Development Bill and the reconstruction and development plan.
Urban Edge concept	The urban edge concept was implemented to promote a compact city that optimally utilizes the existing infrastructure and potential for public transport. This concept impacts on various other spheres and thus needs to be implemented effectively.
Significance of the concept	As in other metropolitan areas, great development pressure and urban sprawl is occurring. Compact cities are known to be more sustainable and efficient in terms of transport distances and costs. Therefore a tool must be implemented to contain the urban environment.
Spatial planning principles and spatial context	The South African city has changed over the last decades, as institutional and policy frameworks was transformed. This created various spatial and development problems that need to be addressed. Integration needs to be enhanced in the areas.
Social-economic objectives	The poverty gap in South Africa delivers great concern. Low-income settlements are located on the periphery and this stimulates the poverty gap even more in terms of transportation and distance to the working areas. Compact cities will answer to the social-economic problems that currently exist.

Source: Own creation (2005)

3 Local level

The concept of the urban edge as a planning tool for compact cities was evaluated on a local planning level with special reference to the North-West sector of the Gauteng area. For the purpose of this research the elements and impacts of the urban edge concept must be evaluated. This will be comparable to the international models and elements. A comparison between local and international concepts will be made in conclusion.

A Case study – Gauteng:

1. Overview:

Gauteng is a province in North-Eastern South Africa, bounded by Free State province on the south, Mpumalanga province on the east, Northern Province on the north, and North-West Province on the west. (Gauteng, 2005 [Web:] http:www.gpg.gov.za).

Facts regarding the area of Gauteng in which the planning initiatives is developed:

- Gauteng is the smallest of the provinces measuring 18 810m^2
- Its three main cities are Johannesburg, Soweto and Tshwane.
- Total population is 9.2 million.
- It is the most industrialised province, the economic hub of South Africa.
- Seen as one metro pole, as from the way which cities have grown.
- South African engine room because almost 37% of the GNP is produce here.

Gauteng has developed a special urban and industrial character that is uniquely African. In recent years, this energy has been directed towards developing a province for the new millennium, a smart province that is globally competitive.

Gauteng's challenges: (Gauteng, 2005 [Web:] http://www.gpg.gov.za).

- Translate economic growth into employment growth
- Reduction of poverty and inequality, while linking economic growth to improved services
- Provide basic services for all and housing on well located land
- Ensure fast, reliable and safe public transport and respond to environmental pressures
- Promote and maintain health and prevent diseases of poverty and lifestyle
- Forge stronger links with the region and continent.

2 Dominant features of planning in Gauteng:

2.1 Land use:

Planning and development are subject to the current and proposed land uses. There are certain areas identified where development is restricted – the "no go" areas. Other development initiatives and land uses are subject to these no go areas. This includes the industrial development areas, the residential areas and also the areas identified to enhance the environmental quality. Open green areas are in contrast to the built environment. The land use structure is an integrated approach of different development types as the following maps illustrates. The maps were obtained form Ceroi (Cities Environmental Report on the Internet). These maps were used in an international project conducted within the framework of the Local Agenda 21. Data is obtained from the official Greater Johannesburg Metropolitan Council website. ([Web:// http://ceroi.net/reports/johannesburg/csoe/default.htm).

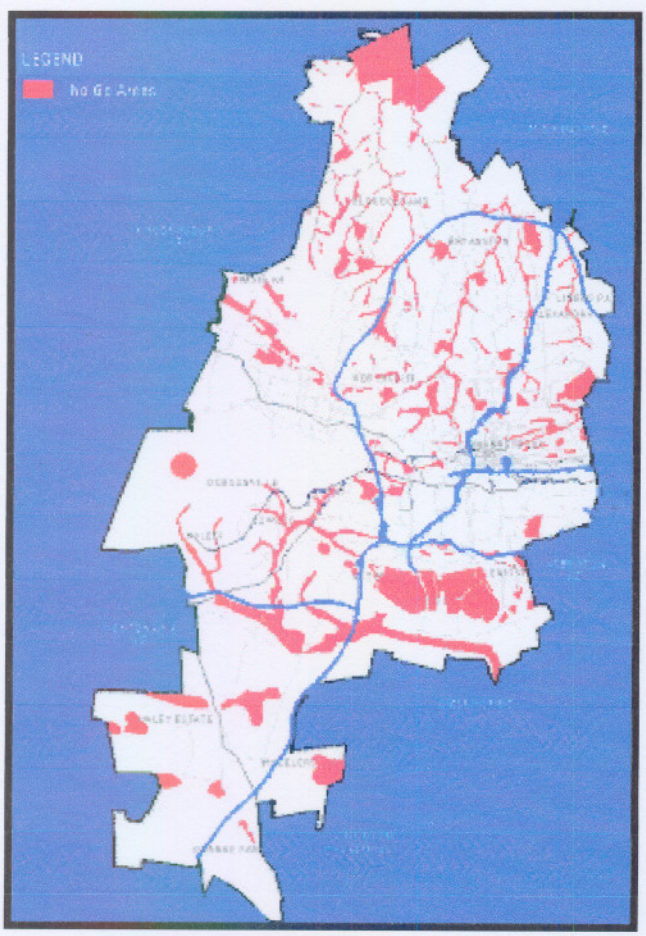


Figure 4: No go areas
Source: Ceroi (2005)

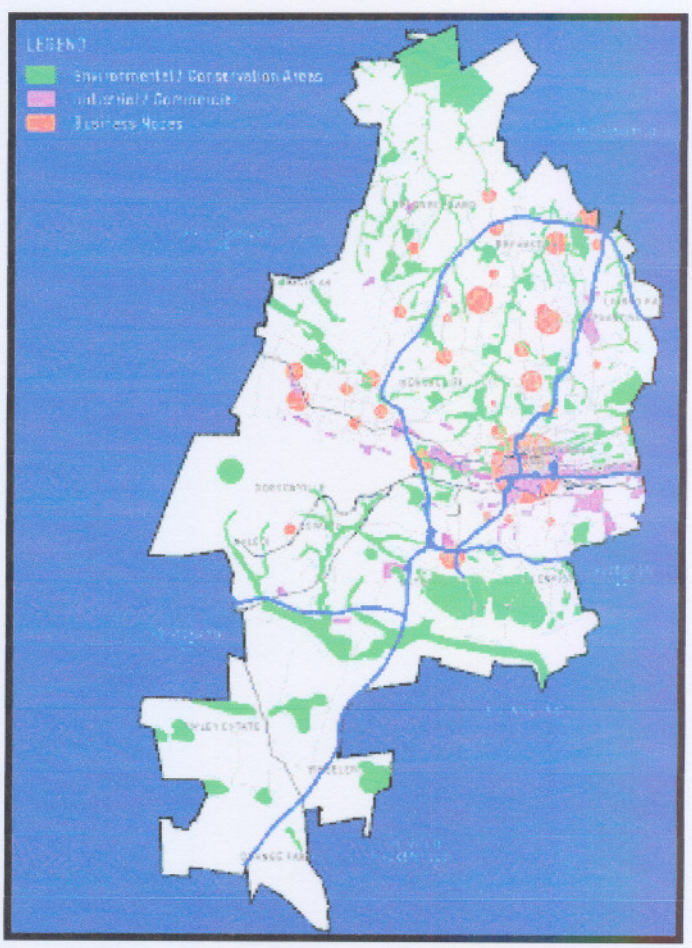


Figure 5: Environment, residential and business locations
Source: Ceroi (2005)

Figure 4 illustrates the "no go" areas in Gauteng. Development in restricted in this areas, as can be seen in figure 5. The environmental areas are in accordance to these no go areas. Specific areas are located for the industrial and residential developments. The urban form is structured by these land uses.

Development pressure is increasing and expanding the urban environment. Development will cause densification of the urban area and also urban sprawl. Within Gauteng there should be a certain amount of open green spaces. This is proven in the international case studies to produce a qualitative environment. The current open space per person is illustrated in figure 6. This can be compared to the conservation of the built environment. (Figure 7). These two contrasting elements will structure the urban form and development direction.

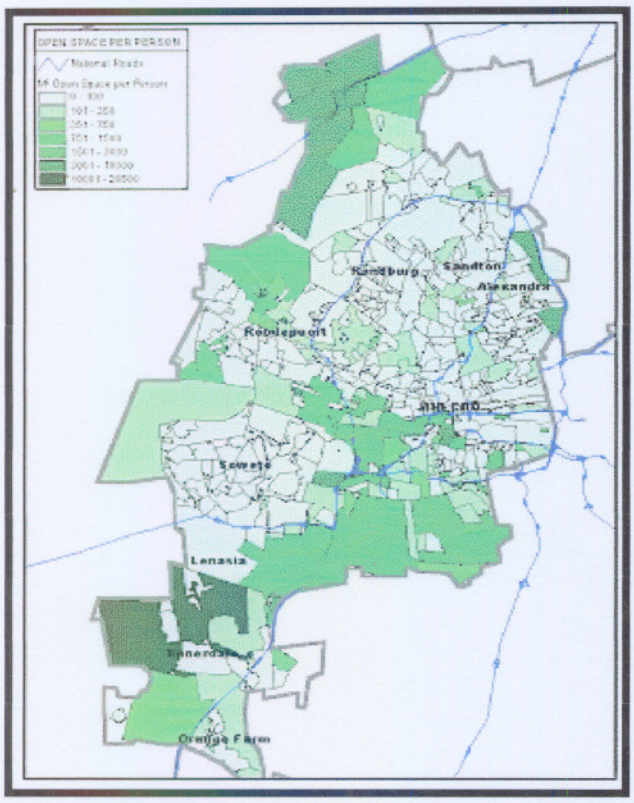


Figure 6: Open Space per Person
Source: Ceroi (2005)

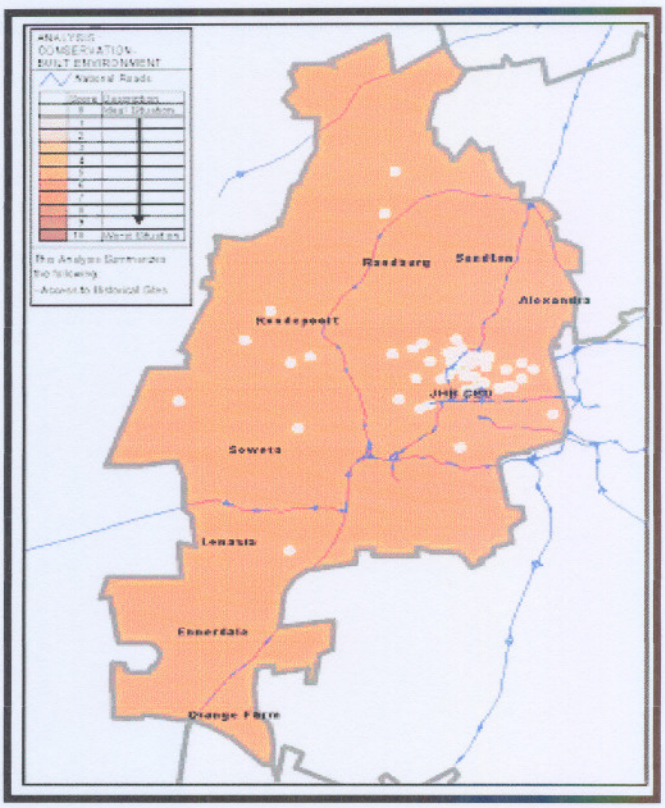


Figure 7: Conservation-Built environment
Source: Ceroi (2005)

The land use patterns are also reflected in the population distribution. Figure 8 illustrates that middle and upper-income residential areas, mainly in the northern suburbs of Johannesburg and Tshwane, supporting low densities, are located near to most of the urban opportunities, whereas low-income areas, supporting medium and high population densities are mostly located on the urban periphery and isolated from urban opportunities and services. (Department of Agriculture, 2003:12).

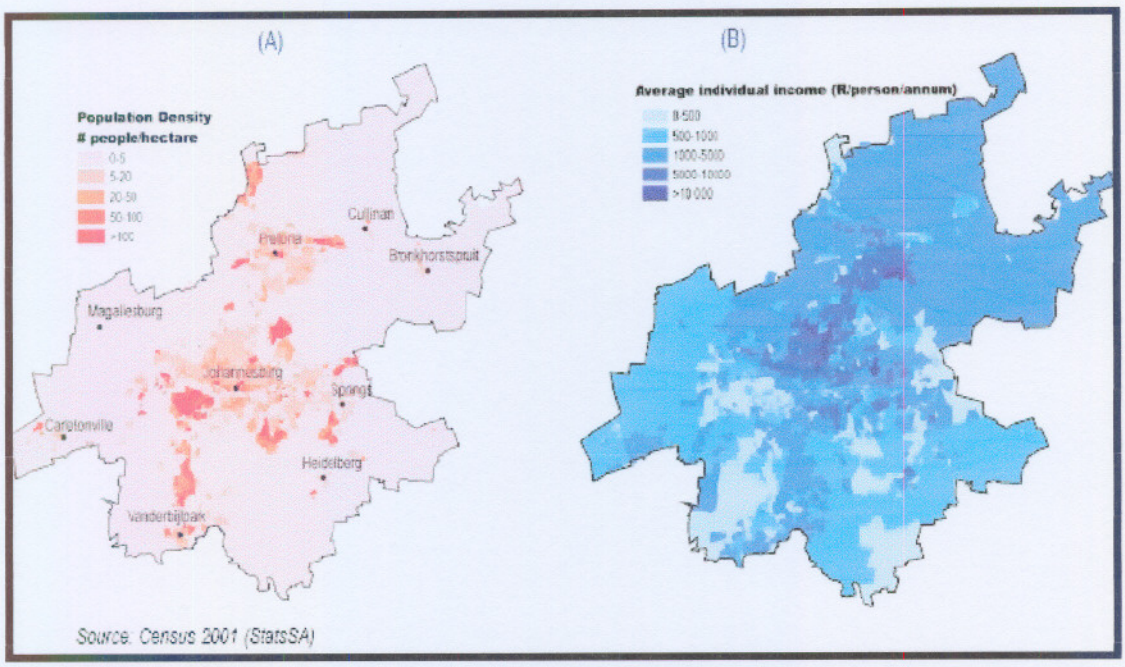


Figure 8: Comparison of (A) population and housing distribution with (B) income levels

Source: Census (2001: Stats SA).

These different land uses are integrated in a map illustrating the land cover categories. This is illustrated in figure 9.

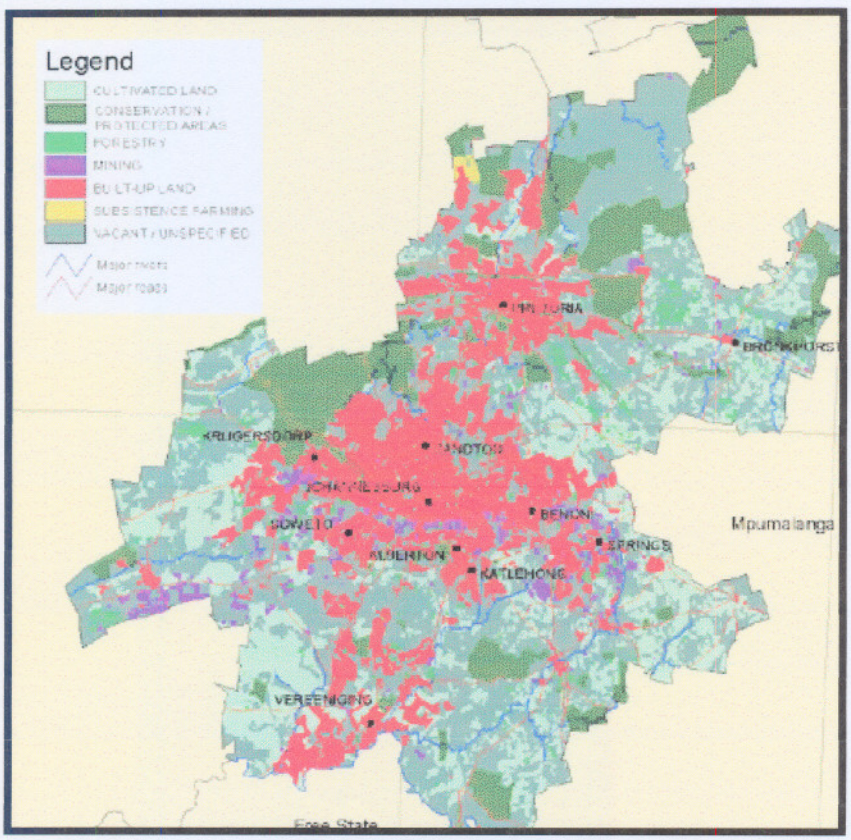


Figure 9: Land cover categories

Source: Gauteng (2000) [Web:] http://www.environment.gov.za

The different land uses and land cover categories shape the urban form and urban structure. The urban environment needs to accommodate the pressures of all the different land uses. This results in a certain development direction (Figure 10). This development direction is subject to the urban edge and development objectives of the area. The Spatial Development Framework and Gauteng Strategic Public Transport Network was formulated to structure urban development and expansion in Gauteng, towards a sustainable form.

