

**ADVERSE CONDITIONS IN THE MEREBANK AREA AND
POSSIBLE URBAN DESIGN INTERVENTIONS**

By:

Maveshnee Govender

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School of Architecture, Planning and Housing
University of KwaZulu-Natal

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Declaration

Submitted in partial fulfilment of the requirement for the degree of Master of Town and Regional Planning, in the Graduate Programme in the School of Architecture, Planning and Housing, University of KwaZulu-Natal, Durban, South Africa.

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. It is being submitted for the degree of Master of Town and Regional Planning in the Faculty of Humanities, Development and Social Science, University of KwaZulu-Natal, Durban, South Africa. None of the present work has been submitted previously for any degree or examination in any other University.

Student Name

Date

Dedication

This dissertation is dedicated to the Govender and Soobiah families, and more specifically to the women who made self-less sacrifices and endured many hardships in life to nurture and care for their families, namely:

- Atha Govender
- Gonarathanam Govender
- Govindamma Govender
- Jagadammba Soobiah Govender
- Joycee Govender
- Lizzy Govender
- Lutchmi Govender
- Pongavanamma Rangasamy
- Pushpavathie Govender
- Rani Govender
- Yoga Govender

I thank and salute you!

God bless

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LIST OF ABBREVIATIONS AND ACRONYMS

ABM	Area Based Management
ACSA	Airports Company South Africa
CBD	Central Business District
CBOs	Community-Based Organisations
DANIDA	Danish Ministry of Foreign Affairs
DN	Danmarks Naturfredningsforening
DWAF	Department of Water Affairs and Forestry
MRA	Merebank Ratepayers Association
MPP	Multi-Point Plan
SAPREF	South African Petroleum Refinery
SDB	South Durban Basin
SDCEA	South Durban Community Environmental Alliance
SARAH	South African Railways and Harbour
UIP	Urban Improvement Precinct
WESSA	Wildlife Society of South Africa

CHAPTER 1

Introduction and Research Methodology

1.1 Research Overview

While, many communities around South Africa have been affected by apartheid planning, some were left worse off than others. Apartheid planning followed a distinct socio-political and economic programme, as well as a particular development approach. Such an approach placed little emphasis on man and the environment (Iyer, 1995). One of the primary principles of the apartheid policy was to racially segregate population groups. In most cases, it created built environments or living spaces that were unsupportive of resident communities.

Iyer (1995) suggests that the South African city is not only a result of apartheid policy, but also a product of a modernist development mentality, and reflects the importation of associated planning models and ideals. Modernist planning is premised on technocratic and utilitarian ideals. According to Iyer (1995: 19), such models, which are “based on efficiency, the motor vehicle, engineering and maintenance standards, spatial segregation of land uses, rigid zoning, and so on, have produced environments that lack human quality, expression and identity” (Iyer 1995: 19).

The built environment is expected to “provide its users with an essentially democratic setting, enriching their opportunities by maximising the degree of choice available to them” (Bentley & Alcock, 1985: 9). In other words, the built environment needs to be a living space that is responsive to the community it serves. A responsive environment is an environment that allows people to enrich their lives. It creates positive and livable living spaces.

Urban design is an approach to design that seeks to establish responsive environments. Urban design interventions may be used to improve the many adverse conditions created by apartheid policy and the modernist way of thinking.

The study area in this research, Merebank, is situated approximately 15 kilometres south of the city of Durban and is one of the oldest Indian residential areas in KwaZulu-Natal.

See Map 1. Merebank is one of the suburbs particularly affected by the laws of apartheid and modernist planning. It is a highly controversial area having many urban design faults.

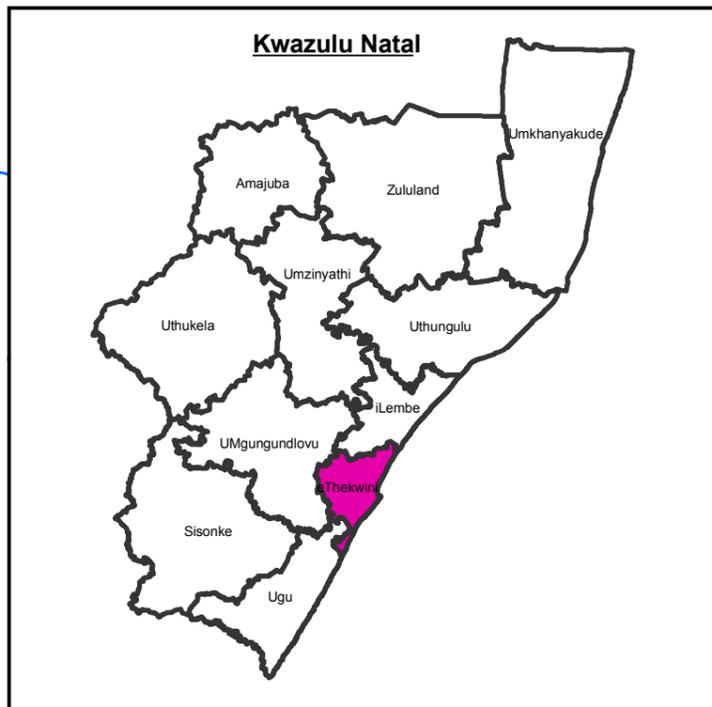
The aim of this dissertation is to analyse the study area, examining the planning and design problems that negatively affect the area, and to explore possible design interventions that can be used to counteract or improve these conditions.

1.2 Formulation of Hypothesis

1.2.1 Research Problem

In the early 1920s, the then Durban Town Council implemented the policy of industrialising the southern Durban corridor. In 1931 the Council extended its boundaries in order to have jurisdiction over southern Durban (Scott cited in Gajan, 2001). The 1934 Town Planning Ordinance encouraged local authorities to plan municipal areas that would ensure orderly development. Consequently, the Durban City Council began to undertake the “twin imperatives of residential segregation and slum clearance, and industrial planning in the southern corridor, commencing in the 1930s” (Scott cited in Gajan, 2001: 10). The zoning of the south Durban industrial basin not only differentiated between work zones and zones for residential use, but also between residential zones on the basis of race. The Merebank-Wentworth Public Housing Scheme commenced in 1939, with 1050 acres of land set out for Indians and 235 acres for Coloureds (Scott & Ridsdale cited in Gajan 2001). This housing scheme was the first formal residential zone with the purpose of providing labour for the ‘productive’ zone (Scott in Gajan 2001: 10).

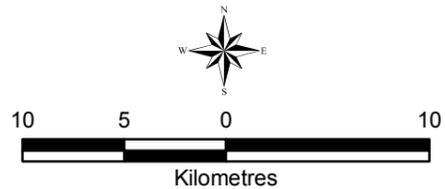
Today, the location of industry and residential communities in such close proximity to each other reflects the consequences of the development of a racially segregated industrial core, which commenced in 1920 (Gajan 2001). There are various heavy polluting industries within the study area, namely the Engen Refinery, the South African Petroleum Refinery (SAPREF), Mondi Merebank, including the Durban International Airport. See Map 2 and Photographs 1-4.



MAP No. 1

MEREBANK LOCALITY MAP

- eThekweni Municipality
- Merebank
- Surrounding District Municipalities
- National Roads

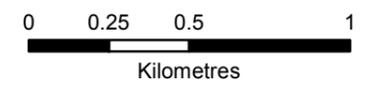


Source: Ethekewini Municipality (2008)

MEREBANK AND SURROUNDING INDUSTRIES

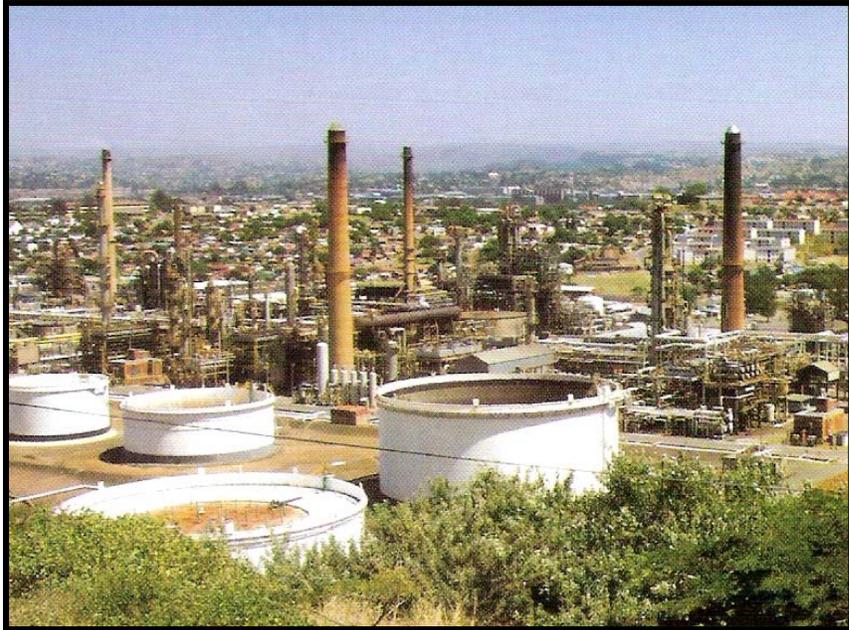


- Surrounding Industries
- Surrounding Suburbs
- Main Roads
- National Roads



Source: Ethekewini Municipality (2008)

Photograph 1: Engen Refinery surrounded by houses in Merebank



Source: South Durban Community Environmental Alliance (SDCEA) and Danish Ministry of Foreign Affairs (DANIDA) (2005)

Photograph 2: South African Petroleum Refinery (SAPREF) in close proximity to houses in Merebank



Source: Author (2008)

Photograph 3: Mondi Merebank emitting pollutants into the air, with Merebank homes in the background



Source: SCDEA (2005)

Photograph 4: View of Durban International Airport, taken from “View Point” in Merebank, illustrating the proximity to Merebank



Source: Author (2007)

Over the years poor planning of this type resulted in unfavourable living conditions in Merebank. This resulted in problems with regards to pollution; verges and landscapes; canals; safety and security; social issues; roads, rail and traffic; and planning. These issues created adverse living conditions in Merebank, and are further discussed in Chapter 4.

1.2.2 Research Question

Given this context, my research question can be framed as follows: What are the possible urban design interventions that can be used to alleviate the adverse living conditions in Merebank?

1.2.3 Subsidiary Research Questions

Subsidiary research questions were also formulated for this study:

- What were the historical events that shaped the development of Merebank?
- What are the present social, spatial, physical, economic and environmental conditions in the study area?
- What are the trends over the past ten years (i.e. is the situation getting better or worse)?
- How does Merebank rate as a vibrant living environment?
- What are main causes of, and driving forces behind, the adverse living conditions?
- What planning and development initiatives have been undertaken in the past ten years and what has been their impact?
- How can urban design interventions improve the situation?
- What new urban design initiatives can be implemented and how would these address the adverse conditions in the study area?

1.2.4 Research Hypothesis

Research hypothesis for the study is: Good urban design initiatives can change adverse living conditions to create healthier and more vibrant living spaces.

1.2.5 Key Concepts

The research hypothesis comprises three main concepts: **urban design**, **adverse living conditions** and **vibrant living spaces**. However, the concept, **built environment**, also requires defining as it forms a major part of this dissertation.

Urban design is an aspect of urban or suburban planning that focuses on creating a desirable environment in which we live, work and play. It is a form of design or an approach to design that tries to achieve positive urban environments, by following a distinct design position, design criteria and principles. Urban design initiatives are plans that seek to create positive urban environments (Iyer, 1995).

Adverse living conditions, in terms of this dissertation, relate to the way people are living in relation to their built environment. It pertains to the negativities of the built environment and the impact it has on residents.

Vibrant living spaces refer to living spaces that offer residents employment opportunities, community facilities, and easy and accessible routes to and from work and other places. It is use of space that creates a *sense of place*.

Built environment refers to manmade surroundings that provide the setting for human activity, from the largest-scale civic surroundings to the smallest personal space. It includes roads and other transport corridors, but also housing and residential areas, commercial centres, pipelines and utilities, all of which have particular influences on the urban environment. Street trees are also an integral feature of many built-up areas in towns and cities.

1.3 Objectives

The study aims to:

- thoroughly explore the concept of urban design and the role it plays in the built environment, looking at the principles, goals and focus;
- investigate the study area, identify the urban design problems affecting the community, and explore the extent to which urban problems affect the community, and

- identify and assess the current urban design interventions, and future urban design interventions that may counteract or mitigate the identified problems.

1.4 Research Methodology

The following section explains the manner in which data was obtained. It explains the research design, target groups, and research tools and sampling method.

