

“MANAGING COASTAL DEVELOPMENT IN A RAPIDLY DEVELOPING AREAS: THE CASE OF UMHLANGA ROCKS”

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This Dissertation is submitted in partial fulfilment of the requirements of admittance to the degree of Masters in Town and Regional Planning in the School of Architecture, Planning and Housing at the University of KwaZulu Natal

I declare that this research is my own work and has not been used previously in the fulfilment of another degree at UKZN or elsewhere. Use of the work of others has been noted in text.

Signed at UKZN on the 08 December 2011

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LIST OF ACRONYMS

CRZ:	Coastal Regulation Zone
DFA:	Development and Facilitation Act
EIA:	Environmental Impact Assessment
EMA:	eThekwini Municipal Area
HAT:	High Astronomical Tide
ICMA:	Integrated Coastal Management Act
IDP:	Integrated Development Plan
IPCC:	Intergovernmental Panel on Climate Change
LAZ:	Littoral Active Zone
LECZ:	Low Elevation Coastal Zone
NEMA:	National Environmental Management Act
SDF:	Spatial Development Framework
UNPP:	Umhlanga Node Precinct Plan
WCED:	World Commission on Environment and Development

PREFACE

*THE WORLD is charged with the grandeur of God.
It will flame out, like shining from shook foil;
It gathers to a greatness, like the ooze of oil
Crushed. Why do men then now not reckon his rod?* 5
*Generations have trod, have trod, have trod;
And all is seared with trade; bleared, smeared with toil;
And wears man's smudge and shares man's smell: the soil
Is bare now, nor can foot feel, being shod.*

*And for all this, nature is never spent;
There lives the dearest freshness deep down things;* 10
*And though the last lights off the black West went
Oh, morning, at the brown brink eastward, springs—
Because the Holy Ghost over the bent
World broods with warm breast and with ah! bright wings.*

Source: Gerard Manley Hopkins: Poems and Prose (Penguin Classics, 1985)

This poem was written in 1877 and amazingly, at that time Gerard Manley Hopkins was intuitive to the manner in which earth's natural resources were being exploited; the manner in which it was being abused (1st stanza); but the optimist in him spoke of the Grandeur of God and how this would save the Earth. He somehow thought the Earth could never be spent, it was eternally sustainable (nature is never spent). How wrong he was!

This poem has always been close to my heart and I could never comprehend how it was possible for us, humankind, to be so eternally ungrateful. Instead of performing a stewardship roll we instead destroy the very environment that shelters us! The environment has always intrigued me and for the first time in 2004, when the media covered the effects of the Tsunamis in South East Asia, I felt afraid, the world as we know it was truly changing. When given the opportunity to fulfil my Masters Degree requirements by completing a dissertation, all my thoughts centred on researching something that was interesting and important to me, a natural resource; the coastline. My proximity to the Umhlanga Coastline made it accessible to me and I pondered as to why the Umhlanga Coastline was so fortunate during the 2007 tidal surges that we had, as compared to its neighbouring coastlines. This dissertation was written in an attempt to understand why we don't learn from our experiences. The international scene on coastal disasters should have paved the way for all other coastal communities to take better care when it comes to developing along the coastline; sadly this is not the case since more developments have been planned alongside coastlines. The Earth has the capacity to rejuvenate itself, but the pace of urbanisation has resulted in diminishing the Earth's capability (in terms of rejuvenation).

There is a sufficiency in the world for man's need but not for man's greed. ~Mohandas K. Gandhi

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CHAPTER 1: BACKGROUND AND RESEARCH METHODOLOGY

1.0 BACKGROUND

Umhlanga Rocks (which will be referred to as Umhlanga in this research document) is a tourist destination, and a coastal town that thrives on tourism revenue. Urbanization of the coastline is in response to the tourist market, with many of the buildings being holiday resorts. Tourism related businesses in Umhlanga contribute to its economy and the creation of jobs. There is interdependence between the local economy (thriving businesses) and tourists. Without tourists many jobs may be lost and an otherwise thriving economy will fail to exist. Development of the coastline has however had an impact on the natural environment, particularly on dune vegetation. It is important to ask the question, is such denigration of the natural environment necessary for economic gain?

The Rio Summit which was held in 1992 paved the way for the inclusion of sustainability and sustainable principles in development. The Rio Declaration and Agenda 21 were the direct documentary outcomes of the Rio Summit. Agenda 21 acts as a blueprint (globally) for sustainable development, by providing guidelines for sustainable action plans for development (Williamson et al 2003 cited in Blore M, 2006). Local Agenda 21 is the translation of Agenda 21 principles meant for sustainable development in the surrounding locality as opposed to Agenda 21, which is geared for global action. Local Agenda 21 has therefore been adopted by South Africa and KwaZulu Natal. A great deal of effort has been made in the last eighteen years to address issues of sustainability and the protection of the earth's natural resources. Documents like Agenda 21 and Local agenda 21 translated this focus into action plans. However balance between the protection of the earth's natural assets and progress (as in social up-liftment and or development/progress is key consideration. Sustainability cannot be taken to the extreme, in that it hinders much needed development for the survival of many developing countries. Sustainable development has created a rationale for the

need to take cognizance of the environment with a view to develop urban environments in a manner that is responsive to the sensitivity that prevails in the natural environment. The rapid development and expansion of the Umhlanga CBD has dramatically changed the layout and design of the Umhlanga coastline (East of the M4). This has had an impact on the environmentally sensitive coastline (dune vegetation and other environmentally sensitive areas).

It is necessary to ascertain to what extent sustainability principles have been used to create this urban landscape. This analysis can be achieved by considering eThekweni's environmental policies (the Environmental Management Policy for the eThekweni Municipality, 2005) and the municipally legislated Integrated Development Plan [IDP] which has replaced Local Agenda 21 as the key driver in environmental management planning and implementation in Durban. If there is a lack of policy and/ or the implementation of policy on the part of the Council, or if there are environmental issues that have not been adequately addressed within these policies, then the research presented will suggest what amendments need to be made to existing policies which can apply to future developments. This research is therefore concerned with management of the Umhlanga Rocks coastline, especially with regard to sustainable resource utilization on the coastline and strategies and policies that will contribute toward effective conservation of environmentally sensitive areas.

1.1 THE STUDY AREA, REASONS FOR CHOOSING TOPIC AND RESEARCH PROBLEM

Umhlanga Rocks is situated on the east coast of South Africa, north of Durban, 18 kilometres from the city, on the warm waters of the Indian Ocean.

Map 1: Durban and Surrounds



Source: <http://umhlangatimeshare.co.za/ssphotos/ss-map.gif>

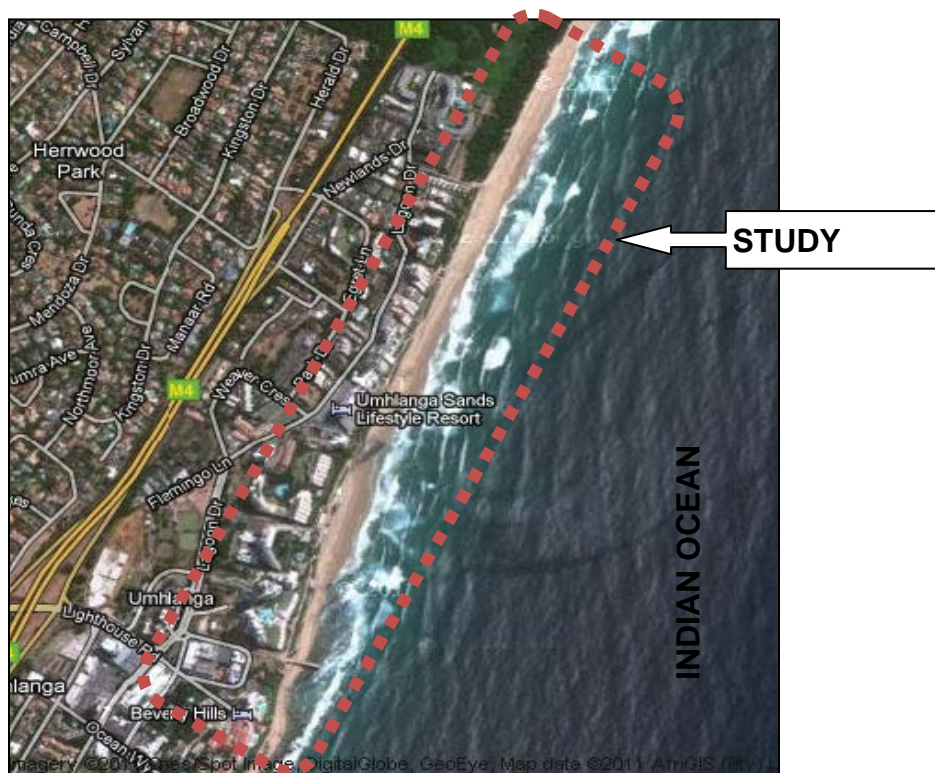
The beach moves northwards for more than 200 kilometres, all the way to Greater St Lucia Wetland Park. Inland from Umhlanga, endless fields of sugarcane give way to the tumbling area of the Valley of Thousand Hills, the massive Inanda Dam and mystical hidden valleys of Zululand. (Welcome to Umhlanga Rocks)¹ Sibaya Casino and the Gateway Shopping Centre are some of the main attractions that Umhlanga has to offer. Umhlanga has a wide array of adventure sports to offer including surfing, deep-sea fishing, whale watching and dolphin viewing, scuba diving, kite boarding and micro light flips. Further nature seeking activities include the Umhlanga Lagoon Nature Reserve, the Hawaan Forest - a beautiful indigenous woodland area that has been allowed to maintain its natural state for centuries; the Beachwood Mangrove Nature Reserve, and various dive sites. (Umhlanga Coast, KwaZulu Natal)²

¹ <http://www.umhlanga-rocks.com/Home.htm>

² <http://www.sa-venues.com/attractionskzn/umhlanga-coast.htm>

The Umhlanga CBD has undergone a transformation, intensifying urban development on the coastline with development and expansion occurring at a rapid rate. This development has transformed the layout and design of Umhlanga and its coastline. These new developments may be taking its toll on the environmentally sensitive areas, especially the coast line (dune vegetation). With an increasing emphasis on conserving the environment (on a national and international scale), there is a need to control developments that are on the verge of destroying the natural environment.

Map 2: Study Area



Source: Umhlanga Node Precinct Plan, 2007, 2

The study area for this dissertation is primarily the coastal area, more specifically the resort area beginning from the Beverly Hills Hotel to the Hawaan forest as can be seen from the map below. The Red dotted line indicates the area primarily under

investigation. However, it is important to note that this dissertation is concerned with a coastal area and may include examples (photos) of other coastal areas.

With reference to articles on tsunamis and coastal vegetation mitigating the effects of these disasters, it is apparent that there is a definite need for coastal management and planning. Global Warming has resulted in climatic changes across the world, raising the temperature (greenhouse effect) across the planet, resulting in the melting of icecaps, which have had a significant impact by raising the sea level (McGrahaman, Balk, & Anderson, 2007). "Continued global warming will cause sea-level rise and increased intensity and frequency of coastal storms." (Breetzke et al (Eds), 2008, 1). In fact the collapse of an iceberg may do more than just alter sea levels; an avalanche may trigger a tsunami that may result in catastrophes far from the site of the original event. With the recent spate of tsunamis across the world especially in the South Asian Countries, it is necessary to try and manage natural resources along the shoreline and manage development in a manner that decreases the risks associated with coastal communities. KwaZulu Natal has had its share of coastal problems (see Figure 1), where the occurrence of the so-called 'mini tsunami's' in 2007 has devastated coastlines, disrupted tourism and eroded land from residents. "Increased coastal erosion will lead to higher and continued risk to human life and the natural and built environments."(Breetzke et al (Eds), 2008, 1) The result has been the radical reshaping of the coastline and the need to rethink the policy for development along the coast.

Figure 1: Damage to Infrastructure and Buildings on Durban's Coastline (La Lucia KwaZulu-Natal)



Source: eThekweni Municipality, 2007, p. 1

Figure 1 shows damage that occurred on Durban's coastline on the 18-19th March 2007 due to a low cut-off system that resulted in higher than normal tides. A tide is the longest oceanic wave and can be defined as *"the periodic rise and fall in the level of the water in oceans and seas; the result of gravitational attraction of the sun and moon."* (<http://www.coastalwiki.org/coastalwiki/Tides>) Astronomical tides are governed by planets. The Earth and the Moon revolve around each other- 27.3 days. The centrifugal force within the Earth-Moon system balances the gravitational force between these two bodies. If there isn't a balance between the centrifugal force and the gravitational force the there would be disequilibrium resulting in the earth either colliding with the moon or alternatively moving away from the moon. (<http://www.coastalwiki.org/coastalwiki/Tides>) these forces are tide producing forces. Water on the Earth's surface is therefore pulled towards the Moon-gravitational pull, and directly away from the Moon, by the centrifugal force, creating a tidal bulge on either side of the Earth. In this way the Sun also creates tides. *"We get spring tides (high tidal range) when the Sun and Moon are in alignment or sysygy (after full and new Moons) and we get neap tides (low tidal range) when the Moon is in quadrature (first and last quarters)."* www.coastalwiki.org/coastalwiki/Tides

The results of the storm in March along the KwaZulu Natal coastline included damage to buildings and property, businesses, infrastructure, as well as closure of the port. (eThekweni Municipality, 2007) Damage to the coastline was caused by a storm coupled with the fact that KwaZulu Natal was also experiencing the Highest Astronomical Tide (occurs once every 18 years). Erosion to the KwaZulu Natal coastline stretched over a distance of approximately 350 kilometres. According to Mather (2008), the Saros equinox spring tide was identified in September 2006 as a possible period of vulnerability for the Durban coastline especially properties located north of Durban along Eastmoor Crescent, La Lucia but these areas were not prepared for what happened in March. One has to wonder why there weren't any mitigating structures in place or if there was a risk management plan. By the devastation along La Lucia, Ballito, Umdloti etc. on the surface it's seems as though those coastlines weren't properly managed.

The new Coastal Regulation Zone³ (CRZ) policy in South Africa aims to curb development along the coast by ensuring that no new developments occur within 100 meters from the high water mark. In the 1980's (due to haphazard anthropogenic activity) the Government of India issued a strict warning with instructions for all coastal development on curbing development 500m from the high water mark, since the effects of anything within that zone would be severe. (Mascarenhas & Jayakumar, 2006) Amongst the directives issued was one that related directly to coastal management. It stated that coastlines needed to be kept clear of human interference for a setback of 500 metres from the high water line. In 1991, the Ministry of Environment and Forest (MEF) (India) declared the delineation of the CRZ to be 500 metre from high tide line and the land between the high tide line and low tide line (McGrahaman, Balk, & Anderson, 2007).

³ Coastal regulation Zone in South Africa is not strict. It is meant to deter development but it is not a stone wall, it can be overturned with a development application- if the application is deemed essential.

In December 2004, the South East part of India was hit by a series of Tsunamis with disastrous consequences. In light of the previous directives taken to protect the coastline, the question then arises as to whether 100 meter development prohibition from the high water mark is sufficient to mitigate the effects of such disasters. Furthermore, Mangrove forests and other dune vegetation have helped in the protection of coastal villages, by providing protection against the adverse effects of disasters. In Umhlanga which is the focus of this research there is very little dune cover left which suggests that the natural line of defence against coastal disasters has been removed by development. There is an increased level of vulnerability along this coastline as the result of previous actions.

Umhlanga is a major tourist destination in KwaZulu Natal and the transformation along the coast has been the result of tourist initiatives. The Umhlanga Node Precinct Plan (UNPP) as well as the eThekweni IDP (2010 and beyond) emphasize that all current and new developments must be developed in a sustainable manner. This emphasis stands in stark contrast to the actual situation on the ground alluded to before.

The World Commission on Environment and Development (WCED) stated that the goal of sustainable development is *“to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.”*(World Commission on Environment and Development, 1987). This means that the social, environmental and economic spheres must work in unison so that balance is maintained. Appropriate planning decisions must be made, which take care not to impact negatively on the natural environment. Since Umhlanga is a tourist destination, and much of its tourist revenue comes from its coastal resource, it is imperative that the coastline is effectively managed to prevent the scales from slipping towards favouring economic progress to the detriment of the natural asset on which the economic development depends. Glavovic writes, *“... under Apartheid, the government effectively*

ensured that the large majority of coastal resource and development opportunities were reserved for whites.” (Glavovic, Our Coast Our Future, 2000, p.63)

The introduction of Environmental Impact Assessment (EIA) regulations has been an attempt to address this issue. Environmental Impact assessment was first introduced in 2006 and includes activities identified in terms of National Environmental Management Act (1998). This means that all activities in environmentally sensitive areas, within a distance of 100m from the high water mark, will require environmental approval before it can commence. Yet there is still a wave of developmental activity occurring on the Umhlanga coastline. The Pearls Development (on the Umhlanga coastline), has been fraught with much controversy, having to eventually downgrade the 29 storeys initially planned, to a 20 storey building (due to the 29 storey building casting shadow over the public bathing area). Furthermore the EIA regulations were amended, calling for a basic assessment of all developments within the 100 m high water mark, yet the Pearls were granted an exemption from this requirement by the Department of Agriculture and Environmental Affairs.⁴ – the provincial level of government charged with protecting the coastline. Could this be the economic sphere overpowering the environmental and social sphere or could it be a case of poor governance?

Literature exists in the form of coastal zone management policies, or coastal dynamics for South Africa and KwaZulu-Natal. There is also literature available on sustainable development, articles, books and reports on coastal management worldwide as well as various policies instituted by National Government including the Integrated Coastal Management Act (Act24 of 2008) together with the coastal protection zone, the Admiralty Reserve, the Integrated Development Plan prepared in terms of the Local Government Municipal Systems Act (Act32 of 2000) with its Spatial Development Framework, the Constitution of South Africa (Act108 of 1996) and the National Environmental Management Act (No. 107 of 1998).

⁴ [The Mercury](#) (January 03, 2007)

It seems as though there has been an attempt by environmentalists and the Municipality to downgrade development on the coast, as can be seen by the recent coverage on the Pearls development (downgrading Pearl Dawn from 29 to 20 storeys) but it also seems as though the environment has taken a back seat when it comes to economic progress. Even NEMA has strong principles with regard to protection of the environment and sustainable development, yet at the same time NEMA identifies that people's needs are of the utmost importance and as such the needs of people outweigh the environment. Chapter 1 of NEMA proposes " *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably*". Development on Umhlanga's coastline is truly remarkable, helping put KwaZulu Natal on the map. It is plausible to assume that many jobs have been created by these new development initiatives, but one has to ask the question: what are the consequences? Is the environment suffering due to market driven planning?

According to the researcher an example of market driven planning is the Umhlanga Node Precinct Plan⁵ (UNPP). The Umhlanga Node falls within the study area of this dissertation. The area " *is bounded by the M4 on the west, Durban View Park to the south, the promenade and beach to the east and up to the northern extent of Lagoon Drive*." (eThekweni Municipality, 2007, p.2). In the UNPP, an attempt to made to provide a framework for public and private investment by intensifying and diversifying this node with a view to increasing public and private investment. According to the UNPP one aspect of the Development Vision " *is to create a seaside resort and tourism destination which is people friendly, walkable and safe, with a cosmopolitan sense of place and urbanity*." (eThekweni Municipality, 2007, p.13). The UNPP has within its situational analysis touched on the Coastal Policy Green Paper, by considering three themes related to the environment, that is: coastal planning and development, pollution control

⁵ "The strategic thrust is the optimisation of the node economically and physically" (Umhlanga Node Precinct Plan, 2007,15)

and natural resource management, with emphasis on sustainability as one of its key developing principles, taking cognizance to the environmental sensitivity of the coastline.

The UNPP mentions the development of a *“beach promenade that affords views of the sea and access to the beach while leaving it as natural as possible”* (eThekweni Municipality, 2007, p.60). Yet at the same time, the concept is market driven and the new look envisaged for ‘Lagoon Drive’ and the ‘Promenade’, is completely urbanized. The role of sensitive environments especially along the coast is fully identified and mention is made of establishing biodiversity and conservation in the area. However the overall plans that show the Umhlanga Lagoon Beach edge as a sensitive environment constitute one page in the entire document. The underlying message, when one views the full plan is that the area needs to be aesthetically pleasing, emphasizing the built environment with the inclusion of lip service reference to the sensitive environment to show that the environment is being considered and to ward off any environmental activists. Once again, one has to wonder whether the built environment (and concretization) is more important than the environment and which type of sustainability is being achieved? The inclination is toward economic sustainability, with environmental sustainability and equity planning taking a back seat.

This dissertation will investigate if development along Umhlanga Coastline has been managed effectively and whether the Municipality has made a significant contribution toward environmental protection along the coast. The outcome of this dissertation may reveal more appropriate actions by authorities concerned, to aid in the protection of Umhlanga’s environmental assets, as well as provide information with regard to disaster management policy on the coastline.

1.2 RESEARCH PROBLEMS AND OBJECTIVES

The principal question for the research is as follows:

Has development on the Umhlanga coastline been efficiently managed, and are the environmental policies instituted by the Municipality effective in addressing the environmental concerns?

In order to answer the primary question, it is necessary to find answers to the following subsidiary questions:

1. What are Umhlanga's environmental assets and environmentally sensitive areas?
2. How has Umhlanga's coastline changed (in terms of natural and human features) in the past 10-15 years?
3. Who are the role players involved in developing the Umhlanga Coastline?
4. What design principles or plans have guided development on the coastline and the old Umhlanga Central Business District?
5. How does the vision for eThekweni (according to the IDP) tie in with what is taking place in Umhlanga?
6. Has the eThekweni IDP dedicated sufficient attention to the environmental areas?
7. What is eThekweni's Environmental policy with regard to coastlines and or environmentally sensitive areas?
8. Are there any alternatives?

The specific objectives for this dissertation are therefore as follows:

1. To obtain information on the layout and design of Umhlanga;
2. To investigate changes (structural and physical) on the Umhlanga coastline;
3. To investigate whether sustainable practices have been used by the new developments (like the Pearls development) on the Umhlanga coastline;

4. To investigate what environmental policy is applicable to Umhlanga and whether this has been implemented; and,
5. To investigate the role of coastal vegetation in mitigating the impact of tsunamis by looking at literature on the impact of tsunamis and coastal vegetation in South East Asia.