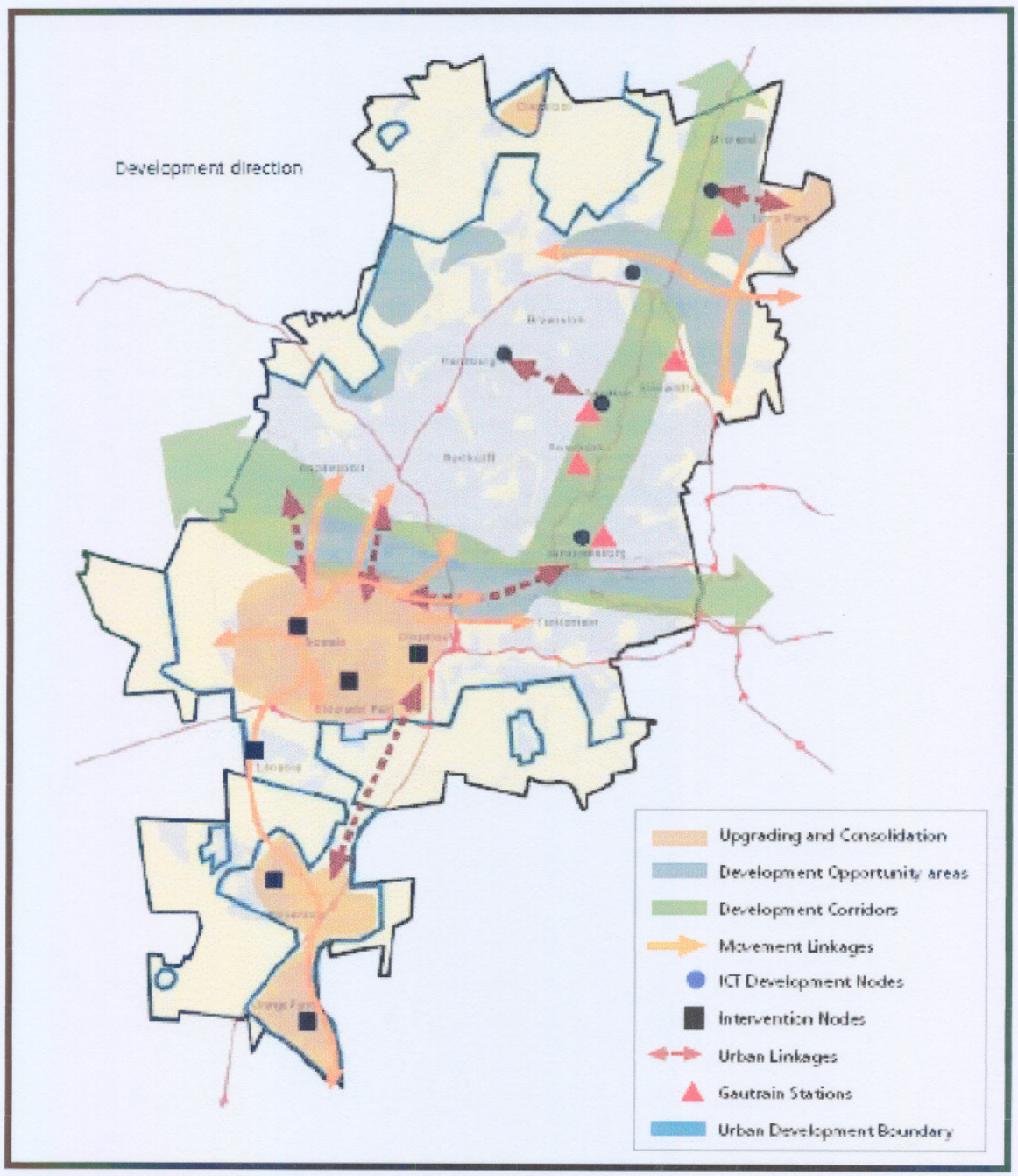


Figure 10: Development direction in Gauteng

Source: Johannesburg (2005:13)

2.2 Gauteng Spatial Development Framework.

During the late 1990's the Department of Development Planning and Local Government compiled the Gauteng Spatial Development Framework (GSDF) to direct the growth and development of the province towards a sustainable and economically viable future settlement pattern. (Gauteng, 2003a:7)

It covers aspects such as:

- The space needed for activities
- The area to be developed
- Sustainable and functional spatial inter-relationships between activities
- Provision for future growth (Gauteng, 2003a:7)

It is furthermore intended "to guide decisions relating to the location and nature of physical development in Gauteng. The GSDF was finalised, accepted and published in 2000 as the core policy framework to guide spatial development in Gauteng. It is regarded as one of the building blocks of an integrated development planning system to achieve economic growth, job creation and balanced development. (See figure 1)

It comprises various elements, economic development, a defined urban edge, urban and rural development and transportation systems. (Department of Development Planning and Local Government, 2002:13).

Following from the Gauteng Spatial Development Framework and its emphasis on containing urban sprawl by way of a statutory urban edge, the Gauteng Provincial Cabinet adopted an Urban Edge for Gauteng Province on 15 May 2002. The main aim of this is to contain urban sprawl and to promote higher density, compact urban complexes within the urban edge area. (Department of Development Planning and Local Government, 2002:15).

The above implies that the GSDF provides an indication of the most desirable settlement pattern for Gauteng Province. This is achieved by means of the following:

- Indication of growth and development poles and where it should be discouraged
- Indication of the most desirable form and nature of future growth and development
- Defining the way forward for the province.

Each settlement or group of settlements will have one or more urban cores which should be physically and functionally integrated with and around major railway stations.

Urban cores should be the highest order activity nodes of the local urban realms and should be developed as the urban places of highest concentration of residential, commercial, social, cultural and other general urban activities.

Built-up areas should not be allowed to extend further outwards beyond the urban edge. The urban edge can be defined as an institutional boundary within the metropolitan area with the sole purpose of containing physical development and sprawl and redirecting growth towards a more integrated, compact and efficient urban form.

The GSDF is thus envisaged to be a tool that will contribute to the redressing of past spatial imbalances, while at the same time, guiding development towards a sustainable, equitable and economically viable future settlement pattern. (Hanekom, 2004 [Email interview]).

2.3 Gauteng Strategic Public transport Network.

The Gauteng Department of Transport and Public Works (2004) has a legal mandate and obligation to plan, provide, manage, regulate and maintain public transport within the provincial boundaries in partnership with Metropolitan and District Municipalities. One of the key elements associated with the successful development of high density, mixed use environments is, however, the provision of proper public transport services.

This is also stipulated in the Gauteng Transport Framework Act. It is focused to provide a framework for the integrated planning and provision of the transport system in the Province; the establishment of transport authorities and transport authority funds; the administration and utilisation of the provincial land transport fund; the preparation of integrated transport plans; and to provide for matters connected therewith. (Gauteng Provincial Government, 1998:2)

The Gauteng Strategic Public Transport Network and the associated public transport services provided along this network are thus key management instruments towards achieving the envisaged compact urban environment for South Africa in future. Where and how public transport is provided in the urban environment, could serve as strong form-giving element in terms of how the city develops. (Gauteng, 2003a:1)

Figure 11 illustrates the Gauteng Strategic Public Transport Network and the proposed development nodes and corridors.

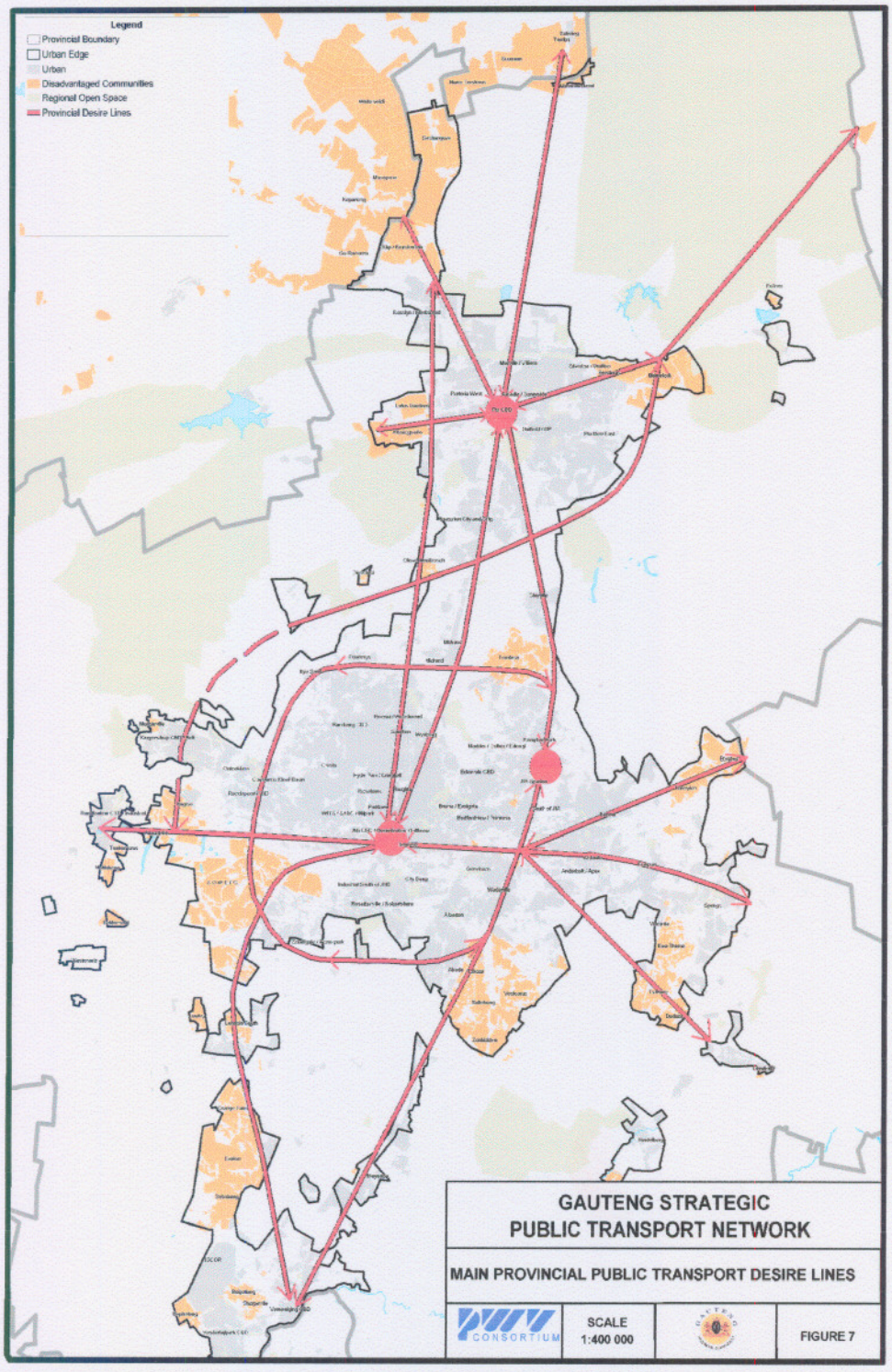


Figure 11: Gauteng Strategic Public Transport Network

Source: Gauteng (2000 [Web:] http:// www.transportandpublicworks.gpg.gov.za).

The transport development corridors will contribute towards the reconstruction of the urban environment in South African context. (Tshwane Metropolitan Municipality, 2003 [Web:] www.gautengtcc.co.za]).

All aspects of the transport sphere must be well inter-connected by means of a good and efficient public transport system as depicted in figure 12. The rail system has the greatest potential of becoming the basis of public transport throughout Tshwane and Johannesburg and will, therefore, form the primary movement system. (Department of Public Transport, Roads and Works, 2004:10).

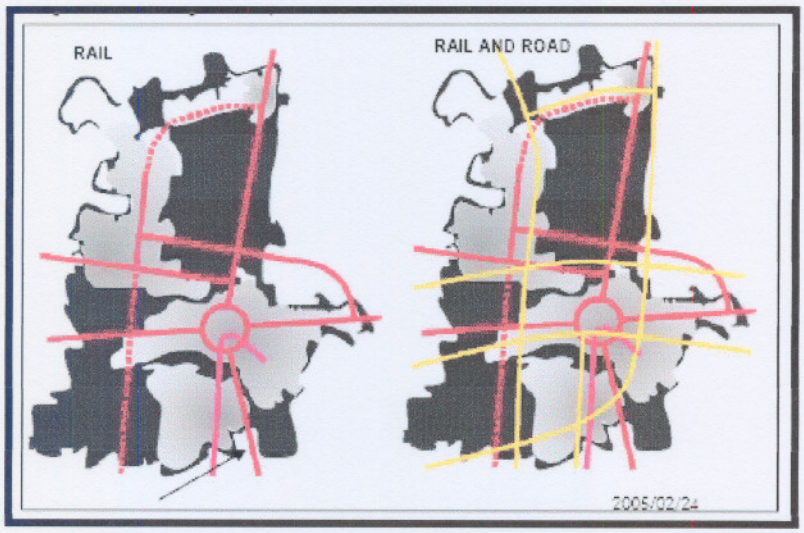


Figure 12: Existing and Proposed Road & Rail Networks
Source: Tshwane (2005:4)

The Department of Public Transport, Roads and Works initiated the Gautrans Project. It is a rail network between the main urban cores in Gauteng. Rail and road networks are not bounded to the urban edge.

They form development corridors, across the urban edge. Although the introduction of a rail network in Gauteng would be to the benefit of public transport modes, the researcher found that this concept would have a great impact on the urban edge and urban containment.

For spatial development the Gautrain is a very important structuring element fundamentally because it will set in motion a new urban form.

It will also endeavour to create more effective and efficient environments than exist presently. (Gauteng Provincial Government, 2000 [Web:] www.gautrans.co.za).

The foundation for the Gautrain and all spatial planning which is part of this project is embedded in two parallel strategies that were initiated by the Gauteng Provincial Government. The Gauteng Spatial Development Framework (GSDF) 2000 and the Gauteng Spatial Development Initiatives (SDIs).

The GSDF based the Province's future development on five critical factors:

- Resource Based Economic Development: In order to ensure Gauteng's advancement internationally, economic development should be promoted.

- Re-direction of urban growth: The aim is to implement the principles of planning legislation and policy whereby the integration of residential areas with areas of employment opportunities takes place so creating a more functional urban form.

- Rural development beyond the urban edge: The purpose is to achieve a balance between the urban and rural environments, and to protect the rural land from being taken up through urban sprawl.

- Mobility and accessibility: Access to the townships is limited, and where access to movement is limited, limitations are placed on access to job opportunities, social facilities, and such like. (Visser, 2004).

- Contained urban growth: Peripheral urban development is costly and particularly so for local government, which is the provider of bulk infrastructure and services. Hence, there is general consensus in the planning arena that unlimited urban sprawl should be contained. An urban edge is proposed as the vehicle to achieve this and this edge should be determined at a provincial level.

The Gautrain is in line with the fundamental spatial planning principles that underpin the GSDF. There is no doubt that the Gautrain will be highly influential in shaping the future urban form in its proximity, as firstly it centres on the core economic area of the Province, secondly it brings with it many development opportunities which the private market is certain to identify and explore and thirdly density and land use changes are inevitable. (Gauteng Provincial Government, 2000 [Web:] http://corporate.gautrain.co.za).

Movement is determined by roads which essentially relate to a grid system and the provincial grid facilitates sprawl at a regional level. Urban development has seldom been hindered and so typically occurred in a concentric fashion radiating out from the development centre.

Not being confined by an urban edge or development perimeter new nodes developed on the outskirts of existing nodes and so sprawl thrived. (Gauteng Provincial Government, 2000 [Web:] http://corporate.gautrain.co.za).

The Gautrain endeavours to change this pattern of development within its proximity, by defining a development edge. Development will in the linear railway line corridor. Figure 13 illustrates this development pattern.

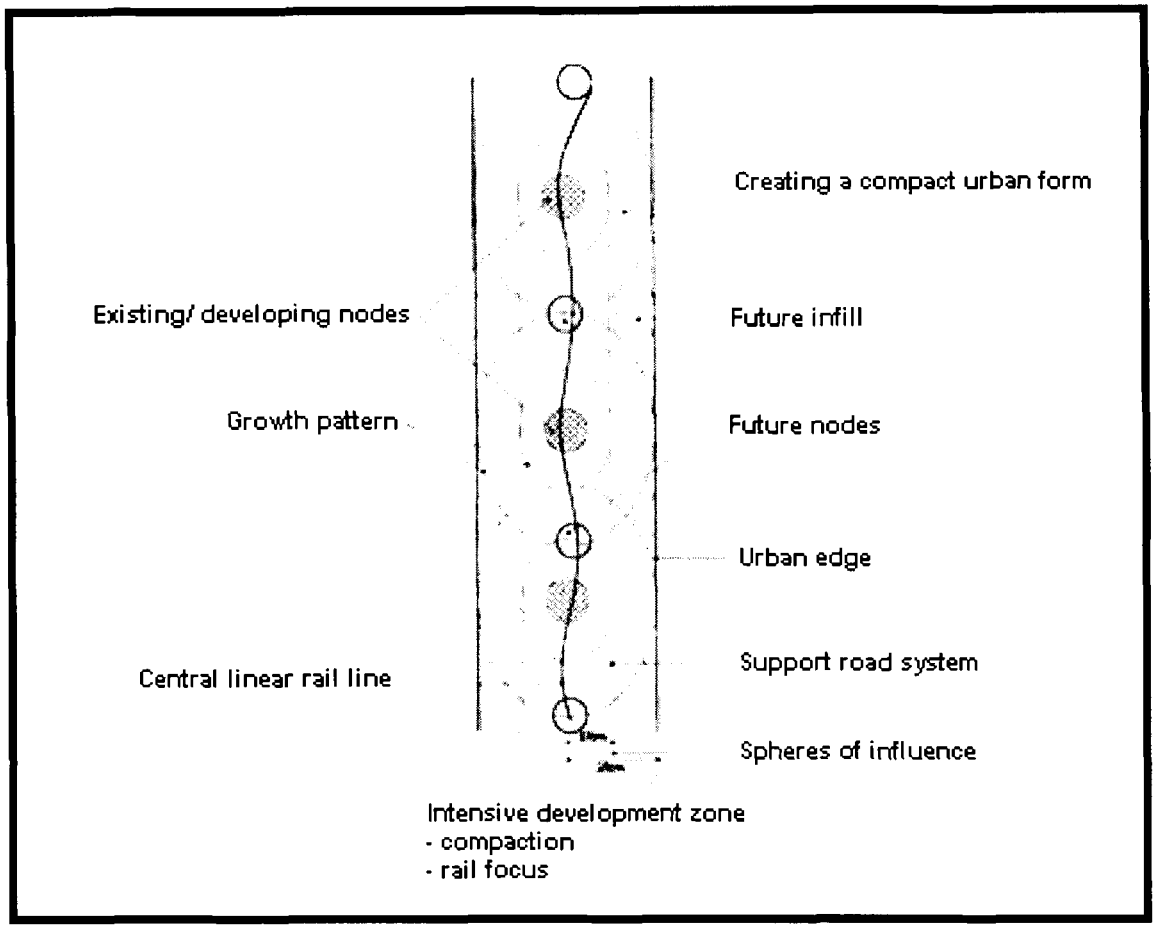


Figure 13: Gautrain intensive development zone

Source: Gauteng Provincial Government (2000 [Web:] www.gautrans.co.za).