1.4.1 Research Design

A qualitative research approach has been used, namely, the case study. This choice was appropriate given the interactive method of in-depth interviews. It enabled the interviewer to manage and conduct sessions. This ensured that all questions were answered. Since the interviewer asked the questions, clarification of questions could be done on the spot and respondents did not necessarily have to be literate. Body language was observed, which enabled a better understanding and insight into responses.

1.4.2 Target Groups

The target groups were:

- local residents of Merebank;
- community-based organisations (CBOs) active in the area;
- surrounding industries; and
- built environment specialists.

a) Local Residents

Merebank residents were one of the prime focus groups of this research. Input obtained from residents was highly informative as respondents reported the problems experienced in the area and the extent to which these affected their daily lives. In their responses, valuable suggestions were made as to what they thought could help better shape their living spaces. In addition to this, views were expressed on the existing urban design interventions, rating their effectiveness. Overall, true sentiments were conveyed about Merebank as a living space, as a work place and as a social space.

b) Community-Based Organisations (CBOs)

Specific organisations active in the study area, particularly the big and more established organisations, were selected for this research. The aim was to find out what was

considered to be the main problems in the area, and to identify the initiatives they have undertaken in addressing them.

c) Surrounding Industries

Local industries play a vital role in Merebank. Not only do they take up a fair amount of land space, they have also grown with the community over the years. The big industries closest to the community were selected for this research namely Engen Refinery, SAPREF, Mondi Merebank, and Durban International Airport. The intention was to identify their problems within the built environment, to discover what affected production, and what would make it easy for industries to operate more efficiently.

d) Built Environment Specialists

Built environment experts included five urban design experts, three town and regional planners, one landscape architect and one municipal official. The issues identified in the research problem formed the basis for this selection criterion. Information drawn from this group was valuable. These specialists commented on urban design interventions proposed and implemented in the area. In addition, comments were made on how well existing urban design interventions worked. Successful attempts were made to obtain input from Cape Town based practitioners and academics (who have not necessarily lived or worked in Merebank). The aim was to attain more information about urban design interventions that might best suit the area, in order to gain a broader geographical response.

1.4.3 Research Tools and Sampling Methods

Household interviews were administered with *local residents*. The area based management (ABM) team identified a three level hierarchy for Merebank. The areas classified as 'primary' were areas that required the most attention, in terms of urban design interventions. Areas marked 'secondary' required a satisfactory amount of intervention, whilst areas marked 'tertiary' required the least amount of attention. For purposes of this research, only the primary areas were targeted.

Three roads were identified as primary namely, Bikaner Road, Dharwar Road and Badulla Drive. See Map 2. Houses on Badulla Drive stare directly into Engen Refinery, here, ten households were interviewed. Bikaner and Dharwar Road are the main roads

in Merebank; the main shopping centre (Bombay Walk) is located here. Again, ten households were interviewed in this area to allow for fair representation.

For the twenty households interviewed, the availability sampling method was used. This means that residents who were at home and available to participate, were interviewed. The attempt to introduce a quota sample to get an equal mix of men and women, was unsuccessful. Interviews were conducted during the day when mainly women were available. Questionnaires were designed to identify how residents felt about their current living space.

There are many (unknown as no record is kept and too many to count) *community-based organisations* (CBOs) in and around Merebank. In-depth interviews were conducted with five of the largest and most established organisations: the Merewent Ratepayers Association (MRA); the Community Policing Forum; the Urban Improvement Precinct (UIP); the Environmental Forum, and the South Durban Community Environmental Alliance (SDCEA). The snowball sampling method was also used. CBOs interviewed made referrals to other relevant CBOs, which proved to be very useful.

Four major *surrounding industries* are located in the study area: Engen Refinery, SAPREF, Mondi Merebank, and Durban International Airport. Attempts were made to interview all industries; however, only Engen Refinery and SAPREF were eventually interviewed. Personnel from Mondi Merebank and Durban International Airport were unable to schedule an interview date and time. It is possible that this may have had an impact on the study as problems specific to these industries could not be identified.

In-depth interviews were conducted with *built environment experts* using the snowball sampling technique. Nine specialists were interviewed, and the information obtained was largely technical.

Field observations were also conducted to identify the existing urban design problems as well as renewal initiatives. This was done in the company of area-based management personnel and was undertaken on foot and by car. A camera was used to record visual findings. Unless otherwise indicated all photographs were taken by the author.

1.5 Outline of the Dissertation

Chapter one set the dissertation in perspective. It introduced the study area and identified the problems in Merebank. The strategy and logic used throughout the dissertation to address the issues mentioned has been discussed. The following chapter (Chapter 2) explains urban design using an historical sequence, from 1970 to early 2000. It discusses most aspects of urban design starting from the components to movement in space. Chapter 3 introduces the study area, Merebank, covering its historical background as well as spatial context. Chapter 4 presents the case study findings, and analyses the issues affecting the quality of life in Merebank. Chapter 5 discusses the recent and proposed urban design interventions in Merebank. It also assesses the effectiveness of each. Chapter 6 sums up the findings of the dissertation and makes recommendations.

CHAPTER 2

Understanding Urban Design

Evolution of Approaches to Urban Design

2.1 Introduction

Urban design is a composite concept, which has various dimensions worth exploring. This chapter looks into urban design from an historical point of view dating from the 1970s to the early 21st century (2004 and 2006). Over this period, many facets of urban design were established and debated, resulting in a clearer understanding of the concept. Each decade brought about new aspects for discussion. This chapter explores the components of urban design (1970s); responsive environments and urban design theories (1980s); the definition of urban design, urban design aims and qualities and criteria for positive urban design, principles, design dimensions and goals (1990s), and lastly, movement in space (early 2000s). The aim of this chapter is to show how these aspects come together in urban design interventions, which can be used for improving living standards in places like Merebank.

2.2 1970s: The Components of Urban Design

The environment constitutes various elements, the process of manipulating those elements is a major part of the designer's concern. To a large extent, the designer's success will depend on how well he or she is able to handle all these separate but related elements. In the 1970s, urban designers began to discuss the important urban design components to be considered when planning. It was agreed that success in the world meant a positive change in the social, environmental, economic and spatial aspects of living conditions within communities (Catanese & Snyder, 1979).

Keeping this in mind, urban designers listed seven elements to be considered when planning living spaces, such as Merebank. These are:

a) **The Space Between and Around Buildings (Public Realm)**

Urban design is usually thought of in terms of the interior and exterior space of buildings. The idea (and urban designer's responsibility), is to give that space a positive

relationship to the adjacent buildings and to relate that space to the larger urban pattern. This in itself changes the outlook of these spaces, making them more attractive (Catanese & Snyder, 1979).

b) Public Perception

Public perception relates to the perception of settlements, space and buildings; the image of the place; its relationship to orientation, accessibility, evaluation, public attachment and behaviour, and its implications for the design of the townscape and the public realm.

c) Townscape and Human Awareness

Cullen (1971) in his book "Townscape" places major emphasis on describing the physical appearance of urban space. His interests lie in identifying those elements and combinations of elements that give particular aesthetic satisfaction. Aesthetic satisfaction in the contemporary world is ruled by fashion. Urban designers need to remember that it is therefore difficult to define any rules of thumb that might be broadly used for any culture at any time. Aesthetic satisfaction relates to a sense of place and pride, security and healthier living conditions. Cullen's (1971) analysis of urban quality supports research that indicates that there are several factors that remain fairly constant, regardless of context or cultural relations, in aesthetic concern. These factors are visual perception, stimuli and anthropometrics (measurements).

d) Visual Perception

Visual perception is merely a function of the eye, which receives messages, and the brain, which translates those messages into an image. The perception of space is physically experienced in much the same way by everyone having the gift of sight. Urban designers use a useful set of ratios based on the eye cone of vision to determine the amount of visual enclosure that might be achieved given different ratios of height of wall, to width of floor plane. These ratios describe what a person actually sees, but a person's sense of enclosure may vary depending on cultural background (Cullen 1971).

e) Anthropometrics (Measurements)

Anthropometrics is another concern for urban designers as it plays an obvious role in our sense of the area in which we live. The height of stairs, walls, benches and so on, all

directly affect our relationship to the environment. Each height relationship, whether used in conjunction with a staircase, wall, ledge, railing, table, or other element, establishes a very clear response from a user (Cullen, 1971).

f) Stimuli

When planning, urban designers pay special attention to stimuli, or responsive cues. This refers to different types of materials that are used within a space to amplify or absorb sound. For example, concrete reflects sound, while grass and planting other vegetation absorb sound. Similarly, with the texture of surfaces, rough surfaces discourage people from entering certain areas. Temperature is also an important factor, as concrete and stone reach ambient temperatures quickly and thus a space is cold or warm depending on the surrounding temperature. The list of considerations goes on. Our response to the environment can be quite predictable if we consider the basic capabilities and limitations of human beings (Cullen, 1971).

g) Physical Determinants

Other elements of urban design which are the physical determinants of urban form, include transport networks, communication service networks, public space and private development, form and location of public space to mention a few (Catanese & Snyder, 1979).

2.3 1980s: Urban Design – Creating Responsive Environments

This section comprises two subsections. The first (2.3.1) discusses the qualities that make up a responsive environment, and the second (2.3.2) discusses urban design theories.

2.3.1 Making Places Responsive

Bentley and Alcock (1985) argue that urban design creates a responsive environment that allows for choice. In the 1980s, they identified seven qualities illustrating how to make places responsive. These are: **permeability**, referring to where people can go; **variety**, referring to the range of uses available to people; **legibility**, looking at how easily people can understand the opportunities offered to them; **robustness**, referring to the degree to which people can use a given place for different purposes; **visual appropriateness**, or making people aware of the choices available; **richness**, which

affects people's choice and sensory experiences, and **personalisation**, referring to the extent to which people can put a stamp on their place. A responsive environment is one in which people can live, work and play. Communities like Merebank need an environment like this to ensure a better quality of life. These qualities are discussed in detail below, illustrating the role they play in living spaces and the factors they depend on.

a) Permeability

A permeable place can offer people choices. The extent to which an environment allows people choice of access through it, from place to place, is a key measure of its responsiveness. If all places were equally accessible to everybody, there would be no privacy. But one of our basic sources of choice stems from our ability to live both private and public roles. For this capacity to flourish, both private and public spaces are necessary. The permeability of any system of public space depends on the number of alternative routes it offers from one point to another. When designing these alternatives, it is important that they are visible so that even people who are not familiar with the area can find their way around. This results in visual permeability, which is as important as physical permeability.

Both physical and visual permeability depend on how the network of public space divides the environment into blocks, which are areas of land surrounded by public routes. These blocks can vary in size and shape. Smaller blocks have an advantage they allow for more choice in routes than larger blocks. They also increase visual permeability, improving people's awareness of the choice availability, which is what urban design plans for (Bentley and Alcock, 1985: 12-13).

b) Variety

Urban design plans for variety. Places are only valuable if they offer experiential choice. A place with varied uses has varied building types of varied forms; it attracts varied people at varied times, for various uses, and because of the different activities and forms, people provide a rich perceptual mix. Different users interpret the place in different ways, and it takes on varied meanings. Mutual support of activities help variety to work well: primary uses act like magnets, attracting people to the site (Bentley and Alcock, 1985: 27-30).

Secondary uses lack the pulling power to attract large numbers of people. Primary uses therefore, if well-positioned, support secondary uses by providing them with pedestrian flows that are needed for operation. A shopping centre is a good example of how this works. Primary stores attract large numbers of people to the complex, while the smaller secondary enterprises feed off the pedestrian flow between these main magnets (Bentley and Alcock, 1985: 27-30).

c) Legibility

Having permeability and choice is nothing if people cannot grasp the layout of a place and what goes on there. Legibility makes a place graspable. There are different levels of legibility, which is important at two levels: physical form and activity patterns. Places may be read at either level separately. This is important to the outsider, who needs to grasp the place quickly. The key physical elements of legibility are discussed by Bentley and Alcock (1985):

- *Paths*, which are the channels of movement, like alleys, streets, motorways, railways etc.
- *Nodes*, which are focal places, such as a junction of paths like the roundabouts to markets.
- *Landmarks*, which are point references experienced from outside.
- *Edges*, which are linear elements and are either not used as paths, or are usually seen from positions where their path nature is obscured (rivers and railways).
- *Districts*, which include paths, nodes, landmarks and edges. Together the latter constitute the skeleton of the urban image, which is fleshed out with areas of less strongly differentiated urban fabric. Districts are medium-to-large sections of the city having some particular identifying character, for example whether they are low or high-income areas, detached dwellings or flats. (Bentley and Alcock, 1985: 42-45).