1.3 PRINCIPAL THEORIES UPON WHICH THE RESEARCH IS BASED

This is a critical section of the dissertation which will focus on the relevant issues that addresses the research proposal. Coastal areas, the regional and local economies tend to rely on what is being offered by the coastal eco-systems, that is the services provided by these ecosystems and it is logical that if these communities rely on the goods and services then the ecosystem needs to be maintained such that it can provide these services for years to come (sustainable development). (Glavovic, Our Coast for Life: From Policy to local action, 2000). This research on the Umhlanga coastline will therefore reflect on key concepts, which include sustainability, sustainable development, sustainable coastal development, ecosystems and integrated coastal management, as well as new urbanism. Critical to the research will be to define the above mentioned concepts and show their relevance to the Umhlanga coastline.

1.3.1 DEFINITIONS

In the following section, a number of relevant definitions applicable to this research are presented.

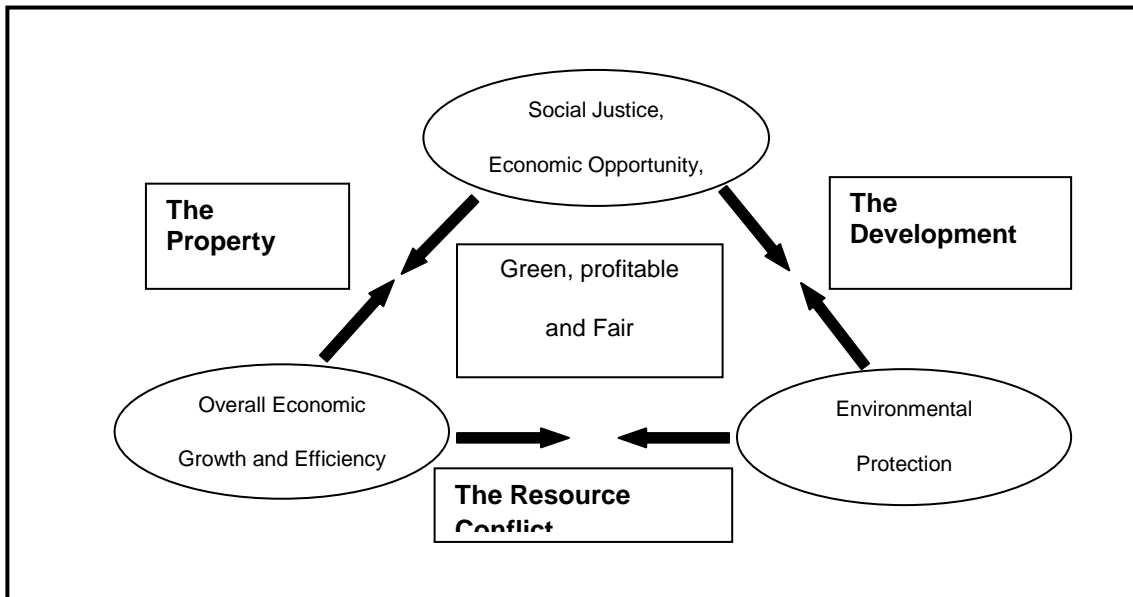
1.3.1.1 SUSTAINABILITY

Definitions of sustainability and sustainable development have been imprecise and descriptive and have therefore been used in different ways, by different professions and organizations in a manner that allows them to use the definition to suit their needs (Agyeman & Evans, 2003). The Brundtland Commission defines sustainable development as, *“development that meets the needs of the present generation without*

compromising the ability of future generations to meet their own needs”(World Commission on Environment and Development, 1987, p. 8); and this is the most widely used definition. Sustainability is defined as a *“strategy of development that results in the enhancement of human quality of life and the simultaneous minimization of negative environmental impacts”* (Spain; 1995 cited in Edward: 2001, 502). Then there is another definition that supports the “integration of ecological and economic uses” of the earth’s “life-support systems” (Loucks: 1994 cited in Edward: 2001, 503). Another definition of sustainability is *“the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems”*(Agyeman, Bullard, and Evans (2002), cited in Agyeman and Evans: 2003, 35). The definitions therefore vary, with the most commonly used, rather vague, whilst the other two definitions are more specific, addressing environmental concerns and economic concerns. Sustainability and sustainable development therefore deals (broadly) with the human and the natural environment, which is what the planning profession is involved with, hence planning and sustainability are linked.

Sustainability has taken on a functional form, which Edward refers to as the three E’s, which are the Environment, the Economy and Equity. Edward explains that *“the emerging sustainability doctrine holds that the natural environment can be protected, the economy developed, and equity achieved all at the same time”* and that we achieve a degree of sustainability when we strike a balance between the three E’s (Jepson: 2001, 503). Campbell suggests a triangular model saying that in order to achieve sustainability then we need to develop the economy and distribute the growth fairly whilst ensuring the safety of the environment (Campbell, 1996, p. 297). Figure 2 describes what Campbell meant.

Figure 2: The Triangle of Conflicting Goals for Planning, and the Three Associated Conflicts in Sustainability



Source: Campbell: 1996, 289

According to The above diagram sustainability can be achieved when there is a balance between the three components, that is, the environmental, the social and the political. Recent work on sustainability suggests that this concept contains the three spheres , that is the environmental, the social and the economic however these spheres are have an overarching sphere, that being governance.

1.3.1.2 NEW URBANISM

Figure 2 illustrates three different types of planning, which are, environmental planning, economic planning and equity planning. It is interesting to note that all three types of planning occur in the Umhlanga CBD, the new Umhlanga Ridge as well as the Umhlanga coastline. What is equally apparent is the dilemma that exists between sustainability model and the neo-liberalist approach, which emphasizes “*market-based entrepreneurialism, social inequality, and resource exploitation*” (Raco, 2005, p.

324)and has the makings of unsustainable development. Interestingly some see new urbanism as a model that would help in creating sustainable societies, whilst including sustainability principles.

"New urbanist' principles have been used in the construction of the new Umhlanga-Umhlanga Ridge. It will be necessary to deconstruct this concept and test whether this applies to the coastline as well. New Urbanism has been created to "solve the conundrum of urban sprawl"(Stephenson, 2002, p. 99).

New urbanism is also being promoted *"to encourage sustainable growth and to facilitate infill development"* (Garde A. , 2004, p. 154). This model has offered a design perspective to planning, which enhances environmentally responsible and sensitive developments and tries to foster an improved social life and enhance a sense of community life (Stephenson, 2002). New urbanism primarily advocates mixed- use and mixed-income environments, as well as pedestrian oriented, compact developments, with the necessary blend of including the environmental component (in the form of an open space, parks, and buffer areas). Umhlanga, whether it be the old CBD, the new Umhlanga Ridge, or the coastline all promote mixed-use development, which can be considered pedestrian friendly, as well as compact, however Umhlanga can be considered unsuccessful in creating a mixed-income area.

It is understandable that no specific model (especially sustainability) can be used to develop an area, because the pressure of economic progress is great, especially for developing countries and economies. The best that can be done is to try and find a compromise between different models. It is the view of the researcher that development on the Umhlanga coastline is market driven, to the detriment of coastal vegetation. To test this hypothesis, the research will include the study of environmental policy documents against this claim. The development prohibition zone is 100 m from the high water mark, and the research centred on the Pearls development in Umhlanga which is assumed to infringe upon this zone. At the same time the research will look at

examples of coastal regulation zones in Asia and lessons that have been learnt from these examples.

1.4 RESEARCH METHODOLOGY

A review of primary and secondary sources of information was examined thus enabling this dissertation to address the relevant issues (sustainability, sustainable development, sustainable coastal development, ecosystems and integrated coastal management, as well as new urbanism) for this dissertation. A structured approach was employed to analyze suitable sources as a response to the dissertation topic.

1.4.1 SECONDARY SOURCES

Secondary sources were reviewed to establish a conceptual framework and to identify policies and legislation. The relevant secondary sources pertinent to the study topic were reviewed from:

- I. E-journals (regarding tsunamis, coastal development and environmental concerns, as well sustainable development and sustainability concepts);
- II. Library Books (regarding planning of urban areas, coastline management, sustainable development and coastal vegetation);
- III. Policy documents- the EThekwini IDP, Umhlanga Node Precinct Plan, EThekwini Long Term Development Framework;
- IV. Policies and legislation- specifically environmental policy; and,
- V. Documents- Published and unpublished, with emphasis on environmental matters, sustainable development, and new insights to urban development.

1.4.2 DESKTOP SURVEY

A desktop Survey, with the investigation of maps, reports and aerial photographs were used to establish:

- I. Environmentally sensitive areas and assets;
- II. Existing development; and,
- III. Planned development.

1.4.3 PRIMARY SOURCES

Interviews were conducted with these key respondents who were able to provide relevant information for the purpose of the research. These were:

- I. An elected representative from local government (Councillor) that was be able to provide information on the political issues surrounding the development of the coastline. A semi-structured interview was employed during this interview.
- II. An official from the EThekweni Town Planning Department, situated in Umhlanga, who was able to provide information about any rezoning applications done on the coastline, issues related to the construction of major developments as well as the nature of development along the coast and restrictions imposed by the Municipality for these developments. Again a semi-structured interview was used for this interview.
- III. A Town Planner in private practice who has been involved with planning within the Umhlanga area. He was able to provide me with information that took the views of the private developer into consideration. This was in the form of a semi-structured interview.
- IV. An expert in the environmental field dealing specifically with coastal engineering.

All interviews conducted took the form of open-ended questions. The reason for the use of open-ended questions is that it allowed the person being interviewed flexibility in answering questions.

1.5 STRUCTURE OF DISSERTATION:

Chapter 1: Introduction and Research Methodology

This chapter presents and explains the research question. It will also explain the rationale for choice of this topic, the research approach, limitations, as well as research contributions. This chapter outlines the method of research, in a manner that will allow it to be duplicated if needed in the future.

Chapter 2: Conceptual Framework

This chapter provides the background to the research. It includes a widespread survey of previous research done. This chapter also describes key concepts and theories of the study as well as reference to case studies that show relevance to this dissertation.

Chapter: 3: Legislation and Policy

This chapter examines and reviews policies and laws that are relevant to the case study, especially with regard to Coastal Zone management.

Chapter 4: Research and Analysis

This chapter will provide the results of research undertaken as well as provide and analysis of those results.

Chapter 5: Recommendations

This chapter will outline a list of recommendations for more effective coastal zone management.

Chapter 6: Summary and Conclusions

This chapter will give an overall summary of the findings of the research hence concluding this dissertation.

CHAPTER 2 LITERATURE REVIEW

2.0 INTRODUCTION

The purpose of this section is to examine the existing literature which will inform the theoretical structure of the research. A perusal of the literature indicates that there are many themes that will inform the research. The area under research is a coastal strip on the North coast of KwaZulu Natal, South Africa referred to as Umhlanga Rocks.

The researcher proposes a logical approach, relating the different components in a manner that allows one to understand the reasons to prevent development on the coastline. The research begins by looking at how weather patterns influences sea levels as well as oceanic disturbances (spring tides, tsunamis etc.) and what impact this has upon the coastline.

Global warming has resulted in a change in weather patterns which has affected the ocean, resulting in rising sea levels. Tsunamis have in the recent past resulted in devastating effects along the coastline, especially in Asia. It is important to note that this dissertation does not in any way state that rising sea levels cause Tsunamis but that rising sea levels have exacerbated the effects of these Tsunamis. Evidence from countries in South East Asia illustrates the effects of tsunamis on coastal developed areas, resulting in the devastation of built-up areas and the loss of life. As a result Coastal Regulation Zones (CRZ's) have been devised in the Asian continent to regulate and manage coastal development. Furthermore, the recent emphasis on sustainable development has resulted in developers, planners and policy makers taking a stewardship approach to the use and management of natural resources and the environment. The literature review in this thesis follows this trend, in a logical and thematic way. An overarching theme that will inform the research will be sustainability

and sustainable development, however the literature review will include global warming, tsunami experiences (effects and information) and low lying coastal areas.

2.1 SUSTAINABILITY

The *Brundtland Report* defined *sustainable development* as simply development that “meets the needs of the present without compromising the ability of future generations to meet theirs” (World Commission on Environment and Development, 1987, p. 8). Although other definitions for sustainable development are available, this one shows a direct relationship between present and future generations. There is agreement by many authors that sustainable development is simply not only about the environment but also includes the economy and society, hence there is an emphasis by these authors to try and find a balance (or something close to a balance) between these three aspects, that being the environmental sphere, the social sphere and the economic sphere. (Banerjee, 2003)(Castro, 2004)(Haughton, 1999)

“Sustainability is a term that has received a significant amount of attention in the public policy arena. Within the planning profession, there has likewise been a growing recognition of its possible relevance in the areas of land use and general community development, and planners are increasingly finding themselves either leading or being expected to contribute to local “sustainable development” efforts.”(Jepson, 2001)

Sustainable development has three different aspects that being the social, environmental and economic aspect of sustainable development that can be related to the three different types of planning, namely environmental, economic and equity planning. Striking a balance between these three types of planning is regarded as sustainable development (Campbell, 1996).

Sustainable development is therefore not just a concept, or an idea; instead it can be considered an action; a plausible and practical solution to ensuring that current and future generations have access to limited resources (WCED:1987). The way forward is dependent on the view and actions of development professionals, like planners.

Sustainable development can be partially attained by professionals, like town planners making meaningful contributions to development using a holistic approach (striking a balance between the three spheres).

It is the researcher's view that there is a close relationship between market driven activity in Umhlanga Rocks and the use of environmental resources, to the detriment of these resources, in particular the Umhlanga coastline. Although sustainable development involves the relationship that exists between the three spheres (the environmental, social and economic); the research will however explore the relationship between the economic and the environmental sphere. Sustainable development is essentially about merging development (defined as progressing economically) with environmental resources (Elliot, 1999), hence this research will explore the relationship between the economic and the environmental spheres.

In the business world, sustainable development is translated as being able to meet the needs of all stakeholders (concerned with the business) presently whilst allowing for future stakeholders to be able to meet their own needs as well. (World Commission on Environment and Development, 1987 and International Institute for Sustainable Development, 1992).

“The marine and coastal environment and its associated resources contribute considerable value to the South African economy in terms of employment, recreation and tourism. Since the 1980s, the four major coastal cities, namely Cape Town, Port Elizabeth, East London and Durban have shown the fastest economic growth of all cities in South Africa.” (White Paper: Sustainable Coastal Development 2000 cited in Clark & Barry, 2005, 11).

Economic development in the past had a close connection with dwindling natural resources and pollution of the environment (Elliot, 1999). The pursuit of sustainable development is dependent on several issues dealing with the three spheres, that is the social, the economic and the environmental and the pursuit of development needs an

economic system that will offer solutions to problems occurring in disharmonious development and a production system that is obligated to preserve the ecological base(World Commission on Environment and Development, 1987).

The world's cities are expanding, under pressures from immigration, natural population growth and in some instances from environmental changes. The greater the number of people living in an area, the greater the use of resources in that area, as well as the greater the need for economic growth to cater for the needs of the growing population. It becomes important to ensure that the demand for resources do not exceed the supply of those resources for the population. *“The world must quickly design strategies that will allow nations to move from their present, often destructive, processes of growth and development onto sustainable development paths”*(World Commission on Environment and Development, 1987, p. 49). One way forward is to recognise that development (meaning growth) includes costs and benefits. If this approach is considered in terms of economic development, then we need to evaluate whether the income obtained from this process (the benefits) will result in degradation of the environment, or the unencumbered use of renewable and non renewable resources (the costs). Thus sustainable development is the progressive stance of development, ensuring that we think things through, and consider whether the costs outweigh the benefits; if this is the case then the response would be to search other avenues that will make the development sustainable (when the benefits outweigh the costs) (Fitzgerald, McLennan, & Munslow, 1995).

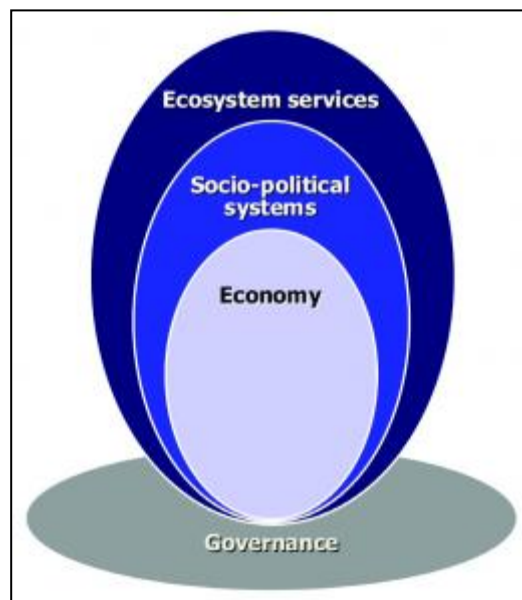
“The essential threat to sustainable development is that the human species is attempting to live beyond the capacity of the earth to sustain both humans and other species, most notably as we destroy the natural balance of critical natural protective systems, from depletion of the ozone layer to the creation of the greenhouse effect.” (Haughton: 1999, 234). Essentially developing in a sustainable manner must reconcile development with the environmental resources that people depend on (Elliot, 1999). Environmental un-sustainability refers to the misuse and the exploitation of the environment has become a global issue with emphasis placed on conservation and the

need for sustainable development (Elliot, 1999). In the past twenty years, environmental issues have become recognized as global concerns. Issues include the destruction of the ozone layer, which has resulted in the heating of the atmosphere, the accumulation of greenhouse gases and ultimately global warming (Elliot, 1999).

2.1.1 SUSTAINABILITY AND GOVERNANCE

The issue of sustainability has always been considered as a balance among the three spheres, that is, the environmental, the social and the political. However, recent work on sustainability suggests that this concept exists within a governance framework and there are inter-linkages within them.

Figure 3: Sustainability within a governance framework



Source: www.enviropaedia.com

This integrated framework allows for the economic, socio-political and ecosystem to be embedded within one another whilst being underpinned by a system of governance (figure 3). The National Spatial Development Perspective (NSSD) has been developed to promote sustainable development appropriate to the South African context. The NSSD attempts to improve the definition of sustainable development as set out by

NEMA by highlighting the importance of institutions and systems of governance in implementation. It is necessary to include governance in the sustainability framework, because this allows for a way to ensure that the principles of sustainability are met by municipalities, local stakeholders and private organisations.

Thus far, municipalities have been determined to hold the key to ensuring that sustainability principles are adhered to. The inclusion of Integrated Development Programmes (IDP's) by all municipalities has provided a way forward in terms of creating sustainable and equitable environments, attempting to create a balance between the three spheres. Amos Masondo explains local governance with regard to sustainability by saying "the momentum created by the hosting of the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002 has ushered in a new system of environmental governance. This has guided the way in which we provide citizens with a clean and healthy environment." (www.enviropaedia.com) Masondo goes on to suggest that since the World Summit on Sustainable Development (WSSD) there has been many inclusions in terms of policy and law by local government to the upkeep of sustainable development placing people, planet and prosperity (in other words social, environmental and economic) on an equal footing. Local government has thus far committed to ensuring that all infrastructure projects undertake Environmental Impact Assessments (EIA's), integrating EIA's with town planning requirements, creating the essential capacity to ensure sustainable development within municipalities, creating environmental policies for municipalities, developing waste management, air quality and water quality plans as well as plans to ensure the safe delivery of water and sanitation to the people. (www.enviropaedia.com)

Cormac Cullinan writes on sustainable development and the law and asserts that there is a problem with governance in this country. Whereas the law should be there to mitigate any ill effects of development by ensuring sustainable development, Cullinan implies that it is quite the opposite; rather the law is used to promote unsustainable practices. Cullinan concedes that *"the core falsehood is that we humans are separate from our environment and that we can flourish even as the health of Earth"*

deteriorates."(www.enviropaedia.com). What is needed is a paradigm shift in the way in which we perceive the environment, ensuring that the environment is placed first, before the exploits of humans.

2.2 GLOBAL WARMING

The term global warming has been used interchangeably with climate change.

"Climate change has been singled out as a major challenge currently facing the world. It is caused by emissions of greenhouse gases, largely from energy production and consumption, agriculture and other ecological processes. The activities causing most emissions are key drivers of global socioeconomic development. High-income countries are responsible for a large percentage of these emissions, with the USA and Europe emitting 51 per cent of total greenhouse gases into the atmosphere, compared to Africa's 2.5 per cent."(Awuor, Orindi, & Adwera, 2008, p. 231)

Global climate change or global warming refers to the increasing temperature experienced globally.

"Global average sea levels have also risen by about 1.8 mm per year in the last 40 years and it appears that the rate has increased to about 3.1 mm per year in the last 10 years." (IPCC, 2007 cited in (eThekweni Municipality, 2007, p. 11). *"Over the past 100 years, the global average temperature has increased by approximately 0.6 °C and is projected to continue to rise at a rapid rate."*(Root, Price, Hall, Schneider, Rosenzweig, & Pounds, 2003, p. 57).