The Gautrain rail system will surely strengthen the development pattern, as it will enhance access, mobility and visibility. In addition, like the road system, the rail will have a linear alignment and will therefore promote the creation of a linear urban form. The development concept is illustrated in figure 14.

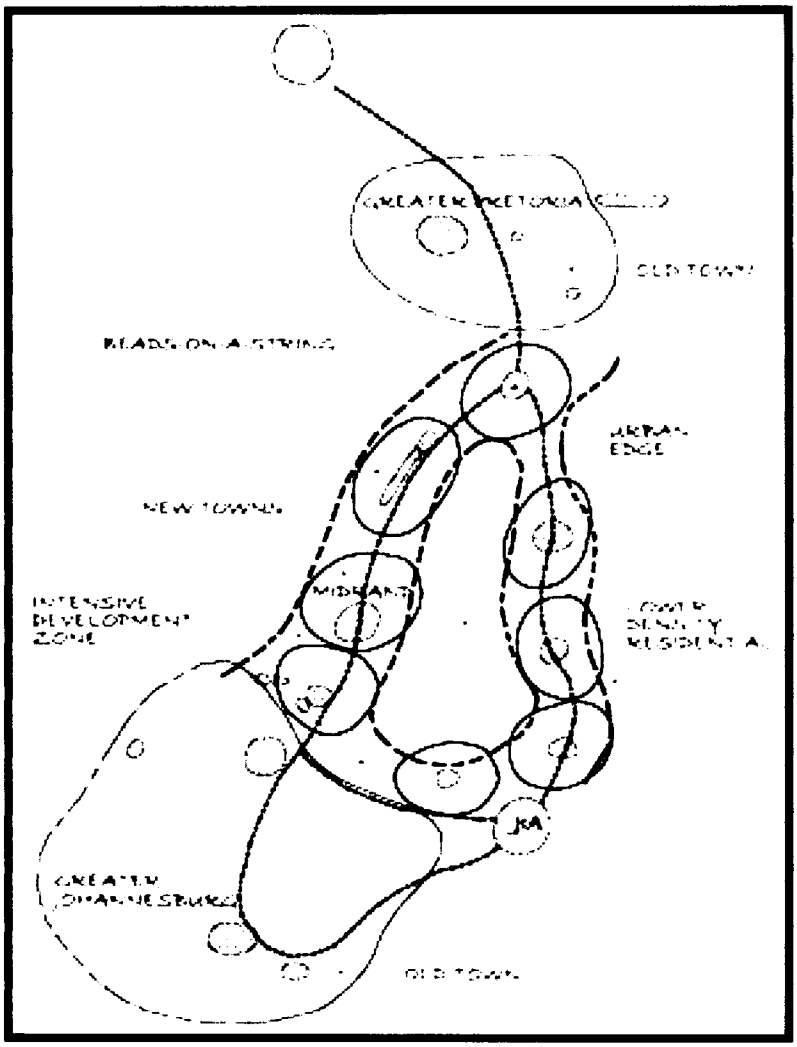


Figure 14: Gautrain development concept
Source: Gauteng Provincial Government (2000 [Web:] www.gautrans.co.za).

If this concept is implemented the spatial reality of Gauteng will change. The urban edge needs to accommodate this planning initiative and development, as well as the resulting expansions of the urban environment. Figure 15 illustrates the proposed Gautrain rail in the current spatial development framework and urban environment.

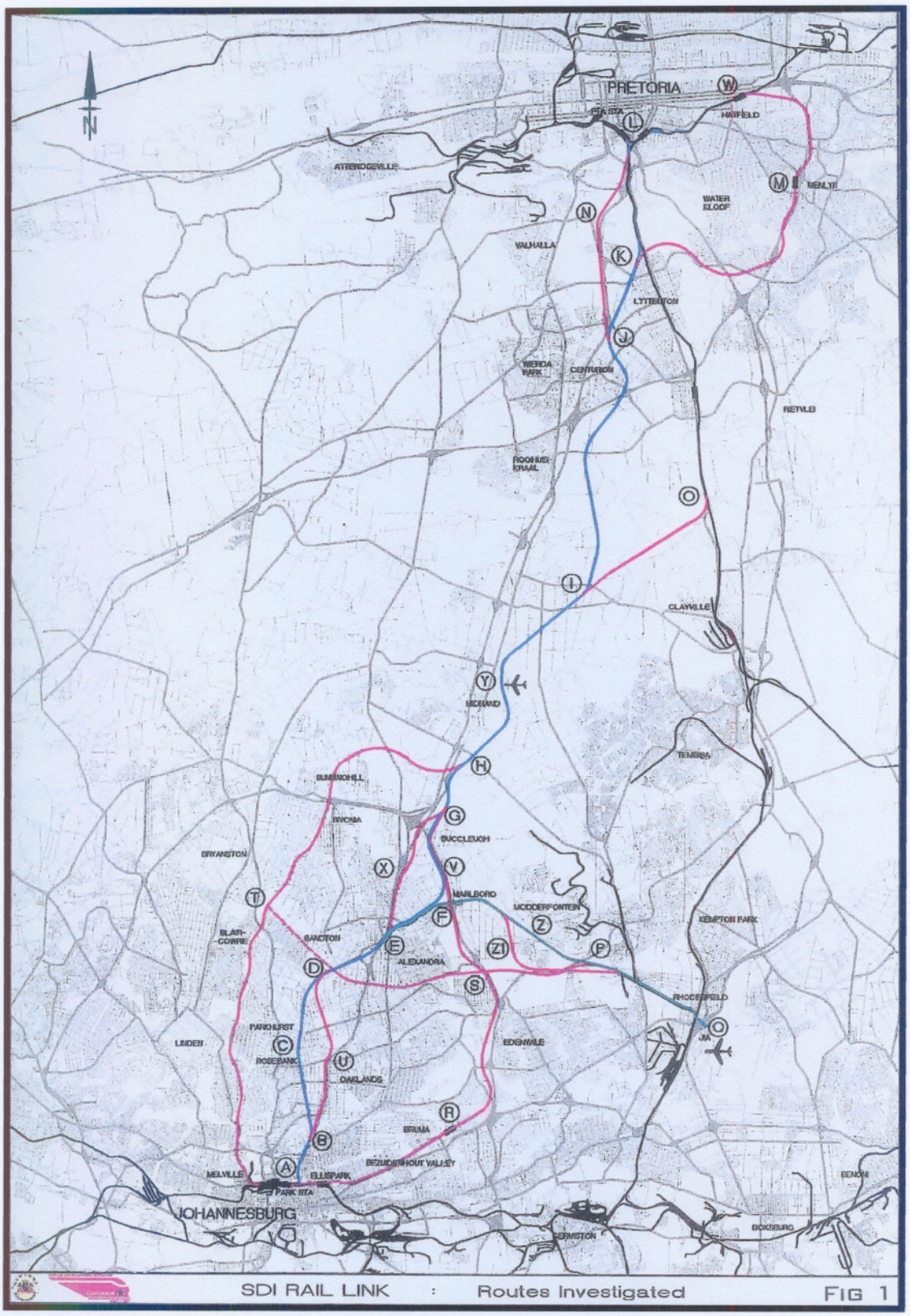


Figure 15: The proposed Gautrain rail alignment and route description.

Source: Gauteng Provincial Government (2000 [Web:] www.gautrans.co.za)

The current and proposed land use patterns, the Gauteng Spatial Development Framework, the Gauteng Strategic Public Transport Network (that includes the proposal of the Gautrain rail) all influence the urban environment of the Gauteng area. These components are integrated and development nodes and corridors are developed. (Figure 16). These are dominant features of planning in Gauteng. The urban edge manifests within these features.

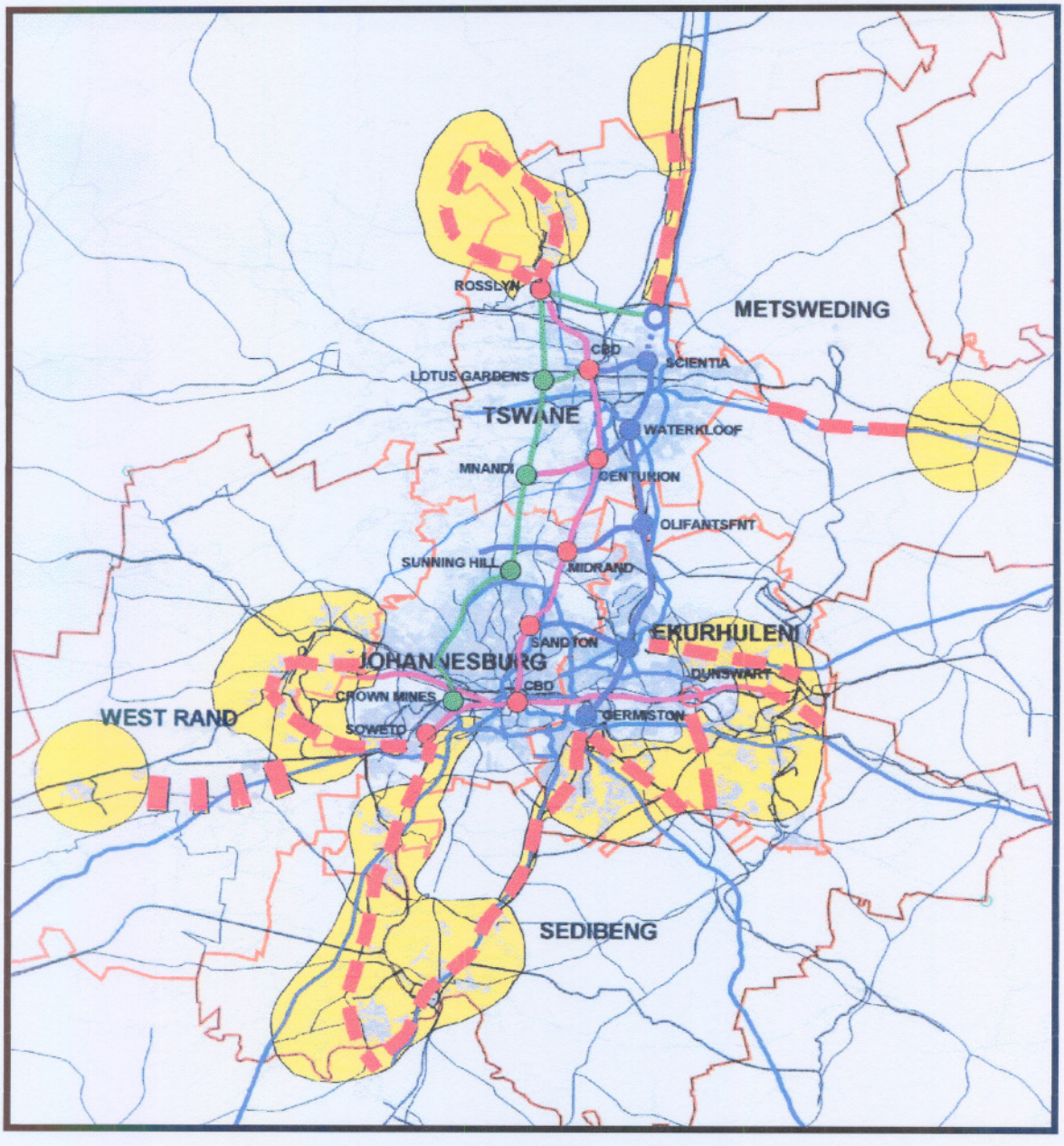


Figure 16: Future nodes and corridors

Source: Gauteng Spatial Development Framework

3 The urban edge concept in Gauteng:

The Urban edge can be conceptualized as containing three elements: (Figure 17)

- The Urban edge itself – defined by cadastral boundaries, contours etc. and is a single line.
- An Urban Management Zone – the area inside the urban edge line where specific policies are required to control the impact of urban growth on the rural or natural hinterland.
- A Rural Management Zone – the area adjacent to, but outside the urban edge line where specific policies are required, that do not permit any conventional urban development, and which may control the impact of rural or agricultural activities on the urban areas.

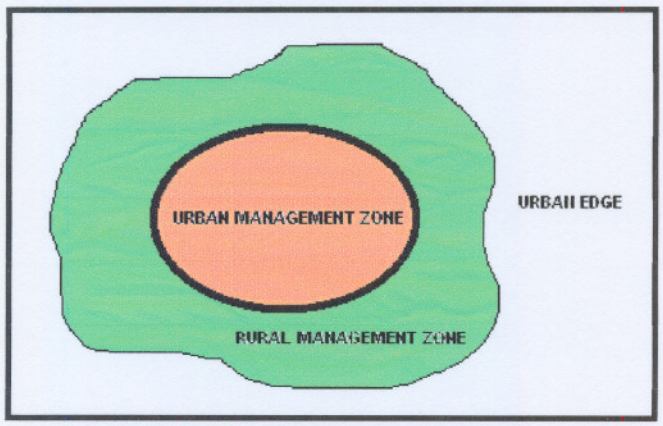


Figure 17: Concept of the Urban Edge
Source: Own creation

The purpose of the urban edge and urban edge policy is to contain development. It is a guiding tool that directs development patterns while providing a platform for all interested and affected parties to reconsider all options. This is subject to certain legislation in Gauteng. (Van der Merwe, 2004).

1. Development Facilitation Act, of 1995.
2. Municipal Systems Act, 2000.
3. Municipal Structures Act, 1998.
4. Land Use Management Bill, 2002.
5. Gauteng Planning and Development Bill, 2003.
6. Municipal Planning and Performance Regulations.

The Gauteng edge will be implemented within the Gauteng Spatial Development Framework and thus would apply to the basic needs of economic development, urban growth, infill and densification practices, rural development, mobility and accessibility through the support of the existing urban structure.

Based on these factors, the GSDF proposed the establishment of a provincial urban edge to serve as a mechanism towards ensuring the containment and redirection of urban growth, while addressing rural development beyond the edge. (Department of Development Planning and Local Government, 2002:10).

3.1 The purpose of an urban edge in Gauteng would be to:

- Discourage urban sprawl and contain growth with the city limits
- Compact the city through infill and densification
- Improve the utilisation of existing infrastructure, services and facilities
- Preserve the rural environment and landscape
- Protect agricultural land, especially high potential agricultural land
- Assist urban regeneration by adopting an inward approach
- Protect cultural and tourism assets
- Give structure and form to the city (urban growth)
- Manage the re-shaping of the city towards a more sustainable outcome.

3.2 Principles and main considerations:

1. To promote the development of compact urban structure, which optimizes the use of resources such as engineering services, transportation and social infrastructure.
2. To contribute to a sustainable open space network that is accessible to the public.
3. To optimize food production capacity of the surrounding agricultural areas and functionally link these areas to the disadvantaged communities in terms of basic food supply, informal trade promotion and SMME development.
4. To integrate the disadvantaged communities into the urban fabric by way of infill development and promotion of corridor development along the main linkages between these communities and the major concentrations of job opportunities.

Emanating from the Gauteng Spatial Development Framework, a study was commissioned by the Gauteng Department of Development Planning and Local Government to determine a provincial Urban Edge to be implemented.

The adoption of the urban edge/boundary, as an outcome of the GSDF, implied that the urban edge became binding on all provincial departments and local authorities. The provincial urban edge is supported by clear policy directives distinguishing the type of development permitted within and outside the boundary.

As stated before, this concept will not integrate Urban and Rural areas, but divide them. Although the Urban Edge has many positive outcomes, integration should also be set as priority in the development thereof.

Theoretical and practical examples globally suggest that the mere declaration of an Urban Development Boundary will not solve the problem of urban sprawl and pressure of expansion.

According to the Department of Development Planning and Local Government (2002), the outcomes of the management measures to compliment the boundary must seek to:

- Support appropriate densities and development intensification
- Promote and support public transport
- To ensure infrastructure provision
- Promote sustainable economic growth by promoting redevelopment & infill developments
- Support environmental management guidelines
- To combat urban sprawl
- To shift the focus to infill and redevelopment
- To create a compact city
- To promote relevant densities and densification
- To provide a mechanism for effective growth management
- To protect environmentally sensitive areas, agricultural land and open space
- To promote rural development beyond the Urban Development Boundary

3.3 Delineation of the Gauteng urban edge: (South Africa, 2002:16).

The actual delineation was based on one or a combination of the following factors:

- The existing border of urban areas
- Existing, approved development rights
- Natural features like rivers and mountains and other conservation areas
- Local authority boundaries
- Functional boundaries like major roads, strategic development areas
- The availability / lack of bulk infrastructure.

Figure 18 illustrates the Gauteng urban development boundary concept, with the spatial distribution of the master programmes. (Johanneburg , 2005:15)

3.4 Procedures and Requirements:

The land use development within the urban edge that is in line with the relevant local precinct plan, the Spatial Development Framework (SDF), Land Use Management Plan should be supported subject to the application following the procedure from the relevant legislation. (Els, 2004). The land use development that is rural in nature falling outside the urban edge should be supported subject to the application following the procedure from the relevant legislation; these land uses are as the following:

- Extensive Agriculture and Conservation Areas or Nature Reserves
- Tourism and Related Activities, as well as Recreational Facilities
- Farm Stalls and Home Industries
- Rural Residential Uses and Agricultural Holdings in specific areas
- Services primarily the local market and that is resource based

The land use development that are not in line with the above criteria falling outside the urban edge should be supported subject to additional motivation requested for things such as specific location, proof that there is no other suitable location, indication of the responsible party for bulk services, impact of the development on urban sprawl and on the environment.