These elements help designers to analyse the key image-forming features, both actual and potential, in their projects' existing surroundings. Familiarity with these concepts enables reasonably accurate prediction about the features of the place, which are likely to form a key part of its users' image (Bentley and Alcock, 1985: 42-45).

d) Robustness

Places which can be used for different purposes offer their users more choice than those whose design limits them to a single fixed use. Hence, urban design interventions work towards creating environments which offer this choice. This quality is called robustness. The ultimate power of deciding how a place should be designed lies in the hands of whoever pays for it, namely, the patron. Particular activities defined by the patron get most of the designer's attention; projects are usually designed rigidly around them, tailoring the pattern of spaces so that the desired pattern of activities can take place as efficiently as possible, without interfering with each other. Robustness is equally important outdoor as it is indoors (Bentley and Alcock, 1985: 56-60).

Active and passive areas are also a factor. To a large extent, the potential for robust outdoor spaces depends on what goes on in the parts of the building next to them. Some activities within the buildings may benefit from being able to extend outwards into adjacent public outdoor space. The principle supporting robustness looks to design settings, which, as far as possible, enable a variety of activities to co-exist in the public realm without inhibiting each other. This particularly affects the way the public handles vehicular and pedestrian activity (Bentley and Alcock, 1985: 56-60).

e) Visual Appropriateness

Appearance affects the interpretations people put on a place. Whether designers want them or not, people will interpret places as having meaning. When these meanings support responsiveness, the place has a quality called visual appropriateness. This is important in places which are most likely to be frequented by people from a wide variety of different backgrounds, particularly when the place's appearance cannot be altered by the users themselves. The interpretations people give to a place can reinforce its responsiveness at three different levels: by supporting its legibility, in terms of form and use; by supporting its variety, and by supporting its robustness at both large and small scale. Urban design creates a detailed appearance of a place that helps people to decipher the pattern of use it contains (Bentley and Alcock, 1985: 76-77).

f) Richness

Richness increases the variety of sense-experiences, which users can enjoy. Richness is not purely a visual matter; other senses also have design implications which urban

designers have to take into consideration. These senses include the sense of motion, the sense of smell, the sense of hearing, the sense of touch and the sense of sight. These are discussed below based on the works of Bentley and Alcock:

- *The sense of motion.* Choice of kinetic experience can only be gained through movement, so kinetic richness implies different possibilities for moving through a place. It is therefore more relevant to large spaces such as outdoor places and circulation routes within buildings.
- *The sense of smell.* Because the sense of smell cannot be directed, choice of olfactory experience can only be achieved by moving away from one source to another. So this is another potential for richness which is only possible in relatively large places.
- *The sense of hearing.* The act of hearing is involuntary. Aural richness can be achieved in small spaces but only at the cost of imposing it on everyone there. This means that it is best restricted to spaces large enough for people to escape altogether from the sound sources involved.
- *The sense of touch.* This is both voluntary and involuntary in nature. Richness or surface texture can be packed into the smallest of spaces, but variety of air movement and temperature should be reserved for large spaces.
- *The sense of sight.* This is the most dominant sense in terms of information input and the one most under our control. People only have to move their eyes to change what they look at. This gives visual richness double importance. Visual richness depends on the presence of visual contrasts in the surfaces concerned. The most effective means of achieving such contrasts depends on two main factors: the orientation of the surface concerned and the likely positions from which it would be viewed (Bentley and Alcock, 1985: 89-90).

g) Personalisation

The previous sub-sections covered ways of achieving qualities that support responsiveness of the environment itself, without being influenced by political and

economic processes. However, even with the highest level of public participation, most people will still have to live and work in places designed by others.

It is therefore important to make it possible for users to personalise these existing environments with their own tastes and values. This is done by encouraging users to change the external appearance of their homes and buildings. Personalisation is not random, as people personalise only the space they control. Users personalise in two ways: to improve practical facilities, or to change the image of a place. People personalise a buildings image for two main reasons, either as an affirmation of their own tastes and values, referred to as affirmative personalisation, or because they perceive its existing image as inappropriate, referred to as remedial personalisation (Bentley and Alcock, 1985: 99-101).

2.3.2 Urban Design Theories

Trancik (1986) in his book "Finding lost space" identifies three theories, namely figure-ground theory, linkage theory, and place theory, which form a good basis for urban design. These theories set the perimeters for urban design and were implemented from the mid-1980s.

a) Figure-Ground Theory

This theory is based on the study of building coverage relationship to open spaces, that is, the 'figure' to 'ground' relationship. Trancik (1986: 97) explains this by stating that "each urban environment has an existing pattern of solids and voids, and the figure-ground approach to spatial design is an attempt to manipulate these relationships by adding to, subtracting from, or changing the physical geometry of the pattern". The objective of these manipulations is to understand physical structure and to add a hierarchy of spaces within the system that are enclosed and supported by building volume.

b) Linkage Theory

Whilst the figure-ground theory is based on solids and voids, the linkage theory is based on lines that connect various components of the urban system. These lines are represented by streets, pedestrian ways, linear open spaces, or other linking elements that physically connect different parts of the city. When designers apply the linkage

theory they try to organise a system of connections that establishes a structure for ordering spaces alike. Linkage theorists place emphasis on movement patterns, circulation and infrastructure, which are considered very important (Trancik, 1986: 97-98).

c) Place Theory

Unlike the other two theories, the place theory includes components of human needs and culture, historical, and natural contexts. Trancik (1986: 97-98) argues: “In place theory social and cultural values, visual perceptions, of users and an, individual’s control over the immediate public environment are as important as principles of lateral enclosure and linkage”.

Taking the above into consideration, the optimum theory for positive urban design was regarded as one that draws on the merits of all three theories and applies these in an integrated and supportive manner.

2.4 1990s: Defining Urban Design-Debates and Discussions

The 1990s was a ground-breaking decade as urban designers and planners began to grasp and understand urban design better. Professionals continued to refine the definition of urban design; discuss the achievements of urban design, and identify qualities, criteria, principles and dimensions of sustainability, as well as the goals of urban design. These are discussed in the following sub-sections.

2.4.1 Definition of Urban Design

Urban design was understood and defined in various ways by different authors. This depends on, and was influenced by, their professional backgrounds and experience. This section seeks to define and understand urban design through the various debates. In so doing so it also illustrates tangible and non-tangible aspects of our lives that are influenced by urban design.

Urban design is the generally accepted name for the process of giving physical design and direction to urban growth, conservation and change. It is understood to include landscape as well as buildings, preservation and new construction, in rural areas as well as cities (Barnett cited in Iyer 1995: 30). As previously mentioned, urban design is a form

of design or approach to design, that strives to establish responsive environments. It is achieved through a distinct design position or attitude, and through the use of certain design criteria and principles (Iyer, 1995).

Trancik (1986) and Iyer (1995) agree that urban design is both philosophical and physical, as it encapsulates a set of attitudes that inform urban design processes, which in turn lead to change in the built environment. In contrast, Markewicz and Boden (cited in Iyer, 1995) define urban design as closing the void between planning and architecture. This is the most popular and most commonly used definition of urban design. This definition suggests that there was an urgent need for a profession, namely urban design, to take on a holistic approach to the design of cities. Barnett (cited in Iyer, 1995) also agrees, saying that urban design provides physical direction to urban growth, conservation and change.

Other supporting definitions pertaining to this train of thought are as follows:

- “Urban design is the art of making places. It involves the design of buildings, groups of buildings, spaces and landscapes, to create successful development.” (www.planningportal.gov.uk/egland/government/en/1115310689961.html)
- “...urban design is the design of the public realm, its central concerns are the quality and usefulness of the public spaces enclosed and defined by buildings.” (www.aberdeencity.gov.uk/acc/YourCouncil/Departments/plannin/localplan2004/local_plan_web_pages/written/cpt17.htm)
- “Urban design is related to urban planning, but focuses on the physical design of places and deals at a more fine-grained scale. It may include the arts of civic design and elements of architecture and landscape architecture.” (www.en.wikipedia.org/wiki/Urban_design)

Iyer (1995) agrees partially with this train of thought. The above definitions perceive urban design to be very uni-dimensional, in that it provides mostly *physical direction* and is located within a *spatial planning* mainstream. Iyer proposes that there is a need to promote the philosophical and attitudinal processes within urban design. Markewicz

(1992) also supports this, arguing that “urban design is not only a separate discipline, but philosophically deals with attitudes” (Markewicz cited in Iyer, 1995: 31).

Taking all of the above into account, the author suggests a comprehensive definition of urban design for the purpose of this dissertation:

Urban design is an approach to design that encapsulates both a physical and philosophical dimension. It creates desirable environments via design elements that are based on cultural, social, economic and physical processes that determine the structure of the built environment.

2.4.2 Purpose of Urban Design

Dewar and Uytenbogaardt (1995) look at what urban designers should and are trying to achieve when planning. By understanding the achievements of urban design, one can envisage possible mitigating solutions for the problems experienced in Merebank (discussed in Chapter 4). Urban designers plan to create high performance environments. These environments resemble living spaces where:

- Streets are narrow but which burst into public spaces. Where streets are protected from the wind and where there is a changing pattern of light and shade.
- Where cars and taxis move through settlements but not at high speeds.
- Where there are secretive, residential precincts into which vehicles cannot penetrate.
- A place that is distinctive and unique, with a definable character.
- A place where the urban fabric is continuous (i.e. it is hard to tell where one place ends and the other begins) and it is easy to connect with public transportation which takes you almost anywhere in the city.
- A place that is convenient, where almost everything you need is within walking distance.
- A place which is easy to read i.e. almost every time you come to an important public space there is a public facility or number of facilities such as schools, a public library, clinics and places of worship associated with it (Dewar and Uytenbogaardt, 1995: 12-13).

There are a number of interrelated environmental characteristics which underpin high performance environments. The identification of these helps bridge the gap between intention and physical design. These characteristics include balance, freedom and complexity, equity, continuity, integration, and clarity. They are and should be kept in mind while planning, in order to achieve or ensure a particular living condition. What follows is a list of each of these characteristics and the function each plays in the living environment.

- a) **Balance** of which two forms are important. One is the balance between the settlement and nature to ensure that all people have easy access to nature. The other is balance between urban opportunities, ensuring that all people have easy access to the full range of activities that make up urban life (Dewar and Uytendogaardt, 1995: 13).
- b) **Freedom and complexity**, which is an important characteristic since high performance environments are complex. This complexity results from the interplay of structured public actions and freedom of individual actions. Design, therefore creates opportunities for this freedom of action to occur.
- c) **Equity** ensures that no individual or groups are unfairly advantaged or disadvantaged over others and that all people have access to the full range of urban opportunities generated within the settlement (Dewar and Uytendogaardt, 1995: 13).
- d) **Continuity** of urban fabric is essential to capture the systematic nature of urban settlements. Particularly important in this is continuity of housing fabric and its role in defining and enclosing streets and other public spaces (Dewar and Uytendogaardt, 1995: 14).
- e) Allowing for **integration**, urban design plans need to ensure that positive urban environments are integrated and interdependent, so that there is a mix and overlap of activities and a locational synergy (different but complementary activities and facilities located in close proximity from each other).
- f) **Clarity**, is an equally important characteristic of urban design. Positive environments exhibit qualities of structural clarity, in the sense that they are easily legible to users.

Another important dimension of clarity is the interface between public and private space. This determines the degree to which public activities impose on private space and affects patterns of responsibility for the maintenance of space (Dewar and Uytendogaardt, 1995: 14).