"The Intergovernmental Panel on Climate Change (IPCC; 2001a) has projected possible changes for the period 1990-2100, including a rise in average global temperature of approximately 1.4 - 5.8°C, an elevated sea level of between 9 and 88 centimetres (chiefly because of the thermal expansion of ocean waters), and alterations in the frequency and intensity of extreme climatic phenomena." (Wall 1996, p. 210; Wall and Badke 1994, p. 194; World Tourism Organization 2003a cited in Belle & Bramwell, 2005, p. 32) *"Global climate change is the increase in the average temperature of the*

earth's atmosphere, which will cause changes in the local climate patterns and sea level rise worldwide" (eThekweni Municipality, 2007, p. 2),

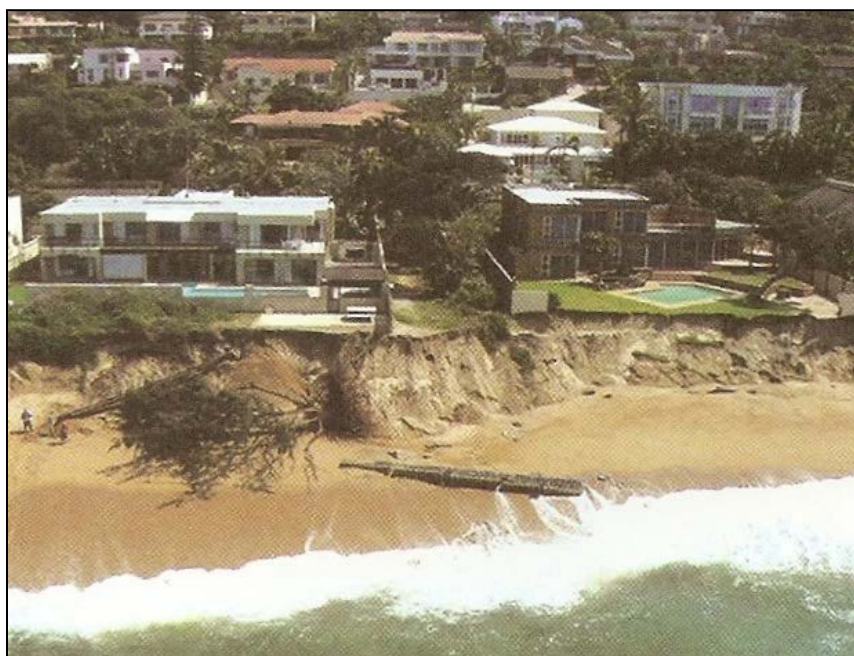
The International Panel on Climate Change (IPCC) states that *"global average surface temperatures have increased, global mean sea level is rising, and the concentration of ozone in the stratosphere has decreased. Annual average precipitation has also changed and the intensity and frequency of extreme weather events appear to have increased."* (IPCC, 2001 cited in Atkinson and Clark, 2005) According to the Intergovernmental Panel on Climate Change (IPCC) it is anticipated that *"climate-related changes include: an accelerated rise in sea level of up to 0.6 m or more by 2100; a further rise in sea surface temperatures by up to 3°C; an intensification of tropical and extra-tropical cyclones; larger extreme waves and storm surges; altered precipitation/run-off; and ocean acidification."*(Nicholls, et al., 2007)

Climate change will therefore result in rising sea levels and increased air temperatures and extreme climatic phenomena (greater incidence of tsunamis, floods, tornadoes and hurricanes). Human settlements are therefore at risk, especially those that occur on low lying areas, closer to the coastline. The probability of infrastructural damage on the coastline also increases with the consistent changes in climatic phenomena. It also indicates that with the increase in sea level as well as the reoccurrence of the incidence of violent storms, the impacts in low lying coastal areas could prove disastrous. This increase in sea level can result in flooding especially for low lying coastal areas. High rates of runoff are common in urban areas due to lack of natural drainage features and this can heighten the effects of flooding especially in areas that are flood prone. *"Dunne (1984) recommends that the most obvious method of reducing runoff is to maintain as much possible natural vegetation and permeable soils [...] the planting of covers that are effective in maintaining high infiltration capacities [...]"* (Giovani, 1998, 410 cited in Davoudi et al.,2009, 42)

In areas like Umdloti (KwaZulu Natal), there has been a notable change in the level of the high tide. The Umdloti Beach which is the neighbouring beach to the Umhlanga

Coastline has also been under enormous strain: All the sand dunes have been removed and the beach is followed directly by a two lane road which immediately leads on to various groupings of flats. The high tide now washes directly on the sea wall which is the buffer that separates the beach from the road. The eThekwini Municipal Area (EMA), through studies conducted by the CSIR has noted that the change in the level of sea will roughly increase by 2.5 cm every 10 years (CSIR, 2006 a). It is hoped that Umdloti will not see the same results as La Lucia (Durban, KwaZulu Natal) [see Figure 3] where there has been a significant amount of beach erosion resulting in damages to infrastructure, property and homes (eThekwini Municipality, 2007).

Figure 3: La Lucia (Durban) - battle with beach erosion



Source: eThekwini Municipality, 2007

Global climate change has resulted in local effects for the eThekwini Municipality by changed weather patterns which demonstrate increased temperature rates and changes and unseasonable rainfall. There have been marked instances of extreme weather events (like cyclones, hurricanes, floods and droughts) as well as sea level rising (due to the melting of the ice caps) (eThekwini Municipality, 2007, p. 13). The

CSIR's report on eThekweni's climate patterns indicate that daily temperature will increase by 2-4°C with heat waves during the Spring and Summer seasons, frequent flooding due to increased rainfall or alternatively droughts due to longer dry periods and average sea level rise by approximately 2.5 cm every 10 years (CSIR, 2006 a). Climate change will therefore pose a threat to the sustainable development goals for the eThekweni Municipality, be it social, economic or ecological.

The impacts of global climate change will have local effects. This assertion is especially true for low lying coastal areas which are vulnerable. Although low lying coastal plains are at risk, they still appear to increase in population and to urbanize rapidly (McGraham, Balk, & Anderson, 2007).

2.3 TSUNAMIS

"A tsunami is a series of large waves of extremely long wavelength (several tens of km) that travel over 800 kmh usually generated by a violent undersea disturbance such as an earthquake." (Obura, 2006, p. 874) Tsunamis are unpredictable but are generally common in areas that have high seismic activity. Coastal communities located close to fault lines (found on the ocean bed) are the most vulnerable. Tsunamis have in the recent past become a real cause of concern for all coastal communities. The rising sea levels caused by global warming (eThekweni Municipality, 2007) have exacerbated the effects of Tsunamis on coastlines. *"Environmental conditions may exacerbate the impact of a disaster, and vice versa, disasters tend to have an impact on the environment."* (Srinivasa & Nakagawa, 2008, p. 4)

"The devastation wrought by the 2004-2005 tsunamis also brought a long simmering concern to the fore – the integrated management of India's coastal zone, balancing environmental and biodiversity conservation, livelihood and economic development and risk mitigation concerns. A series of integrated coastal zone management plans are now in progress, along with a review of the principles for managing the coastal regulation zone. This will provide an important stepping stone for a more evidence

based set of climate mitigation and adaptation measures for coastal India and its cities – a key driver of medium-range economic growth and development.”(Revi, 2008, p. 210)

An Environmental Impact Assessment (EIA) conducted by the Stockholm Environment Institute showed that sand dunes, mangrove forests and coral reefs acted as natural barriers in Sri Lanka and reduced the energy of tsunami waves (Srinivasa & Nakagawa, 2008), hence reducing the devastation that may have been caused by the tsunami waves.

The December, 2004 tsunami affected many countries, the most affected being Indonesia, Thailand, Sri Lanka and the Maldives. Evidence from these countries illustrates the devastating impact of the waves. An estimated 250 000 people perished. Many were left destitute with no shelter (displaced); coral reefs, mangroves, coastal areas, wetlands, agricultural fields and forests, and aquaculture areas were badly damaged. Infrastructure such as roads, harbours, railways and bridges were destroyed or damaged and residential areas were devastated. The natural environment also felt the impact of the waves with the contamination of groundwater which became highly salinized, shorelines were re-sculptured and coastal vegetation was removed. Economic sectors like tourism, agriculture and fishing were hard hit. (Srinivasa & Nakagawa, 2008)

The information in Figure 4 (see next page) conveys a few important points:

- The effects of tsunamis are devastating.
- Lives are lost which can have an impact on the human capital in the area and results in decreased economic potential in the area.
- People are displaced resulting in local and national authorities having to cough up large sums of money to take care of the displaced.
- Infrastructure is damaged (roads, towns, houses and businesses) and requires large sums of money to rebuild.
- Agricultural land is lost or salinized thus decreasing fertility of the land and once again requiring large sums of money to correct.
- Coastal erosion is increased.

Figure 4: Summary of damage to countries worst hit by the tsunami of 26 December 2004

Country	Region	Human	Marine environment	Land/infrastructure
Indonesia	Aceh, northwestern Sumatra	164,891 buried 114,897 missing 412,438 displaced	Seagrass beds (20% loss), coral reefs (30%), mangroves (\$24.5 million damage), rivers/wetlands damaged	Seaside and low-lying infrastructure destroyed (roads, towns, aquaculture/farming, etc.). Groundwater salinized. Damage total \$4.45 billion
Thailand	Andaman coast–Phangnga, Phuket, Krabi, Trang, Satun, Ranong provinces	5393 dead 3062 missing 8457 injured	Seagrass beds (5% impacted), coral reefs (13%), mangroves (0.2%)	Seaside and low-lying infrastructure destroyed in Phuket (roads, hotels, buildings), fishing fleets, 1505 ha agricultural land salinized. No \$ estimate
Sri Lanka	West and south coast most strongly impacted	30,000–37,000 dead	Coral reefs damaged by waves/backwash, mangroves damaged, seagrass beds intact	> 150,000 houses destroyed, 2/3 of fishing boats destroyed, coastal damage was high where coral mining occurred, extensive solid waste transport, groundwater salinized, coastal roads/railway destroyed. No \$ estimate
Maldives	All islands	13,000 displaced	Coral reefs intact, mangroves intact	69 out of 199 inhabited islands damaged, groundwater salinized, coastal/beach erosion high, fisheries infrastructure damage. Damage approx. \$400 million
Seychelles	Northwest and central islands (La Digue, Praslin, Mahe)	No mortality or injuries	Carbonate-substrate reefs highly impacted, granitic reefs intact. Mangroves slightly eroded, some seagrasses smothered	Infrastructure damage at low-lying points, some groundwater salinization and solid waste movement. Damage total \$30 million
Yemen	Socotra island, Al Mahra Governorate	No mortality or injuries reported	Underwater assessments not undertaken	Localized beach erosion and some groundwater/well salinization. Major damage to fisheries infrastructure, approx. \$1.1-2 million
Somalia	Hafun (Horn of Africa)	300 dead, 4500 displaced	No assessment possible	Waste and hazardous waste impacts

Source: UNEP 2005 cited in Obura, 2006, p. 876

Also evident from Figure 4 is that those areas that had greater coastal vegetation cover in the form of mangroves and coral reefs had less of an impact on the lives lost. This brings the point home that those areas that were urbanised (coastal urbanization) had greater destruction, both in terms of infrastructural damage and the loss of lives. *“A number of threats to the environment, such as land degradation, deforestation, erosion etc. have had a number of impacts on recent disaster events.”* (Srinivasa & Nakagawa, 2008, p. 4)

According to Andrew Mather, a coastal engineer (working for EThekweni Municipality) who manages the coastline from a strategic point of view and works on the policy side of the coast, tsunamis occur in South Africa, including Umhlanga. The difference between the tsunamis that occurred in Asia and the ones that occur on the South African coastline is the magnitude. Tsunamis that have so far reached our shoreline have been relatively small, less than 2m. However, it is important to note that we do have (what the media referred to as) tidal surges; more correctly they are spring tides. Spring tides occur every two weeks; however the devastation wrought in September 2006 was the Highest Astronomical Tide (HAT) which apparently takes place once every 18, 6 years. Our coastlines were not ready for the Highest Astronomical Tide and damage to property was evident. La Lucia and Umdloti beaches, neighbouring Umhlanga Rocks, were severely affected. Umhlanga Rocks was also affected but the destruction was minimal, damaging the promenade. One might say that Umhlanga is well managed but the fact is that it is the natural composition of Umhlanga's beach that makes it less susceptible to coastal disturbances (mainly rocky rather than sandy beaches present at La Lucia and Umdloti). Coastlines that had sandy shores were the most affected. Breetzke et al (Eds), assert that the following points are the reasons for significant coastal erosion:

- *“Stretches of coast that have been drained (e.g. Ballito) and where the cohesiveness that was supplied by the groundwater has been lost.*
- *Narrow, sand depleted beaches and bays.*
- *Sandy bays which are north of points.*

- *Beaches with a thin veneer of sand over rock.*
- *Beaches whose natural defence mechanisms such as foredunes, naturally vegetated dunes, offshore sand bars and reefs have been removed.*
- *Beaches with, and adjacent to, inappropriate sea defences.*
- *Beaches where the built environment is located too close to the shoreline and the high-water mark.*
- *Beaches with badly planned, inappropriate and poorly maintained storm water systems.*
- *Beaches where the natural dune vegetation has been removed and replaced with alien vegetation such as kikuyu grass and ornamental gardens.” (Breetzke et al. (Eds), 2009, 4)*

In terms of Umhlanga’s coastal management there is also a man made sea wall that extends throughout the coastline. If this wall was not there the effects could be disastrous, since Umhlanga’s coastline is pretty urbanized consisting of holiday accommodation and high rise residences. The removal of dune vegetation and the dunes on the Umhlanga coastline has resulted in the placement of a sea wall.

2.4 LOW LYING COASTAL AREAS

“More than one-quarter of Africa’s population resides within 100 kilometres of a sea coast, with 12 per cent of the urban population living within the land area that may be affected by a 10-metre sea-level rise (the Low Elevation Coastal Zone or LECZ).” (Douglas, Alam, Maghenda, McDonnell, & Mclean, 2008, p. 192)

This statement indicates that a large percentage of people in Africa, including South Africa that live in coastal low lying areas will be at risk from hazardous situations resulting from the ocean (Figure 3). These include Tsunami waves, spring tides and flooding resulting from storms which include heavy rainfall, hurricanes and tornadoes resulting in the erosion of beaches, damage to infrastructure and property as well loss of lives and biodiversity.

“The 2003 World Development Report notes the pronounced difficulties the poor face when disaster strikes. Developing countries are particularly vulnerable because they have limited capacity to prevent and absorb...effects [of natural disasters]. People in low-income countries are four times as likely as people in high-income countries to die in a natural disaster.... Poor people and poor communities are frequently the primary victims of natural disasters; in part because they are priced out of the more disaster-proof areas and live in crowded, makeshift houses... poor families are hit particularly hard because injury, disability and loss of life directly affect their main asset, their labour. Disasters also destroy poor households’ natural, physical and social assets, and disrupt social assistance programmes”. (Independent Evaluation Group (2006) cited in (Douglas, Alam, Maghenda, McDonnell, & Mclean, 2008, p. 192))

Douglas et al. imply that Developing Countries do not have the means to effectively mitigate the effects (negative) of natural disasters, like floods. McGranahan et al. (2007) also indicate that the Less Developed Countries have a higher percentage of people living in a LECZ (14%) and these people are at great risk. South Africa falls into the category of a Developing Country and its history indicates that one of the most prominent cities in South Africa (Cape Town) began as coastal town (with the Dutch East India Company) and has become a thriving tourism hub with magnificent beaches, including a harbour.

Cape Town’s coastal community has taken an up-market stance and attracted interest from overseas investors. Umhlanga Rocks similarly appears to be a rich enclave with its coastal area marketed for high income groups and especially for private development on the beachfront. Areas like Umhlanga Rocks, although a part of a developing country fit into a different category since they are developed enclaves that due to location are a part of the developing country. The question then arises as to whether the municipal council and private developers in Umhlanga Rocks have done enough to safeguard the community from the onslaught of a natural disaster.

2.5 NEW URBANISM AND COMPACT CITIES

2.5.1 THE ORIGINS OF NEW URBANISM

John Nolen entered into the field of city planning after completing a course in landscape architecture lectured by Frederick Law Olmstead Jr. who was a spokesman for city plan. In 1905 Nolen graduated top of his class and concluded that the way to gain civic harmony was through planning. Nolen then travelled through Europe and used this experience in his designs. He further based his designs by incorporating Thomas Jefferson's "nature aesthetic" and Frederick Law Olmsted Sr.'s "romantic environmentalism." Nolen contended that nature was important and like Olmstead had the view to keep nature's existing form and to blend architecture to this natural form rather than decimating nature to make way for architectural designs. Nolen wanted to plan a different life, his assumption was that Americans had political rights but they lacked beauty, comfort, convenience and orderliness like their European counterparts (Stephenson, 2002). In 1911 Nolen met Unwin, also a pioneer planner. Unwin planned two garden cities with much help from Nolen.

A garden city is a theory postulated by Ebenezer Howard. "The garden city concept rested on the faith that planners could break down the complexities and pathologies of urban life by designing communities around natural forms and at a "human scale" (not greater than twelve units per acre)." (Stephenson, 2002, 106) These garden cities included green belts as well as corridors that connected suburbs⁶. The use of natural contours was also important in determining what building could be placed and where (working with nature rather than against it). Nolen died in 1937 and the planning profession in America began adhering to the sciences rather than art. Nolen's plans were dismissed as being utopian and planning took on a more practical route choosing economics over the environment. In 1976 St Petersburg was inundated by a series of ecological disasters which forced them to start looking at a more environmentally

⁶Green belts and corridors include parks, forested areas, lined trees, fields, existing streams and gardens. EThekwini uses DMOSS (Durban Metropolitan Open Space System) to help link green areas (ecosystems) such that they may help reduce the carbon footprint and help preserve and protect the environment as well as prevent any unlawful development in these areas.

friendly approach, building with nature as Nolen suggested. (Stephenson, 2002) Architects Andres Duany and Elizabeth Plater-Zyberk architectural plans for Seaside, Florida, imitated the work of Nolen.

With soldiers returning from World War II it became necessary to provide housing and the result was encroachment on land that could be better utilised for purposes like agriculture or other types of farming. The post World War II sprawling urbanisation is portrayed as one of the most sinister forces in modern American life, a phenomenon that brought the United States to the brink of socio-economic crises (Furnseth, 1997: 202). Inner city inhabitants also took the opportunity to move to the countryside for cleaner air and healthier living. Developers took advantage of this opportunity since more land became available for development. (Ellis, 2008) The post World War period was haunted by images of deteriorating cities and this turned the tide and forced American planners to become innovative; New Urbanism was born. Much of Nolens work is apparent the New Urbanist vision.

2.5.2 WHAT IS NEW URBANISM?

New Urbanism has offered design concepts that help alleviate the stresses of urban sprawl by creating environmentally friendly developments. The benefit of this approach entails the “efficient use of land as well as preservation of environmental and ecological quality of neighbourhoods, districts, and regions” (Garde, 2004, 154). Other than linking green belts which help protect the environment, the efficient use of space means that there is less destruction on the environment and in areas that can be used for farming or agriculture (also important for sustaining the population).

New Urbanist planning advocates an urban space that includes mixed-use, mixed-income, pedestrian-oriented, compact developments. Creating a pedestrian friendly environment means people are able to walk to work, which minimizes the use of vehicles, thus contributing to lowering the carbon footprint. New Urbanism initially began as an approach for Greenfield developments but it has now being used to revitalize Brownfield developments and is seen as a measure to combat sprawl (Garde,

2004). Urban design is instrumental in New Urbanist projects and the idea is to foster a sense of place identity, sense of community, and environmental sustainability (Day, 2003). New urbanism attempts to break down barriers by promoting diversity in neighbourhoods; however there are no strict codes to ensure that this diversity is met. The most that new Urbanism does is that it allows for the designs of different housing types (high, medium and low income) however this does not equate to diversity in the neighbourhood. Umhlanga has used the new urbanist concept to build Umhlanga Ridge as well as the development along the beach, yet it's hard to imagine anyone but the wealthy living there. "New Urbanists have accomplished only a facade of social improvement, promoting instead quaint architecture and a "yuppie infantalist fantasy" for the upper middle class "(Risen 2005).

New Urbanism is promoted by certain principles. These include aspects such as : interconnected streets, short distances for walking, streets and pavements designed for communal use (shared), promotion of mixed (residential use and land uses) with the need to create diversity in a multi-racial enclave, infill development (to promote development) and in totality to be able to work, live and play in the same area. "Streets and public open spaces are a major feature in most New Urbanist developments and help to structure the community and give it character. The street is reclaimed as a social space for walking, bicycling, playing, and social interchange." (Southworth, p.219) The role of nature in the city is a contentious issue for new urbanists; some have stated that rural nature has no place in the city and the city has no place in rural areas. "Urban open space should consist of squares and plazas, not greens or conservation areas." (Southworth, p.212) the principles of New Urbanism are summarized in a formal document, the *Charter of New Urbanism* (Congress of New Urbanism, 2000).

Compact Cities and New Urbanism therefore have two things in common, the first being the need to minimize sprawl and secondly to create more sustainable areas. This is important especially for the study area (Umhlanga Rocks) as this area has sprawled into agricultural land over the years and recently there has been a shift. The shift has been to create enclaves within Umhlanga: termed the *old* and the *new* areas. An example of

a *new* area would be the Gateway Complex which has been a site of tremendous growth. It can be described as a Greenfield site that has been infused with new urbanist design. The *old* area (which is the study area) is the coastal strip. This has been infused with compact city tendencies but with the inclusion of the Umhlanga Node Precinct Plan (UNPP), there has been a view to infill and revitalize the area, hence giving it a new urbanist vision.

2.5.3 WHY USE NEW URBANISM

The issue with many urban settlements is sprawl. Sprawl is basically the outward expansion of an area which then tends to increase the size of the settlements and may result in the expansion of one settlement into another. Developed countries have decreased sprawl and have instead changed development trends from horizontal (on the ground) to vertical. This trend is not only for the business sector but includes the residential sector as well (Barcelona and London are examples of this approach). Umhlanga has used this type of architecture in create high density residence in the new Umhlanga Ridge. The shift is to create more compact cities, which is needed if we are to save any agricultural land for the future (sustainability!). Umhlanga can be seen as a city within a city. According to Gordan and Richardson, compact cities are characterized by high-density residential living and a greater reliance on mass transit (particularly light rail) for routine transportation. The concept of a compact city focuses on land consumption, efficient service provision, transport costs, energy usage and social equity (Gordon & Richardson, 1997). New Urbanism also suggests developing according to the natural features of the environment rather than changing the environment to suit the development, and this creates a sense of environmental protection.

2.6 CONCLUSION

The overarching theme of this dissertation is sustainability and sustainable development. The use of planning innovations like New Urbanism to reach that sustainable goal is apparent in an area like Umhlanga. The question remains as to just how sustainable these developments are? The ability for developers to develop in a sustainable manner requires that developers take a balanced approach by balancing the social, the environmental and the economic aspects of development. It is necessary for developers, planners and any other agencies that are involved in planning and development to abide by the rules and regulations that promote sustainability. The next section deals with legislation that is applicable to the South African situation.

CHAPTER 3 LEGISLATION AND POLICY

3.0 LEGISLATIVE FRAMEWORK FOR COASTAL MANAGEMENT AND DEVELOPMENT

About two thirds of the world's population lives along the coast and it is expected that by 2025 that this figure will increase to at least three quarters of the world's population (Glavovic, Our Coast, Our Future: A New approach to Coastal management in South Africa, 2000).

“The coast can be described as a system that is made up of natural and human components. Physical and chemical processes give rise to different coastal systems that provide a range of goods and services to coastal stakeholders that include the coastal users, the coastal public, institutions of coastal governance and the coastal research community” (Glavovic, Our Coast, Our Future: A New approach to Coastal management in South Africa, 2000, p. 22).

There are various stakeholders that show interest in the coast, be that for business, residence or for pleasure and for this reason it are essential that the coastline is managed in a manner that will give all parties equitable access to coastal resources. At the same time it is essential that the coastline is developed in a sustainable manner.