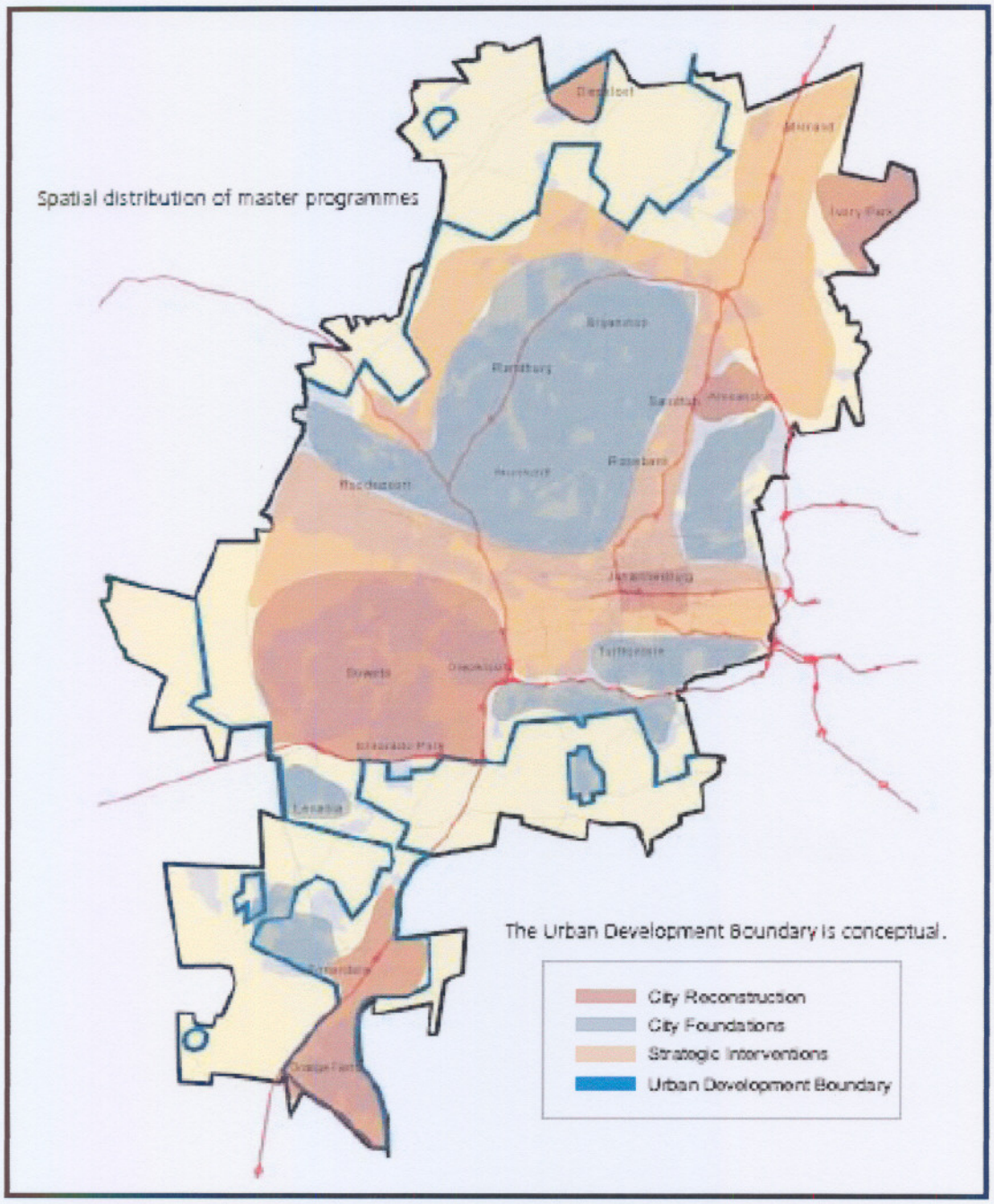


Figure 18: Urban Development Boundary
Source: Johannesburg (2005:15)

The implementation and management of the urban edge is the joint responsibility of both provincial and local government. (Van der Merwe, 2004 [Personal interview]).

Areas under pressure for land use development falling outside the urban edge the Metropolitan will submit an application to the MEC for Development Planning and Local Government for the amendment of the urban edge in that specific area, after receiving comments from the said MEC and other Provincial Departments the Metropolitan Municipality will in turn provide a decision.

The current situation of the Urban Edge, prescribe different developments inside and outside the Urban Edge. Inside the Edge there is higher densities, residential developments, industrial and commerce sectors, high traffic circulation and need for infrastructure.

Long-term density is part of the future plan within the edge. On the outside of the Edge, only rural developments are allowed. Land uses that are rural in nature would be more desirable, and should therefore be promoted outside the urban edge rather than inside it. (Gauteng, 2001:36).

3.5 Potential Concerns of the Urban Edge:

- By restricting land availability for new housing, growth boundaries can increase the price of land, and housing for the poor is a major development issue
- Land speculation inside the urban development boundary may increase, which could result in large pieces of land remaining undeveloped for extended periods of time.
- Owing to the latter, the cost of land can increase and so can the cost of developments.
- Owing to the densification principles that accompany the urban boundary, overall service delivery will have to change given land restrictions. Engineering services will have to be designed at new standards to accommodate highly densified urban areas. (Department Development and Planning, 2002:21).

4 Conclusion:

A matrix was, to illustrate the conclusions of the Gauteng case study. This will ensure an optimal comparison with the various international case studies.

Table 3: Matrix of the Gauteng case study

Spatial Issues	Gauteng
Spatial reality	Following the first democratic elections of 1994 and the scrapping of Apartheid, the Pro-Planning Approach, based on racial segregation, was scrapped and replaced with a Pro-Market Approach focussing on the restructuring of the South African Apartheid City. The newly elected Government of National Unity soon made its objectives regarding the future spatial structure of South African Cities clear, by way of the Land Development. These Principles are mainly aimed at promoting a future compact city with full integration of services, facilities and communities, and thereby also correcting the spatial distortions emanating from Apartheid.
Policy and Legislative frameworks	• Development Facilitation Act • Gauteng Planning and Development Bill • Gauteng Spatial Development Framework • Gauteng Strategic Public Transport Network
Connectivity corridors and mobility	Transport corridors exist to all the core urban environments. Development occurred along these corridors and this resulted in urban sprawl. Rail and road networks form the basic connectivity and mobility corridors. The introduction of the Gautrain concept will enhance these corridors even more.
Regional integration	All the municipalities within the region are integrated via the connectivity corridors. Transportation corridors link the various regions with each other. Integration of the area is important because of the economic function of Gauteng. Regional integration is based on economical and transport modes.

Nature of the urban edge	The urban edge is delineated on a map, but the implementation of this concept need a more detailed approach in order to function effectively. The boundary is not only a mechanism to change developments patterns, but is more so a tool to direct public spending towards changing the urban environment.Therefore it can be stated that the Gauteng urban edge is also a planning tool that will ensure a compact city, but only if it is implemented to its full potential.
Principles related to the urban edge	• Development rights • Natural features • Local authority boundaries • Availability of bulk infrastructure and services
Management	The current situation prescribes different land uses within and outside the urban edge. Development should adhere to the various legislative and policy frameworks that are applicable. Regional Land use is integrated within the urban boundary. The urban edge sets the types and future development regulations for the area, and this determines the regional land use patterns in the area. Land use change as one move to the outer parts of the urban area, and thus it can be said that the urban edge impacts on the total inclusive area.
Successes	• Regional integration • Compacting the urban environment • Directing urban growth
Failures	High-density residential developments are currently located on the periphery of the urban area, and this has great financial implications for residents in terms of traveling costs. Integration of green open areas need to be a priority. Implementation of this concept needs a detailed approach. Importance of this concept needs to be realized. Planning and development must be transformed to limit current urban expansion and ensure compact urban environments.

Spatial planning conclusions	The South African concept needs to integrate the green areas to a higher degree into the urban boundary and its principals. The Urban boundary is not only a line drawn on a map. One that illustrates the boundary of the civil services and the municipal potential, but must focus on more detail qualitative measures, such as compacting the urban area and creating a sustainable environment. Urban development and economic upliftment was the main focus in this developing country and especially Gauteng.
Recommendations	Environmental and spatial aspects need to be integrated in the current planning and development approach. A tool that can contain urban management must be implemented. Green areas need to be integrated for quality purposes. The urban edge is in fact an important planning tool for all future development, but municipalities, town planners and developers need to realize the greatness of this tool.

Source: Own creation (2005)

Section D

Conclusions and Recommendations

Chapter 7

Conclusions

1 The South African cities today.

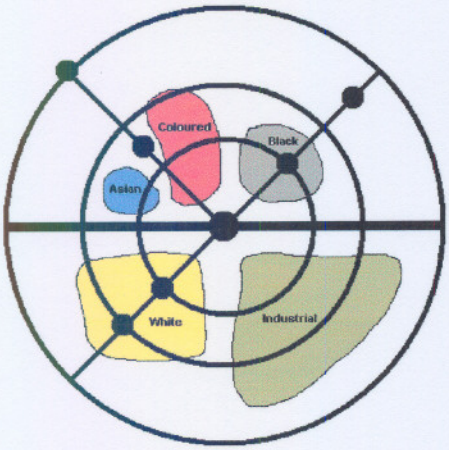


Figure 1: The South African Cities as known today.
Source: Own creation (2005)

The features of the divided urban structure can be summarized as follows: (See figure 1).

- Segregation of residential areas based on race
- The poor were separated from the social facilities
- Ineffective land use management systems
- Housing densities
- No integration
- Urban sprawl (Planact 1997:8)

The Relevance of the Compact City Approach:

The major social and environmental consequences that stem from the structure and form of South African cities suggest that the current pattern of urban development is entirely unsustainable, and that urban compaction is an essential condition for improved urban performance.

However, compaction is not a sufficient condition – it needs to be accompanied by substantial urban restructuring. Furthermore, directed residential infill, which is primary policy instrument for achieving greater compaction, cannot be applied ubiquitously – it needs to be used to reinforce positive structural change. The urban edge must be used as a planning tool to ensure this compact city approach. The benefits of this are seen in all of the European countries. South Africa must adopt these initiatives and think of future planning as a compact entity, not urban development that keeps expanding into the open, green areas.

Actually, this whole approach need to be transformed in the mind of all town planners in South Africa, and everyone must see the need for compacting the urban areas and upgrading the rural areas in an integrated process. (Dewar, 1992:5)

The problem in South Africa - Segmentation of all spheres. Specific spatial features include the segregation of residential areas based on race, buffer zones, segregation of amenities, separation from social facilities, disparities in the levels of services, disparities in terms of economic activities, ineffective and inefficient land use management systems, different housing densities and standards, need for urban rejuvenation and renewal, residential areas and places of employment not integrated, informal settlements developed on the urban fringe and the phenomenon of urban sprawl.

The structure of South African Cities:

The structure and form of South African towns and cities have been shaped historically by two ideologies:

- The first is the ideology of modernism. Dominant city planning and management systems and policies have been almost entirely imported from the UK, Europe and the US, and have strongly entrenched the urban characteristics of modernism.
- The second major form-giving ideology was the policy of apartheid. Spatially, the apartheid model had at its core the separation of racial groups.

Significantly, the precepts of modernism and apartheid were compatible. The combination of these forces has resulted in the three spatial characteristics of low-density, fragmentation and separation, which fundamentally describe South African cities and towns. Now it is time to integrate these structures into a sustainable, efficient urban form.

As the international study concluded – a compact approach. This will lead to upliftment of the natural environment and ensure greater accessibility to all the urban areas, linked with living areas.

The current sprawling, fragmented and separated form of South African towns and cities is entirely unsustainable. Greater compaction is essential.

There is an increasing national awareness of the need for this and of how it might be achieved technically, but there are a number of entrenched policies and practices which need to be changed if rapid improvement is to happen. The critical variable is political will. What is required, and what has not yet emerged, is a powerful political champion for compaction.

Perhaps the greatest single institutional stumbling block is that the distribution of national cabinet portfolios is fractured along sectoral line: urban issues, for example, are spread over a wide range of government departments such as Housing, Environment, Transport, Economic Affairs. The creation of an integrated urban ministry to consider urban development historically is arguably the single most effective measure to make rapid progress. (Mabin & Smit, 1997).

How do we manage to develop these sustainable, compact cities? With our planning tool: The urban edge. If it is implemented correctly, and managed in an effective way, this tool can be the answer to many town-planning questions. Intensive planning and development features lead to a quality environment in Europe, and South Africa need to follow in those footsteps. The Urban Edge will bring with it a whole process of intensive planning, land use management and future development initiatives.

These planning procedures must look at all issues that will be affected. The planning of the Urban edge concept is an enormous task, but implementing it, even bigger. Thus, there also need to be government structures to support this concept, in order to ensure the success as seen in the international case studies. The basis for the Urban Edge is already set in most towns and cities, but it is time to realize the importance of this concept, and to develop according to the principals of this concept.

Gauteng today – the urban edge concept.

In Gauteng today there are various positive, but also negative consequences that the urban edge has in the development sphere.

Table 1: Positive and negative points towards the urban edge

Positive points towards the Urban Edge:	**Negative points of the Urban Edge:**
Protect agriculture	Low cost housing that occur on the periphery
Ensure compact cities and higher densities	Accessibility
Enhance public transport	Municipal Edges aren't connected to each other

Source: Own creation (2005)

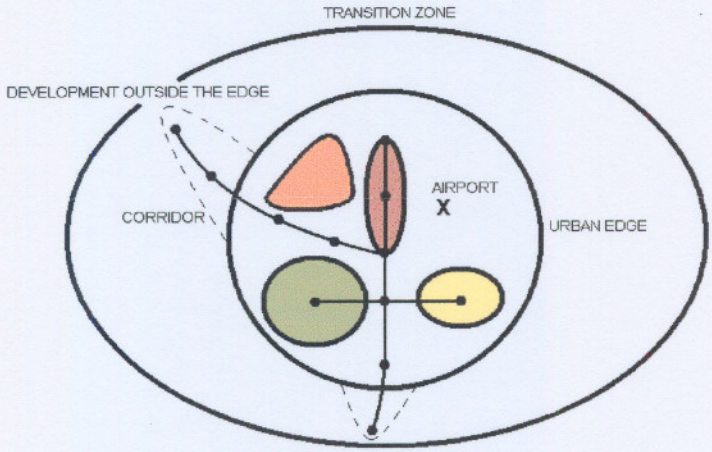


Figure 2: Diagram of the current development corridors in Gauteng.
Source: Schoeman (2004)

Figure 2 stipulates the current development in Gauteng. Corridors, especially transport corridors, do not enhance the importance of the Urban Edge, but follow its own path in order to link with another corridor outside the study area. As development increases next to this transport corridor, the whole built area will change and the compact city will loose its form. This development pattern should be reformed in order to optimize the efficiency and function of the Urban Edge. This pattern should focus on a North-South development, in order to develop the area as a whole, within the current East-West corridors. This will ensure more effective development within the area, without urban sprawl. (Figure 3).

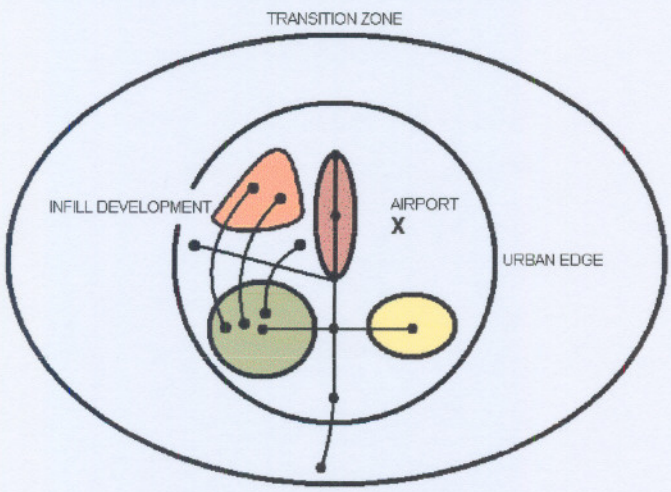


Figure 3: Development proposal for Gauteng Area
Source: Schoeman (2004)

Thus, the Urban Edge should not be a line on paper with a theoretical background, but a prominent planning tool, used to ensure the compactness of cities – as it is seen in the international case studies. The approach must be holistic and integrate all the different sectors and nodes.

2. The Urban Edge as a Transition Zone (An alternative approach)

The Urban Edge is a planning tool for compact cities. This means that even though the Urban Edge is demarcated and in place, there should still come a result from this initiative – more compact cities.

Thus, in the figure it can be seen that, if the city were to be divided into 3 sectors, the middle part (B) would be the most important area of the city. This would be the link between the urban and the rural areas. Therefore it can be stated that the urban edge is indeed also a transition zone, from dominant urban areas, to the rural areas of the outer city. This middle area must integrate the two spheres effectively as seen in figure 4.

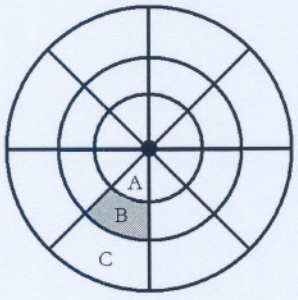


Figure 4: Transition zone and Urban Edge
Source: Own creation (2005)

This can be achieved through the implementing of concepts such as green belts or green wedges – as the example of the United Kingdom illustrates. We need see a different view of the South African cities. Not one where the city is in the core area, and residential high-income areas are on the periphery, but one where this middle area is improved in order to enhance the quality of the total area.

The transition zone will also strive to minimize urban sprawl, but in a manner that will enhance the quality of the environment and ensure sustainable and meaningful development in future years to come. The transition zone will focus on development in Area B.