2.4.3 Qualities of Good Urban Design

The purpose of urban design mentioned above and the goals of urban design (to be discussed later in section 2.4.7), draw attention to the qualities needed for good urban design. These qualities are needed for improving the living standards in places such as Merbank. Dewar and Uytendogaardt (1995) state that improving the quality of urban environments require more appropriate approaches to urban design and urban planning. They recognise that there is more than one way of creating a place and that the creative skills used on a project are essential dimensions of its quality. If qualitative improvements to urban environments are to be achieved, a number of conceptual shifts away from current ways of thinking about settlement making are required, many of which are currently practised. This section summarises the qualities of urban design that promote favourable living conditions as defined by Dewar and Uytendogaardt.

a) Urban Qualities

Achieving urban qualities pertains to settlements that accommodate the complex pattern of human needs and activities that characterise urban life, but in such a way that those activities are enriched and that a wide range of economic and social opportunities are created (Dewar and Uytendogaardt, 1995: 8-9). The main urban qualities are space, place, choice, convenience and opportunity. Particularly important is enhancing the capacity of settlement to generate opportunities for job creation and income generation, both through the process and form of settlement-making. Many people will have no option in future years but to generate their own incomes. Therefore creating vibrant local economies and viable places for people to manufacture, trade, and provide services at very low overheads, will continue to be vital to the survival chances of a large number of people. Vibrant local economies therefore focuses on issues such as compaction and intensity; overlap and mix of land uses, activities and elements as opposed to separation; continuity of urban fabric and more complex levels of order, and lastly, more complex processes of development, involving many actors and agencies, as opposed to simplified processes with a few players (Dewar and Uytendogaardt, 1995: 8-9).

b) Pedestrianisation

The next urban design quality and way of thinking focuses on letting pedestrians take precedence over cars. This means that places are designed to allow for maximum access to people on foot. There is an incorrect assumption that the vast majority of people do have or shortly will have access to car ownership in South Africa. This belief does not describe the reality of urban dwellers who are restricted to two modes of transport, that being public transport and by foot. At the most basic level, they travel on foot. For longer trips, they are dependent on public transport and there is a degree of disadvantage to people if efficient public transportation does not exist. The environments which best suit the needs of this majority, therefore, maximises access, not mobility. Environments of this kind are complex, integrated, fine-grained and highly convenient places in which most basic needs can be met, and most daily activities are carried out, within reasonable walking distance (Dewar and Uytendogaardt, 1995: 9).

The case for making pedestrian-based environments the core focus of planning results from the realisation that if environments perform well at the level of the lowest common denominator (people on foot), choice is maximised. Additional means (represented by car ownership) is a bonus, increasing options for people. Clearly, therefore, the issue is not one of focusing only on pedestrian-based or car-based settlements. It is about creating settlements which perform well at the level of people on foot and which also accommodate vehicles (Dewar and Uytendogaardt, 1995: 9).

c) Public Spaces

The third quality is based on the public environment. The focus is to think spatially and holistically in the making of settlements, rather than treating them as a collection of discrete elements such as utility services, roads, houses, social services and so on. Precedent shows that the quality of the public spatial environment is particularly important in positively performing urban environments. The public spaces are the places within which people experience the town and engage, both formally and informally, in its collective life. They are the primary elements affecting the quality of urbanity as experienced by all people.

While important for all, the role of public spaces in the lives of the poor is critical. When people are poor, the whole range of household needs cannot be met through the

individual dwelling which represents the locus of one family's limited resources. A significant part of their lives is enacted in public space. These spaces need to be created properly, as spaces give dignity and a sense of permanence to environments, even in informal settlements. They are the places where most social experiences are played out and which operate as an extension to the private dwelling unit (Dewar and Uytendogaardt, 1995: 9-10).

Conversely, when public spaces are undefined, un-scaled and unpleasant, the entire environment is permanently miserable, regardless of how much investment goes into individual buildings. It is the integral framework of public space, institutions and facilities that are seen as the basic restructuring system of urban settlements, if genuinely livable environments, which upgrade and improve overtime, are to be created. Each structure in a settlement must contribute to creating a sense of scale, definition and enclosure in terms of public spatial environment (Dewar and Uytendogaardt, 1995: 9-10).

d) Creating Opportunities

Lastly, urban design focuses on planning partially. This refers to the idea that urban environments contain qualities of secrecy and complexity, which cannot be entirely achieved through design. Instead they result from the energy and ingenuity of the people living within them, applied to meet their own particular needs and requirements. In light of the above, it is therefore essential that plans create a pre-condition for this complexity to emerge, by creating opportunities for freedom of action (Dewar and Uytendogaardt, 1995: 11).

2.4.4 Criteria for Positive Urban Design

Taking into account the components of urban design, responsive environments; urban design theories; definitions; achievements and qualities of urban design, one can develop a set of criteria for urban design. Iyer (1995) in his dissertation, "Towards Responsive Environments", drew up a useful set of urban design criteria to be used in the design process. These can also be used as a framework for evaluating design responses. The list includes complexity and integration, place, reinforcement of activities, protection, choice, individual expression, constraint, interdependence between public and private space, legibility, community, and permeability. These are explained in Table 1.

Table 1: Urban Design Criteria

Complexity and integration	This relates to creating conditions that allow for a range of activities and responses to occur within a similar location to promote choice, experience and freedom. Complexity is also a result of a variety of responses in built form and through the change in the environment brought about by the integration of activities. Integration relates to how well functions overlap and in doing so, positively reinforce each other to create complexity.
Place	Expressing a commitment to creating a rich environment that fosters a sense of place.
Reinforcement of activities	To arrange activities in a manner that complements each other.
Protection	To create an environment that allows for protection through the treatment of space both public and private.
Choice	The quality of choice is achieved through the application of the other criteria in a mutually supportive manner.
Individual expression	To allow for people to express themselves in the built environment on an ongoing basis.
Constraint	To establish the minimum conditions that are required to provoke meaningful responses.
Interdependence between public and private space	The positive treatment of the interface between public and private space to ensure that each is supportive of the other and that the negative impacts are not exchanged between the public and private realms.
Legibility	To create an environment that allows for ease of interpretation by its user's to promote choice.
Community	To create an environment that fosters a sense of belonging and identity.
Permeability	To allow users maximum choice in movement and ease within an environment.

Source: Iyer (1995: 57-58)

2.4.5 Urban Design Principles

It is important to note that the qualities listed in 2.3.1 those include permeability, variety, legibility, robustness, visual appropriateness, richness and personalisation had many limitations. Bentley (in Punter and Carmona, 1997) attempts to address these criticisms to embrace environmental concerns by adding energy efficiency, cleanliness, and wildlife support as sustainability concepts to the core 'responsive' concepts of permeability, variety, legibility, and robustness.

Emerging from the discussions so far, it is possible to identify ten key principles for urban/environmental design. These are shown in Table 2. The principles are noted on the vertical axis and are set against five dimensions of the urban environment on the horizontal axis. These principles clearly show the important aspects of urban design and the effect it has on living spaces.

Table 2: Urban Design Principles

<i>Dimensions of the Urban Environment</i>					
<i>Urban Design Principles</i>	Architecture	Townscape	Urban form	Public realm	Landscape
1. Permeability		Morphology	Layout	Access, linkages, spaces	Green networks
2. Legibility		Landmarks, views, districts, identity			Landscape relation
3. Variety		Character		Mixed use active frontage	Ecological balance, biodiversity
4. Robustness	Adaptability, sustainability		Enclosure, privacy, sunlight, daylight, building line	Servicing, safety, surveillance, active frontages, grain	Self-management, maintenance, sustainability
5. Appropriateness	Scale, bulk, expression, materials, vertical/ horizontal emphasis	Context, massing, setting	Scale, height, density, overdevelopment		Landscape design, species choice
6. Richness	Proportion, fenestration, detailing, colour, stylistic pluralism, visual interest, materials	Character			Bio-diversity trees
7. Personalization: largely permitted development except on listed buildings					
8. Energy efficiency	Local materials		Building, orientation, shadowing, density, facility location	Pedestrian and cycle networks	Shelter
9. Pollution minimization			Density, noise	Pedestrian and cycle networks	Carbon fixing and particulate removal
10. Ecosystem maintenance					Protection of hydrology, retention of key habitats

Source: Punter and Carmona (1997: 81-82)

Punter and Carmona (1997) discuss how these ten principles can be applied in the case of lighting, car parking, commercial uses and housing. These are particularly relevant with regard to improving security (which is a critical issue in South Africa and certainly Merebank) to the design and layout of the built environment. The principles mentioned below may be understood as the do's and don'ts of urban design as per work of Punter and Carmona.

a) Access

Major circulation routes should not meander through open spaces unless an alternative direct route is also available. Alternative day and night routes such as footpaths should be designed to enhance visibility—corners, blind bends and obstructed views should be avoided, and this applies particularly to those away from busy routes. Tree or high shrub planting should not be located adjacent to footpaths unless sufficient lighting is provided to deter attackers. Footpaths should not have blind bends. Fencing between the planting and footpath could be considered as an alternative. Metal railings are preferable to use in preference to walls or fencing, as they afford less cover for attack. Furthermore, footpaths and footways bounded by blank walls should be avoided (Punter and Carmona, 1997).

Roads and residential areas should be designed to restrict through movements by cars whilst enabling cyclists and pedestrians to move freely. Roads should be designed to restrict traffic speeds to a maximum of 20 mph. Some of the measures include traffic calming, width restrictions, raised surfaces, gated closures and return loop layouts deterring cars but encouraging free movement of pedestrians and cyclists. Clear sign posting of routes to bus/train stations and public facilities is important, while, the segregation of vehicular and pedestrian routes should be avoided (Punter and Carmona, 1997: 175).

b) Lighting

Landscaping schemes should be designed to avoid the creation of heavily shaded areas. Communal spaces and routes for pedestrians and cyclists should be lit at night in such a manner that pools of darkness do not occur. In residential areas, low powered lighting sources are preferable to standard lamp posts. However, the number should be sufficient to provide adequate lighting of the footpath and road. Furthermore, common entrances, stairwells, corridors and landings in commercial or residential developments should be well lit (Punter and Carmona, 1997: 175).

c) Car Parking

Planting, fencing and advertisements around car parks should not impede visibility from the road for pedestrians and all road users. Large separate garage courts and car parks should be avoided in preference to smaller parking areas, with orientation in such a way

that they are overlooked by people working in nearby buildings or houses. They should not rely solely on existing street lighting at the perimeter, but should be provided with sufficient lighting to avoid the creation of deep shadows. Multi-storey car parks should include clear directional signs and must also be well lit to avoid deep shadows. Consideration should be given to providing security equipment such as alarm bells and surveillance cameras (Punter and Carmona, 1997: 176).

d) Commercial Uses

A mixture of land uses like residential, commercial and leisure, ensure residents that streets have evening activity and are not deserted after working hours. In the case of major redevelopment, clearly identified and well-lit pedestrian routes should be provided, and tall shrub planting should not reduce visibility from adjacent streets. Commercial buildings should be designed to ensure natural surveillance by having offices facing the street. Areas such as refuse stores or service roads should be designed to avoid the creation of deep shadows (Punter and Carmona, 1997: 176).

e) Housing

Houses and flats should be designed to ensure an unobstructed view of the area immediately outside the door and with habitable rooms looking over the street. Porches, garages or ground floor extensions should be designed to avoid their use as platforms to enter the upper floors, and entrance points to blocks of flats should be kept to minimum and should be visible from the flats themselves. Rear lanes should not normally be used to provide access to rear gardens. Waist high walls or fences should be provided to the front of houses. Rear boundary fences are better if they are strong and high enough to deter intruders. They should be positioned to ensure they do not allow access to a window ledge or roof, or should be of a nature so as to make climbing difficult, as hedges are (Punter and Carmona, 1997: 176).

Communal open spaces and children's play areas should be clearly defined. Where fencing, railings or hedges are used, two gates should be provided (to offer alternative exits, thus avoiding the potential for users to be trapped). They should be overlooked by nearby houses. In addition, housing developments should be designed to ensure that public and private areas are clearly defined with positive treatments and that there are

no left-over pieces of open spaces with no clear ownership or responsibility (Punter and Carmona, 1997: 176).

2.4.6 Design Dimensions of Sustainability

Turning to the question of sustainability, Punter and Carmona (1997) isolate six key design concerns: spatial form; movement; building design and conservation; energy; ecology, and environmental management (See Table 3). These define the new set of issues that have informed urban design theory and hence, urban design principles.