This chapter outlines the policy and legislation that has been used to help manage resources on the coastline. The Integrated Coastal Management Act (Act 24 of 2008) together with the coastal protection zone, the Admiralty Reserve, the Integrated Development Plan prepared in terms of the Local Government Municipal Systems Act (Act 32 of 2000) with its Spatial Development Framework, the Constitution of South Africa (Act 108 of 1996) and the National Environmental Management Act (Act 107 of 1998) will be used to demonstrate the legal framework that exists to manage and develop the KwaZulu Natal coastline.

It is essential to note that legislation is the result of effective policy decisions. Internationally Agenda 21 became the engine that drove sustainability and locally, Local Agenda 21 was formed to cater to local needs. Various policies in the form of White Papers, Green Papers and Bills are necessary to ensure that the correct Acts are passed and can be instituted nationally. The Coastal Policy White and Green Paper with The Coastal Management Policy Programme (Association incorporated under Section 21) 1998, the Green and White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1996), the Environmental Policy for South Africa, Green Paper, Environmental Management Policy White Paper (1997), the National Environment Management Bill (2007,2008,2009) and finally the National Environment Management: Integrated Coastal Management Bill (2006, 2007, 2008) are directly related to this dissertation and are worth mentioning since the legislation that follows are the end result of the above mentioned.

3.1 THE CONSTITUTION OF RSA

In South Africa's endeavour to promote sustainable development and use of the environment, the constitution has also provided for the protection of the natural resources. According to the *Constitution of the Republic of South Act 108 of 1996, section 24 – 25 states that:*

Everyone has the right-

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

The Constitution of the Republic of South Africa has given South African's a legal means to protect and conserve the environment. Sustainable Development requires all

developers to take cognizance of the environment and to ensure that natural resources are available for both present and future generations.

3.2 THE DEVELOPMENT AND FACILITATION ACT (ACT67 OF 1995)

The Development and Facilitation Act supports reconstruction and development while adhering to general principles governing land development. The Development and Facilitation Act 67 of 1995 was introduced to speed up delivery. Post apartheid, there was a need to rewrite bad apartheid planning, by delivering house on a large scale to formally disadvantaged communities. Legislation at that moment was the Town Planning Ordinance, but this took at least 18 months before actual development could begin. Tired of the long struggle to provide poor people with adequate services, the DFA was introduced, designed to provide these disadvantaged communities with quick service delivery. A noble task, which unfortunately had loopholes, since private sector delved into the legislation, and were quick to use the DFA to provide development for higher income houses. The eyesores in the form of green roofs that lurk on former sugar plantations are testimony to this. Chapter 1, subsection (3) j aptly states that “Each proposed land development area should be judged on its own merits and no particular use of land, such as residential, commercial, conservational, industrial, community facility, mining, agricultural or public use, should in advance or in general be regarded as being less important or desirable than any other use of land.”

The DFA is composed of 8 chapters. Chapter 1, 2 and 5 are the most appropriate to the town planning discipline. Chapter 1 refers to the general principles of land development. It refers to the need for policy, administrative practice and laws that should provide for and facilitate urban and rural development, formal and informal and new and existing settlements, whilst discouraging illegal occupation of land (possibly by providing housing) and efficient and integrated land development.

Chapter 2 refers to the Development and Planning Commission, who will advise and inform the minister and or the MEC or any premier. The Commission consists of not more than 24 members who are representative of the rural and urban community.

Chapter 3 refers to development tribunals. A development tribunal is established for each province, so it is not only applicable to KZN like the Town Planning Ordinance, but to the whole of South Africa.

Chapter 4 and 5 of the Act deals with land development procedures. The applicant will provide details and documents to the tribunal, who will over a short period of time, make a decision as to whether the application is rejected or granted. If granted, there may be conditions that can be imposed by the tribunal, which need to be adhered to by the applicant as a condition of establishment. The applicant must then lodge with the Surveyor general and the registrar plans, diagrams, documents and other required documents.

The DFA is therefore composed of the tribunal that makes the decisions, there is no need to be referred to other bodies; therefore this cuts the processing time down. It is one development process, where all reports that are needed are compiled in an integrated fashion, for instance the environmental scoping report is done with the application.

The DFA allows for the speedy delivery of reconstruction and development programmes, as well as the establishment of a Development and Planning Commission which is shared with the Town Planning Ordinance. The main purpose of the act is the prescription of land use in land development procedures. The act promotes integrated planning, optimal resource use, sustainable development and competitive advantages and merits of land.

3.3 KWAZULU-NATAL PLANNING AND DEVELOPMENT ACT, 2008 (ACT 6 OF 2008)

The Town Planning Ordinance No. 27 of 1949 was assigned to the former province of Natal, or what is now known as KwaZulu Natal. The purpose of the Ordinance was to “consolidate and amend the law relating to the establishment of private townships, the

sub-division and lay-out of land for building purposes or urban settlement and the preparation and carrying out of town planning schemes; and to provide for other incidental matters.” (Town Planning Ordinance No. 27 of 1949) The KZN Planning and Development Act 6 of 2008 replaced the Town Planning Ordinance 27 of 1949.

The KZN Planning and Development Act 6 of 2008 is also referred to in short as the PDA. The functions of the KZN Planning and Development Act 6 of 2008 are:

- provide for the adoption, replacement and amendment of schemes;
- provide for consent in terms of schemes;
- provide for the subdivision and consolidation of land;
- provide for the development of land outside schemes;
- provide for the phasing or cancellation of approved layout plans for the subdivision or development of land;
- provide for the alteration, suspension and deletion of restrictions relating to land;
- provide for the permanent closure of municipal roads or public places;
- provide for enforcement measures; to provide for compensation in respect of matters regulated by the Act;
- establish the KwaZulu-Natal Planning and Development Appeal Tribunal; provide for provincial planning and development norms and standards (KZN Planning and Development Act 6 of 2008)

It's important to note that the Planning and Development Act(Act 6 of 2008) places importance on law or governance in that whereas the Act is responsible for the points above; it is necessary that the Act is governed purposefully, maintaining the impact of the Act.

Thus the law must promote a uniform planning and development system, provide an equitable standard of planning, build on good planning practices, promote a planning system that rectifies the injustices of the past, promote lawful development, be practical

and clear. The law must promote certainty, ensure that decision makers are timeous, ensure that decision makers incorporate expert advice before any hasty decisions, direct decision makers in the correct way (by being clear, precise) and must be enforceable (practical).

This Act has provided a 'just' way for developers, allowing for due public process, transparency and equitable opportunities. It also paved the way for criminal action to be sought against unlawful developments, with jail time (5 years). The KwaZulu Natal Planning and Development Act 6 of 2008 became law in May 2010. The writing of the Act is in keeping with the national Constitution of South Africa, allowing for the Province to make decisions regarding itself. Planning and development decisions are taken by local government whilst appeals will be dealt with by a tribunal appointed by the MEC in consultation with the Executive Council of the province.

The Planning and Development Act 6 of 2008 has created a platform that allows for rightful, proper and equitable development in KwaZulu Natal, and at the same time seeks just action from local government ensuring that development is in keeping with the Act.

3.4 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The protection of the environment is necessary and if development on the grounds of economic progression for South Africans is detrimental to the economy of this country then NEMA is responsible for the promotion of conservation and the prevention of degradation of the environment, by attempting to get developers to comply with legislation. It is therefore imperative that if an area is to be developed then an Environmental Impact Assessment must be conducted such that the environment that is to be developed on is properly cared for and to prevent degradation of sensitive ecosystems. Previously developers were quick to develop along coastlines, since the property market dictated a boom in coastal properties, but since the use of Environmental Impact Assessment (EIA), it has become more difficult for developers to develop along coast lines.

National Environmental Management Act (NEMA), Act 107 of 1998 states that the act is meant:

“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 state; and to provide for matters connected therewith.” (RSA, No 107 of 1998, National Environmental Management Act, 1998)

The preamble to NEMA reiterates section 24-25 of the South African Constitution (see section 3.1 of the dissertation). The principles set out in NEMA apply throughout South Africa. NEMA serves as a guideline for implementation, management and the development of the environment. NEMA is relevant to all environmental issues and serves as a framework to serve and protect the environment.

NEMA protects the environment in many ways but for purposes of this dissertation the relevant ones are listed below:

- I. Integrated environmental management: Environmental Impact Assessments (EIA) is regulated by NEMA. Duty of care to the environment: responsibility must be taken by those that degrade the environment- polluter pays principle.
- II. Access to environmental information: everyone has the right to access information on the environment whether that is from the government or private developers. The controlled use of vehicles in the coastal zone: regulations are put in place to prevent exploitation of the beach area by off road vehicles and also regulate boat launching facilities. NEMA stewards the environment putting the environment before the needs of developers or does it?

As much as NEMA has done for the environment, yet it still says *“Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.”* This can be interpreted in various ways. For the developer it means that he or she needs to prove that a specific community requires a somewhat sensitive area to fulfil their physical, psychological, developmental, cultural and social interests and the development should be approved. This may mean that sensitive ecosystems could potentially be disrupted.

NEMA provides a brilliant definition for sustainable development and at the end of reading Chapter 1, section 4 of NEMA; one would be very clear as to what is regarded as appropriate to the environment and what should not be allowed.

Figure 5: Sustainable Development Principle in NEMA

(4) (a) Sustainable development requires the consideration of all relevant factors including the following:

- i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- ii) That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- iii) That the disturbance of landscapes and sites that constitute the nation’s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- iv) That waste is avoided or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- v) That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
- vi) (That the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;
- vii) That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and

3.5 INTEGRATED COASTAL MANAGEMENT ACT

The National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008) will be referred to as the Integrated Coastal Management Act. This statute is meant:

“To establish a system of integrated coastal and estuarine management in the Republic, including norms, standards and policies, in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable; to define rights and duties in relation to coastal areas; to determine the responsibilities of organs of state in relation to coastal areas; to prohibit incineration at sea; to control dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment; to give effect to South Africa's international obligations in relation to coastal matters; and to provide for matters connected therewith.”(RSA, Act 24 of 2008, National Environmental Management: Integrated Coastal Management Act, 2009).

The Integrated Coastal Management Act (ICMA) has within the above definition embodied the notion of sustainable development, with the aim of conserving and protecting natural resources. The ICMA makes reference to the three different spheres, that is, the social, environmental and the economic which are the main topics dealt with in definitions of sustainable development (see chapter 2). It also refers to prohibition of inappropriate development, except that the ICMA does not have any direct reference to what inappropriate development is. The ICMA does however refer to the Coastal Protection Zone and development within this zone can be considered inappropriate. With this said, it makes it very difficult to rationalize the type of Ribbon Development that has and is occurring along the KwaZulu Natal Coastline. The most impressive of these developments appear to be found on the North Coast with Umhlanga Rocks taking the lead.

3.5.1 THE COASTAL PROTECTION ZONE

According to section 16 of the ICMA, the coastal protection zone is composed of:

- (1) Subject to subsection (2), the coastal protection zone consists of—
 - (a) Land falling within an area declared in terms of the Environment Conservation Act, 1989 (Act73 of 1989), as a sensitive coastal area within which activities identified in terms of section 21(1) of that Act may not be undertaken without an authorisation;
 - (b) Any part of the littoral active zone that is not coastal public property;
 - (c) Any coastal protection area, or part of such area which is not coastal public property;
 - (d) Any land unit situated wholly or partially within one kilometre of the high-water mark which, when this Act came into force—
 - (i) Was zoned for agricultural or undetermined use; or
 - (ii) Was not zoned and was not part of a lawfully established township, urban area or other human settlement;
 - (e) Any land unit not referred to in paragraph (d) that is situated wholly or partially within 100 meters of the high-water mark;
 - (f) Any coastal wetland, lake, lagoon or dam which is situated wholly or partially within a land unit referred to in paragraph (d)(i) or (e)
 - (g) Any part of the seashore which is not coastal public property, including all privately owned land below the high-water mark;
 - (h) Any admiralty reserve which is not coastal public property; or
 - (i) Any land that would be inundated by a 1:50 year flood or storm event.
- (2) In areas forming part of the coastal protection zone, except an area referred to in subsection (1) (g) or (h) may be excised from the coastal protection zone in terms of section 26.(RSA, Act 24 of 2008, National Environmental Management: Integrated Coastal Management Act, 2009)

Section 1(d) and (e) of the ICMA are extremely important because these sections tend to enforce a setback line which is either 1 km if the area did not fall into a town planning scheme or if it was agricultural land, or 100 m from the high water mark. It is hoped that

the Coastal Protection Zone will change with time. It is envisaged that due to global warming, the sea level cannot remain constant, thus an increase in the level of water should trigger a change, moving the Coastal Protection Zone accordingly.

It becomes necessary to define a few terms from section 16 of the ICMA. For clarity the *high-water mark* refers to the highest line reached by coastal waters, but at the same time excludes any line reached due to abnormal floods or storms which take place no more than once in ten years or alternatively an estuary being closed to the sea. The *littoral active zone* refers to any land forming part of, or adjacent to, the seashore which may be unstable and dynamic due to natural processes and is characterized by dunes, beaches, sand bars and other landforms composed of unconsolidated sand, pebbles or other such material which is either un-vegetated or only partially vegetated. The Admiralty Reserve refers to any strip of land adjoining the inland side of the high-water mark which, when this Act took effect, was state land reserved or designated on an official plan, deed of grant, title deed or other means and is referred to as Admiralty Reserve, government reserve, beach reserve or as a coastal forest reserve. (RSA, Act 24 of 2008, National Environmental Management: Integrated Coastal Management Act, 2009).

3.6 ADMIRALTY RESERVE

“The main functions of the Admiralty Reserve are environmental (biodiversity conservation, particularly of coastal dune vegetation); provision of public access to the beach which is essential for recreation and tourism, and therefore has an economic benefit; geomorphologic by providing dune stability and ensuring that the natural coastal processes of sand transport and deposition are not hampered in this dynamic coastal zone; and legal through providing a buffer strip which assists in the administration and control of the beach and sea-shore.”(Provincial Planning and Development Commission, 2008, p. ix). The Admiralty Reserve provides the coastline with an effective environmental management strategy with the purpose of conserving existing dune vegetation, preventing any further degradation of dunes and preventing further erosion on the coastline. It is normally considered as a strip of land 45m to 60m inland of the

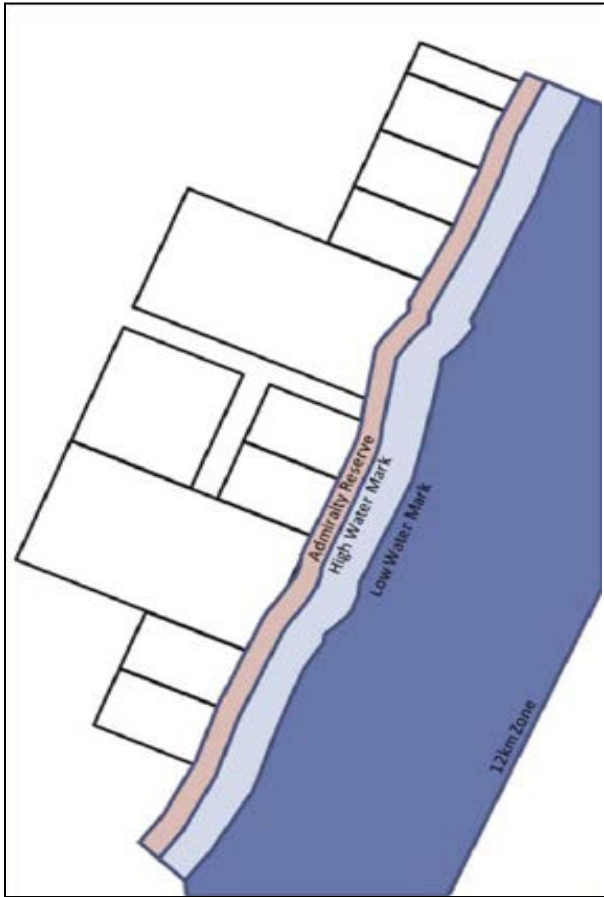
high water mark, however it is not a continuous line; it does not occur throughout the coastline. It does however provide an excellent management tool, which with proper governance can create better protection of coastal assets in KwaZulu Natal.

The pink line in figure 6 shows the Admiralty Reserve which is 40-60m inland of the high water mark. Theoretically it should include all land along the coastline that is between 400-60m inland of the high water mark. Practically this is not the case. Figure 7 indicates that the Admiralty Reserve is a broken line, where there is no pink on the diagram indicates that this land is privately owned rather than being state owned.

“On the 19-20 March 2007, a storm swell coinciding with a Saris spring high tide struck the coast of KwaZulu-Natal.”(Provincial Planning and Development Commission, 2008). The result was damage to private and public property (Photo 2 and 3), estimated 1 billion Rand and an alteration of KwaZulu Natal beaches by stripping the coastline of sand (which exacerbated erosion on these beaches for 6 month after) (Mather, 2008). The highest waves (8.5 to 12m waves) in 23 years were reported during this storm (See Photo 1). Due to reckless urban planning as well as the coastal property boom, the effects of the March 2007 storms exacerbated the effects of the storm by destroying property and businesses. Beaches and infrastructure from the South Coast to the North Coast were affected.(Provincial Planning and Development Commission,2008)

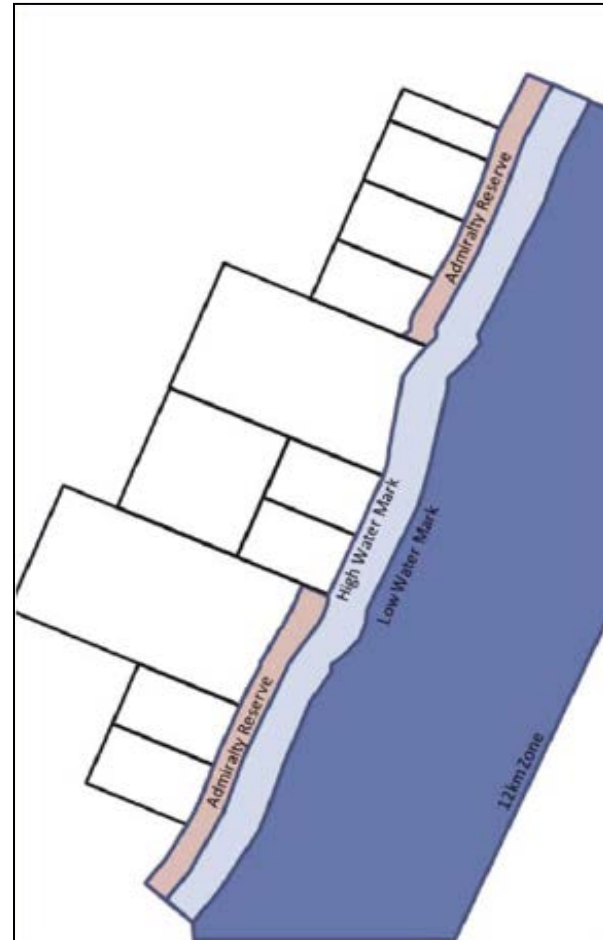
Photo 2 shows what Amanzimtoti beach looked like before the storm and photo 3 shows the results after the storm.

Figure 6: Theoretical Admiralty Reserve



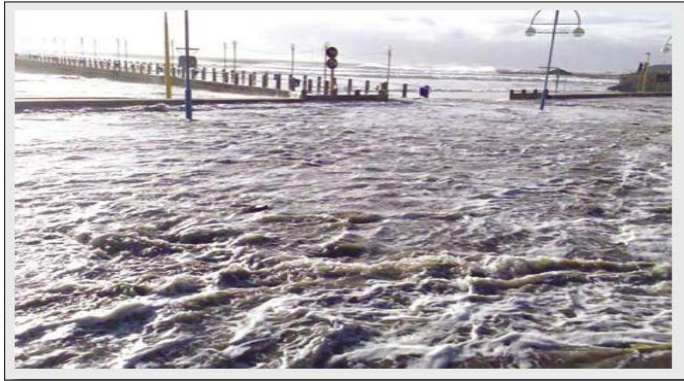
Source: Provincial Planning and Development Commission

Figure 7: Current Reality- Admiralty Reserve



Source: Provincial Planning and Development Commission

Photo 1: Waves on Durban's Marine Parade



Source: Provincial Planning and Development Commission, 2008

Photo 2: Amanzimtoti Beach, January 2007



Source; Provincial Planning and Development Commission, 2008

Photo 3: Amanzimtoti Beach, July 2007



Source: Provincial Planning and Development Commission, 2008

3.7 THE INTEGRATED DEVELOPMENT PLAN

The IDP for eThekweni, *2010 and beyond* (2006) has an interrelated eight point plan which is:

- 1 Sustaining our natural and built environment.
- 2 Economic development and job creation.
- 3 Quality living environments.
- 4 Safe, healthy and secure environments.
- 5 Empowering citizens.
- 6 Celebrating our cultural diversity.
- 7 Good governance.
- 8 Financial viability and sustainability.

Although these plans are separate, they are also interrelated. However, this dissertation concerns itself with the environmental component and therefore specifically looks at Plan 1 which refers to sustaining our natural and built environment.

Accordingly the EThekweni IDP (2006) recognizes that natural assets must be conserved and since it is a coastal municipality, much emphasis is placed on the sustainable management and use of coastal resources.

Chapter 2, programme 2 of the EThekweni IDP (2006) notes the coastal management strategy and identifies 12 strategic objectives:

- Development and implementation of Coastal Management Plans.
- Blue Flag rollout plan.
- Coastal recreation/tourism development plan.
- Event management plans.
- Estuary management plans for each estuary.
- Storm water and coastal water quality improvements.
- Coastal legislation and bylaw development.
- Coastal education and awareness.

- Sustaining the supply of environmental goods and services.
- Managing development in the coastal zone.
- Sustainable coastal livelihoods programme (poverty relief focused).
- Coastal structures management and coastal engineering.

Plan 4 speaks of create secure, safe and healthy environments but it emphasizes fire and emergency services without any due consideration for the coastline and impacts on the coastline. Since EThekwini is a coastal municipality, surely there must be a disaster management plan dealing specifically with the coastline, but this is not the case. There is no specific programme that deals with risk assessment and disaster management of the coastline. According to the researcher this may be one of the flaws in the IDP.

According to the eThekwini IDP, the Municipality is committed to ensuring the long term sustainability of eThekwini's natural assets, as identified by the EThekwini Environmental Services Management Plan (EESMP). This is included as Chapter 2, programme 3 of the eThekwini IDP. The natural assets that require protection and management include:

- Rivers;
- Wetlands;
- Estuaries ;
- Grasslands, forests; and
- Coastal zone resources.

According to the eThekwini Environmental Services Management Plan (EESMP), 63000 ha falls within the above five categories. Of this 90% is under private ownership, but the view held by eThekwini is to conserve this land by using conservation servitudes or by any other means possible.