This will attract development from area C inwards, to the core area and at the same time decentralize the high densities of area A. In order to make this approach work, the land-value of area B should rise and there should be enough recourses and infrastructure to back this development.

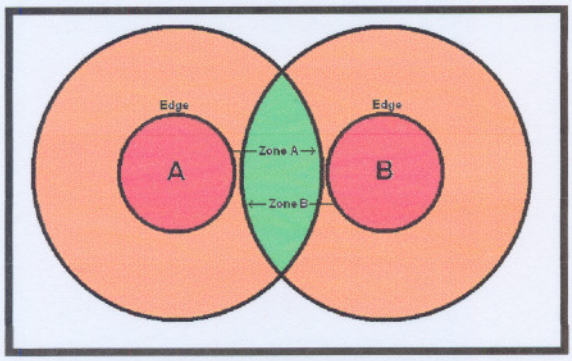


Figure 5: Effect of the Urban Edge as Transition zone
Source: Own creation (2005)

Figure 5 illustrates the effect that the transition zone will have on the surrounding area. If all the core areas (A and B) develop a transition zone, these zones will in the end overlap (as indicated in the grey area in the above figure) and thus would lead to more effective, sustainable development, because the core areas will be integrated through the transition zones. This will stimulate the area as a whole to develop more efficient, make more use of planning initiatives that will uplift the whole surrounding area to become sustainable, effective and qualitative.

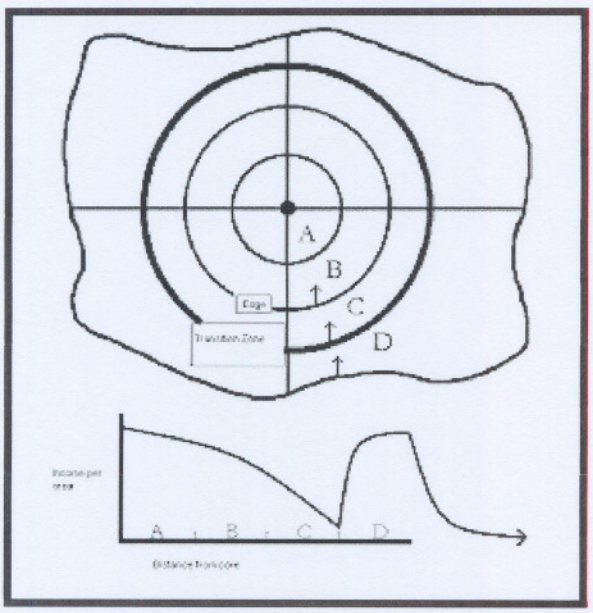


Figure 6: Effect of the Transition Zone and Urban Edge
Source: Own creation (2004)

This graph (Figure 6) illustrates the distance from the city centre in relation to the income per area. It is thus seen that the income decreases the further away one move from the core. It is proposed that the land-uses next to the Urban Edge (that is illustrated with the line between C and D) must be of a high value in order to avoid urban sprawl. This element of the Urban Edge will thus force the income/area to rise and that is seen on the graph.

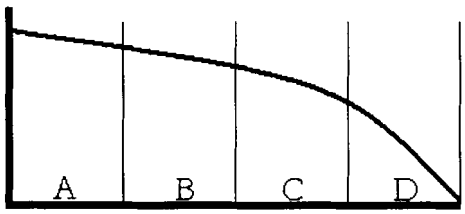
This area will integrate the rural and urban area because of the specific developments that will take place their and that will be evaluated by die National Spatial Development Perspective.

The National Spatial Development Perspective as prescribed by the Government is a top-down approach, and though the development of the Urban Edge and transition zone must be in line with the NSDP, there should be left more space for a bottom-up approach.

The National Spatial Development Perspective shows the areas of development, but the transition zone should define this area's in order to optimize integration and effective planning initiatives. Different zone of integration leads to efficient planning.

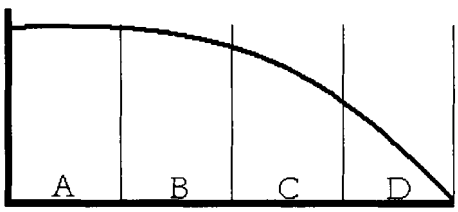
The transition zone increases the development possibilities. It is also an integration initiative. This zone will ensure more effective and efficient planning for the future and optimizing the ground use and development in and outside the Urban Edge, as it is known today.

It will integrate the transport sector, the housing sector and all the resources that are bound to the planning thereof.



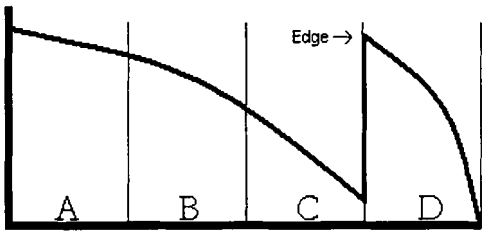
Economic Activity : Distance from core area

Economic activity is the highest at the core areas. As we move further away from the core, the economic activity is declining. The transition zone will stimulate economic developed, because of the zoning and equal distribution of economic sectors. Integration will be the answer to effective economical development.



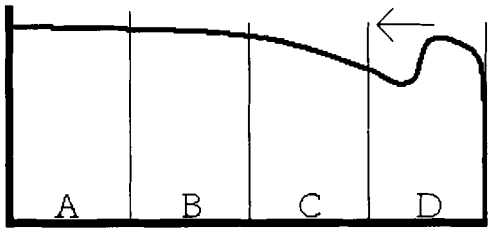
Density : Distance from core area

The regions are characterized by high densities in the core. The transition zone will focus on evenly distributing people, resources and material in the area in order to answer to the density problem. If the economic activity is more distributed, the density will follow.



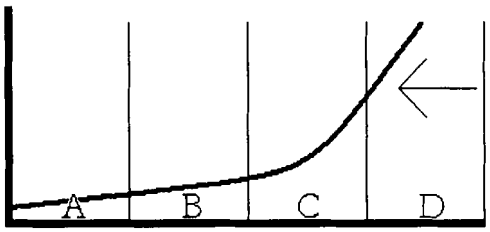
Ground-value as with Urban edge : Distance from core area

Declining of the ground-values is a factor of the distance one move away from the core. The ground in Area A has a high density, good infrastructure, and most important is supported by a transport network that will improve the quality of live. This is why ground is more expensive.



Ground-value as with Transition zone : Distance from core area

The transition zone will answer to this problem by integrating the area. Their now can be development in the whole transition area, as long as it falls in the right zoning. This will improve ground-values and uplift the surrounding area.



Force of attraction towards core area : Distance from core area

The transition zone will aim to achieve a force of attraction towards the core area in order to avoid urban sprawl. This force will be optimized in Area B which will be the integrate point between the City and the periphery area.

Figure 7: Graphs of urban development
Source: Own creation (2004)

This is the proposed planning initiative for the urban edge concept. The difficult part is to implement this concept effectively. Therefore the international case studies are of great benefit. They lead by example.

In this concluding chapter certain models are developed. It takes the form of the international footprints and integrates it into the local development environment of South African cities.

3 Integration of the Local and the International Urban Edge concept.

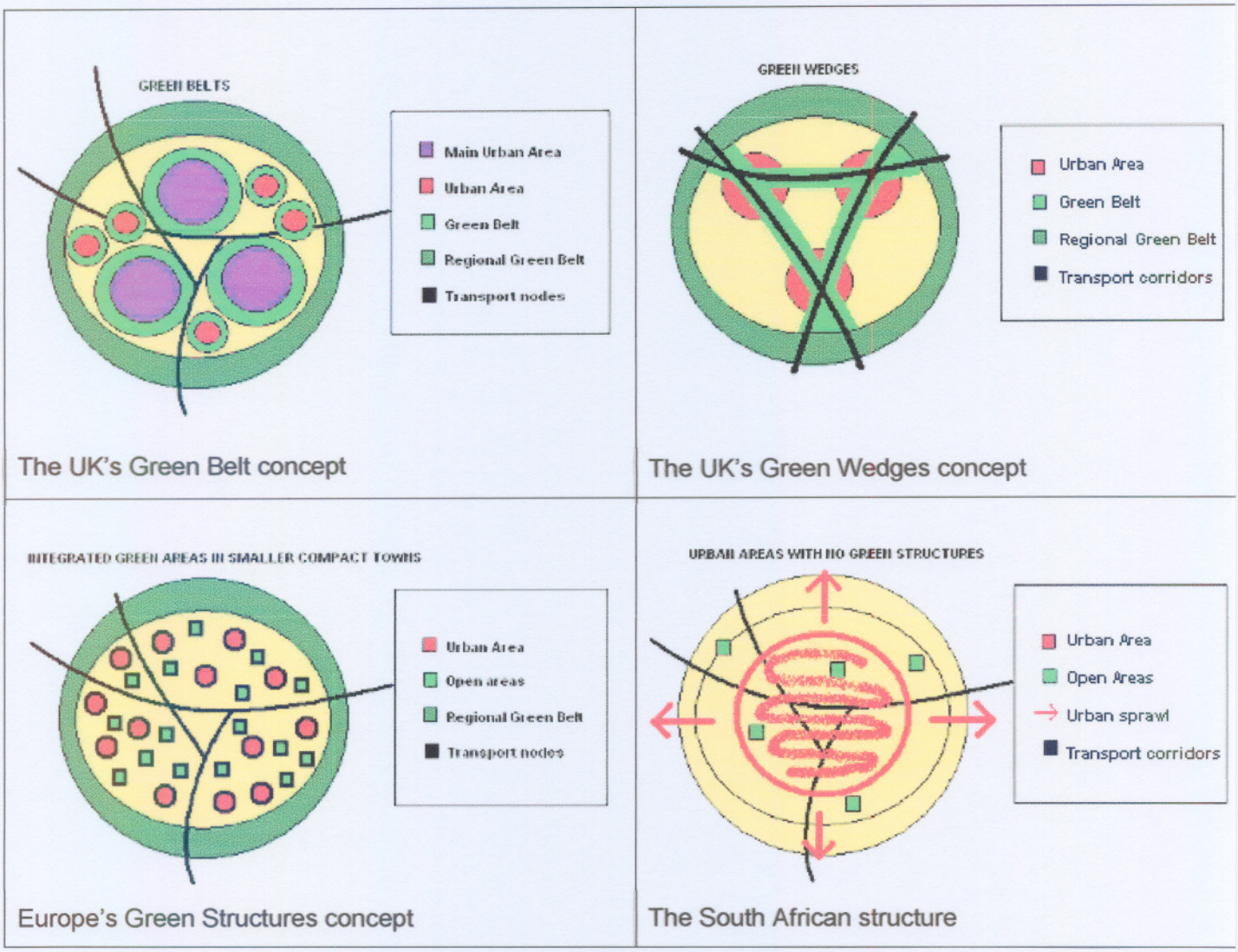


Figure 8: Models of the International Urban Edge concepts
Source: Own creation (2005)

The South African cities are known for the high-density developments within the core area. The development and density decrease as one moves away from the core. Thus, the development pattern will peak in the center of the graph and gradually decrease outwards. This decrease, however, is stretching further and further, because of the phenomenon of urban sprawl. Figure 8 illustrates the South African concept compared to the international concepts and implementation of the urban edge as a green belt, green wedge or green structure. The United Kingdom was able to transform this development pattern and increase the frequency of the open areas in relation to urban areas. This is illustrated by a wave on the graph. The Green Belts ensure more compact cities, each with enough open areas, and that reduce the high peak point of the urban area, as it is in the South African concept.

The lower this wave can be, the more effective and qualitative the area will be. (See figure 9). A smaller wave illustrates a better integration of urban and green areas. Thus, the Green Wedges are an even more effective planning tool to ensure compact cities that are integrated into the green structures. The urban development pattern is more stabilized and decentralized.

Small towns all with their own open spaces characterize the European urban development. Urban and rural areas are very good integrated. The cities are planned with special green structures. Urban sprawl is no problem in these cities, because of the importance of open areas that manifest already in the planning of towns.

They have smaller towns, but it is compact. It is surrounded by green areas and ensures a qualitative living environment.

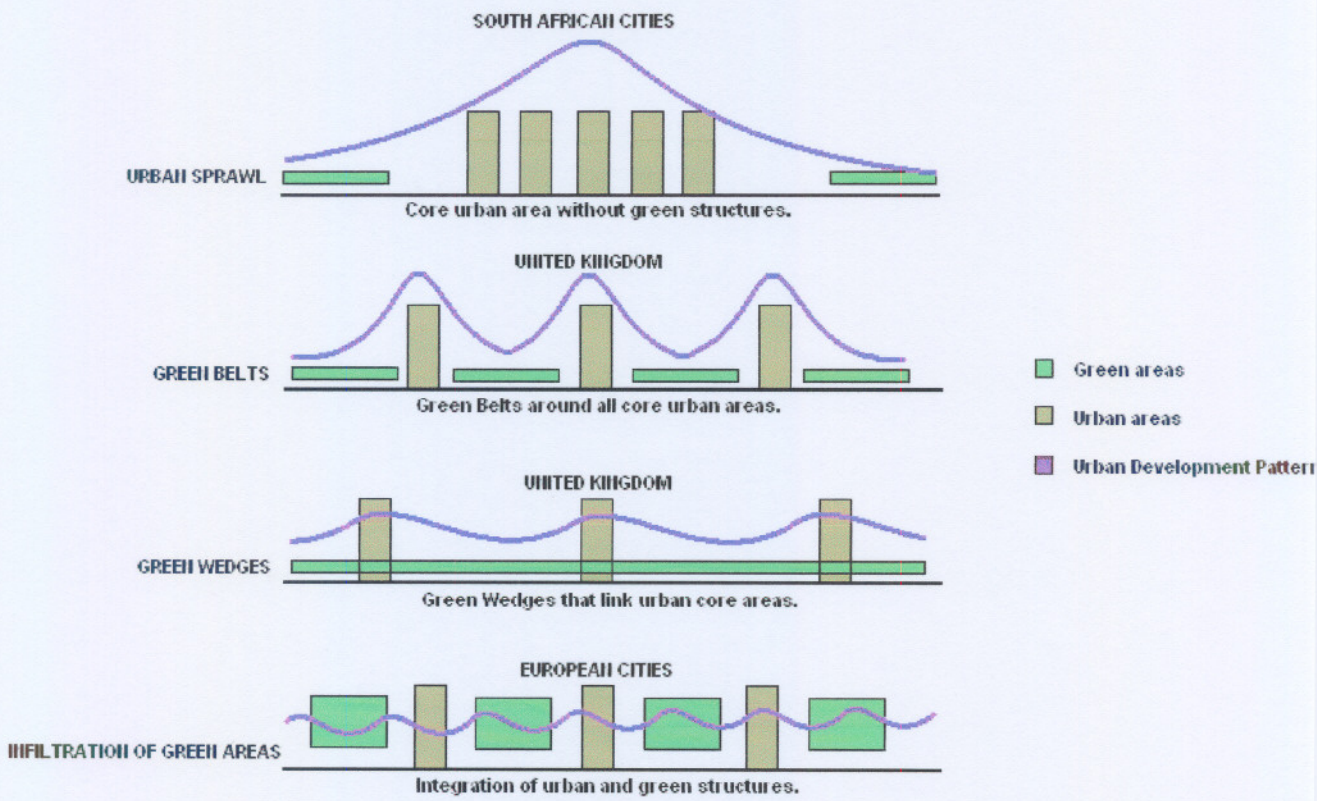


Figure 9: Graphs of the spatial development patterns
Source: Own creation (2005)

4 Conclusion.

The South African cities must integrate these concepts that are manifested internationally in order to effectively implement the urban edge. The urban edge is a planning tool for compact cities and serve this function.

Table 2: Matrix of the Gauteng case study

Spatial Issues	Proposed development for Gauteng
Connectivity corridors and mobility	Transport corridors needs to be enhanced. Development along the development corridors needs o be managed to limit urban sprawl.
Nature of the urban edge	The urban edge should answer to the problem of urban sprawl. The implementation of the urban edge must be a performed within a detailed approach that will ensure effectiveness and sustainability
Management	Policy and legislation should protect the urban edge and the urban environment from sprawl and urban expansion. Detailed development plans should be formulated.
Successes (Aim)	• Directing urban growth • Containing urban growth • Limiting urban sprawl • Integrating green open areas into the core • Transportation efficiency • Distance between work and living areas reduce • Social aspects enhance • Qualitative environment ensure
Spatial planning conclusions	The urban edge is a planning tool that can contain the urban environment and limit urban sprawl. This tool must be implemented into the metropolitan areas that are currently experiencing urban development pressure. The urban edge manifests in different forms. Green structures need to be integrated into the urban edge concept.
Recommendations	Environmental and spatial aspects need to be integrated in the current planning and development approach. Implementation of the urban edge is essential, as is the managing thereof.

Source: Own creation (2005)

Chapter 8

Spatial Planning Lessons Learnt

1. Spatial Policies learnt from the International case studies:

- Regional governance - either provincial or regional - is necessary to implement and manage an urban edge. (Gauteng, 2001:23)
- Public participation also leads to effective planning. South African planning procedures are a top-down approach. More attention should be placed on a bottom-up approach.
- The urban edge should form part of a comprehensive, multi-disciplinary provincial framework (policy document) that integrates all development disciplines
- Successfully implementation of the urban edge requires effective growth management strategies and focus on promoting concepts like infill development.
- Compact development is achieved through infill development.
- Conservation areas/sensitive natural environments are good features to define the urban edge as these areas form natural boundaries to the urban areas.
- Accessibility is a major concern for South African cities. You can travel all over in Europe with public transport. In South Africa, this is almost impossible, or very expensive. Transport planning must ensures good accessibility to the entire area.
- There is a need for green structures within the core center. This will ensure that people stay in the urban core area, and don't move to the periphery. South African is known for the open spaces that it has, but in the urban cores, there is a lack of these green areas, as developments take up all the open areas, for the economic and industrial benefit. Integrating the green areas , to ensure a sustainable, qualitative environment.
- A tool need to be implemented to ensure containment of the urban environment. Tools that was proven succesful in the international case studies – Green Belts, Green Structures and Green Wedges, can be spatial implemented in the local context.
- Green areas limit urban sprawl and enhance the quality of the total environment.
- Development axis will cross the urban edge, and therefore management is a dominant feature to protect the area from urban expansion along these corridors.
- We create and develop places for people to life and work in. The urban environment is thus more than a spatial framework. It has social, economic, environmental and qualitative aspects that need to be considered and integrated in a hoslictic manner.