Table 3: Design Dimensions of Sustainability

<p>Spatial Form</p> <ul style="list-style-type: none"> • Reduce/reverse decentralisation • Increase densities but not excessively to encourage compact forms (neither cramming nor sprawl) • Increase appeal of inner areas (greening, housing type) • Encourage mixed-use developments • Density related to nodal points/public transport • Relate to existing infrastructure (utilities and roads) • Develop brown field sites and avoid green field sites • Relate built and natural environments (open space provision, green space networks) • New settlements to be self-sustaining • Assess environmental capacity 	<p>Movement</p> <ul style="list-style-type: none"> • Reduce the need for travel • Design for pedestrianisation/environmentally friendly transport • Recover road space for public use or public transport • Exclude non-essential traffic • Minimise car parking • Encourage route connectivity and permeability • Tame traffic flows
<p>Design and Development</p> <ul style="list-style-type: none"> • Rehabilitation rather than redevelopment • Recycling of materials • Use local materials • Environmentally friendly materials/ techniques • Protection of built heritage • Show openness to sustainable architectural forms • Encourage robust building forms • Visual quality and appropriateness 	<p>Energy</p> <ul style="list-style-type: none"> • Passive solar gain (orientation, design, layout) • Renewable energy sources (solar, hydro, wind) • Accept responsive facades • Encourage energy conservation • Microclimate (discourage development on exposed sites and use natural features) • Encourage use of natural daylight • Discourage air-conditioning and encourage natural ventilation
<p>Ecology</p> <ul style="list-style-type: none"> • Assess ecological value of sites and encourage continuity • Protect natural assets and preserve landscape • Maximise bio-diversity • Increase rain water retention • Reduce run-off (permeable paving, natural channels) • Preserve individuality of landscape character 	<p>Environmental Management</p> <ul style="list-style-type: none"> • Co-ordinate statutory authorities • Encourage urban management (support cleanliness) • Reduce pollution and polluted sites • Re-educate professionals, public and politicians • Economy of means as the overriding goal

Source: Punter and Carmona (1997: 80)

2.4.7 Goals of Urban Design

The definition and understanding of urban design provided a basis for identifying urban design goals. This section outlines those goals, giving attention to the tangible and non-tangible aspects. Urban design goals may be considered at a philosophical level and a more practical level. According to Moughtin et al. (1999) urban design has three main goals they are, “to design and build urban developments which are both structurally and functionally sound while at the same time giving pleasure to those who see the development.” Urban design shares with its counterpart, architecture, these three qualities of utility, durability and the ability to bring to the user a sense of well-being and emotional satisfaction.

The goal of sustainable development is the social foundation of urban design today. The social imperative is an environmental crisis for cities, which give purpose and meaning to urban design. Sustainability is an important aspect of ‘commodity’ (Moughtin et al., 1999: 2). The pursuit of sustainable structure is predicted on the development of a built environment of quality. At the start of the new millennium, quality in urban design is seen against a backcloth of current concerns for the global environment and in the context of sustainable development where the environment is of paramount importance and is given priority in design decisions. In order to create a sustainable future in an environment of quality, it will require the design of appropriate policies and programmes which directly address the related problems of unsustainable growth and environmental degradation. Part of this overall agenda for sustainable development is the pursuit of non-polluting, energy efficient urban forms of quality (Moughtin et al., 1999: 3).

A generally accepted definition of sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. Three key ideas stem from this definition: development, needs, and future generations. *Development* and therefore urban design, is concerned with improvement or progress including cultural, social and economic dimensions. *Needs* refers to resource distribution, that is, meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations of a better life. *Sustainable development* extends the concept of equity to future generations (Moughtin et al., 1999: 3).

The pursuit of sustainable development gives to urban design its social purpose and acts as a goal which informs the design process. Subsumed within this goal of sustainable development is the aim of developing an environment of aesthetic quality (Moughtin et al., 1999: 2).

2.5 Early 21st Century: Movement in Space and Sense of Place

This section is divided into two sub-sections. Sub-section 2.5.1 discusses movement in space. This discussion revolves around limited access channels, hybrid channels, activity channels, local channels, internalised street spaces, and pedestrian streets. Sub-section 2.5.2 offers an explanation of a sense of place.

2.5.1 Movement in Space

At the beginning of the 21st century, Dewar and Todeschini (2004) began to focus on issues of spatial and environmental quality associated with elements of the transportation network. They used South Africa as a classic case study to demonstrate the four issues that constitute these findings.

The first issue is that many of the transportation projects in South Africa have caused severe urban and environmental damage upon the contexts on which they have been imposed. This is because issues of engineering and geometrics have primarily driven the design of these projects, superceding social and environmental concerns. McHarg (cited in Dewar and Todeschini, 2004) puts the blame solely on transport engineers. The authors, Dewar and Todeschini, (2004) believe that it is a collective responsibility of all those involved in the construction of the built environment including planners, architects, transportation engineers, civil engineers, developers, political decision-makers and others to consider social and environmental issues when planning.

The second issue is that negative environmental consequences associated with transportation projects are by no means inevitable. The dominant tendency is towards degradation, not improvement. The path to improvement is returning to a concern about the concept of 'street' as opposed to 'road' (explained in section 'd' to follow). Another matter is the recognition that the design of transportation projects requires an interdisciplinary approach.

The third issue is that the aesthetic and social appeal of the street has not disappeared. It has simply been privatised and taken indoors in large commercial developments, such as shopping malls. In this process, however, the concept of the street has become exclusionary and is policed on class grounds. Improvements demand a reversion from this, and a review of the concept of street as public space.

The fourth issue is the large amount of spatial waste which occurs in the form of unnecessary and excessive road reserves. This results from the belief that motor car ownership will grow. Consequently, the urban and natural environmental consequences of this waste are highly negative. Dewar and Todeschini (2004) drew attention to seven categories of movement, namely: limited access channels; hybrid channels; activity channels; local channels; internalised streets (shopping centres, theme parks etc) and pedestrian streets.

a) Limited Access Channels

Limited access channels refer to freeways and parkways. The concept of freeways was originally conceived as an inter-settlement connection with a strong scenic component. This scenic dimension is very important but often forgotten when planning. It is important that new highway projects are accompanied by generous landscaping budgets. In addition, while intra-urban access routes may be necessary to facilitate mobility, they have extremely negative fragmenting or barrier effects. Efforts should be made to reduce these (Dewar and Todeschini, 2004).

If appropriately aligned and landscaped, limited access routes can play an important scenic role and promote awareness of local place. Scenic routes allow motorists to experience the particularities of regional landscapes. The potential negative impacts include the disruption of fine-grained fabric; cluttering of the skyline; blockage of views; excessive and poorly maintained verges and road reserves, and visually disruptive barriers erected as a vain attempt to prevent pedestrian crossing. It may also have fragmenting social effects. Limited access routes can splinter community life as effectively as building a wall across the city. Over the N2 in Cape Town for instance, local women use the pedestrian bridge over the National Road to take cattle to pasture. This example clearly indicates that space for pasturing on this route is lacking in and around the residential area. Women take their children with them when the cows have to

pasture and the road verge operates as a space for recreation. In contrast, where no bridges exist but the need remains, pedestrians take their chances in crossing the route, with fatal consequences (Dewar and Todeschini, 2004: 124-129).

b) Hybrid Channels

Hybrid channels seek to satisfy both mobility and urban structural objectives. To be successful they require more complex forms of design, and paralleling routes and spaces. It is common that more intensive activities receive some service from the route, but only indirectly, as specialised service channels are required. If not carefully designed, these main routes fulfill neither mobility nor structural roles adequately. A common problem is getting two sides of the route to work together (Dewar and Todeschini, 2004: 134-135).

c) Activity Channels

Activity channels are flanked by commercial and other more intensive activities requiring public support. They need to be multi-purpose spaces. The central sub-theme is that the greater the demands made upon these routes in terms of activities, the more complex their cross-sections need to be. Key success factors include:

- Sufficient residential back-up to generate vibrant activity.
- Activity on both sides of the route.
- Routes which are narrow enough for the two-sides to interact via pedestrian crossings.
- Traffic flows which are slow enough for pedestrians to be able to maneuver their way around vehicles (Dewar and Todeschini, 2004: 136).

d) Local Channels

In order for local channels to work well it is important to start thinking about streets, not roads. The difference is that roads are channels of movement, whereas streets are social spaces within which movement is one activity. There are a few key success factors in making streets (Dewar and Todeschini, 2004: 138-139). Firstly, streets need to be made as spaces, not movement 'pipes', streets may not accommodate any demand made upon them optimally, but overall can accommodate all activities. Secondly, streets should be scaled to the pedestrian, not the motor vehicle. And thirdly, streets need to

have a sense of enclosure, spatial definitions and protection. To achieve this there must be a close and direct relationship with activities, which abut them.

e) Internalised Street Spaces: Shopping Malls and Entertainment Centres

The desire to experience street spaces has not disappeared. This is expressed via internalised streets, often in the most nostalgic forms, within shopping malls and theme parks. The downside of this is that it is sanitised and highly exclusionary: the determination of who can experience this is controlled by economic or class grounds. This means that only those members of the public who own private cars are able to enjoy this shopping experience. This is the opposite of the real street concept, which is highly democratic (Dewar and Todeschini, 2004: 140-141).

f) Pedestrian Streets

There is no doubt that the concept of pedestrianisation has become something of an international trend in recent years. Pedestrian streets are streets that exclude vehicles for much of the day. Successful pedestrian streets are designed to enhance the pedestrian experience. According to Dewar and Todeschini (2004: 144-145), key factors for creating this experience include adequate threshold of pedestrian flows, interesting flanking activities which means the more interesting the experience, the greater the propensity to walk. Other key factors are humanly-scaled circulation spaces, a sense of enclosure and definition, and security, particularly through on-going surveillance from flanking buildings. The creation of sub-spaces within the space, such as through lighting and street furniture to facilitate a range of informal activities is also a key factor as well as planting and other forms of landscaping and street furniture such as seating.

2.5.2 Understanding a Sense of Place

Urban designer Moss, says that in landscape and architecture 'place' is the one word that is left out. Instead more commonly used words like 'space' and 'objects' are used (Moss cited in Paul, 2006). He identifies the problem with conventional planning as being two-dimensional. He compares urban space as peoples' natural understanding of rooms: "...a quaint, urban square is a public room and you treat it like a room. If you are the first to arrive in a large room, you will not sit in the middle: you go and sit on the side" (Moss cited in Paul 2006: 19). This is the same with public spaces: you walk to the edge.

Therefore, it is important when planning streets and squares that it is designed to achieve this.

If people do not have boundaries they may find it difficult to recognise a place in terms of its geography and its place qualities, such as mountains. When humans cannot recognise their surroundings they feel a little lost, because they can not as humans, identify in a meaningful way with things around them of value and worth if it is not connected to place (Paul, 2006).

Relph in Gajan explains place as a space that is invested with human symbolism and meaning, usually something that is individually experienced in terms of a person's attitude, experiences, intentions, and unique circumstances, but also communally experienced (Relph cited in Gajan, 2001: 32). This in essence is what a sense of place should feel like and possess.

2.6 Summary

The dimensions of urban design discussed in this chapter provide a good indication of the complexity of urban design. The components of urban design include the public realm, public perception, townscape and human awareness, visual perception, anthropometrics, stimuli and physical determinants. These are dynamic elements to be considered when planning living spaces. The ability of an urban designer to address these different but linked elements ultimately determines the success of the project. Creating responsive environments involves taking fundamentals such as permeability, variety, legibility, robustness, visual appropriateness, richness and personalisation into consideration when planning living spaces. These fundamentals provide a living space with personality and character which represent the people who reside in it. Urban design theories namely figure-ground theory, linkage theory and place theory form a basis for urban design. Positive and successful urban design projects depend on how well these are integrated and supported when planning. The urban design characteristics which form the basis for high functional environments include balance, freedom and complexity, equity, continuity, integration and clarity. Identifying these characteristics bridge the divide between intension and physical design.

Qualities of good urban design have the ability to improve living standards, these qualities take into account urban qualities which is the complex pattern of human needs and activities. It also takes into account pedestrianisation, public spaces and creating opportunities. The criteria for positive urban design include complexity and integration, place, reinforcement of activities, protection, choice, individual expression, constraint, interdependence between public and private space, legibility, community, and permeability. These are instrumental in the design process and acts as a checklist when planning for living spaces. The principles for urban design and the dimensions of the urban environment complement each other during the planning process. The principles encompass permeability, legibility, variety, robustness, appropriateness, richness, personalisation, energy efficiency, pollution minimisation and ecosystem maintenance. Urban environment dimensions are architecture, townscape, urban form, public realm and landscape. All of these can be applied when planning different aspects of the living environment.

The design dimensions of sustainability are instrumental in that they define issues that have informed urban design theory and urban design principles. These design dimensions of sustainability include spatial form, design and development, ecology, movement, energy and environmental management. The goal of urban design is to create living spaces that are all inclusive. That means one that is structurally and functionally sound while at the same time aesthetically pleasing to those who see it. Transportation networks or movement in space can negatively and positively affect the spatial and environmental quality of living spaces. There are seven categories of movement namely limited access channels, hybrid channels, activity channels, local channels, internalised street spaces and pedestrian streets. These determine the type of activity that can take place and the restraints or freedom it allows to vehicles and pedestrians. A sense of place is a living environment in which people are comfortable and familiar with. The ultimate goal when planning is to plan a living space in which people can successfully live, play and work.

This wide-ranging review of the evolution of thinking around urban design and its practice from the 1990s to the 21st century provides a conceptual framework within which to analyse the Merebank living environment. This review acts as a guideline when

proposing urban design interventions. The next chapter provides an in-depth assessment of Merebank, looking at its background and current situation.