Programme 2 of chapter 2 in the eThekweni IDP (beyond 2010) refers to the development and implementation of municipal pollution reduction and climate protection. Global climate change is detrimental to the health and wellbeing of developing countries, and South Africa recognizes the need to protect and conserve its natural resources in order to minimize the impacts of climate change. Sustainable development has therefore become the order of the day for all development located within eThekweni municipality. The suggestion is to keep the natural environment and resources, wherever possible untouched especially if it has received conservation recognition. Since eThekweni is a coastal municipality, it recognizes that global warming has resulted in an increase in sea levels and that much needs to be done to promote the sustainable management and use of eThekweni's coastlines.

3.7.1 SPATIAL DEVELOPMENT FRAMEWORK

The Spatial Development Framework (SDF) is one part of the IDP that should be able to translate the vision for the area into a map (figure 8). The SDF is therefore represents a spatial view of what is expected to be found in which area. What is also extremely important is that the SDF is an effective tool in protected conservation areas, by demarcating these ecologically sensitive areas on a map that will prevent developers from developing there. Also noticeable in figure 8 is that the whole KwaZulu Natal coastline is regarded as an ecologically threatened area. Yet at the same time the major investment nodes all appear to be close to the coastline or on the coastline- these areas include the South Durban Basin (SDB), the Point Precinct and Umhlanga. Ribbon Development seems to be a continuing trend on the KwaZulu Natal coastline, with areas like Richards Bay, Ballito, Umhlanga Rocks and La Lucia and Durban's North and South beaches becoming major investment nodes and tourism enclaves.

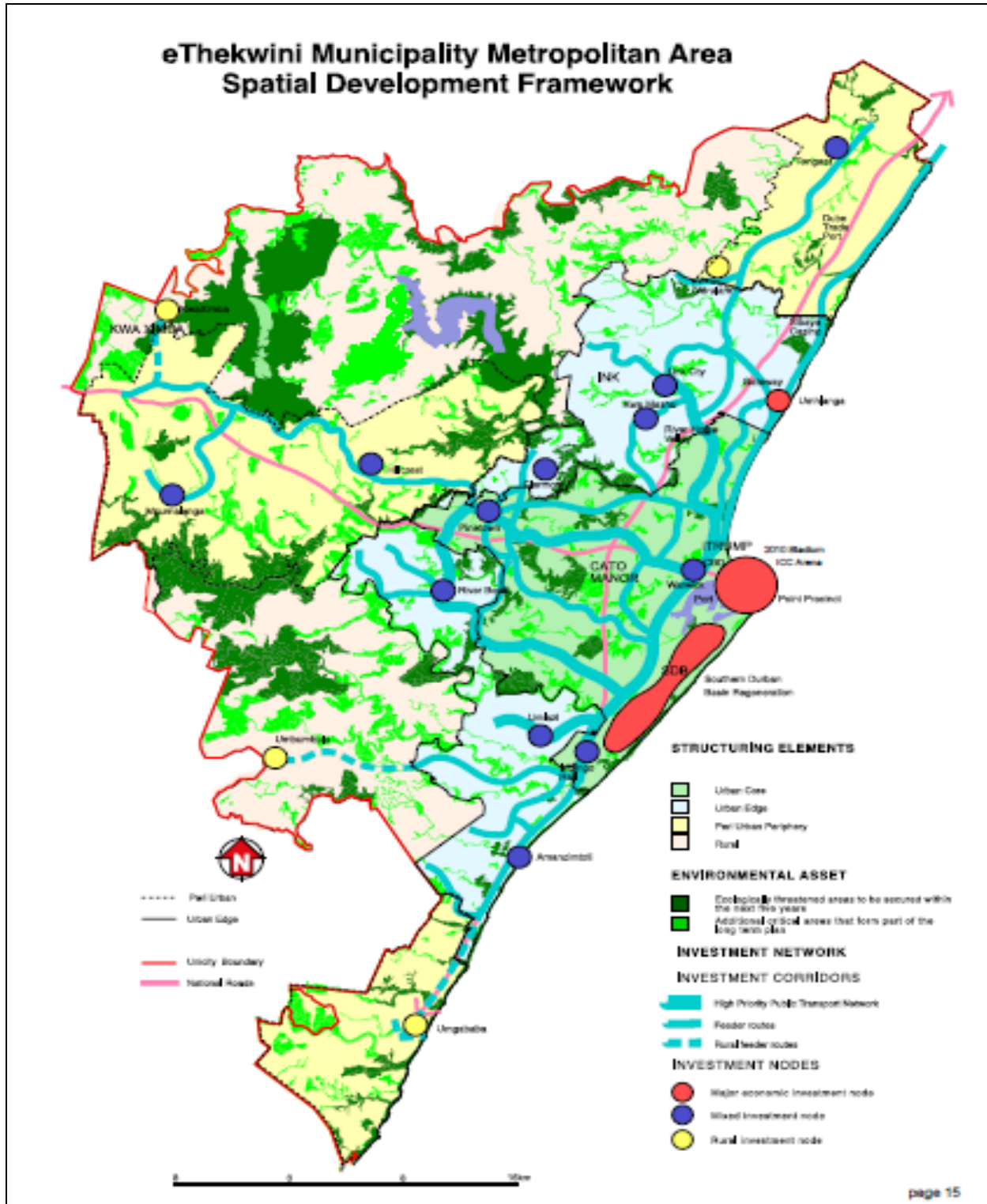


Figure 8: Spatial Development Framework for eThekweni

3.8 UMHLANGA NODE PRECINCT PLAN

Umhlanga Rocks is situated around 18km's from Durban. It is ideally situated since it is easily accessible from King Shaka airport, a mere 12km's away. The Umhlanga Node is bounded by the M4 on the west, Durban View Park to the south, the promenade and beach to the east and up to the northern extent of Lagoon Drive. "The Precinct (core of the Node) starts from the intersection of Lagoon Drive and Weaver Crescent in the north, and is bordered by Ocean Drive in the south, the M4 and Flamingo Drive in the west, and the Indian Ocean from Casa Playa to Ocean Drive in the east." (Umhlanga Node Precinct Plan Executive Summary, 2007, 2) See figure 9.

The ASM Consortium was appointed to prepare a precinct plan for Umhlanga. The Development Vision for Umhlanga included:

- a tourist destination/ seaside resort with a people friendly, walkable and safe environment conveying a cosmopolitan sense of place and urbanity
- an 'urban village'-like environment
- a unique place that balances between the needs of holiday makers and the local community.

The Precinct Plan includes all land uses and densities, proposed built form, movement, circulation and parking, public space and landscaping, services and infrastructure, and public amenities and services. The plan also has detailed design guidelines, recommended amendments to the town planning scheme and a list of key interventions and projects, including design interventions for the public realm within the core area.

Because the Umhlanga Node is situated along the coastline, the Precinct Plan has had to pay special attention to the Integrated Coastal Management Plan. In terms of the coastline the Plan has four objectives: Coast-dependent economies and activities (promote diversity, sustainability and vitality of coastal economies and activities), Balance and Diversity (balance between built, rural and wilderness areas), design and management of coastal settlements and risk and natural hazards (manage coastal development to avoid incidence and severity of natural hazards).

Figure 9: Study Area for Umhlanga Node Precinct Plan



Source: Umhlanga Node Precinct Plan, 2007, 2

The development principles used include:

- Accessibility: improve accessibility in and around the area for tourists, locals, and children as well as the elderly and disabled. Create an environment that is

walkable- pedestrian friendly thus preventing traffic congestion as well as parking problems.

- **Connectivity:** Define functional linkages with other nodes as well as structural linkages between precincts. Define the east-west connection with the Ridge Town Centre, Ridgeside, and Westridge to provide access to the node and beachfront facilities.
- **Legibility:** enhance the unique attributes of the area- environmental, historical and architectural. Create a pedestrian friendly environment with signage making the area more user friendly.
- **Sustainability:** encourage mixed land use, promote trading from different sectors within a managed programme, connection of neighbourhood centres, and infill of areas between the main connections and finally use the natural elements like the beachfront and nature reserve to maximize gains.
- **Liveability:** promote interconnectedness between public and private open spaces. Extend the public open space system thus promoting environmental sustainability. Promote the preservation of the natural ecosystems, the beachfront promenade as well as other natural corridors. Lend support to the tourism industry.
- **Built Form:** Introduce architectural codes for all new developments. Establish site parameters dealing controlling height of new developments. Provide relief and diversity of massing developments in different localities.
- **Landscaping and public places:** consolidate and extend indigenous vegetation, linkage and extension of the public open space system, preserve the natural ecosystem and integration with DMOSS.

The main purpose of the Precinct Plan is to guide development in a manner that is in keeping with the general character of a coastal resort. The Plan is meant to outlay a list of guidelines that will ensure sustainable development. The Precinct Plan is not statutory which means that it is not a legal document. The Plan uses new urbanist principles in an effort to provide a walkable, pedestrian friendly, ecologically sensitive,

high density area, with the purpose of creating a place that is safe to live, play and work in.

3.9 CONCLUSION

South Africa's coast is seen as an asset to the country, due to the various opportunities available on the coastline which includes its rich natural resources, aesthetics and economic potential. Hence the coastline is a place of meeting between the economic sphere, the social sphere and the biophysical sphere (Department of Environmental Affairs and Tourism, 1998). This chapter has outlined the various legal requirements for development along the coastline. At the same time this chapter has also referred to development allowances on the coastline and very importantly, where development can occur. The chapter also outlines who is responsible for ensuring that development occurs in an equitable manner and provides for criminal proceedings against law defaulters, as evident in the KZN Planning and Development Act 6 of 2008. The new integrated Coastal Management Act has provided a practical assessment of where development can occur by identifying the high water mark and creating a coastal protection zone. The IDP has insisted on proper coastal management and development which forms an integral part of EThekweni's vision for the future by providing an SDF. The Constitution has provided the legality concerned with ensuring that all citizens have equal access to the coastal resources and NEMA has reiterated this sentiment whilst providing an excellent definition of what sustainable development is and how to go about achieving this.

CHAPTER 4 RESEARCH AND ANALYSIS

4.1 INTRODUCTION

Urbanisation along coastlines around the world is gaining impetus and Umhlanga Rocks is following suit. With the increasing emphasis on sustainable development, worldwide and the need to prevent environmental catastrophes, as well as curb global warming; the coastline becomes an important natural asset that needs to be protected. In many parts of the world, most human activity is concentrated in the coastal zone, and therefore this is the area where the most environmental management is required, especially where coastal vegetation, like dune vegetation and mangrove forests have been removed or exploited (Barrow, 2006). Mather (2008) has undertaken to research tide gauge records in Durban and the results are that the sea level has risen by 2.7 from 1970 to 2003 at about 0.05 mm per year. The global sea estimate is about 0.07mm per year (Mather, 2008). The impact of the recent spate of coastal disasters, especially the 2004 Tsunamis would have been better managed if the necessary environmental and coastal protective mechanism and the regulation of them had been in place. Notable is that installation of pre warning buoys along the coast line affected by the Tsunamis. Coastlines and the adjacent developed areas would have been better prepared to face the impacts had this increased environmental management been installed prior to the disasters (Barrow, 2006). Against the background of these developments the questions is posed - has Umhlanga effectively managed their coastline? This chapter deals will the research findings and an analysis of those findings.

This chapter is structured around the consideration of the documented effects of Tsunamis on the coastline and what this may mean to the study area as well as other South African coastal areas. An overview of coastal vegetation follows, with a look at the importance of coastal dune vegetation and its significance with regard to mitigating the disastrous effects of coastal disturbances. The next part of the chapter considers low lying coastal areas and the effects of coastal disasters on these areas. Finally this

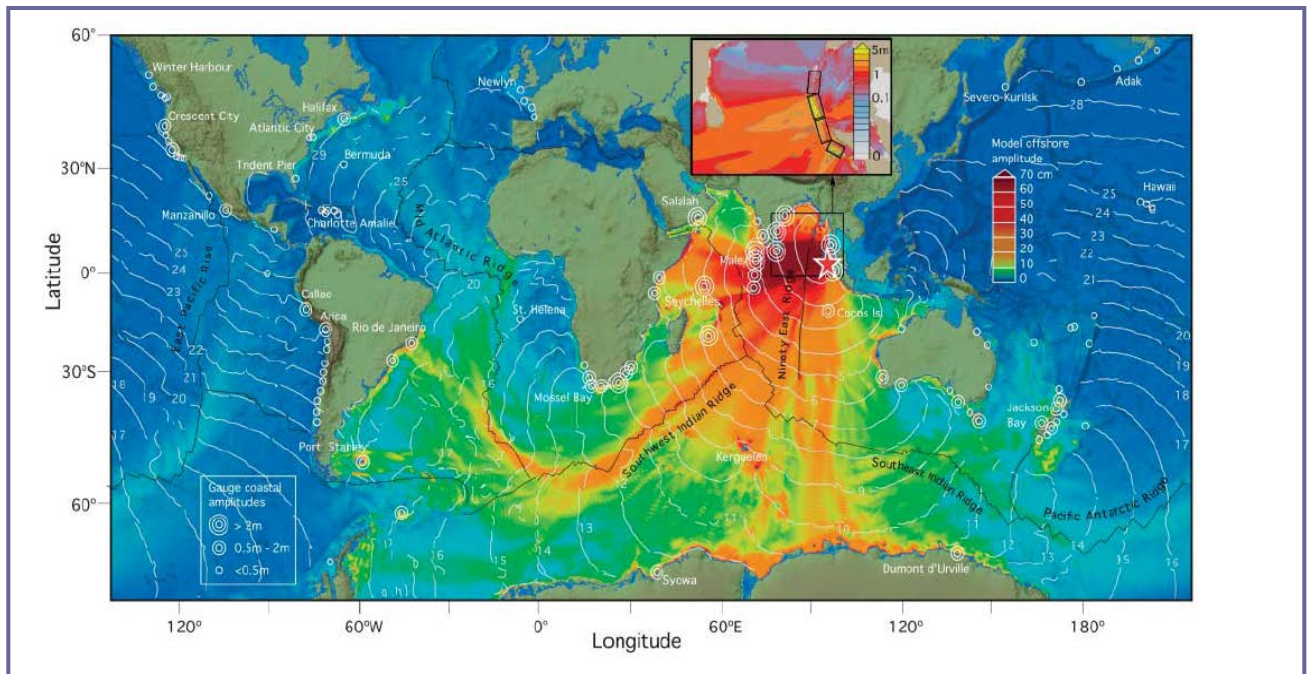
chapter considers the case study area of Umhlanga Rocks itself and analyses development along the coastline by scrutinizing a historical series of aerial photography of the coastline from 1985 to the 2009, as well as developments like the Hawaan Estate, Pearls Development and the Umhlanga Node Precinct Plan (UNPP). The chapter will outline effective management principles in the Hawaan Estate development and use this as an example of sustainable development that is applicable to the coastline and consequently in areas that are highly sensitive.

4.2 TSUNAMI OCCURRENCES IN SOUTH AFRICA

Tsunamis, according to Andrew Mather, a Coastal Engineer for the EThekweni Municipality, are an occurrence on the South African coastline. The difference between Tsunamis experienced on the South African coastline and the Asian disaster is the magnitude of the Tsunamis. Tsunamis have been experienced on the South Asian coast in the recent past and the damage caused by these Tsunamis has been catastrophic. Infrastructure has been damaged, people have been displaced, millions of dollars worth of damage to the coastline has been observed and thousands of people have lost their lives (see figure 5 in chapter 2). The effects of the 2004 Tsunami have been felt far and wide, with countries like Indonesia, Thailand, Sri Lanka and the Maldives the worst affected. Evidence indicates that certain parts of the African coast have been also been affected (see figure 10) e.g. the coastline of Somali. Figure 10 indicates that the strength of the waves reached the South African coast, as far as Mossel Bay and spread of the impacts were recorded as far as the South American coastline. Obviously the strength and force of these waves were dissipated with distance from the epicentre and initial sites of the Tsunami but the fact remains that the effects of the December 2004 tsunami had a definite impact on several continents (Asia, Europe, Africa and South America). Interviews conducted indicate that people feel that Tsunamis are not a threat to the South African coastline, yet figure 10 indicates differently.

South Africa may not be prone to tsunamis directly but the effects of tsunamis triggered elsewhere can be a threat to the South African coastline, which includes Umhlanga Rocks. The recent spring tides or tidal upsurges along the North Coast of KwaZulu Natal are testament to this natural phenomenon. Coastal towns like La Lucia and Ballito were severely affected with the destruction of private property and infrastructure. Wave height was recorded with the highest reaching 14m. Respondent 2 indicated that much of the destruction occurred in areas where people developed on public property, meaning the beach itself. Private owners increased their seaside properties by incorporating public property as part of their own. Furthermore dune vegetation was removed to accommodate private development and when the tidal upsurge occurred, the strength of the coastal waves destroyed all buildings, including pools and outhouses which were outside the private home owners' property. Yet another reason for the need for proper management practices along the coastline and the need to contain all natural vegetation along the coastline as well.

Figure 10: Locations and amplitudes of tsunami waves



Source: Vasily Titov, 2005

4.3 COASTAL VEGETATION

“In South Africa the coastal zone has experienced an intensification of human population pressure induced by socio-political changes stemming from the Apartheid legislation and the result has been an influx of people to coastal cities and towns.” (Gwynne, De Ruyck, Kerley, & McLachlan, 1996, p. 1)

The importance of retaining and protecting vegetation on the coastline is a lesson that South Africa needs to learn from the experience of Asian countries. Mangrove forests have been observed to mitigate the impact of Tsunamis. Simeuleu in Indonesia was close to the epicentre of the Tsunami yet very little damage or loss of life was observed since the area was well endowed with Mangroves (Kathiresan & Rajendran, 2005). *“The role of mangroves in reducing the sea-waves has been scientifically proved. For instance, a six-year-old mangrove forest of 1.5 km width will reduce 1 m high waves at the open sea and 0.05 m at the coast.”* (Mazda et al., 1997 cited in Kathiresan & Rajendran, 2005). Dune vegetation lessens the impacts of coastal disturbances like Tsunamis. Furthermore evidence indicates that those areas that have been located between 500m and 1000m from the high water mark have little or no infrastructural damage.

Development in and along coastal areas in South Africa have been regulated by the Sea Shore Act (Act 21 of 1935 and the Environmental Conservation Act, 1982 (Act 100 of 1982) which was fore runner to the National Environmental Management Act (Act 107 of 1998). Various delineations of what constituted the coastal strip were determined by these statutes. The Sea Shore Act defined the sea-shore as *“the area between the low-water mark and the high-water mark.”* Similarly the Environmental Conservation Act, 1982 (Act 100 of 1982) declared that the strip of land 1000m from the high water mark have limited development, and any development on this land required permits. This Act was however repealed in Cape Town and KwaZulu Natal with the result that insensitive development was allowed on the coastline. (Gwynne, De Ruyck, Kerley, & McLachlan, 1996). Historically, KwaZulu- Natal has had additional legislative measures in the form of the Admiralty Reserve which restricted development from 200metres inland from the

high water mark but this was considered to be policy rather than enforceable legislation and did little to limit development within the sensitive interface of the high water mark. Currently, South Africa has changed their coastal development policy, with the introduction of the Coastal Management Act (Act 24 of 2009) which aims to introduce measures to protect the coastline including the area formally covered by the Admiralty Reserve. New measures include proposals for a coastal protection zone which attempts to prohibit any new developments within the 100m of the high water mark. Any proposal for development within this 100m protection zone triggers an environmental Impact Assessment. Poor coastal planning in the past has resulted in high density developments within 50m of the high water mark. *“Recent work along the KwaZulu- Natal coast has shown that the strip of land 100m inland of the high-water mark (HWM) has been transformed from 28% urbanised in 1994 to 50% in 2006...”* (Mather, 2008, 50)

The storms in March 2007 caused by a cut-off low pressure system caused devastation along the northern coastline of KwaZulu-Natal. Tropical cyclones, cut-off low pressure systems and coastal lows are some of the things that influence wave climate. “During these events, the deep water significant wave heights occasionally reach 8m to 10m (periods between 11 s and 17 s) off Durban and 10m to 12m (periods between 14 s and 20 s) off Cape Town” (Ematek, 1991 cited in Mather et al., 2011, 90) Wave run-up has been defined as the “time-varying location of the shoreline water level about still-water level” (Holman and Sallenger, 1985 cited in Mather et al., 2011, 88). Predicting wave run up is of importance to coastal engineers, developers, coastal managers and land use planners since this will help in managing the coastline as well as setting development setback lines.

In many instances natural vegetation, forest or dune may have protected the coastline. The dunes had been sacrificed for development and since no natural defence systems exist (lack of dunes and dune vegetation) or in some cases artificial defence mechanisms, there was nothing to mitigate the intensity of these tidal waves. Therefore the fact that South Africa has proposed a change in the coastal protection zone can be

regarded in a positive light. Yet there still appears to be exceptions to the rule, allowing for certain developments to be approved within this 100m protection zone. The Umhlanga coastline provides a prime example of the policy and legal requirements for the protection of the coastline not being adhered to. The economic potential of development on the coastline seems to far outweigh the environmental effects for developers and the official approving agencies. One such example is the Pearls development which is located in Umhlanga and bears testament to a decision of economic tradeoffs being considered more important than coastal conservation.

The Littoral Active Zone (LAZ) is the area on the shore where the sand is mobile. “The constant flow of sand within the borders of the LAZ is a self-regulating mechanism of coastal protection and preservation.” (Gwynne, De Ruyck, Kerley, & McLachlan, 1996, p. 61) In this zone, the malleability of land allows sandy coasts to act as buffers between the sea and the land. Frontal dunes have the natural capacity to lessen the impact of high tides, storm wave energy as well as gale force winds, thus acting as a protective barrier between the coast and inland areas. The LAZ therefore remains effective, as a protection barrier or buffer, as long as this area is allowed to go about its natural processes. (Gwynne, De Ruyck, Kerley, & McLachlan, 1996) Unfortunately in Umhlanga development have been allowed within this LAZ and the natural processes are hampered thus the potential incidence of disasters along this coastline appears to be greater, than any other coastline that has significantly less development. Furthermore, the concretizing of the coastal surfaces in the form of the Promenade along the Umhlanga coastline may result in greater runoff of storm waves and high tides, allowing for flooding to occur.