A integrated matrix was formulated. All the different areas and case studies are presented, with the focus on the essential aspects, elements and impacts. (Table 1 and 2)

Table 1: Integrated matrix of the research issues: Comparison between the international empirical study and South Africa (National perspective)

Issues/Components	As manifested in the United Kingdom	As manifested in the Netherlands	As manifested in Belgium	As manifested in South Africa
Legislative Framework	PPG	Spatial Planning Act exists. Regional Plan. Structure plan. Land use plan. Urban renewal plan.	Spatial structure plans and spatial implementation plans.	DFA, Spatial Development Frameworks, Land Use Development Bill, RDP
Urban Edge concept	Green Belts, Green Wedges	Green Structures.Red and Green contours.	An urban development boundary.	Urban Edge concept
Significance of the concept	Contain urban environment	Pressure to expand. Identifying growth areas. Buffer zones. Safety for pedestrians and bicycles	Identifies an area for urban growth, concentration and infill.	Urban sprawl. Development pressure. Transport distances.
Spatial planning principles and spatial context	Positive land use	Green Structures Clustered deconcentration	Integrates all the urban spheres	The South African city has changed over the last decades
Social-economic objectives	No citizen rights. Environmental protection	Densities. Quality environments	Economic development and natural development forces give structure to the urban environment.	The poverty gap. Low income settlements are located on the periphery.
Spatial lessons learnt: Impacts on Town Planners	Visual separation. Natural edges	Space. Development planning.	Nature is an important issue in development planning.	See recommendations

Source: Own creation (2005)

Table 2: Integrated matrix of the issues/components: Comparison between the international empirical case studies and Gauteng. (Local perspective)

Spatial issues	Kentdowns	Havering	Breda	Utrecht	Uden	Antwerp	Gauteng
Spatial reality	Area of outstanding natural beauty	Pressure from London. Social deprivation.	Spatial-economic location.	Centre of the Netherlands.	The boundaries of Uden was set even before a urban edge was developed.	Urban fragmentation.	Pro-Market Approach focussing on the restructuring of the South African Apartheid City.
Policy and Legislative frameworks	Planning Policy GuidelinesLocal Development Framework	Havering Unitary Development Plan (UDP - 1993)	Landscape policy plan. Green structure plan. Regional ecological model	Master Plan. Vision Map. Green Structure Plan. Green Structure Plan	Provincial Spatial policy. Regional Plan. Structure Map.Action Plan	Spatial structural plan. Spatial implementation plan	Gauteng Strategic Public Transport Network. Gauteng Spatial Development Framework
Connectivity corridors and mobility	Transport and infrastructure corridors with national interest	The transport network	Infrastructure corridors and transport	The new station	The railway and roadnetworks	Road networks are well developed	Rail and road networks
Regional integration	Sustainable natural environments	Main corridor to London city	Spatial-economic location	Infrastucture corridors.	Pentagon between Eindhoven, Nijmegen and Den Bosch.	Not of much importance	Regional integration is based on economical and transport modes.
Nature of the urban edge	Green Belts	Green Belts	Green structures	Green structure planning with green networks	Naturally formed	No development control measures	The boundary change developments patterns, direct public spending
Principles related to the urban edge	Environmental protection Natural boundaries formed by the topography. Quality enhancement in the total area.	Limit outward sprawl Coalescence of towns	Nodal development	Nature back into the core urban areas	Topography. Land uses. Open areas	Ensure open areas and parks. Established around the current ports	Linked in a logical way. The urban boundary brings with it a wide range of changes. planned for on an ongoing basis and in an integrated manner.
Management	Sustainable and environmental friendly.	Environment efficiency	Red-green contours are developed. Definite green structures are present	The Green structure planning	Detail development plans	Natural forces	Regional Land use
Successes	Environmental management and beauty. More environmental rights than citizen rights	Permanence of Green Belt Holistic approach	Greening the city. Upgrading the quality. Nodal development points	Development of green networks. Integration. Spacious city centre	Natural edges. Intensive development. Integrate	Transition zone in the urban area exist. No strict development control measures.	Urban containment
Failures	No social focus.	The plans are guidelines, not legal	Traffic congestion	Regional axis is not bound to the urban edge	Green structures are less important	Social impacts. Fragmented city	High-density residential developments located on the penphery of the urban area. Integrate the green areas
Spatial planning conclusions	Environment determines the spatial pattern	London area overpower	Nature. Nodal points	Green structure planning integrates all spheres	The natural environment determines the future development initiatives.	There are no strict development and spatial planning initiatives and this can be seen in the fragmented urban areas.	Focus on qualitative measures, such as compacting the urban area and creating a sustainable environment.
Recommendations	Holistic development	Balance	Greening the city. Identifying development nodes	Linked in a green network	Natural edges	Natural forces will structure the urban environment.	Town planners and developers need to realize the greatness of this tool.

Table 2: Integrated Matrix of the different case studies

Source: Own creation (2005)

2. Recommendations:

Integration of the International concepts of Green Belts, Green Wedges and Green Structures are possible. This would require intensive planning of the development area, but also directly lead to sustainable, qualitative environments. A model to illustrate the integration of these concepts is presented in Figure 1. This is only to illustrate how the Green Belt will manifest on a National level, around the current urban environment, the Green Wedges on the outer parts of the region and integration of Green Structures within the urban core.

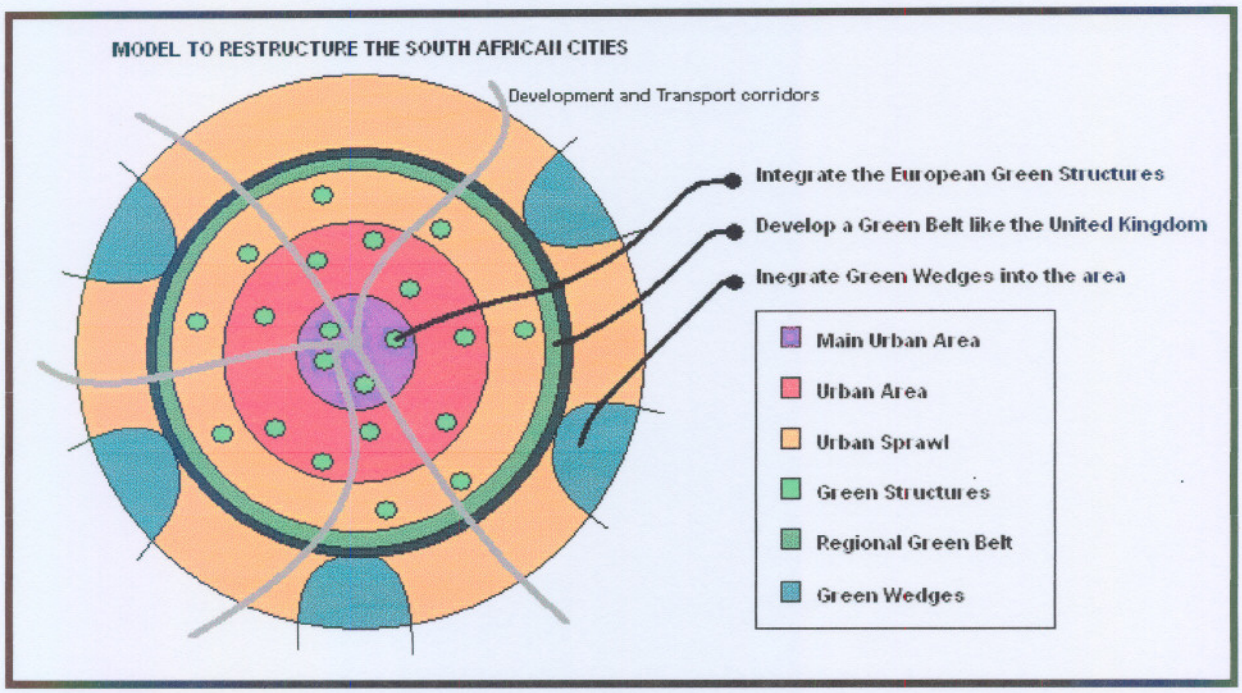


Figure 1: Integration of the International concepts in the current city structure.
Source: Own creation (2005)

The impact of this model can also be evaluated on a graph. (Figure 2). The new development initiative is compared to the current trend. It can be seen that the integration of green areas (Green structures such as these in Europe) will decrease the urban development peak at a specific area, and decentralize this into the whole area. (Fase 1).

The urban development will also decrease when the Green Belt concept is introduced (Fase 2), and decrease even more when Green Wedges are integrated. (Fase 3). Fase 2 and 3 can be integrated and illustrated as the transition zone – a concept to transform urban environment to rural environment.

The urban edge concept that currently exists in South Africa must be transformed and injected with this creative approach. This planning tool can be of great benefit once the potential is realized. The urban edge can manifest in different forms, but proven to be successful in the international case studies are the Green Belts, Green Structure and Green Wedges.

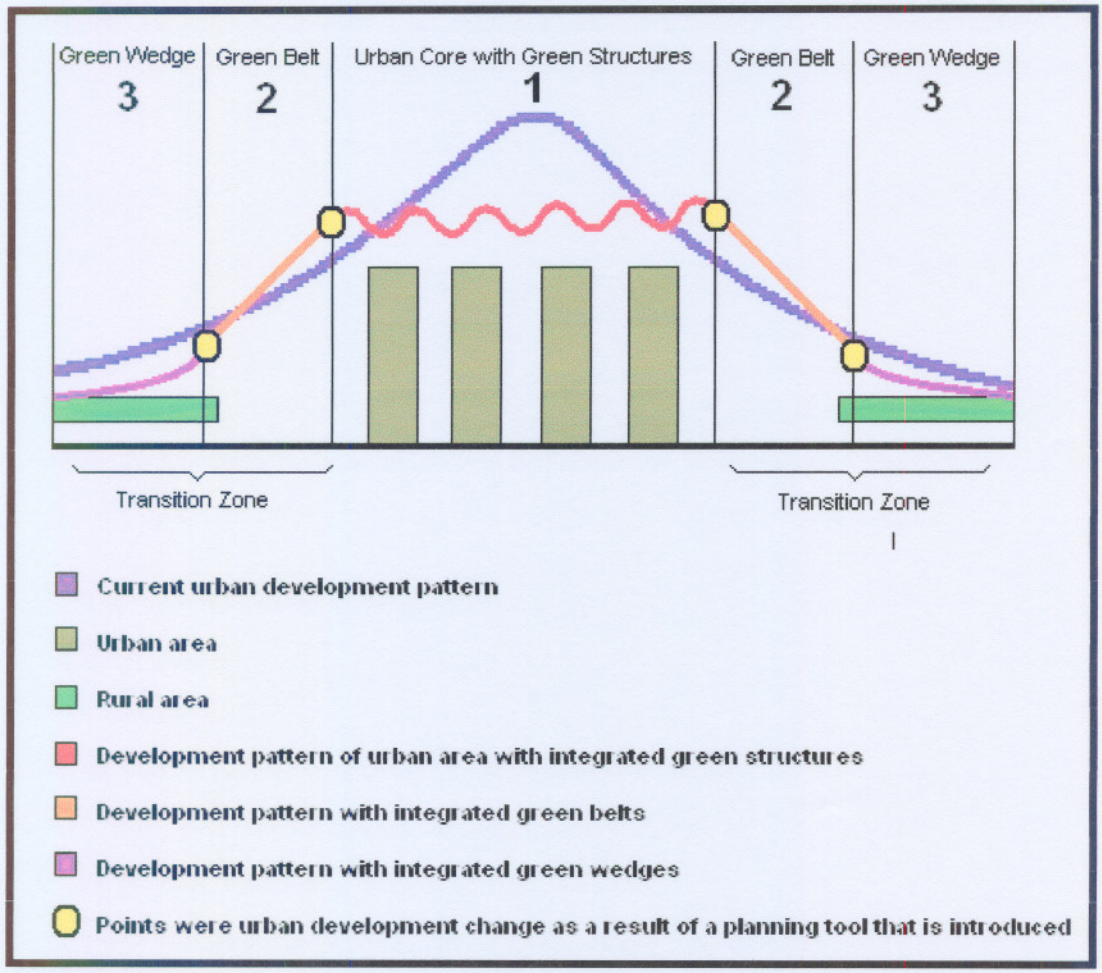


Figure 2: A graph illustrating the current development pattern versus the proposed international pattern
Source: Own creation (2005)

If this concept is implemented in the local level, the form of the current urban environment will change. The urban structure as illustrated by Schoeman (2004:5) was restructed by the researcher, in order to incorporate all the elements and impacts as stipulated in the international studies. The different racial settlements still exists, as well as the basic city structure. This is however, now transformed into a more sustainable, and effective form. The development nodes and corridors will be enhanced by the implementation of the Gautrain Rail network. The urban edge has a more definite role in containing the urban environment. This concept is also improved as green structures are integrated into the core urban area and the green wedges on the outer part of the city that will restructure development growth. (Figure 3)

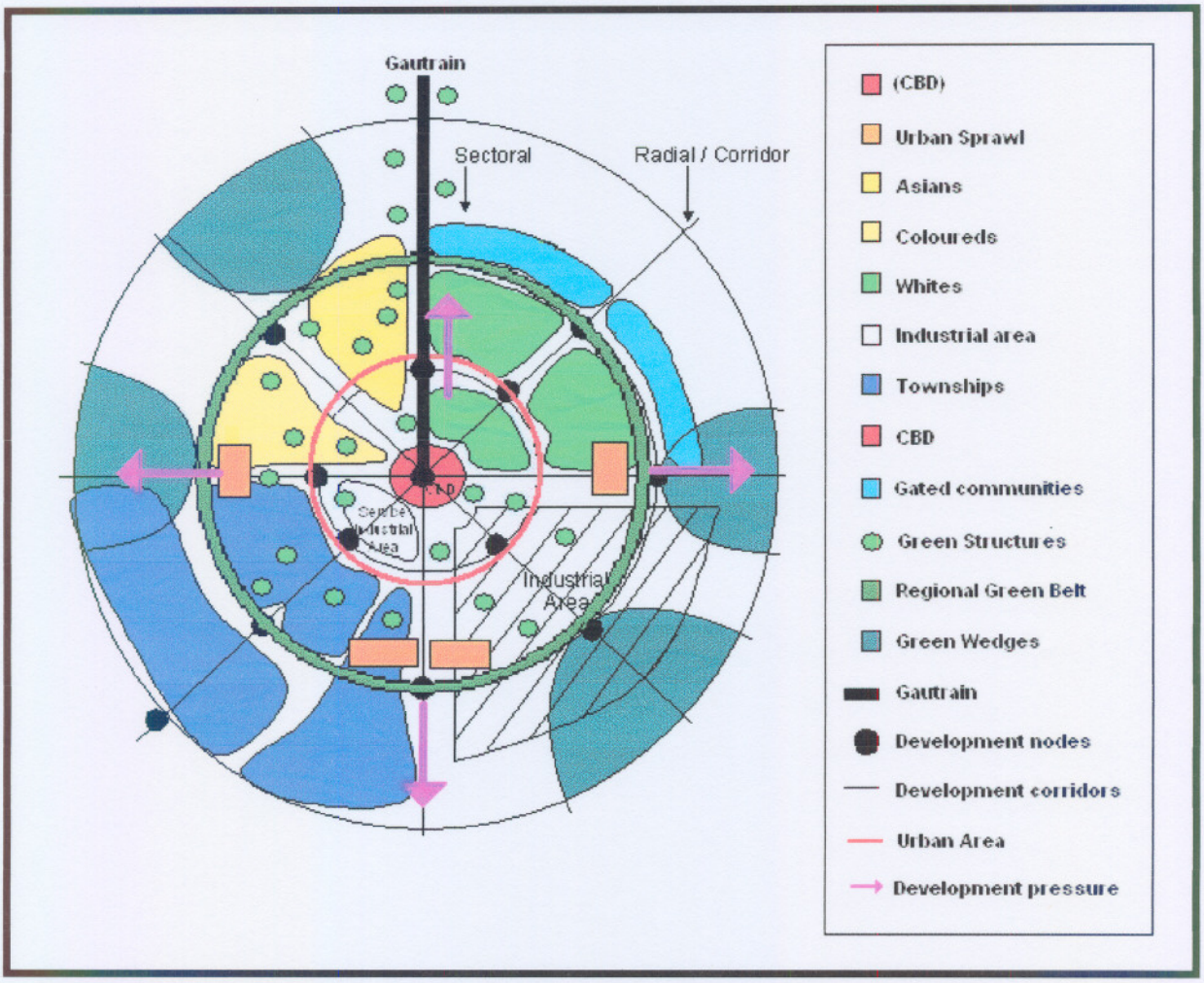


Figure 3: The proposed urban environment with the impacting elements of this research
Source: Own creation (2005)

The main social focus of this initiative is to create better living conditions for all South Africans, this include bringing the work and home areas closer together, improve accessibility, maintain a compact city with economical and social functions and integrate it with the open areas and nature, all in such a manner that it would be sustainable for the future years to come.