CHAPTER 3

Merebank: Past and Present

3.1 Introduction

This chapter addresses three subsidiary research questions. It explains the historical events that shaped the development of Merebank, then discusses the spatial, social, physical, economic and environmental conditions in the study area and finally examines the trends over the past ten years.

The first section (3.2) presents the historical events that shaped the development of Merebank. This includes the Merebank concentration camp (1899-1902); industrialisation and modernist planning (1920s-1930s); mapping of south Durban and racial planning (1940s-1950s); resistance to industrialisation (1960s-1970s); collaboration between Merebank residents and surrounding areas (1980s-1900s), and Merebank as we know it today (late 1900s to present).

3.2 History of Merebank

This section explains the development of Merebank in an historical sequence from 1899 to the present day (2008). Merebank was developed as a result of events that occurred in surrounding areas, which later influenced nearby suburbs. It is for this reason that Merebank cannot be viewed in isolation.

3.2.1 1899-1902: Merebank Concentration Camp

British concentration camps were established during the Anglo-Boer War (1899-1902). These camps were set up to accommodate thousands of white and black civilians who were left destitute by the scorched earth policy (Wohlberg and Wessels, 2002). This policy was a military strategy, which involved destroying anything useful to the enemy such as crops, shelter, transportation, communications and industrial resources (http://en.wikipedia.org/wiki/Scorched_earth). The first concentration camp to be erected in Durban was in Merebank. This camp was established in September 1901. It was the largest camp of the war, and had more than 8000 inhabitants (Wohlberg and Wessels, 2002). The inhabitants were accommodated in wooden or corrugated iron huts or

wooden and canvas huts. The camp included doctors, hospital matron and nurses, teachers, clerks, and Indian and African sanitary personnel.

Concentration camps in Jacobs and Wentworth were also established for the same reasons as Merebank. The Jacobs Concentration Camp opened in February 1902, just 3 kilometres north of Merebank. The Wentworth Concentration Camp was established in March 1902, and was the first to close down in 1902. The Jacobs Concentration Camp was the last Natal concentration camp to close down in February 1903. Each of these camps housed 3000 people. They were pre-planned as small towns with schools, housing and hospitals (Wohlberg and Wessels, 2002). After the concentration camps cleared out, ex-indentured Indian settlers started moving in upon the completion of their contracts. They made a home for themselves and undertook market gardening and other small-scale productive activities.

3.2.2 1920-1930s: Industrialisation and Modernist Planning

Industrialisation began to take root in colonial societies and spread around the world, eventually influencing Durban. Prior to the First World War, the main function of Durban was that of a port and commercial centre. The main activities included the supply of food, clothing and shelter to the small white settler population (Scott, 2003).

The most significant industrial development in the pre-First World War years was the municipal reclamation and construction of Maydon Wharf (Map 3). This became the first industrial zone in Durban, south west of the central business district, this was followed by Congella Industrial Estate (shown as Congella in Map 3, Scott, 2003). As the industry grew there was a need to expand. There were no significant alternatives to the north and west of the CBD, so land towards the south of Durban came under spotlight. The south of Durban provided cheap labour, flat land and low-lying areas, which were close to the harbour and CBD (Scott, 2003). White-owned industries required cheap and expendable labour and low waste-disposal costs, and so this was an ideal opportunity (GroundWork, 2002).

Industries became more interested and by 1920 Durban began to assume a more industrial character. Industries began to gravitate towards the south of Durban. The earliest industrial towns were at Congella, Isipingo (shown as Isipingo Beach on Map 3),

Wentworth, Merebank, Umbilo, Jacobs, the Bluff, Umbogintwini and Clairwood as shown in Map 3 (Scott, 2003: 241).

Map 3: Early Industrial and Residential Nodes



Source: Scott, 2003: 242

In 1925, the then Durban Town Council purchased land at Wentworth for both industrial and housing scheme developments. In 1931 more land was purchased at the Woods

Estate (not on Map). This area was situated across Bayhead along the southern corridor, and was earmarked for industrial and residential purposes (Map 3). Subsequent to the acquisition of these two tracts of land, further acquisition was impossible as Indians and Whites had already settled to the south of Durban since 1920 (Scott, 2003).

The Town Planning Ordinance (10 of 1934) was the first means of controlling and guiding urban development. It embodied the assumptions of modernist planning, that planning should be for the public good; that it would ensure a functional city to promote industrial capitalists development, and that the blueprint or Planning Scheme would order and zone urban space to control present and future development (Scott, 2003: 248). This formed the backdrop against which the Durban Town Council proceeded to plan for the reconstruction of southern Durban, to accommodate industrial development. “Underlying these imperatives to achieve functional order, however, was the political imperative to dictate (and often restrict) the pattern of black urban settlements in urban environments” (Scott, 2003: 248). Guided by this and the apartheid policy, to the white local authority (Durban Town Council), this meant the removal of blacks (i.e. Indians, Blacks and Coloured races) and the eradication of informal settlements. The 1934 Slums Clearance Act was the tool used to achieve this purpose (Scott, 2003).

3.2.3 1940-1950s: Mapping of South Durban and Racial Planning

A series of maps and plans were used to plan the landscape of southern Durban, such as the map accompanying the South African Railways and Harbour (SARAH) General Manager’s Annual Report, which was compiled in 1934, and formalised in 1949. It made the following recommendations to the planning of South Durban:

- the localisation of industry in Durban to the south of the Bay;
- the integration of the railways, shipping and industry in this location;
- the location of African and Indian housing schemes to the south of Lamontville and Merebank, to provide sources of labour for the industry (Map 3). It also recommended reclamation, dredging and canalisation to provide usable industrial land (Scott, 2003: 247).

Two other maps were used: the Racial Zoning Plan to the Durban Post-War Development committee (1944), see Map 4, and the map forming the basis of the Technical Sub-Committee Report on Racial Zoning of Durban (1951) in terms of the

Group Areas Act (Map 5). The Racial Zoning Map of 1944 also includes all industrial areas and housing schemes in south Durban prior to 1950.

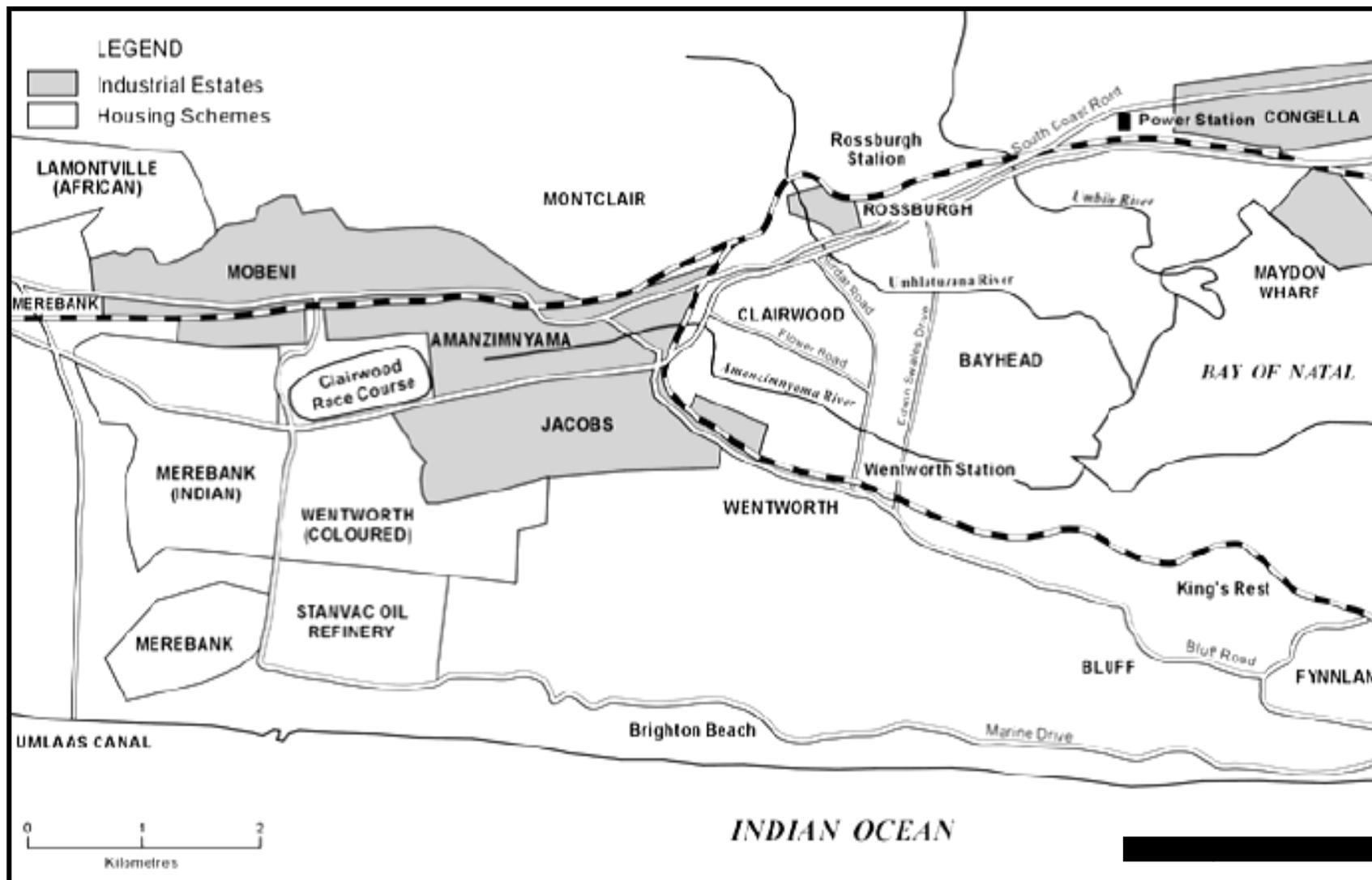
South Durban was zoned to differentiate between specialist productive or work zones and zones for residential use, as well as between residential zones on the basis of race. The productive zone was to occupy the low-lying and flat alluvial valley stretching from south of the harbour to the Umlaas River. “Flanking this zone was the predominantly white residential areas of the Bluff and Wentworth to the east, with the black middle-class township of Lamontville to the south-west. An Indian village-Merebank was planned by the council and built at the south end of the productive zone” (Scott, 2003: 251, Map 4).

Beginning of the late 1950s, many small families of diverse racial origins were forced off their land in Merebank, to make way for industrial development and planned, formalised housing. There were also numerous shack dwellers living on the land owned by the council. According to SDCEA (2004:1), “Some Indian residents were re-housed in formal houses on the land where they were already living, a rare case in Durban of residential formalisation without relocation.” In 1954, permission was granted to Stanvac (now Engen Oil Refinery) for the building of a very large oil refinery at Wentworth (Scott, 2003, Map 4). Shortly thereafter in, 1955 Louis Botha Airport was established (now known as Durban International Airport, Naidoo, 2008).