The Admiralty Reserve presents an opportunity to counteract disturbances on the coastline indicating that the reserve should be accommodated and applies to all coastal areas, reserving a space of 60m from the high water mark. Sadly many of these coastal regions have already been developed due to inappropriate planning stemming from the Apartheid era – the legacy of which continues in the present time. Umhlanga, Umdlotti and La Lucia beaches are excellent examples of this. Theoretically, the Admiralty

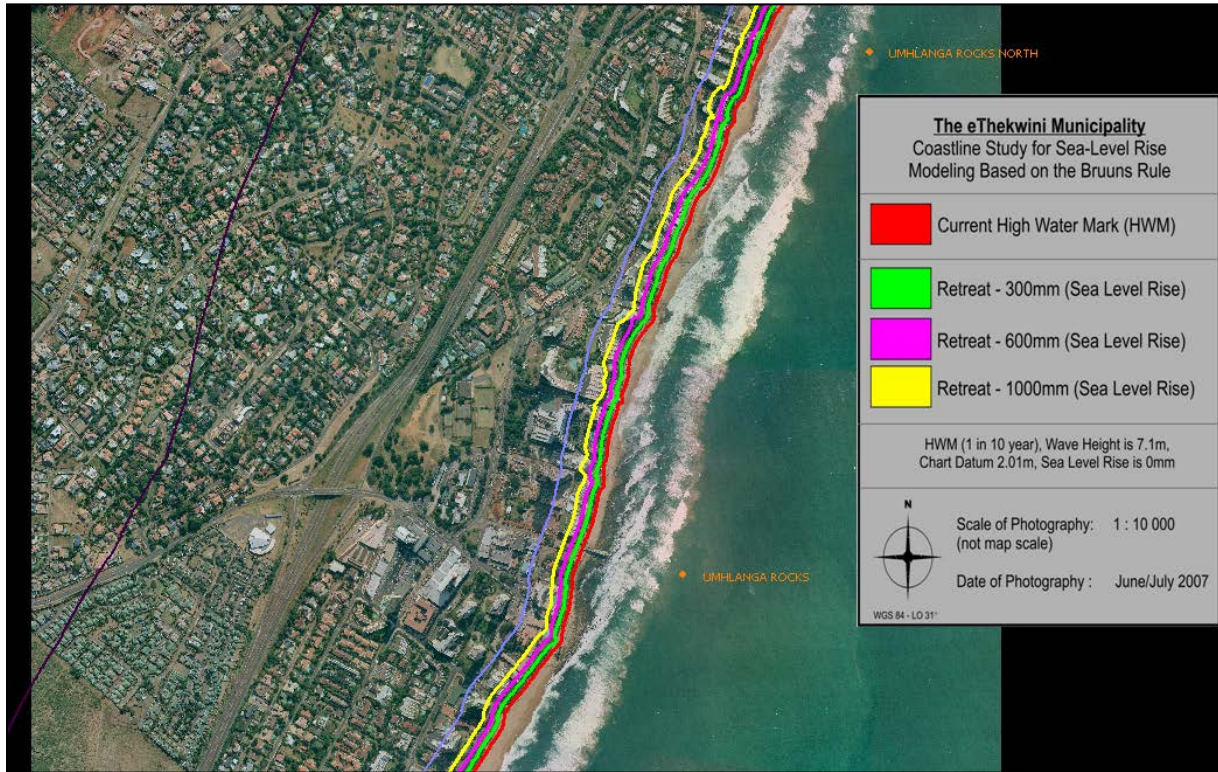
Reserve (see figure 6) occurs within 60m from the high water mark. No development should be allowed within this reserve. The current reality (see figure 7) though depicts something different. The reality is that past planning has resulted in an infringement of the Admiralty Reserve. The lack of discretion on the part of the developers and approving agencies has created an extremely urbanized coastline, with a lack of natural vegetation.

4.4 LOW LYING COASTAL AREAS

Figure 4 illustrates that low lying coastal areas are at risk when it comes to Tsunamis. The same will be true for other climatic disturbances, like heavy rainfall, tornadoes and hurricanes, tropical cyclones as well as spring tides. This area is also referred to as a low elevation coastal zone (LECZ). *“Overall, this zone covers 2 per cent of the world’s land area but contains 10 per cent of the world’s population and 13 per cent of the world’s urban population.”* (McGranahan & Balk, 2007, p. 17). Climate change and the associated rise in sea levels can be detrimental to LECZ’s. The sea level on the Durban coastline has increased by 2.7mm from 1970 to 2003 (Lewis, 2009). This rate will rise and EThekweni has already considered three possible scenarios, with rises of 300mm, 600mm and 1000m.

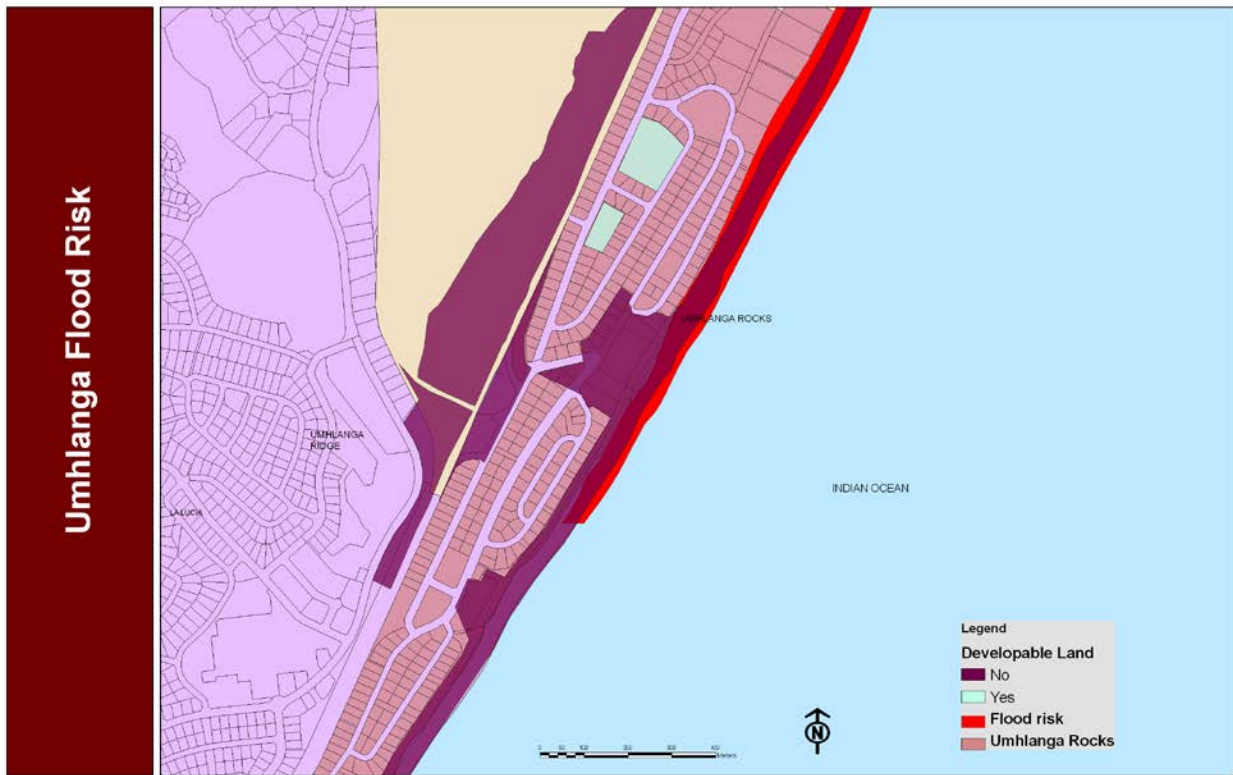
Map 3 is GIS generated and indicates that the land closest to the sea is not developable; still there is development along the coastline, since this area is a tourist destination and the majority of buildings along the coastline are high rise holiday resorts. It is also apparent according to map 3 that much of these resorts are prone to flooding.

Figure 11: Potential sea level scenarios on the Umhlanga Coastline



Source: Mather: eThekweni Municipality

Map 3: Flood Risk for Umhlanga Rocks



Source: eThekweni GIS

Umhlanga is a coastal community and is regarded as a low elevation coastal zone. Properties situated alongside the coastline, especially on Lagoon Drive are at risk to rising sea levels. Furthermore much of the natural coastal defences have been removed; the sand dunes have decreased in height and much of the vegetation has been lost. Properties alongside the coastline were built prior to the changes made to the coastal protection zone and are therefore at great risk for flooding (map 3). Yet there are new developments that have begun, even with the 100m setback line in place, like the Pearls development. According to Durban's Municipal Climate Protection Programme there is an urgent need to revise the coastal setback line, since new rainfall and runoff data indicate that there is an increase in sea levels; this setback line was

meant to be revised by the 30th September 2009(Lewis, 2009) , but has still not been revised (November 2011).

Photo 4: Cabana Beach Resort- proximity to the sea under normal conditions



Source: Zané Möhr cited in Mather, 2008

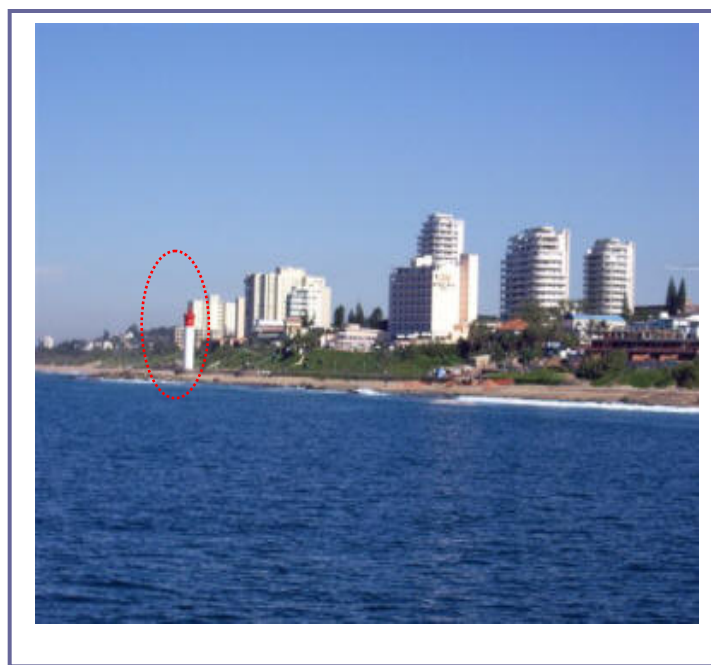
4.5 CHANGES IN THE COASTLINE

The area was first occupied by the San hunter gatherers, and later by Nguni speaking people who were unified by King Shaka in the early 1800's into a Zulu nation. Sir Marshall Campbell sailed to South Africa in 1850 and occupied this land as part of his sugar cane estate⁷. In 1860 Indian indentured labourers were brought in to work on the sugar cane plantations. Umhlanga's first beach cottage, the Oyster Lodge, was built in

⁷ <http://www.umhlanga-rocks.com/Home.htm>

1869 and formed the beginnings of the hospitality industry. Its reflective roof was also used by passing ships to navigate around the rocky shores. By 1954, the distinctive red and white lighthouse (photo 4) was built to ward off ships from the rocky shores. The first hotel, The Umhlanga Rocks Hotel was built in the 1920's and The Oysterbox Hotel was built on the site adjacent to the lighthouse in 1947. The booming hospitality industry soon followed, and the little village of Umhlanga was transformed into a desirable holiday and tourism destination. By 1985 (see photo 5) the Umhlanga coastline was urbanised, mostly containing hotels and high rise residential buildings.

Photo 5: Umhlanga Lighthouse on beach front



Source: www.umhlanga-rocks.com

4.5.1 CHANGES IN THE UMHLANGA COASTLINE 1985-2009

Umhlanga began as a little village, with an array of people, first the Zulu nation, then Colonial rule which included the importation of Indian indentured labourers to work on the cane farms. It was the administration of the colonial British that triggered growth along the coastline. Today the presence of ribbon development along the coastline is testament to the effort placed by developers and residents of Umhlanga, converting

Umhlanga village to its present state (see photo 6). Umhlanga Rocks has now become a rich enclave, still diverse in its population distribution, due to its earliest settlers and the current democratic regime. But it is still considered a rich enclave, with the current residential distribution consisting of gated communities and high rise residences. The 1980's and 1990's saw tremendous growth both along the coastline as well as within the interior.

Photo 6 and 7 represents aerial photographs of Umhlanga Rocks. Photo 6 was taken out in 1985 and photo 7 in 1997. Evident from these aerial photographs illustrates the changes that have occurred in Umhlanga. Within a period of 12 years Umhlanga Rocks urbanised both inland and along the coastline. There is infill development in the interior as well as development along the coastline, marked 1 on the photos. There is also removal of vegetation, possibly for development (building structures), marked as 2 on photo 6 and 7.

Photo 6: Umhlanga Rocks in 1985

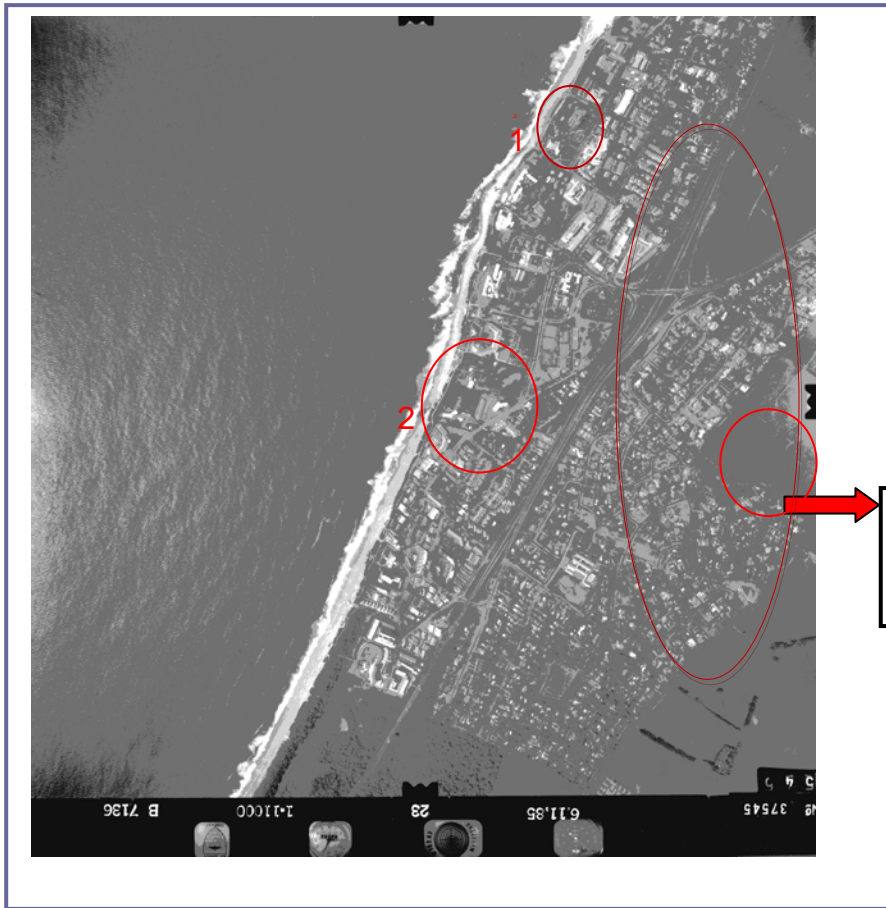
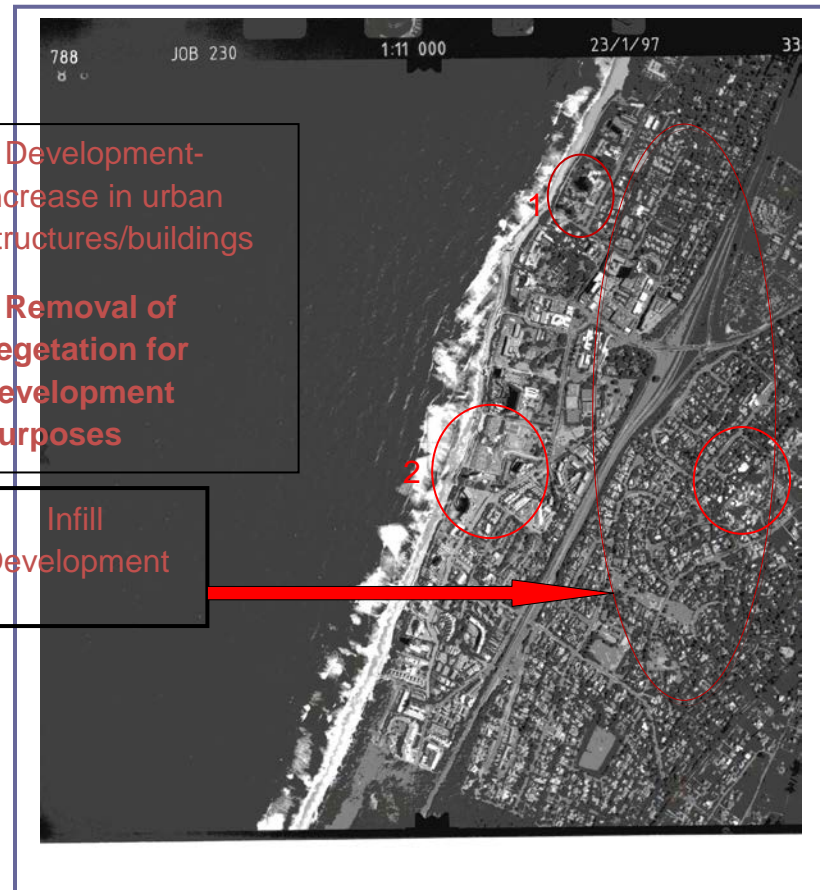


Photo 7: Umhlanga Rocks 1997



Source: eThekwini GIS

From 2000 onwards infill development occurred at a tremendous pace (see photo 7 and 8), including the construction of the Gateway Shopping Centre and Umhlanga Ridge, including the Crescent Shopping Centre. The interior of Umhlanga is being built using a



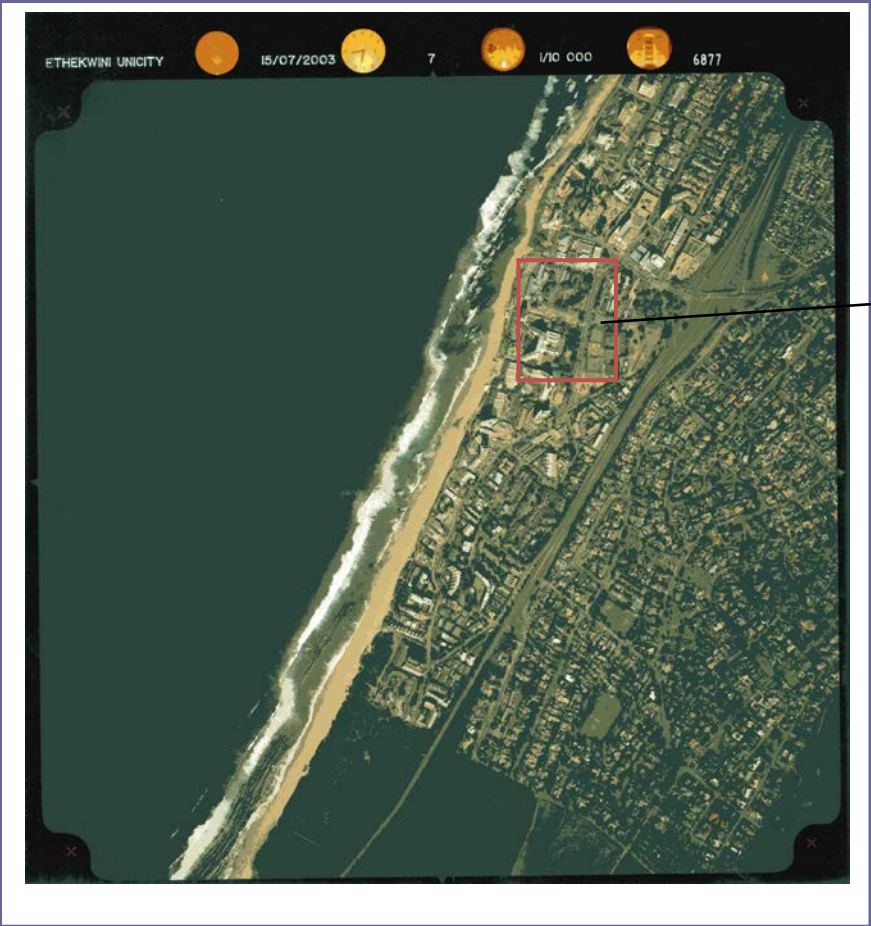
new urbanist vision. Similarly, the Ridge is being built with the vision to create a place where one can live, work and play. Furthermore space is being used to its maximum, by creating high rise buildings in an attempt to prevent sprawl by promoting densification. The coastal area also received attention, by way of the Umhlanga Node Precinct Plan. Further developments

along the coastline included the Pearls development as well as the promenade and the creation of a more South African space by design. The idea around the UNPP was to mirror the Las Ramblas in Spain, which has become a shopping Mecca, with an array of activities that includes local talent, sidewalk cafes and a walkable space. (See included photos for a pictorial indication of Ramblas in Spain)⁸



⁸ Photos from <http://www.emergentstructures.com/wp-content/uploads/2009/12/DSCN0020.JPG> and <http://sejonesphotography.com/SpainIndex.htm>

Photo 8: Umhlanga Rocks 2003



Source: eThekwini GIS



Inset 1: Coastline 2003

Photo 9: Umhlanga Rocks 2009



Source: eThekwni GIS



Inset 2: Coastline 2009

Coastal Development- specifically the Pearls Breeze and Pearls Dawn- Change that occurred since 2003