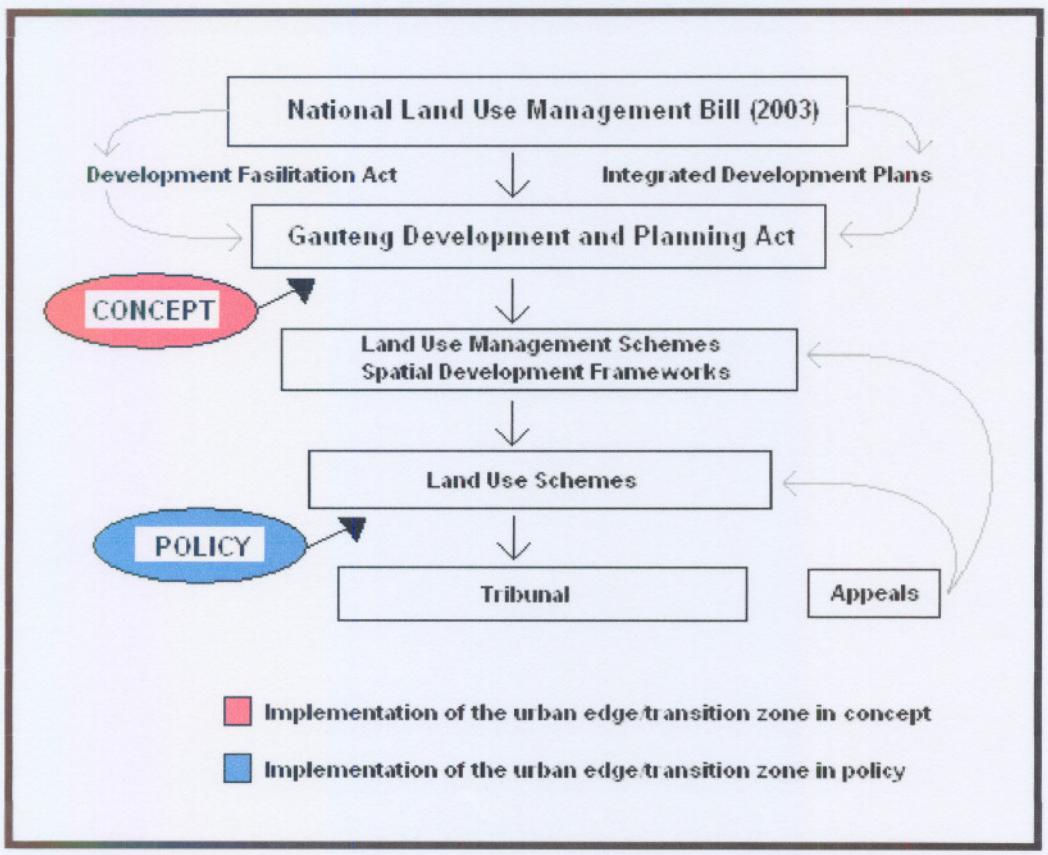
The main spatial focus of this initiative is to contain urban growth and limit urban sprawl. This will direct the growth of metropolitan areas to a more sustainable form. Integration of green areas will enhance the quality of the urban environment and at the same time assist the urban edge in containing the urban environment.

It is possible with the implementation of a tool that will contain the urban environment and ensure enhancement of the quality of the area. The phenomenon of the urban edge will represent this tool for compact cities.

The implementation of this concept must be integrated into the current planning and development structure of South Africa. The Land Use Management Bill represents the national objectives for development. Provincial legislation provides the Gauteng Development and Planning Act. Spatial Development Frameworks and Land Use Management Schemes are formulated in terms of these objectives and legislation. Land use schemes represent a detailed development structure that can be referred to the Tribunal. The urban edge phenomenon must be implemented as concept and policy. (See table 3).

The proposed implementation is to describe the concept of the urban edge in the Gauteng Development and Planning Act. The implementation of the urban edge policy should function under the Land Use Schemes. National and Local spheres will then be transformed by the urban edge concept. The importance of this concept will then be enhanced. An idealistic approach would be to transform the urban edge concept to a rigid legislative imperative, more than just a policy statement that is seen as one of the many tools that government uses to achieve the principles of integration and compaction that are entrenched in the Development Facilitation Act. The urban-edge-planning-tool must ensure sustainable compact cities.

Table 3: Mandate to implement conceptual findings related to the urban edge/transition zone.



Source: Own creation (2005)

Appendix

1. Location Maps



Figure 1: The Netherlands



Figure 2: Belgium



Figure 3: The United Kingdom

Source: Google Pictures (2005 [Web:] www.hostels-europe.com/info-countries)

Personal Interview: (As per individual interview or email interview).

Questions:

1. What are the detemining factors for the delineation of the urban edge?
2. What policy and legislation frameworks impacts on the concept of the urban edge?
3. What are the objectives of the urban edge?
4. Does the current urban edge ensure sustainability?
5. Does the current urban edge ensure urban containment?
6. How does the urban edge impacts on other development and spatial spheres?
7. Is the implementation of the urban edge succesful?
8. What alternatives can be developed for the urban edge?
9. How does the urban edge structure the spatial planning environment?
10. Can this tool ensure qualitative environments?

List of Respondents:

Name	**Institution**	**Place**
Stella Bandu	Town Planner in the United Kingdom at Kentdowns Local Municipality	Kentdowns
Willemien Faling	Town Planner in Netherlands, region Den Haag	Den Haag
Stan Geertman	Human Geography and Planning in the Netherlands	Utrecht
Hans Jooste	Head of Town Planning, Uden local municipality in Netherlands	Uden
Martin Landre	Nederlands higher education institution in Breda	Breda
Anita Van Delden	Town Planner at the Provincial Planning Department of Brabant	s'Hertogenbosch
Ronald Van Lanen	Geographic Information System company in Utrecht (GIS)	Utrecht
Prof Calie Schoeman	Professor North West University South Africa (Town Planning)	Potchefstroom
Nicola Van der Merwe	Plan Associates Town Planning in Pretoria	Pretoria
Daan Visser	Gauteng department of transport, roads and works	Johannesburg
Andrew Barker	Town and Regional Planner in South Africa, Gauteng	Potchefstroom

Matrix to compare the National spatial development issues:

Important research issues	United Kingdom	Netherlands	South Africa
Spatial planning principles and spatial context			
Significance of the concept			
Spatial lessons learnt: Impacts on Town Planners			
Legislative Framework			
Social-economic objectives			
Urban Edge concept			

Matrix to compare the spatial issues as evaluated in the different case studies:

Spatial Issues	Kentdowns	Havering	Breda	Utrecht	Uden	Antwerp	Gauteng
Spatial reality							
Policy and Legislative frameworks							
Connectivity corridors and mobility							
Regional integration							
Nature of the urban edge							
Principles related to the urban edge							
Management							
Successes							
Failures							
Spatial planning conclusions							
Recommendations							

Bibliography

References

1. ADMINISTRATIE PLANNING EN STATISTIEK. 2000. Vlaamse Regionale Indicatoren, Ministerie van de Vlaamse Gemeenschap, Administratie Planning en Statistiek, Brussel.
2. ANTWERPEN. 2003. Spatial Structure plan. Streamlining Antwerp. October 2003. [Web:] http://www.ruimtelijkstructuurplanantwerpen.be/downloads/infobrochure_1_EN.pdf [Date of use: 3 October 2005].
3. BANDU, S. 2005. Vocal sharing with author. England. [E-mail to:] Pekelharing, E.J. (Juanee800@hotmail.com). June 2005
4. BARKER, A. (abarker@icon.co.za) 2004. Urban Fringe Information. [E-mail to:] Pekelharing, E.J. (12248029@puknet.puk.ac.za). Apr 8.
5. BEHRENS, R & WILKINSON, P. 2003. Housing and Urban Transport Policy and Planning in South African Cities: A Problematic Relationship? (In Confronting Fragmentation: Housing and Urban Development in a Democratizing Society. Editors: Philip Harrison; Marie Hurchzermeyer and Mzwanele Mayekiso. University of Cape Town Press.
6. BERRY, B. J. L. (ed.) 1993. The multi-nodal metropolis: special issue. *Geographical Analysis (23).* 82p.
7. BOND, P. 2003. The Degeneration of Urban Policy after Apartheid (In Confronting Fragmentation: Housing and Urban Development in a Democratizing Society. Editors: Philip Harrison; Marie Hurchzermeyer and Mzwanele Mayekiso. University of Cape Town Press.
8. BREDA. 2005. Gemeenskapraad Breda. [Web:] http://www.breda.nl. [Date of use: Jun 2005].
9. BREHENY, M. 1992. The compact city: an introduction, *Built Environment,* 18(4), p241-246.
10. BRUECKNER, J.K. 2000. Urban Sprawl: Diagnosis and Remedies. International Regional Science (SAGE Publications) Review, Vol. 23, No. 2. p120.
11. BRUIJN, M.W.J. & WASSINK, Y.M. 1988. Utrecht aan de Werf (Utrecht along the Wharf). Historische Reeks 9. Matrijs, Utrecht
12. BUIJS, A.E. & VOLKER, C.M. 1997. Publiek draagvlak voor natuur en natuurbeleid, DLO Wageningen. Report 546.
13. BURGESS, E.W. 1925 The Growth of the City, in *The City.* (Edited by PARK R.E, BURGESS E.W, & McKENZIE R,D.) University of Chicago Press, Chicago. [Web:] http://www.geog.umontreal.ca/geotrans/eng/ch6en/conc6en/burgess.html. [Date of use: 10 Jul 2005].
14. CAMPAIGN to protect rural England. CPRE. Campaign to protect Rural England. 2005. [Web:] http://www.cpre.org.uk/compaings/planning/greenbelts [Date of use: 2 Nov 2005].
15. CARTER, H. 1976. *The study of urban geography*, Arnold, London, 398p.
16. CARTER, H. 1995. The Study of Urban Geography, Fourth Edition, London: Arnold, p. 126.
17. COLBY, C.C. 1933. Centrifugal and Centripetal Forces in Urban Geography, Annals of the Association of American Geographers. Vol XXIII(1). March. 21p.
18. COPPENS, T. 2005. Historic cities. [Web:] www.historisch-toerisme-bureau.nl. [Date of use: 10 Nov 2005].
19. DEPARTMENT of Agriculture. *See* SOUTH AFRICA. Department of Agriculture.
20. DEPARTMENT of Development Planning and Local Government. *See* SOUTH AFRICA. Department of Development Planning and Local Government.
21. DEPARTMENT of Development Planning and Local Government. *See* SOUTH AFRICA. Department of Development Planning and Local Government.
22. DEPARTMENT of housing. *See* SOUTH AFRICA. Department of housing.
23. DEPARTMENT of Land Affairs *See* SOUTH AFRICA. Department of Land Affairs.
24. DEPARTMENT of Land Affairs. *See* SOUTH AFRICA. Department of Land Affairs.
25. DEPARTMENT of Land Affairs. *See* SOUTH AFRICA. Department of Land Affairs.
26. DEPARTMENT of Land Affairs. *See* SOUTH AFRICA. Department of Land Affairs.
27. DEPARTMENT of Public transport, Roads and Works. *See* SOUTH AFRICA. Department of Public transport, Roads and Works.
28. DEPARTMENT of Public transport, Roads and Works. *See* SOUTH AFRICA. Department of Public transport, Roads and Works.
29. DEWAR, D. 1992. Urbanisation and the South African city: a manifesto for change, in: Smith, D.M.(ed.), *The apartheid city and beyond: Urbanisation and social change in South Africa*, Routledge, London, pp.243-252
30. DEWAR, D. 1992. *Urbanization and the South African city: A Manifesto for Change,* University of Cape Town, Urban Problems research Unit, Cape Town.

31. DEWAR, D. 1994, Urban planning, shelter strategies and economic development, in: Tomlinson, *Urban development planning. Lessons for the economic reconstruction of South African cities*, Witwatersrand University Press, Johannesburg, pp. 231-242
32. EKURHULENI (South Africa). 2003. Urban Edge Policy. Prepared by Department Development and Planning. Ekurhuleni. 11p.
33. ENCARTA. Gauteng. Microsoft Encarta 1997 Encyclopedia. 1993-1996. Microsoft Corporation. [CD-Rom].
34. FALING, W. 2005. Vocal sharing with author. Netherlands.
35. GARREAU, J. 1991. Edge City: Life on the New Frontier. New York: Anchor Books.
36. GAUTENG (South Africa). 2003. Urban Development Boundary and Growth Management Strategy. Johannesburg (*In* Final Report June. Refinement of the Urban Development Boundary strategy and its implications for growth management).
37. GAUTENG (South Africa). 2003a. Gauteng Strategic Public Transport Network. (GSPTN). [Web:] http:// www.transportandpublicworks.gpg.gov.za [Date of use: 10 March 2004].
38. GAUTENG (South Africa). 2005. Official website of the Gauteng Province. [Web:] http://www.gpg.gov.za [Date of use: 2 April 2005].
39. GAUTENG PHOTOS. [Web:] http://www.photos.co.za/gp/photos/html [Date of use: 1 November 2004.]
40. GAUTENG PROVINCIAL GOVERNMENT (South Africa). 2000. Gautrain. Gauteng SDI Rail Link. (*In* Gauteng Department of Transport and Public Works. Planning and Implementation study with inception report). Jun. 80p. [Web:] http://www.gautrans.co.za [Date of use: 20 Oct 2005].
41. GAUTENG PROVINCIAL GOVERNMENT (South Africa). 1998. Gauteng Transport Framework Act. Act no 8 of 1998. Provincial Printer: Pretoria.
42. GEERTMAN, S. 2005. Vocal sharing with author. Human Geography and Planning, Utrecht. [s.geertman@geo.uu.nl].
43. GEMEENTE UTRECHT. 1990. Groenstructuurplan. (Green Structure Plan), Utrecht.
44. GEMEENTE UTRECHT. 1995. Structuurvisie Utrecht (Spatial Structure View), Utrecht.
45. GEMEENTE UTRECHT. 1997. Het Groene Web. (The Green Web). Utrecht.
46. GEMEENTE UTRECHT. 2000. Groen in en om de stad (Green areas in and around the city), Utrecht.
47. GEMEENTERAAD UDEN. 2001. Struktuurvisie Plus Uden/Veghel. Mei 2001. [Web:] http://www.brabant.nl/Applicaties/Search.aspx?qa=uden%2fveghel+structuurvisie. [Date of use: 10 Jun 2005].
48. GOOGLE PICTURES. 2005. Antwerp. Flanders Region. Gauteng. Havering. Kentdowns. Urban sprawl. [Web:] http://www.google.com/images. [Date of use: 20 Oct 2005].
49. GOTTMAN J. 1964. Megapolis: The urbanized North-Eastern seaboard of the United States. M.I.T. Press, Cambridge. Mass.
50. GREATER JOHANNESBURG METROPOLITAN COUNCIL. 2005. [Web:] http://ceroi.net/reports/johannesburg/csoe/default.htm). [Date of use: 1 Jul 2005].
51. GSDF. Gauteng Spatial Development Framework. 2000. Gauteng Province. [Web:] http://www.gpg.gov.za [Date of use: 10 April 2004].
52. HAJER, M. 2000. Spatial Planning in the Network Society. European Planning Studies (2000) 8 nr.3: 337-355.
53. HALL, P. 1966. The World Cities. London: World University Library. 228p.
54. HANEKOM, T. (TrishH@gpg.gov.za) 2004. Gauteng Edge. [E-mail to:] Pekelharing, E.J. (12248029@puknet.puk.ac.za). May 8.
55. HARRIS C.D. & ULLMAN E.L. 1945. The nature of cities. American academy of political and social science, Vol. 242, November. 17p. [Web:], http://people.hofstra.edu/geotrans/ eng/ch6en/conc6en/sectornuclei.html. [Date of use: 3 Oct 2005].
56. HAVERING LOCAL GOVERNMENT. 2005. Havering local Government. [Web:] http://www.havering.gov.uk [Date of use: Jun 2005].
57. HINSSEN, P.J.W. 1993. Planning, gebruik en beheer van de stedelijke groene ruimte. (Planning, use and management of urban green areas). IBN-DLO, Wageningen.
58. HOYT H. 1939. The structure and growth of residential neighbourhoods in American cities. Federal Housing Authority, Washington D.C. 122p.
59. IDP NERVE CENTER. 2004. The Presidency produces the National Spatial Development Perspective. April 2004. [Web:] http://www.idp.org.za. [Date of use: 5 Jul 2005].
60. JENKS, M. & BURGESS, R. 2000. Compact cities: Sustainable Urban Forms for Developing Countries. London: Spon Press. 356p.