3.2.4 1960-1970s: Resistance to Industrialisation

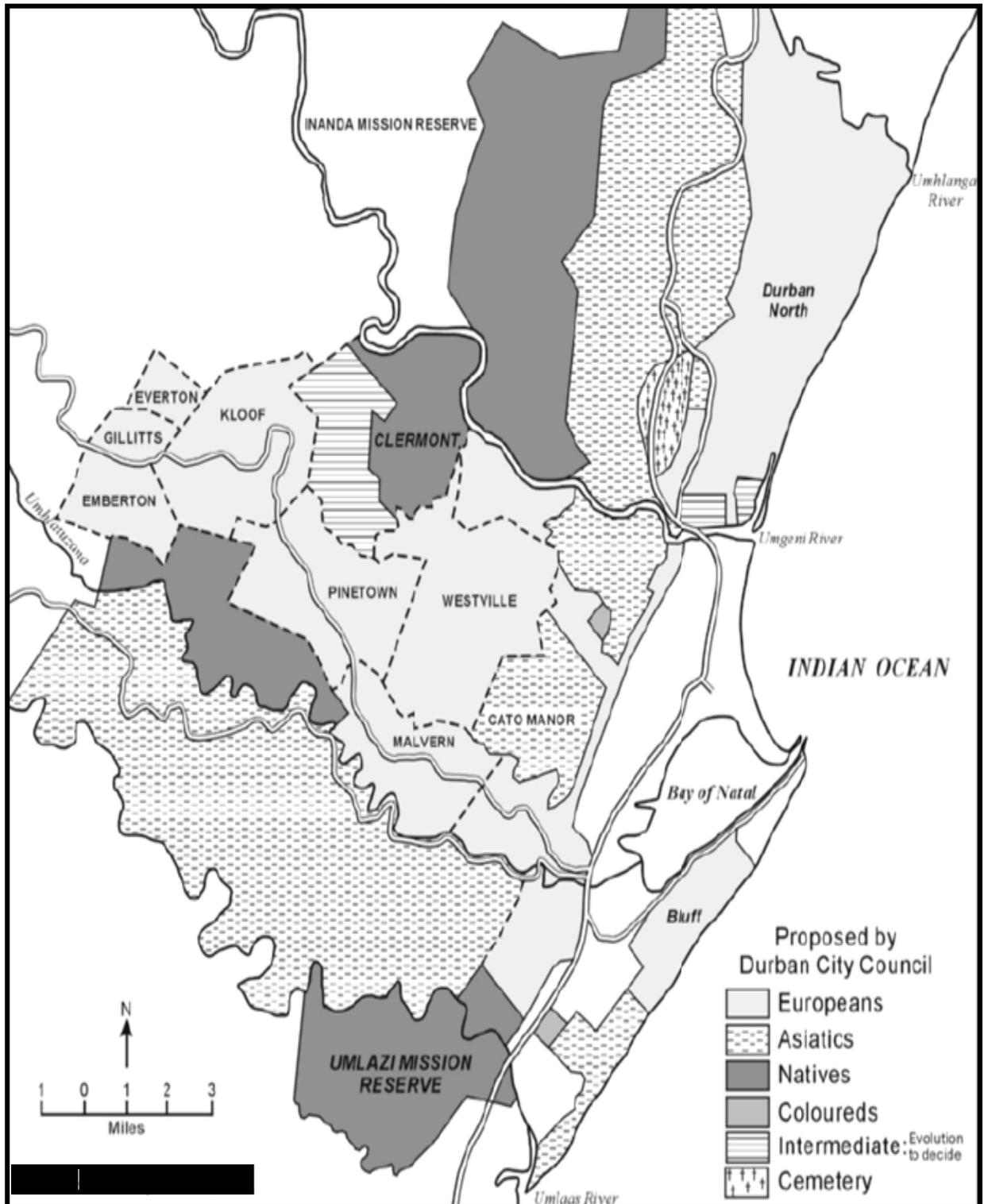
In 1963, another crude oil company, South African Petroleum Refinery (SAPREF), bought land in Merebank and started building their factory (www.sapref.com). Parallel to the ongoing process of industrialisation were the relentless efforts of residential communities to resist industrial modernisation. In 1964 the Anglo-American Corporation negotiated with the Durban Town Council to purchase land along the Umlaas Canal for a large paper factory (Mondi Merebank). Mondi Merebank Mill was founded in 1967 and built in 1970 (www.mondigroup.com). The land was originally zoned as open space within the Merebank Housing Scheme. The (then) Merebank Residents Association (MRA) protested against the change in use due to the loss of land under the Scheme, and the possible pollution hazard (Scott, 2003: 257).

Map 4: Industrial Areas and Housing Schemes in south Durban prior to 1950



Source: Scott, 2003: 246

Map 5: 1944 Racial Zoning Plan



Source: Scott, 2003: 249

The forced removal of a vast number of residents to accommodate industrial development was undertaken through an administrative process. This process was driven by the City Estates branch of the Durban Corporation from the early 1960s until the 1970s. The process of industrialisation consisted of small projects, which was carried out over a period of nearly 40 years. According to Scott, "Parallel to this process, sometimes delaying it, at other times halting it, but always protesting against, were the ongoing attempts of ordinary-mostly-poor people, to maintain their properties and their living environments. Although not being able to change the vision of south Durban as an industrial area, vestiges of other realities remain as a result of community resistance and serve as a marker of the previous social, physical landscape and alternative rationality underpinning it." (Scott 2003: 257)

3.2.5 1980-1990s: Collaboration between Merebank Residents and surrounding Industries

In the late 1980s, the MRA complained about the unresponsiveness of Engen Refinery's management, to environmental pollution. In 1990 a memorandum was forwarded to the refinery management. It raised community concerns about the refinery's pollution and problem areas. The community identified the problem areas as: regular flaring, sulphur dioxide emissions and oil spills (www.umich.edu/~snre492/brian.html). Management argued that the pollution was wind-blown from other factories; while flaring occurred for safety reasons, and some oil spillage was beyond their control.

However, after the democratic elections in 1994, Engen and other industries like Mondi Merebank and SAPREF had to do business differently and began to align with the national discourse favouring consultation with locally affected communities (www.umich.edu/~snre492/brian.html). Residents formed the South Durban Community Environmental Community Alliance (SDCEA) in 1996. This was to ensure adequate representation of local communities during the undertaking of various planning initiatives and environmental assets. The aim of SDCEA is to coordinate and mobilise community action through public meetings, demonstrations, campaigns in the media, and educational programmes (Perold and Weeks, 2008).

According to a survey done by Perold and Weeks (2008), residents in the South Durban Basin (SDB) insisted on being involved in decisions that could affect the quality of their

environment. Eighty percent of respondents indicate that they would like to be registered on the stakeholder database to receive more information on the projects and so to influence the process.

3.2.6 Late 1990s-Present : Merebank Today

Merebank (Map 6) is the local community name, for the area under study. However *Merewent* was later used as the administrative name, and includes Wentworth East. Merebank falls within the current SDB. It is a residential area surrounded by industries such as the Engen Refinery, SAPREF, Mondi Merebank, and Durban International Airport (Map 2). The surrounding residential areas include Austerville, Wentworth, Treasure Beach, Prospecton, Jacobs and Bluff (See Map 6). Merebank is well-established with infrastructure, services and facilities (discussed later), which enable it to operate as an industrial and residential node.

3.3 Spatial Context

This section discusses the spatial context. Since Merebank cannot be viewed in isolation, this section first locates Merebank within the South Durban Basin (SDB). It then describes the characteristics of Merebank, and other surrounding residential areas, namely, Wentworth and the Bluff.

3.3.1 South Durban Basin

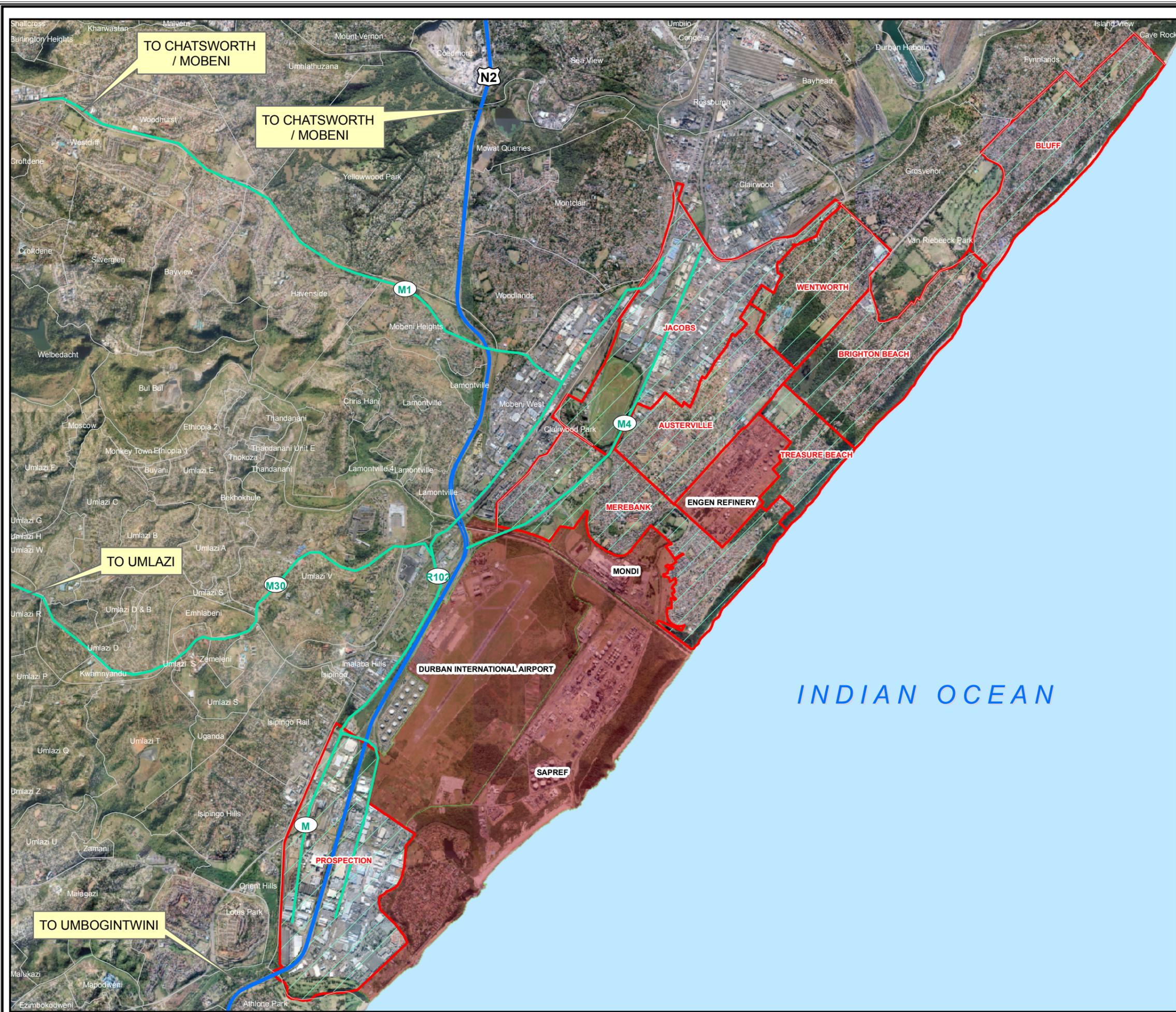
a) Location

The South Durban Basin (SDB) stretches from the port of Durban in the north to Umbogintwini in the south and inland as far as the South Coast Road corridor. The eastern boundary of the SDB is bordered by an environmentally sensitive coastal strip (Map 7, www.durban.gov.za/durban/services/departments/abm/sdb).

b) Land Use

The SDB includes: industrial areas such as Bayhead, Jacobs, Mobeni, Prospecton and Umbogintwini, and mixed use areas such as Isipingo and Clairwood (Map 7). In total, the south Durban area has approximately 800 industries (D'sa, 2008). There are 150 smoke stack industries, 300 chemical industries and the rest are small manufactures and car

MEREBANK AND SURROUNDING RESIDENTIAL AREAS



Legend:

- Surrounding Residential Areas
- Surrounding Industries
- Surrounding Suburbs
- National Roads
- Main Roads

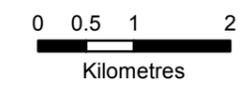
North

0 0.5 1 2 Kilometres

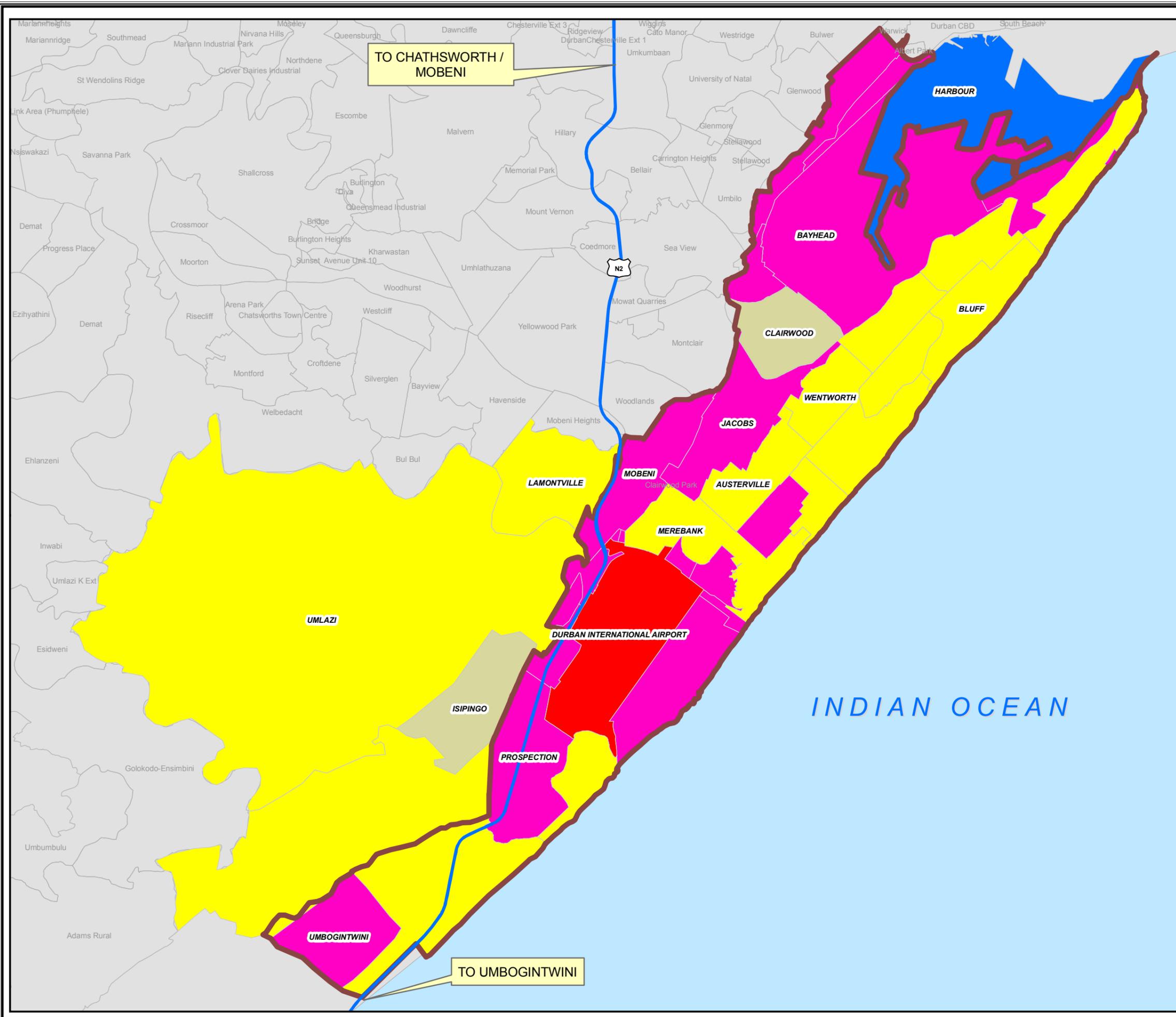
Source: Ethekewini Municipality (2008)