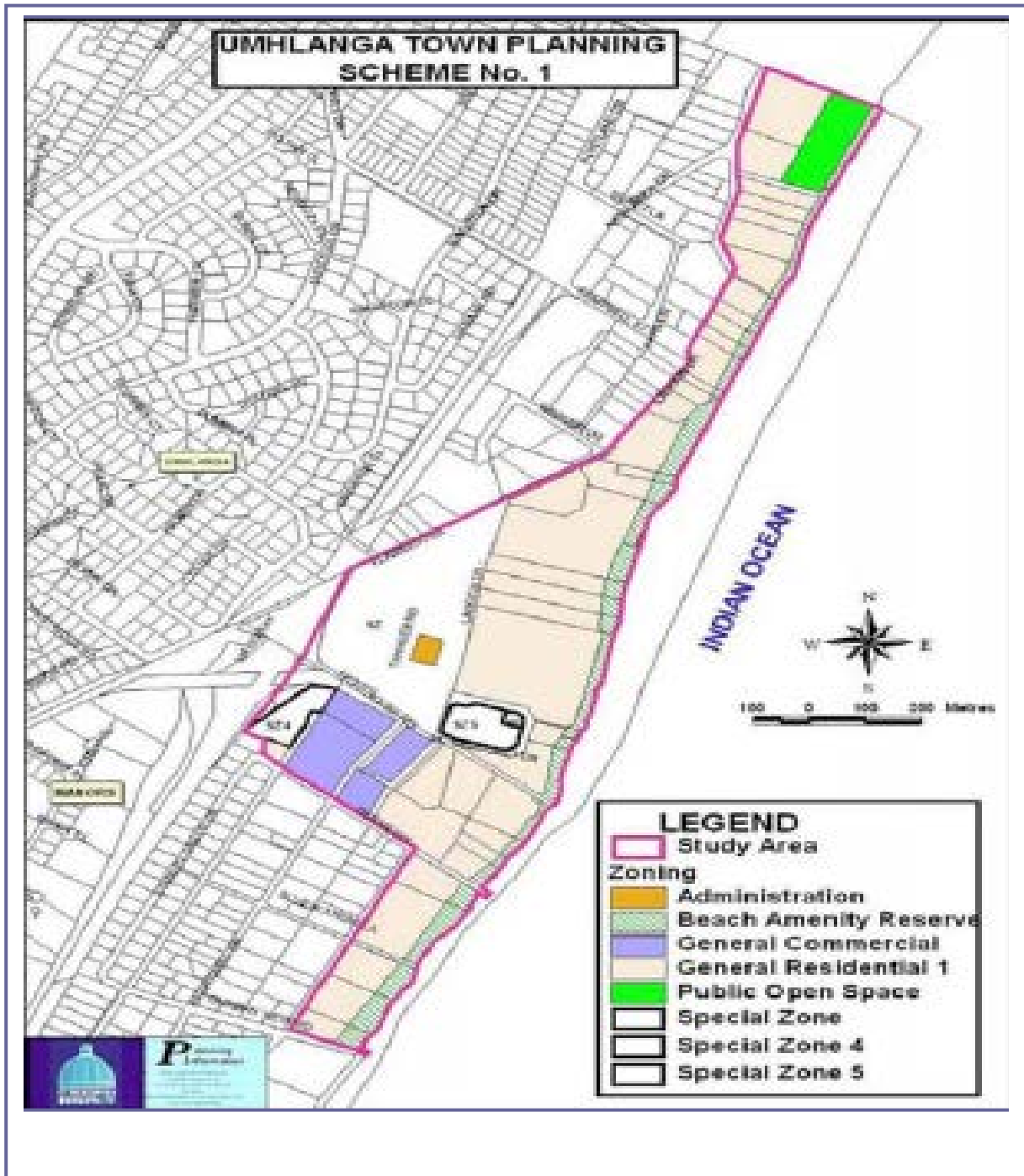
Work in KwaZulu Natal shows that there has been an increase in development from 28% of the coastline, 100m from the high water mark in 1994 to over 50% in 2005 (Mather: 2008). Between 2003 and 2009, Umhlanga Rocks developed along its coastline including individual projects that were greater than 20 storeys- the Pearls development. Furthermore these developments infringed upon the Admiralty Reserve as well as the coastal setback line. Recommendations for the coastal reserve occurred after 2003 yet the Pearls development, especially Pearls Dawn managed to receive consent for its application to development with a portion of the development occurring within the reserve. The Umhlanga Node Precinct Plan (UNPP) is also a predominant plan within this period: 2003-2009. The UNPP came into effect in 2007. It has provided the framework for the approval of more concreted structures and surfaces along the coastline. These include the new pier which resembles a rib structure is an attempt to uplift the coastline. However the use of building material here may also have a negative effect on the natural processes within the littoral zone.

4.5.2 UMHLANGA NODE PRECINCT PLAN (2007)

The Umhlanga Node Precinct Plan (UNPP) has been seen modelled to promote tourism and increase economic activities in the area. The UNPP consists of a variety of landuses which include: general residential, special zones, public open spaces and general commercial (see figure 12).

“The Umhlanga Rocks Node is located 18 km from the Durban central area and approximately 12 km from the planned Dube Trade Port and King Shaka Airport. (The Umhlanga Node) is bounded by the M4 on the west, Durban View Park to the south, the promenade and beach to the east and up to the northern extent of Lagoon Drive. The area currently consists of a mix of land uses including: commercial, general residential (temporary, permanent and tourist), hotel, administration (municipal library, offices and post office), and a taxi rank, as well as the beach and promenade areas.” (eThekweni Municipality, 2007, p. 2)

Figure 12: Umhlanga Town Planning Scheme



Source: eThekweni Municipality, 2006

It is interesting to note that the general residential area lies adjacent to the coastline and this area allows for buildings over 20 storeys tall. The environment is regarded as important and the document considers sustainable development as a means to promote living with nature. There are sections within the UNPP which promote environmental conservation, outlining ways in which to prevent exploitation of the coastline and its sensitive areas. The promenade is closest to the shoreline and the UNPP presented a case to use natural fabrics to counteract the extreme urbanism along the coast. Sadly, this has not been a very fruitful drive. The result been concreted structures (see photo 10) that are not compatible with the natural environment.

Photo 10- Concreted structures on Umhlanga Coastline



Source: Umhlanga Node Precinct Plan, 2007

4.5.3 HAWAAN FOREST ESTATE- A SUSTAINABLE CASE STUDY

The Hawaan Forest Estate is a 65 hectare development, part of which includes a sugar cane field (± 40 ha) and a central portion (± 25 ha) of Hawaan Forest. (Breedlove, 2003) According to the developer, development will occur on the sugar cane field only and not in the Hawaan Forest. The Hawaan Forests occurs within an area that has received conservation status.

The Hawaan Forests are an integral part of the Umhlanga ecosystem and development within these forests was granted on condition that its conservation status be maintained. Currently the Estate functions as an eco-estate, with wildlife and areas that are undisturbed. This development has been seen as a welcomed development, ablending nature with the built environment. Much has been done to enhance sustainability by removing alien plant species, creating a biodiverse habitat, using green roofs, accepting conservation servitudes and preventing encroachment on the Hawaan Forests. All materials used have been carefully selcted to promote conservation, blending in with nature. (Respondent 1)

Photo 11: Hawaan Forest Estate

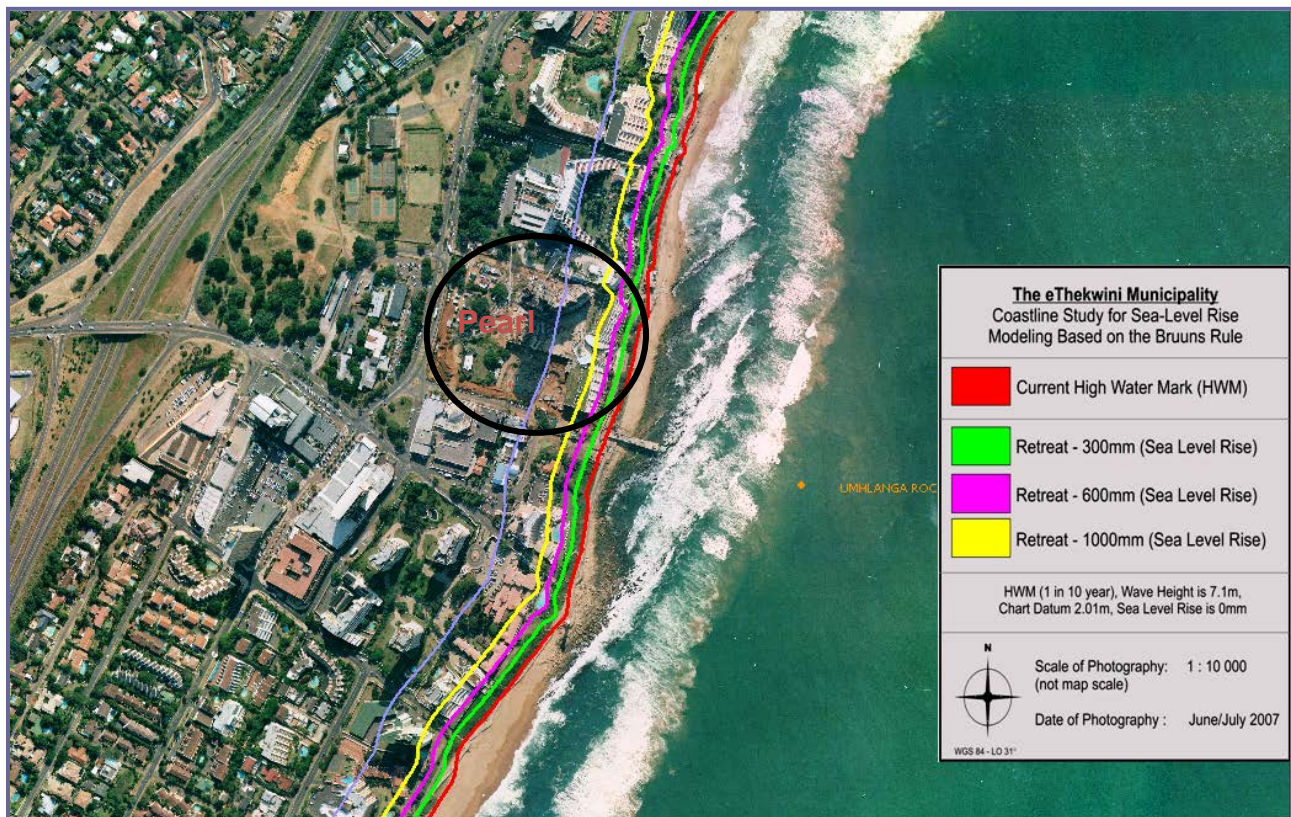


Source: www.hawaan.com/Estate.html

4.5.4 THE PEARLS DEVELOPMENT

The Pearls development appears on the Umhlanga coastline and is a work in progress. It consists of three buildings, the first Pearls Breeze is fully completed and the second, Pearls Dawn which is on the verge of completion, with the remaining building that will be built at a later stage. The Pearls development has been quite controversial, with developers placing notice of Pearls Dawn (the newest Pearl building) over the Christmas period, allowing the public only 10 days to lodge any appeals. (Naidoo, 2007)⁹

Figure 13: Pearls and 100m High Water Mark



Source: Andrew Mather- eThekweni Municipality

⁹ Published in the Mercury, January 03 2007

One of the reasons that the Department of Agriculture and Environmental Affairs consented to this development because only a *“very small part of the development footprint is within 100m of the high water mark of the sea, and the development is separated from the beach and dune system by an existing promenade and the existing Pearl Tides building.”*¹⁰ However according to figure 13, the Pearls buildings do not infringe upon the current high water mark of 100m. It is the promenade that infringes upon the high water mark. Consent for an exemption was granted to the developers of Pearls Dawn 11 days from its application. The fast application approval is in itself is quite extraordinary since the department has been inundated with applications and managed to give consent within such a short space of time. An Environmental Impact Assessment (EIA) approval granted by the Department of Agriculture and Environment Affairs can take as long as six months. Even under fast track legislative procedures such as a DFA (Development and Facilitation Act) application, the period for the department to approve an application or otherwise takes around 90 days. The DFA was especially commissioned to promote fast delivery of government housing but it is used by private developers as well. 11 days is an incredibly short time for approval of an application.

Figure 14: Pearls Development



Source: Umhlanga Node Precinct Plan, 2007

¹⁰ Quoted from The Mercury, January 03 2007, pg 3

The article in the Mercury (January 03 2007) alludes to the point that there is more to the Pearls development that meets the eye. *“Attempts to contact major players in the Pearls development - Trevor Botsis, of Global Property Investments SA, and Keith Wakefield, of Wakefield Property Management - were unsuccessful.”* (Naidoo, 2007) Furthermore, Anant Singh¹¹ expressed the view during plans for Pearls Dawn that the development will be completely transparent, yet the advert for the development was placed in the newspaper during the holiday period when stakeholders were away. With all of the above issues, Pearls Dawn still went ahead; with the only change being that the proposed 29 storeys was dropped to 20 storeys due to shadow studies and its impact upon beach goers. (Carnie, 2007)¹²

4.6 CONCLUSION

Policy and legislative developments have provided South Africa with a means to promote sustainable development as well as provide the law with a way to stop development in areas that are considered sensitive. The Coastal Management Act together with the Admiralty Reserve provides the legislative gate-keeping mechanism to stop development on the coastline. Problems still exist with this since the law seems to be applicable to a few and not to others. Major developments like the Pearls have been given a reprieve allowing for development along sensitive shorelines. In cases such as these, political pressure and wealth may be the advantage that developments like the Pearls have. How sustainable are developments like the Pearls, or landscaping and concreting formerly dune areas for promenades and parking areas? The risks associated with development along the coastline are phenomenal and the economy of Umhlanga will bear the brunt of a coastal disaster if it continues along its current development trajectory. The balance that should exist between the economy, society and the environment for development to be sustainable may perhaps be one sided in this specific locale of KwaZulu-Natal. Private town planners, environmentalists as well as municipal planners all hold different views. Each one is looking out for a different component of sustainability; the social, economic or the environmental. In the case of

¹¹ Movie mogul and Pearls investor

¹² Published in the Mercury, 01 August 2007

Umhlanga economic development of the area tends to overshadow the need for environmental conservation. The present situation in Umhlanga seems manageable, but this may be true for the short term only. In order to ensure the long term sustainability of the coastline, which also includes the social, economic progress and environmental integrity; it is imperative that the Umhlanga coastline is managed in an effective manner. This is in fact the definition of sustainable development. The final chapter outlines possible policies or actions that may result in better management practices along the Umhlanga coastline.

CHAPTER 5: RECOMMENDATIONS

5.0 INTRODUCTION

In this section a set of recommendations is provided based on the research work undertaken for this dissertation. The aim of these recommendations is to promote effective management of coastlines and to ensure that appropriate development occurs within the confines of the law.

5.1 COASTAL DUNES

Taken from Agenda 21 there is a need to promote sustainable land use planning and management as well as provide environmentally sound infrastructure facilities and construction activities. With regard to the coastline this means a **definite restriction on mining opportunities of sand dunes**. It also means **restricting and in some instances stopping the removal of natural vegetation found on dunes** and in nearby coastal nature reserves. Coastal dunes have an ecological role to play and act as a buffer or protection zone between the sea and inland areas. **Management of these dunes is necessary** and all attempts must be made to protect these areas from being exploited. Furthermore **dune vegetation needs protection and rehabilitation** of the pioneer vegetation that occur on the dunes, like low creeping grasses and mangrove forests. Pioneer vegetation help to colonise the mobile sand, as well as lessen the effect of erosion thus providing greater protection for areas inland. If development has already occurred on the path of the sand dunes, like in the case of Umhlanga then it is necessary to ensure that construction materials used during the development process along the coastline are **soft structures which are compatible with the natural environment**.

5.2 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

NEMA propagates the need for sustainable development by providing a means to ensure that the natural environment is conserved. However at the same time it recognises the need for development and paves the way for people by insisting that the environment should be conserved but not at the expense of the needs of people. This may be true for completely built environments (as in the city centre) however **sensitive environments like the coastline should not be compromised for short lived economic gains**. The geographical position of urban areas will have different impacts on the environment; therefore it is necessary that more **stringent rules to development be placed on sensitive ecosystems**. More stringent laws are needed to ensure that the natural environment is available for the use of future generations. NEMA still places people at the forefront of its concerns as it rightfully should but the act allows for the case where the environment should take precedence as it's should in certain instances. People do not necessarily need to develop urban centres along coastlines (ribbon development), when more viable opportunities that allow people and nature to coexist can be found.

5.3 ENVIRONMENTAL MANAGEMENT STRATEGIES

Environmental management strategies need to be redeveloped. The techno-centric view of creating new strategies would be to collect and collate scientific evidence and then make predictions or create solutions. The scientific evidence is there- global warming and the El Nino effect, coupled with rising sea levels due to melting glaciers and the recent spate of coastal disasters including tsunamis and the Highest Astronomical Tide bear evidence of the environmental damage at this point. Many Asian countries that have been affected by such disasters have reconsidered their environmental strategies and management of the coastline and made the necessary adjustments in terms of mandatory setbacks for development. The environment cannot cope and there is a *“realisation to find new patterns and processes of development (which) has come from an improved understanding of the environmental unsustainability of contemporary development.”*(Elliot, 1999) The eThekweni policy for the environment

(true for all of South Africa and other coastal areas around the world) needs to change by **moving away from contemporary development and finding innovative ways to develop**. It is therefore imperative that drastic steps be taken to prevent any future calamity and that all developments be treated in the same light- no development should be seen to have more significance than the other.

5.4 INNOVATIVE DEVELOPMENT

Innovative development would promote a harmonious approach between people and nature, such as eco-estates. The conditions set by the planning authority on the Havaan forest estate resulted in significant changes with the development and due to such intervention, the estate stands as a beacon in the search for models of sustainability in an urban context. **Adherence to a similar model and set of principles along the coastline to manage development would be indicative of building on best practice**. Similarly the creation of **a mandatory minimum set back line is a must** and greater effort and position by the planning authorities to the acceptance of such regulations must occur to ensure that all developments stay away from the coastal reserve zone.

More policies like the Umhlanga Node Precinct Plan may have to be introduced to increase awareness of the sensitivity of coastal ecosystems. **Further research** must be conducted to mitigate the effects of disasters along the coastlines.

5.5 ADMIRALTY RESERVE

The Admiralty Reserve is supported by provincial authorities since it could preserve the natural integrity of the coastline as well as provide public access to coastal assets thus helping to manage the coastline in an effective manner. However this reserve is not continuous; past apartheid planning resulted in bad planning with land within this reserve being sold to private buyers instead of keeping it as part of the state owned coastal asset. **It is recommended that the Admiralty Reserve be regarded as a continuous line along the KwaZulu Natal coastline** and land that is owned by private

individuals be incorporated into this reserve preventing further development of this land. It is important to note that with global warming coupled with the melting of ice caps the high water mark is in constant change. The Admiralty Reserve appears as a band between 40m and 60m from the high water mark and when the high water mark changes then the Admiralty Reserve will change as well, moving further inland. It is probably worth revisiting the dimensions of the Admiralty Reserve, since greater protection along the coastline will ultimately result in long term benefits for coastal communities and economies. We do not want a revisit of the March 2007 floods which resulted in a loss of property estimated to be about 1 billion Rand.

5.6 COASTAL RESERVE ZONE

In 1992, at the United Nations Conference on the environment and development in Rio de Janeiro, it was recommended that coastal communities develop their own Integrated Coastal Zone Management programmes in accordance with their local conditions. *“Integrated coastal management can be defined as a constantly realized decision-making process with a view of sustainable use, development and protection of seaside terrestrial and coastal marine areas and their resources”*.(Cicin-Sain and Knecht, 1997 cited in <http://www.unesco.org/csi/act/russia/legalpro5.htm>) part of an Integrated Coastal Zone Management Programme is creating a Coastal Reserve Zone. The dissertation has thus far incorporated examples of Asian countries and how most have increased their Coastal Reserve ones to 500metres and in some cases 1km. **KwaZulu Natal has yet to create a legal Coastal Reserve Zone, one that prohibits development completely.** The 100metre reserve that is incorporated into the Integrated Coastal Management Act is only a trigger for an Environmental Impact Assessment, however it does not prohibit develop entirely.

5.7 COASTAL DEFENCE MECHANISMS

Dune vegetation is a natural coastal defence mechanism. During the Tsunamis in 2004, it became apparent that areas in Asia that had coastal vegetation- dune vegetation and

Mangrove forests experienced less destruction than those that had no vegetation (Kathiresan & Rajendran, 2005). Tree vegetation helps decrease the amplitude as well as the force of waves. Without any coastal development a coastline will naturally consist of fore dunes and back dunes, a dual natural mechanism to protect the inland against coastal forces. It is imperative that we have **stricter coastal management retaining all coastal vegetation and in some instances rehabilitating and planting new vegetation.**

If vegetation cannot be rehabilitated then the alternative is to **build manmade structures, a seawall** that will help dissipate the intensity of waves. Umhlanga is an excellent example since it has a seawall throughout its coastline. Neighbouring beaches should learn from this.

5.8 CONCLUSION

“We can anticipate change and adapt before it occurs or we can react to change after it occurs. The latter is far more costly in terms of the human and financial resources required.”(Lewis, 2009, 2) The loss of dunes and dune vegetation has exacerbated the effects of coastal storms on coastal communities. Areas that have sandy beaches are more prone to erosion and flooding than areas with rocky beaches. Rehabilitation of dunes and dune vegetation may reap benefits for the future, but in many cases including Umhlanga, there is no available space. Coastal defences in the form of seawalls offer coastal communities protection against tidal surges and the like. A coastal protection zone in a legalized Coastal reserve Zone is imperative to ensure the effective management of coastlines. Failing all these recommendations, it might be worthwhile to invest in a Risk Management Plan, because when the next disaster strikes the coastline, we need to ensure that coastal communities and beach users are warned in time and appropriate measures are taken to limit the effects of these disasters.

CHAPTER 6: CONCLUSION

6.0 INTRODUCTION

The objective of this chapter is to merge the central elements of the study into a conclusion. This chapter is structured by presenting the overall conclusions and then providing some recommendations with regard to effective coastal management which is applicable to Umhlanga Rocks as well as the entire KwaZulu Natal Coastline.

Chapter 1 has outlined the research problem and introduced the themes that are represented throughout the research. The themes considered were sustainable development and sustainability, new urbanism, tsunamis, global warming and low lying coastal areas. Chapter 2 went a step further by deconstructing each theme and showing its relevance to the Umhlanga Coastline. Chapter 3 discussed the relevant policy and legislation in South Africa that would be applicable to the Umhlanga coastline. Chapter 4 provided some examples of how the principles of sustainability are being implemented and ignored in different projects along the coastline. Chapter 5 produce some recommendations that will help with effective management of coastlines. This chapter will reassess all the research findings in order to bring the process to a logical conclusion.

A developed country has to go through the various stages of being a developing country before it can be considered to have reached the status of being a developed state or nation. Understandably developed countries have more resources (especially economic resources) at their disposal to ensure effective management. However the introduction of the concept of sustainable development has changed the dynamics of being a developing country to becoming a developed one. There is more legislation now to mitigate negative environmental effects. Sadly it is those developed countries that produce the most amount of pollution and toxins that exacerbate the greenhouse

effect and contribute directly to global warming and increasing sea levels. The Kyoto Protocol¹³ is one attempt internationally to get countries to develop in a sustainable manner and significantly it was the worst international polluting countries many from the northern hemisphere who declined to hold or agree to the required reduction in carbon dioxide emissions which would make the agreement effective. This example is indicative of an institutional mindset that places economic wealth above that of environmental sustainability even where there is clear scientific evidence of the interconnection of polluting emission and climate change. It is therefore of the utmost importance that the mindset of people changes, especially those that are in decision making positions.