61. JOHANNESBURG. (South Africa). 2005. Official Website of Johannesburg. [Web:] http://www.joburg-archive.co.za/city_vision/spatial_dev/9-glossary.pdf. [Date of use: 1 Nov 2005].
62. JOOSTE, H. 2005. Vocal sharing with author. Netherlands, Uden.
63. KENT COUNTRY COUNCIL. 1996. *Kent Structure Plan 1996*, Maidstone, KCC, para 3.106, policy MK5.
64. KENTDOWNS MUNICIPALITY. 2003. Kent Structure Plan: Deposit Plan. Sep 2003. [Web:] http://www.kmsp.org.uk/chapter04.html#09 [Date of use: 2 Nov 2005].
65. KENTDOWNS MUNICIPALITY. 2005. Local Government Kentdowns. [Web:] http://www.kentdowns.org.uk. [Date of use: Jun 2005].
66. LANDRE, M. 2004. Vocal sharing with author. Breda, Netherlands.
67. McCARTHY, J.J. & SMIT, D.P. 1984. South African City: Theory in Analysis and Planning. South African Geography and Environmental Studies Series. University of Natal, Durban.199p.
68. MEEUS, J.H.A. & BORTS, T.J.M. & KUIPERS, M.A.M. 1989. Van groenstructuurplan tot groenbeleid; analyse van expliciet geformuleerd groenbeleid in 18 gemeenten. (From Green Structure Plan to green area policy; an analysis of explicit green area policy in 18 municipalities.) De Dorschkamp, Wageningen.
69. MEEUS, J.H.A. 1989. Gemeentelijk groenbeleid (Municipal green area policy). Groene reeks 13. Published under joint responsibility of the Ministry of LNV (Agriculture, Nature and Fisheries) and VROM (Housing, Spatial planning and the Environment) by CAD &endash; Stedelijk Groen, Wageningen.
70. MENS EN RUIMTE. 1999. Maatschappelijke Waardering van Groen en Landschap, commissioned by Ministerie van de Vlaamse Gemeenschap, AMINAL, Afdeling Bos en Groen, unpublished report .
71. MINISTRIE LNV. 1990. Natuurbeleidsplan. (Nature Policy Plan) The Hague, Ministerie van LNV, Den Haag.
72. MINISTRIE VROM. 1999. Grote stedenbeleid en Groenimpuls; Groen in en om de stad (Big cities policy and incentives for green areas in and around the city) Sdu, Den Haag.
73. MINISTRY OF HOUSING. 2001. Spatial Planning and Environment. National Spatial Planning Agency. Jun 2001. 5th National Policy Document on Spatial Planning 2000/2002.
74. NSDP (National Spatial Development Perspective) 2003. Spatial Guidelines for infrastructure Investment and Development. 43p. The Presidency. 18 March.
75. ODPM. Office of the Deputy Prime Minister. 2005. [Web:] http://www.odpm.gov.uk. [Date of use: 10 Nov 2005].
76. OED (Oxford English Dictionary). 1995. Oxford: At the Clarendon Press.
77. ORANJE, M. 2002. South Africa's National Spatial Development Perspective: Learning from and Comparing to International Precedents. University of Pretoria. March 2002.
78. PACIONE, M. 2005. Stad en Land. Urban Geography, a global perspective. 2nd ed. Routledge: London. [Web:] http:// www.ru.nl [Date of use: 1 Jul 2005].
79. PATRICIOS, N.N. 1973. The nature of metropolitan areas. Metropolitan Planning: Information Paper 1. Department of Town and Regional Planning: University of the Witwatersrand. April. 49p.
80. PEKELHARING E,J. 2004. The impact of the Urban Edge as a Transition Zone with special reference to the North-West sector of Gauteng. Potchefstrooom: North West University. (Thesis – B.Art et Scien.) 141p.
81. PELFRENE, E. 2000. - In- en uitwijking in Vlaamse steden en gemeenten. Analyse naar leeftijd en ruimtelijke structuren voor de periode 1996-1998, Stativaria nr. 24, juni 2000, Ministerie van de Vlaamse Gemeenschap, Administratie Planning en Statistiek, Brussel.
82. PERROUX, F. 1955. Development Economics Policy: Selected Readings. London: George Allen.
83. PFISTER, J. 2004. Using landscape metrics to create an index of forest fragmentation for the state of Maryland. Master Thesis, Towson University. [Web:] http://cgis.towson.edu [Date of use: 20 Oct 2005].
84. PIENAAR, W.P. 1994. Strategie vir ruimtelike ontwikkeling in Nederland, Planning magazine. University of Stellenbosch. Stellenbosch: University Printers. 4p.
85. PLAN ASSOCIATES. 2004. Vocal sharing with author. Pretoria.
86. PLANACT.1997. Integrated Development Planning – A handbook for Community Leaders. Braamfontein.
87. PPG2. 1999. *Planning Policy Guidance Note 11: Regional Planning*, Public Consultation Draft, London, DETRA, para 8.6. [Web:] http://www.odpm.gov.uk [Date of use: 2 Jul 2005].
88. PROVINCIE UTRECHT. 1993. Werkdocument Ecologische verbindingszones provincie Utrecht (Working Document Ecological Networks in the Province of Utrecht), Utrecht.

89. RODRIGUE, J. 2005. Department of Economics and Geography, Hofstra University. [Web:] http://people.hofstra.edu/geotrans/index.html [Date of use: 1 Nov 2005].
90. RUBENSTEIN, J.M. 2000. Hawaii Geographic Alliance. An Introduction to Human Geography. August, 2000
91. SCHOEMAN, C.B. 2004(b). Ethics in Planning in an Integrated multi-cultural society: the situation as experienced from colonialism to post colonialism in South Africa. Potchefstroom. 19p.
92. SCHOEMAN, C.B. 2004. Integrated Development Plans and Housing Strategy as an instrument of change and development in the integration of the fragmented city in South Africa. Potchefstroom. 11p.
93. SCHOEMAN, C.B. 2005. Vocal sharing with author. Potchefstroom. 2005.
94. SCOTT, A.J. 1980. The urban land nexus and the state. London: Pion. 231p.
95. SOUTH AFRICA .Department of Agriculture. 2003. Strategic Plan for the Department of Agriculture 2003-2006. Pretoria. March 2003.
96. SOUTH AFRICA .Department of housing. 1997. Urban Development Framework. Pretoria: Government Printer. 43 [Web:] http://www.polity.org.za/html/govdocs/rdp/index.html [Date of use: 20 June 2004].
97. SOUTH AFRICA .Department of Land Affairs. 1997. Rural Development Framework. Pretoria: Government Printer. 71p. [Web:] http://www.polity.org.za/html/govdocs/rdp/index.html [Date of use: 20 June 2004]
98. SOUTH AFRICA .Department of Land Affairs. 1999. Draft Green Paper on Development and Planning. Pretoria: Government Printer. [Web:] http://www.polity.org.za/html/govdocs/green_papers/ [Date of use: 20 June 2004]
99. SOUTH AFRICA .Department of Land Affairs. 1999. Green Paper on Development and Planning, National Development and Planning Commission Document DPC 4/99, Pretoria.
100. SOUTH AFRICA .Department of Land Affairs. 2001. White Paper on Spatial Planning and Land Use Management. Pretoria: Government Printer. [Web:] http://www.polity.org.za/html/govdocs/white_papers/ [Date of use: 20 June 2004]
101. SOUTH AFRICA .Department of Public transport, Roads and Works. 2004. Directory Policy and Legislation. (*In* Final Report Version 4. Development of decision making framework for the location of housing projects and the effect that transport subsidy plays in determining the cost location.) Feb 2004.
102. SOUTH AFRICA .Department of Public transport, Roads and Works. Gauteng. 2003. Spatial Planning: its influence on transport. (Presentation: Daan Visser [Pr Eng], 21 Apr).
103. SOUTH AFRICA. 2003. National Land Transition Act. (Act 22, 2000). Government Gazette, Aug 23. (Regulation no. 21493).
104. SOUTH AFRICA. 1995. *The Development Facilitation Act. Act No 67 of 1995.* Government Printer, Pretoria.
105. SOUTH AFRICA. 1996. *Census of the Population of South Africa,* Government Printer, Pretoria.
106. SOUTH AFRICA. 1996. Statistics South Africa: Population Census. Pretoria : Government Printer.
107. SOUTH AFRICA. 1998. *Moving South Africa,* White Paper in Land based transportation, Department of Transportation, Government printer, Pretoria.
108. SOUTH AFRICA. 2002. Department of Planning. White Paper on Local Government. Pretoria: Government Printer. 108p.
109. SOUTH AFRICA. 2003. Department of Planning and Local Government. White Paper on National Transport policy. Pretoria: Government Printer. 80p.
110. SOUTH AFRICA. Department of Development Planning and Local Government. 2002. Gauteng Spatial Development Framework. Review Sub-project 4: Management of Urban Edge. Pretoria: Government Printer. 21p.
111. SOUTH AFRICA. Department of Development Planning and Local Government. 2000. Gauteng Spatial Development Framework. Pretoria. Government Printer.
112. STANLEY, D.B. & WILLIAMS, J.F. 1993. Cities of the World: World Regional Urban Development. 2nd ed. United States of America: Harper Collins College Publishers.507p.
113. STEENBERG, C. (1999) *Strategic Gap and Green Wedge Policies in Structure Plans Preliminary Findings of Survey of Structure Plan Authorities*, Planning Policies Research Group, Oxford Brookes University, 7pp.
114. STRUCTUURVISIEPLUS. 2001. *See* GEMEENTERAAD UDEN.
115. TE WINKEL, A. (internationaloffice@saxion.nl) 2005. Green structures in Netherlands. [E-mail to:] Pekelharing, E.J. (juanee800@hotmail.com) Jun 20.

116. THE URBAN FOUNDATION. 1991. *Policies for a New Urban Future,* Part 2: Policy Overview: The Urban Challenge, 51p.
117. TJALLINGII, S. 2003. Green structure and urban ecology of Utrecht. Faculty of Agriculture, Delft university of Technology. Feb 2003.
118. TSHWANE METROPOLITAN MUNICIPALITY (South Africa). 2003. Transport co-ordination committee. (*In* First Meeting 2003 and documentation for the 27th TCC meeting). [Web:] http://www.gautengtcc.co.za [date of use: 10 March 2004].
119. TSHWANE. City of Tshwane. 2005. City of Tshwane integrated transport plan 2004 – 2009. [Web:] Http://www.tshwane.gov.za/documents/ itp2005/Ch04_SpatialFramework_b.pdf. [Date of use: 10 Oct 2005].
120. TURNER, T. 1992. Open Space planning in London; from standards per 1000 to green strategy. Town Planning Review. 3 (4) 1992, 365-386.
121. UDEN. 2001. *See* GEMEENTERAAD UDEN.
122. VAN DER MERWE, N. 2004. Vocal sharing with author. Pretoria.
123. VAN DER MERWE, N. (planassoc@icon.co.za) 2004. Urban Fringe. [E-mail to:] Pekelharing, E.J. (12248029@puknet.puk.ac.za). Feb 10.
124. VAN GINKEL, J.A. & VERKOREN, O. 1977. *Zicht op de stad. Sociaal-geografische beschouwingen over steden en stedengroei*, Unieboek, Bussum, 372p.
125. VAN HERZELE, A. & WIEDEMANN, T. 2000. - Stedelijk Milieu (Urban Environment), in: MIRA-S 2000, Milieu- en Natuurrapport Vlaanderen : scenarios, ed. Van Steertegem M., Vlaamse Milieumaatschappij & Garant Uitgevers NV, Leuven/Apeldoorn.
126. VAN HERZELE, A. 2000. Environmental values and emotions as reflected in written public comments on EIA. case study: Flanders, in : proceedings of the 20th annual meeting of the International Association for Impact Assessment "Back to the Future", 19-23 June 2000, Hong Kong, in press. [Web:] http://map21ldt.com.kaarte. [Date of use: 5 Jul 2005].
127. VANNESTE, D., CLEAS, K. & MARAIS, L. 1999. Spatial Transformation in the Post-Apartheid era. South Africa. A website course in social economic and political geography. An international educational project. commisioned by the Ministry of the Flemish government. Department of Education. March 1999. [Web:] http://impuls.kulak.ac.be/south_africa/ [Date of use: 1 Nov 2005].
128. VERBURG, J. & LANGEVELD, S. VAN DEN HURK, A. 1994. Ecology, Economy and Local Government in Breda: towards an Ecoregion. Tijdschrift voor Economische en Sociale Geografie Vol 85, no 3, p.269-274.
129. VISSER, D. (DaanV@gpg.gov.za) 2004. Gautrans Information. [E-mail to:] Pekelharing, E.J. (12248029@puknet.puk.ac.za) May 25.
130. VISSER, D. 2004. Vocal sharing with author. Randfontein.
131. VON THUNEN, J. H. 1966. *Isolated state.* English ed. Oxford: Pergamon Press [Web:] http://faculty.washington.edu/krumme/450/thunen.html. [Date of use: 1 Nov 2005].
132. WCED. The World Business Council for Sustainable Development. 1987. [Web:] http://www.greenleaf-publishing.com/pdfs/wttpt1.pdf [Date of use: 2 Nov 2005].
133. WEERHEYM, W. (admission@his.nl) 2005. Green structures in Netherlands. [E-mail to:] Pekelharing, E.J. (juanee800@hotmail.com) Mei 25.
134. WHITE, P. 1984. The West European city. A Social Geography. London: Longman. [Web:] http://www.macalester.edu/courses/geog61/eherfindahl/model.jpg [Date of use: 2 Nov 2005].
135. WIKIPEDIA. 2005. Wikipedia, the free encyclopedia. Literator. [Web: http://en.wikipedia.org/wiki/metropolitan area].
136. WILLIAMS, K. 2005. Can urban intensification contribute to sustainable cities? Centre for Sustainable Development. Oxford Brookes University.
137. ZEIGLER, D.J. 1980. The Contemporary Metropolis. Energy and the Adaptation of Human Settlements. Michigan State University. [Web:] http://www.ncge.org/grf/tutorial/standards/18/map.gif [Date of use: 1 Nov 2005].

List of Figures

Page

Abstract
1. Photographs of the urban edge concept i
2. Structure of the document ii

Inleiding
1. Struktuur van die document iv

Chapter 2
1. Structure of the chapter 7
2. Megalopolis 8
3. Corridor development 11
4. The contemporary and future metropolitan landscape 12
5. The Burgess Model 13
6. The Hoyt Model 14
7. The Harris and Ullman Model 14
8. A model of the West European city 15
9. Forms of urban sprawl. 17
10. Positive and negative impacts of urban sprawl 18
11. The bid-rent curve for non-residential activities 19
12. The spatial structure of Johannesburg in 1960 20
13. The problems and opportunities in compact city environments. . . . 23

Chapter 3
1. Concept of the Green Belt structure 26
2. Development within the green belt 27
3. Planning system for Brittain 30
4. Kentdowns and the green belt 36
5. Areas of Outstanding Natural Beauty 37

Chapter 4
1. Urban cores within green areas 43
2. Development structure 43
3. Netherlands within the European territory 44
4. Spatial development structure 47
5. Structure of the space 50
6. The Netherlands 52
7. Breda. 52
8. Diagram of development and planning in Breda 53
9. The urban edge and how it has moved over the past couple of years . . 54
10. Landscapes of the Utrecht region 56
11. Dominant features of planning in Utrecht 57
12. The 1990 Utrecht Green Structures Plan 59
13. The vision map 61
14. The urban edge and how it has moved over the years 61
15. Uden ground layer 64
16. Expansions of Uden 65
17. Current spatial structure 65
18. Regional integration 67
19. Urban edge Uden 68
20. Land use in Uden 68
21. Enhancement of the open space between core areas 69
22. Landscape within high nature value 69
23. Spatial structure of the region 70
24. Spatial structure 71
25. Blue strategy 73
26. Green strategy 73
27. Red strategy 73

List of Figures

Page

Abstract
1. Photographs of the urban edge concept i
2. Structure of the document ii

Inleiding
1. Struktuur van die document iv

Chapter 2
1. Structure of the chapter 7
2. Megalopolis 8
3. Corridor development 11
4. The contemporary and future metropolitan landscape 12
5. The Burgess Model 13
6. The Hoyt Model 14
7. The Harris and Ullman Model 14
8. A model of the West European city 15
9. Forms of urban sprawl. 17
10. Positive and negative impacts of urban sprawl 18
11. The bid-rent curve for non-residential activities 19
12. The spatial structure of Johannesburg in 1960 20
13. The problems and opportunities in compact city environments. . . . 23

Chapter 3
1. Concept of the Green Belt structure 26
2. Development within the green belt 27
3. Planning system for Brittain 30
4. Kentdowns and the green belt 36
5. Areas of Outstanding Natural Beauty 37

Chapter 4
1. Urban cores within green areas 43
2. Development structure 43
3. Netherlands within the European territory 44
4. Spatial development structure 47
5. Structure of the space 50
6. The Netherlands 52
7. Breda. 52
8. Diagram of development and planning in Breda 53
9. The urban edge and how it has moved over the past couple of years . . 54
10. Landscapes of the Utrecht region 56
11. Dominant features of planning in Utrecht 57
12. The 1990 Utrecht Green Structures Plan 59
13. The vision map 61
14. The urban edge and how it has moved over the years 61
15. Uden ground layer 64
16. Expansions of Uden 65
17. Current spatial structure 65
18. Regional integration 67
19. Urban edge Uden 68
20. Land use in Uden 68
21. Enhancement of the open space between core areas 69
22. Landscape within high nature value 69
23. Spatial structure of the region 70
24. Spatial structure 71
25. Blue strategy 73
26. Green strategy 73
27. Red strategy 73

28. Uden 75
29. Uden map 76
30. Different policies that is implemented within the Uden area . . . 77
31. Development spheres 78

Chapter 5
1. Flanders region 80
2. Population growth versus accessible green areas in Gent . . . 82
3. Photographs of Antwerp 84
4. Ring road in Antwerp 88
5. Quietness as a quality of reachable green areas in Antwerp . . . 89

Chapter 6
1. Gauteng Spatial Development Framework. 93
2. Typical urban form of previous South African city context . . . 96
3. Typical urban form of current South African city context. . . . 96
4. No go areas 106
5. Environmental, residential and business locations. 106
6. Open space per person 107
7. Conservation-built environment 107
8. Comparison of population and housing distribution with income levels. . . 108
9. Land cover categories. 108
10. Development direction in Gauteng 109
11. Gauteng Strategic Public Transport Network 112
12. Existing and proposed road and rail networks 113
13. Gautrain intensive development zone 115
14. Gautrain development concept 116
15. Proposed Gautrain Rail 117
16. Future nodes and corridors 118
17. Concept of the urban edge 119
18. Urban development boundary 123

Chapter 7
1. The South African cities as known today 128
2. Diagram of the current development corridors in Gauteng . . . 131
3. Development proposal for Gauteng 131
4. Transition zone and urban edge 132
5. Effect of the urban edge as a transition zone 133
6. Effect of the transition zone and urban edge 133
7. Graphs of urban development 135
8. Models of international urban edge concepts 136
9. Graphs of the spatial development patterns 137

Chapter 8
1. Integration of the International concepts in the current city structure . . 140
2. A graph illustrating the current versus the proposed international development pattern 141
3. The proposed urban environment with the impacting elements of the research . 142

Annexure
1. Netherlands 145
2. Belgium 145
3. United Kingdom 145
4. Gauteng Provincial urban edge 146