6.1 SUMMARY OF STUDY

6.1.1 INEFFECTIVE COASTAL MANAGEMENT

This study commenced with the question, Is the Umhlanga Rockscoastline managed effectively? Mismanagement on other coastlines has been evident with the research looking at the effects of the December 2004Tsunamis as well as the media coverage on the spring tides, or tidal upsurges or Highest Astronomical Tide that devastated property along the North Coast of the KwaZulu Natal coastline, affecting areas like Umdloti, Ballito and La Lucia as well as the Umhlanga coastline. The Umhlanga coastline was not unaffected during the March 2007 storm with property adjacent to the coastline being spoiled by the spring tides. The developed promenade adjacent to the coastline had to be repaired since the concrete structures took a beating during the spring tides. A portion of the seawall was damaged and had to be reconstructed at great cost. Furthermore lots of sand was lost during the storm even though there was a seawall. Neighbouring coastlines like La Lucia, Umdloti and Ballito had major damage to personal property and infrastructure. It seems reasonable to assume that in order to protect these coastlines the municipality may have to build seawalls like Umhlanga did; if they are to prevent further calamity in future storms. The chance of rehabilitation of

¹³ The Kyoto Protocol was adopted in 1997 but came into effect in 2005. As of 2008, 180 countries ratified the Kyoto Protocol which sets binding targets to reduce Green House Gas emissions to an average of 5% against emissions in 1990. This protocol will terminate in 2012.

dunes is slim on all of these coastlines, since the boom of the tourism industry has presented itself in the form of holiday accommodation alongside the coastline. Effective management of this coastline will in future prevent any loss with regard to lives, personal property, infrastructure and loss of earnings such as was witnessed elsewhere along the KwaZulu-Natal coastline. It can be argued that since minimal damage was sustained by the Umhlanga Coastline as compared to the neighbouring coastlines, then Umhlanga must be effectively managed. However one has to take into cognisance the devastation wrought by Tsunamis and other oceanic disturbance all around the world, especially Asia, and wonder why coastal development is on the increase in Umhlanga. Surely the lesson learned from the Asian experience should be to curb development along the coastline and repair dunes and revive dune vegetation.

6.1.2 UNFAIR DEVELOPMENT

It seems that the Pearls development has been extremely controversial. Some people admit that this development will boost the economy of Umhlanga yet at the same time realise that the Pearl's location infringes on the coastal protection zone. The coastal protection zone which is a part of the new coastal act stipulates that no development should occur within 100metre from the high water mark yet the Pearls received consent to develop within this zone. The reason given for approving the encroachment into the coastal protection zone were at best flimsy and do not stand up to scrutiny. Furthermore the time taken for the relevant authorities to provide consent was extremely short. Interview respondents 2 and 3 are both of the opinion that the Pearls had an unfair advantage, and that the driving force for fast tracking the Pearls development was politically motivated because it brought with it the perception of sustained economic investment and greater rates. Interview respondent 4 admitted that the Pearls was a controversial development, but the respondent also said that the Pearls did not infringe upon the High Water Mark. In fact it may just have been the promenade that infringed upon this mark. Still one has to be mindful of the recent onslaught of coastal disasters and wonder why this development was so quickly approved that close to the coastline.

6.1.3 COASTAL PROTECTION ZONE

The delineation of a coastal protection zone has been an attempt by law makers to create a buffer that will improve coastal vegetation and promote sustainable development. East Asian countries refer to this zone as a coastal reserve zone (CRZ), and literature suggests that most East Asian countries that have been affected by the 2004 Tsunamis have reassessed their CRZ's creating an even wider reserve area. Indian countries have opted for creating 500m to 1000m reserve areas which are much wider than the current ones evident in South Africa. Interestingly the Environment Conservation Act 100 of 1982 allowed the DEA to introduce coastal regulations (Wiley regulations), which required developers to acquire permits to develop within 1000 metres of the high water mark, however these were withdrawn on a technicality (Glavovic, 2000). Recently, the Integrated Coastal Management Act (ICMA) has produced a coastal protection zone which includes a 1000metre reserve from the high water mark for areas that are zoned as agricultural areas, or that have received conservation status. In all other areas the coastal protection zone is 100metre from the high water mark. This 100metre mark is just a trigger that requires a full Environmental Impact Assessment (EIA) to be concluded before any development can occur. There is also a provision for the expropriation of property that intrudes into the coastal setback area but this would be used as a mechanism of last resort.

6.1.4 LITTORAL ZONE

The littoral zone is never static; vegetation and climate are constantly changing along the coastline thus this leads to an increase in the littoral zone or a decrease. Research suggests that global warming has influenced rising sea levels with the result being a change in the high water mark. The high water mark is therefore in a constant state of flux. It seems a bit premature that the Integrated Coastal Management Act only reserved 100m from the high water mark as a protection zone, especially since the recent spate of tidal upsurges evident on the KwaZulu Natal coastline. It is imperative that a Coastal reserve Zone be decided on, such that there is unambiguous prohibition of development within that zone. The absence of fore-dunes on the Umhlanga coastline

is apparent and if there was no sea wall, devastation might have been great during the March 2007 storms. It could be said that the Umhlanga coastline has been effectively managed since it's replaced a natural barrier with a man-made one. Man-made barriers can still be damaged resulting in greater coast to the municipality. Furthermore the sea wall does not prevent erosion. Prevention is better than cure, and it might have been better if past planning took cognisance of the fact that coastlines are sensitive and need to be preserved for posterity.

6.1.5 THE QUESTION OF SUSTAINABILITY

The question that needs to be asked is: how sustainable is development along the coastline? The WCED definition for sustainable development suggests that careful consideration must be given when developing since what occurs in the present will inevitably impact on the future. Development is combined with the notion of environmentalism. Sustainability encompasses 3 aspects that are interdependent; this is the social, the economic and the environmental aspect. As mentioned before recent work on sustainability suggests that this concept exists within a governance framework and there are interlinkages within them. This integrated framework allows for the economic, socio-political and ecosystem to be embedded within one another whilst being underpinned by a system of governance. Sustainability works according to supply and demand. What it often looks at is whether the availability (that's the supply) for resources is in keeping the need (that's the demand) of the same resource. For an area to be considered sustainable it must deal with environmental concerns but at the same time it must also include in it the ability to be economically viable, to be liveable and to have social equity, both inter-generational and intra-generational.

Is sustainability along the coastline the same as sustainability within the city centre? The truth is that there is a significant difference in what occurs along the coast and what happens within the city centre. The coastline is considered a sensitive environment; where there is a desperate need to conserve natural resources. The misuse of these

resources will result in a chain reaction that may result in the loss of lives, infrastructure and investment. The city centre on the other hand is a built environment and has the potential to be developed to the maximum, without too much of consideration needed with regard to the natural environment, since the natural environment doesn't exist anymore. It is necessary that we treat these environments differently. The coastline has many opportunities available however careless development along the coastline may yield unwanted returns especially when there is an oceanic or a weather disturbance, like a tsunami, tidal upsurge, hurricane or a tropical cyclone.

In terms of Umhlanga Rocks, the researchers take on sustainability leans on the environmental aspect. Whereas the researcher believes that a balance should exist between the three spheres (economic, social and environmental), in the case of Umhlanga as with many other areas and countries, the economic aspect supersedes all other aspects of sustainability. In terms of governance, the researcher believes that there is still room for improvement, stricter and more stringent measures need to be put in place to ensure that Umhlanga Rocks (natural assets) has long term sustainability.

6.1.6 AGENDA 21 AND THE IDP

The exploitation of the environment is not a new phenomenon; however the conservation of the natural environment has become a critical issue and must be incorporated into sustainable planning. The Rio Summit held in 1992, highlighted these issues and brought about an important declaration. This is known as Agenda 21.

Agenda 21 highlighted the following issues:

- providing adequate shelter;
- improving management of urban settlements;
- promoting sustainable land-use planning and management;
- providing environmentally sound infrastructure facilities;

- promoting energy-efficient technology, alternative and renewable energy sources and sustainable transport systems;
- enabling disaster-prone countries to plan for and recover from natural disasters;
- promoting sustainable construction activities; and,
- human resource development.

(Blore, 2006, p. 8)

Agenda 21 has been included into the local planning arena, as Local Agenda 21 and is incorporated into the Integrated Development Plans (IDP). An IDP provides the vision for an area, and all development must cede to the principles enshrined within the IDP. The Spatial Development Framework (SDF) is an important part of the IDP since it visually illustrates where development is allowed and where it's not. The coastline within the eThekweni IDP is regarded as a sensitive area and much care is needed when attempting to develop on the coastline. Ideally there should be a balance between the social, the environmental and the economic sector. In reality this is not the case and the economy tends to overshadow all other concerns.

Umhlanga Rocks has managed to keep to the Spatial Development Framework of the Integrated Development Plan, ensuring that sensitive ecosystems like the Hawaan Forest and Lagoon area are protected. However much still can be done in terms of rehabilitating dune vegetation and prohibiting development within 100m of the High Water Mark. The use of natural materials along the promenade might have added a more aesthetic appeal as well as a more sustainable approach to preserve the integrity of the coastal environment.

6.1.7 RESPONDENTS

Respondent¹⁴ 1 was a private town planner, whereas respondent 2 worked for the Municipality and respondent 3 is a councillor. Respondent 4 is one of the leading

¹⁴Please note Respondent 1, 2 &3 were interviewed in 2009 and these interviews are in summary format in the appendices. Respondent 4 's interview was done in October 2011 and is verbatim in the Appendices.

coastal engineering specialists in South Africa and he is presently working for the Municipality. Urbanisation along the coastline has increased tremendously. The aesthetics at the seaside result in people paying millions of Rands to own a sea view. Developers see the coastline as an investment opportunity that will yield high returns. Respondent 1 is of the opinion that a 100m setback line from the high water mark is unnecessary, since South Africa will never experience a Tsunami. Respondent 1 is quite active in development along the KwaZulu Natal coastline as a private planner. Town planners fall into one of two categories, either having a private practice, or working for the state.

Whilst respondent 1 believed that too much of emphasis was placed on the coastline and the use of a 100m setback line, respondent 2 and 3 believed that more should be done to curb development along the coastline. In fact Respondent 2 admitted to inappropriate past planning, with people living along the coastline encroaching upon public property (the beach area). Respondent 3 intimated the use of political pressure to advance certain developments along the coastline to the detriment of the natural resource base that makes the coast attractive in the first place. The result of ineffective planning along the La Lucia coastline resulted in loss of property: damage to walls, pools and houses. Amazingly the earth has the ability to rejuvenate itself. In La Lucia, according to respondent 3, people have wilfully removed natural dune vegetation to get better views of the sea, and claimed land that wasn't theirs. The spring tides (Highest Astronomical Tide) reclaimed this land.

Respondent 4 created a twist to the dissertation, filling in the blanks by giving me expert opinion on the character of North coast beaches as well as giving me insight into the workings of tides and coastal engineering. According to respondent 4, the North coast experienced a Highest Astronomical Tide (occurring once every 18.6 years) and the authorities were not ready for this impact. In all likelihood, due to a change in weather patterns, this type of tide might reoccur sooner than the next 18.6 years. Respondent 4 was also able to point out that the Pearls did not occur within 100m setback line, it might just be the promenade. However this respondent was quick to point out that we do not

have a legal Coastal Reserve Zone, nor do we have a risk management plan and this is the probably one of the few reasons as to why we had such losses (R1 billion damage) during March 2007. Respondent 4 admits that Umhlanga is one of the lucky coastlines that was able to withstand the Highest Astronomical Tide (March 2007) tides since it had a permanent seawall throughout the coastline as well as the fact that it is a rocky beach.

Both respondent 1 and 2 agreed that there was a need to develop in a sustainable manner, but with one trying to balance the three spheres and the other opting to tip the scales toward the economy and economic development. The challenge in the planning profession is therefore increased with different planners holding different world views. This increases the challenge faced by the planning profession. It means 'reconciling three goals: fairness between people, facilitation of economic development, and looking after the physical and biological environment' (Almmendinger, Prior and Raemaekers (Eds), 2000: 423).

6.2 CONCLUSION

The loss of biodiversity, the over utilisation of earth's natural resources and crippling effects of climate change have resulted in the international community realising the need for sustainable development. This phrase, sustainable development, has many implications and involves balancing the economic, the social and the environmental spheres within the necessary governance and state arenas. This in itself is a difficult task but one that will afford us a brighter future and a better tomorrow. The emphasis of this dissertation has been the environment, particularly the coastline. There is a growing need to try and curb development in sensitive ecosystems, and the coastline is by far one of the most sensitive that is prone to disasters linked to climate change.

The destruction of the natural coastline by development agencies that provide tourist destinations at the expense of equal consideration for the protection the coastal and other natural environment has resulted in the loss of many lives during the 2004

tsunamis on the Asian coast. The KwaZulu Natal coastline has also seen the destructive effects of Spring tides or tidal upsurges. It is therefore imperative for developers, planners, development practitioners, officials and all associated land use planning agencies to take lessons from such situations and rethink the starting point for new development and the management of existing ones in a sustainable manner. It is also necessary to give due consideration to the state of natural ecosystems. The natural Umhlanga coastline has been diminished by ribbon development along its coastline, the most recent being the Pearl's development. It is unfortunate that such development was allowed to occur, however the onus is on all planning agencies to stop any further similar development that has a detrimental effect on the natural coastline system. The way forward is to protect the existing natural coastline and to try and reclaim some parts of the coastline, where possible.

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APPENDICES

Appendix A

Interview with Rob Kirby

Respondent 1

Mr Kirby is a professional Town Planner and at the time of the interview was also a guest lecturer at the University of KwaZulu Natal. He owns his own Town Planning firm called: Ndebele, Kirby and Associates. He does development plans for both the Municipality (when needed- low income housing), but a lot of his work comes from private development- upper income housing.

I asked him about Sustainable development: Very quick to give the Brundlandt Report definition: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. However he indicated that there are limits and there's a range of thought, kind of like being deep green to shallow green- the same with sustainable development.

Development along the coastline- as a private developer that where his work comes from, and development can occur in harmony with the environment. There has been a rise in eco estates like the Hawaan Forest Estate- development that works with the environment rather than against it.

The coastal protection zone has increase from 50m to 100m, do you think that this is enough? Mr Kirby said that he thought that that was sufficient, he couldn't see anything bad happening, and furthermore a 100m was a lot.

Coastal development: he said it was necessary, keeps the economy moving, provides jobs to the locals and invites international tourists.

Appendix B

Interview with Denise Padyachee

Respondent 2

Denise holds the position of Senior Town Planning Technician and is based at the Umhlanga Offices in Town Planning. She is involved with Development Control and Land Use Control. This means that she is involved with: building plans, rezoning applications, subdivisions and special consent and relaxation applications. She indicated that she was the middleman between other departments and the developer. She would have to comment on EIA applications, housing projects, deal with the local and spatial plan as well as the coastal plan- ensuring that this tied in with the Town Planning Scheme.

- I asked about changes on the coastline and her reply that there were physical changes- greater urbanization in the Umhlanga CBD, the Gateway Precincts (Umhlanga new town centre), the Office Park, as well as greater development along the Umhlanga Coastline (increase in high rise buildings- residential and hotel). Interestingly there was no commercial or office type structures on the coastline, development was geared toward tourism. The Pearls land was initially zoned for general residential use- flats / houses; this was later amended and rezone as a special use.
- Driving forces in Umhlanga: Denise indicated that the strongest force along the coastline was tourism related. Tongaat Hulett's is a driving force – Star Resort on Lagoon Drive.
- Problems associated with development along the coastline: Development has infringed on the coastal erosion line (100 meters from the high water mark). Recent spring tides show the impact of this- Umhlanga promenade was damaged and La Lucia suffered great loss- private property was damaged. In terms of the Pearls, there has been a lot of opposition to it starting from how come this development was approved (and so quickly), to shadow studies resulting in the Pearls having to drop their height, plus the sewage capacity taken by the Pearls (400 units) resulted in no further development along the coast because the sewage works could take no more. There are plans (by the Municipality and Tongaat Hulett's) to build another plant, which will allow for further development.
- On the issue of the Umhlanga Node Precinct Plan (UNP): Tourism based, and market driven, however they have included principles of the environment especially along the coastline and includes height restrictions for development. As much as the UNP includes environmentally sensitive areas, it does not emphasise it. A Local Area Plan was done from Umhlanga to Tongaat. As a result there is greater restriction on development along the coast, because the findings were that too much of the dune vegetation was removed or disturbed and this could have far reaching consequences- La Lucia spring tides.

- Environmentally Sensitive areas: Havaan forest, Coastal area, green belts- riverine ecosystems. Mostly DMOSS (Durban Metropolitan Open Space System) focused on the coastal area.
- Policies that I should look at with regard to the environmentally sensitive areas: NEMA, National Conservation Act, IDP and the Coastal Act.
- Other countries have increased the coastal erosion line from 100m to 500m and in certain cases 1000m, is the 100m setback sufficient: No, but we have progressed from 50m to 100m. The Municipality has become very proactive after the spring tides incident and is placing greater restrictions on development. Plans have to now go to the environmental department- Andrew Mather. There has been a greater emphasis on replanting dune vegetation; coastal erosion line has been placed on the GIS. Unfortunately previously, development occurred prior to the inclusion of the 100m setback line and nothing can be done about that but the Municipality has clamped down on development.

Appendix C

Interview with Heinz de Boer

Respondent 3

Heinz is a councillor for the DA, based in Umhlanga- Ward 35. He was formerly a journalist but is quite passionate about the environment as well as other things: see his blog page.

On the issue of sustainable development: Development for now that does not have major (negative) consequences for future generations.

Is development in Umhlanga sustainable: Yes and No. There are certain developments that can be regarded as sustainable (environmentally friendly) and then there are those that aren't. Development along the coastline shouldn't occur. Years ago there were dunes with vegetation and now there is not much left.

The Pearls: very much politically motivated, probably that's how it got passed that quickly. There was a lot of opposition, but it seemed to have government backing so it was passed, but much has been written about the development (bad).

The Umhlanga Node Precinct Plan: Appears to be environmentally friendly, but with the amount of concrete structures used on the promenade, it can't be that friendly. The spring tides uprooted some of these structures, since then they have been looking at making things more natural- using more wood rather than concrete.

Changes in Umhlanga: Physical changes – the Gateway Precinct and the old CBD has gone through a facelift, giving it a more tourist edge.

Appendix D

Interview with Andrew Mather

Respondent 4

Andrew Mather is a Coastal Engineer, working along the policy side. He manages the coast from a strategic point of view, and he did work for the Pearls development along the Umhlanga coastline.

1. How sustainable is development along the Umhlanga coastline?

One has to look at sustainability in terms of infrastructure and property along the coastline. Sustainability depends on the type of area along the coastal. The coastline is divided into Rocky and Sandy areas. The Rocky areas are more sustainable than the sandy sections. Rocky areas are more secure whilst sandy areas are more erodible. A coastal setback line indicates that there should be no development seawards.

2. The recent spate of Tsunamis including the devastation wrought in 2004 on the Asian continent resulted in those countries increase their Coastal Reserve zones to 500m from the high water mark and in some instances 1 km. Is the Coastal Setback line of 100m in South Africa sufficient to prevent any calamities on the coastline, considering that the high water mark changes constantly ,especially with rising sea levels?

We are lucky in South Africa since we are away from a subduction zone, however in the South African context we have had Tsunami's but they have been relatively small- less than 2 meters. The occurrence of these tsunamis from a risk point of view is relatively low. At the present moment by using boreholes we are doing research for historic occurrences of Tsunamis. In terms of the Indonesian Tsunami, the disastrous effects can be attributed to the fact that it is a Low elevation zone.

With regard the coastal setback line in South Africa; we don't have an official one. The 100m setback line was basically a figure chosen, with no scientific investigation done. This so called setback line simply triggers an Environmental Impact Assessment. This setback line has no impact on existing development but may an effect on future development. This setback line was developed by the municipality together with CSIR as a preventative measure for wrongful development. 300ml is what EThekweni is using for a setback line. Further we could develop a 600ml marker but the rest of the province is using 1 m.

3. La Lucia and Ballito were severely affected by the Spring Tides, why hasn't Umhlanga?

Spring tides occur every two weeks, however when the sun, earth and moon are in alignment , this is called the Highest Astronomical Tide (HAT). This occurs once every 18,6 years. It last occurred here in September 2006. Equinox tides occur roughly in March and September,

devastation along the coastline in September 2006 and March 2007. We recorded the largest wave length averaging at 8,5 m, with the largest being 14 m.

The devastation along La Lucia can be attributed to the fact that the beach is a Sandy beach, thus much more vulnerable to coastal erosion. Ballito has both sandy and rocky areas so certain parts were more vulnerable. Umhlanga is composed of mainly a rocky beach, which helped securing the coastline. Furthermore Umhlanga has a manmade sea wall that extends throughout its coastline and this secures the area.

4. Do you expect that in the future the Umhlanga coastline may be affected by a coastal disaster?

One can't preclude any disaster but there are stretches of coast that are naturally more resilient. The question to ask is what is the more acceptable risk?

5. Past planning may have resulted in the environment being neglected, but the coastal setback line, EIA's, the IDP and NEMA (as well as other legislation) have attempted to correct this. The Pearls which is a relatively new developed was allowed, even though it falls (minimally) into the coastal setback line; why (in your opinion)?

During the building of the Pearls, it did not seaward of the 100m setback line. Furthermore the Pearls were built on the Rocky shoreline so the area is structurally more resilient to harsh sea conditions. We did have problems with the second tower, shadow related and we lobbied to have them drop the building, lower the storeys, which they had to succumb to after having them to extensive research on shadow. We'll have to see what happens with the third building.

6. By how much has the Pearls infringed on the coastal setback line?

It hasn't.

7. Are there any mitigating measures in place to prevent a calamity along this coastline? (Are there any documents that I could peruse through, or something that I can download online?)

There is no risk management policy, but take a look at the Climate change adaption plan.

Umhlanga coastline is quite distinct. There are many privately owned properties that extend onto the Umhlanga beach. eThekweni has an agreement with all the owners that allows us to build and equip the beach with necessary amenities, like a lifeguard tower.