SOUTH DURBAN BASIN LAND USE

-  South Industrial Basin
-  AIRPORT
-  HARBOUR
-  INDUSTRIAL
-  MIXED USE
-  RESIDENTIAL
-  Surrounding Suburbs
- National Roads



Source: Ethekewini Municipality (2008)



panel beaters. Key industries include sugar and beverage refineries, textile and clothing manufacturers, metal industries, pulp and paper industries, petrochemical industries, car components and assembly, hospitals, chemical storage facilities, and Durban International Airport (www.geoolympiad.org/005-2002SouthAfrica/004-Problemsolving/001Part1.php). Appendix A lists most of the industries in South Durban. This information was difficult to extract and may not be 100% accurate, but gives an idea of industries found in the area. The residential areas are Austerville, Merebank and Wentworth. It can be argued that portions of the adjacent large residential areas of Umlazi and Lamontville form part of the SDB, although they are located west of the N2 (Urban Econ, 2004, See Map 7). The land use also includes provincial and national installations such as the port, national roads like the N2, and the Durban International Airport (Urban Econ, 2004).

c) Population and Socio-Economic Characteristics

Approximately 100 000 people and 22 000 households reside in the SDB (Urban Econ, 2004). The population group is diverse with White, Black, Indian and Coloured race groups. The average household size comprises 4 persons. Merebank and Austerville accommodate around half of the SDB population, having high densities of 17 and 22 households per hectare (Urban Econ, 2004). The SDB is a key manufacturing and industrial zone of the city, contributing to 30% of Durban's Gross Domestic Product. In fact, it is the second biggest industrial heartland of South Africa and provides 10% of the country's manufacturing jobs (Urban Econ, 2004). South Durban has the largest concentration of petrochemical industries in the country, and it refines approximately 60% of South Africa's petroleum (Urban Econ, 2004).

Research conducted by Urban Econ (2004) shows that 18% of households in the South Durban Basin earn less than R12 000 per annum (or R1000 per month); a further 20% earn below R2 500 per month, which is R30 000 per annum. In a number of areas, the percentage of households earning below R12 000 per annum is substantially higher than the area as a whole (18%). Similarly, 24% of households in Austerville earn below R12 000 per annum, while 34% of households in Clairwood and 21.2% in Grosvenor earn below R12000 per annum (Urban Econ, 2004).

3.3.2 Residential Areas

a) Merebank

The 'Mere' in Merebank refers to the water edge, as it was once a complex system of wetlands from the Durban harbour to Isipingo. Merebank is bound by the coastline (Indian Ocean) to the east; Austerville and Engen Refinery to the north; Durban International Airport to the west and SAPREF to the South (Map 8). Merebank is made up of three residential areas: the Ridge, Navy and Merebank Central (Map 8). Approximately 10% of the Durban Indian community lives in Merebank (SDCEA and DANIDA, 2005). The type of residents include flats, apartments, duplexes, masionettes, cluster housing and group housing (Map 9).

There are three income-earning categories here: high-income, middle-income and low-income, with the high-income earning residents situated on the Ridge. The Bombay Walk Shopping Centre is situated in Merebank Central and serves the whole of Merebank (Gajan, 2001).

Badulla Drive, Dharwar Road and Bikaner Road are the three most significant roads for the purpose of this dissertation, as household interviews were administered there. Badulla Drive was targeted because the dwelling units on this road are opposite the Engen Refinery. Dharwar Road and Bikaner Road, in contrast, are better known for the house-to-office conversions, and the Bombay Walk Shopping Centre. The Bombay Walk Shopping Centre has a supermarket and other small retail stores.

The Merebank residential area is surrounded by many polluting industries. In some cases, houses are situated on the fence-line, such as those on Badulla Drive. These houses are 20 metres from Engen Refinery (Whyte, 1995).

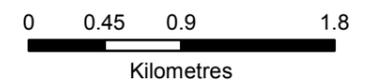
b) Wentworth

Wentworth is adjacent to Merebank (Map 8). It was designated as a "Coloured" township during the apartheid era, and it came to house approximately 40% of the Coloured population of Durban. More than any other South Durban community, Wentworth is affected by harmful emissions from the industrial plants, the closest being Engen Refinery (SDCEA and DANIDA, 2005). According to a survey in 1990, Wentworth is

MEREBANK AND SURROUNDING AREAS



- Merbank
- National Roads
- Main Roads
- Suburbs
- Surrounding Areas
- Suburbs**
- CENTRAL
- NAVY
- RIDGE



Source: Ethekewini Municipality (2008)

Map 9

poorer than Merebank and Isipingo, with three-fourths of households earning less than R2 000 per month. This poverty is a reflection of the high incidence of female-headed families. Also, half of Wentworth's heads of household are artisans or industrial workers, and only 5% are professional, semi-professional or technical workers (SDCEA, 2004).

Severe over-crowding and deplorable housing conditions have often defined the community and its perceptions of itself (SDCEA, 2004). The largest number of housing units is publicly-owned flats which are generally in appalling condition (SDCEA, 2004).

c) Bluff

The Bluff is 10 kilometres from Merebank (Map 8). Bluff was designated a White area under the Group Areas Act (1951). It became home to many civil servants, railroad workers, retirees, skilled blue-collar workers and their families. Although affluent, well-housed and well-serviced in comparison to its non-White neighbours, residents in the Bluff sometimes called their community the 'Cinderella suburb' of Durban. It receives fewer facilities and services than other White communities and therefore has low property values (SDCEA, 2004). The Bluff includes Brighton Beach, Fynnland, Grosvenor, Ocean view, and those areas of Wentworth historically designated for Whites (SDCEA, 2004).

Among the Bluff households, there is a significant working class population (one-fourth are artisans, apprentices, and related); more than a quarter have not completed high school, and one-fourth earned less than R2 000 per month in 1990 (SDCEA, 2004). There is a significant minority (10%), which are professionals, semi-professionals, managers, executives, and administrators. In recent years, a number of Indian and Coloured people from nearby communities have moved into formerly all White neighbourhoods on the Bluff (SDCEA, 2004).

The prevailing winds frequently carry significant amounts of air pollution, soot and even oil spray from the Engen Refinery and ash dust from the Mondi Merebank plant, to the Bluff (SDCEA, 2005).

3.4 Merebank Today

This section looks at the current situation of Merebank. It describes the land use, infrastructure, economic activities, social facilities and services, demographics, religious affiliation, employment, income levels and travel patterns.

3.4.1 Land Use

Merebank is both a residential area and an industrial hub. The biggest industries (in terms of size) located in Merebank are the Engen Refinery, SAPREF, Mondi Merebank, and Durban International Airport. Engen Refinery and SAPREF are 1.5 kilometres apart. It also includes farming land, retail outlets, small-scale manufacturing, warehousing and storage facilities, parks, recreational fields and wild life recreation (Map 9). The land use plan was last updated in 2000, and therefore does not show a true reflection of the current changes in Merebank, such as the house-to-office conversions.

3.4.2 Infrastructure

The Southern Sewerage Works was established in 1969. It was the first infrastructural development in southern Durban and is located in the middle of the residential area (Map 10, Gajan, 2001). The plant is divided into two parts. The first part purifies domestic sewer from Merebank and surrounding areas. It removes solids from the water, after which fine particles are further removed. This water is sent to a company on the plant called Viola Water, which further recycles the water. The water is thereafter pumped to Mondi Merebank and SAPREF plants. These industries use the water during their production processes (Mabaso, 2008). The second part of the plant purifies toxic sewer from the Badulla trunk. This trunk carries chemical waste from surrounding Merebank industries and Island View. The sewer water is recycled and then pumped far into sea. Photograph 5 illustrates the activate sludge unit used at the Southern Sewerage Works.

The Umlaas Canal (Photograph 6) was built in 1952 following the need to develop and protect Durban International Airport from the floodwaters of the Umlaas River. The Umlaas River used to naturally flow into the Isipingo lagoon but was subsequently canalised (Umlaas Canal), into the man-made "Cuttings Beach". The soil from Cuttings Beach was used to raise the level of the airport site (Chetty, 2008). Map 10 shows infrastructure developments in the area such as rivers and canals.

MEREBANK INFRASTRUCTURE

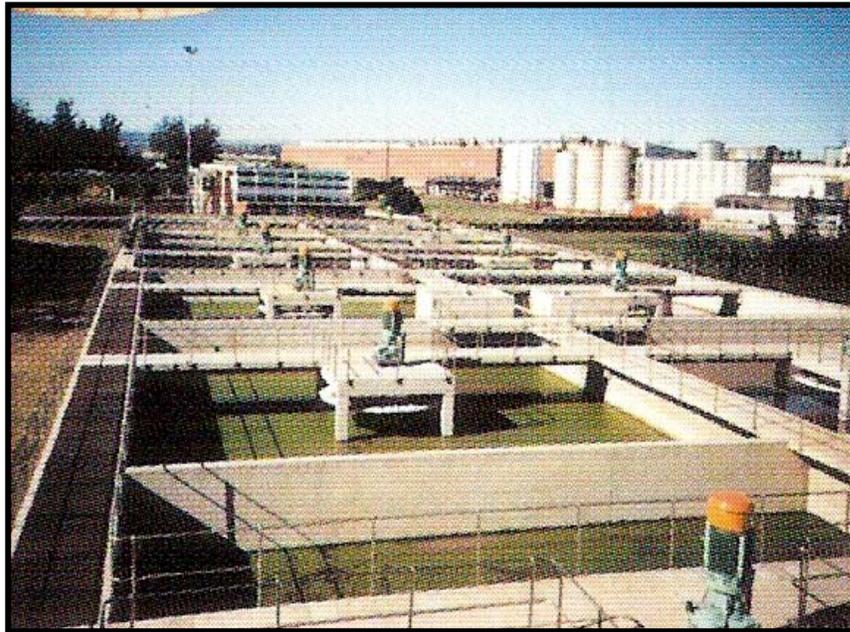


- Main Roads
- Southern Freeway
- National Roads
- - - Railway
- Suburbs
- Streets

0 0.25 0.5 1
Kilometres
Source: Ethekewini Municipality (2008)



Photograph 5: Activate sludge unit



Source: Author (2008)

Photograph 6: Umlaas Canal and Cuttings Beach

Cuttings
Beach



Umlaas
Canal

Source: Author (2008)

The existing road infrastructure includes the Southern Freeway (M4, N2); Old South Coast Road (R102) and the Umlazi and South Coast Rail Line (Map 10). The transport corridor caters for local trips (R102), Metropolitan trips (N2) and national and

international trips (Durban International Airport). The highest percent of public transport trips (75%) takes place in the South Durban Basin (Urban Econ, 2004). The transport network has been widened in order to improve access to the industrial and residential areas of the south (Scott cited in Gajan, 2001).

3.4.3 Economic Activities

There are various types of economic activities in Merebank including heavy and light industry manufacturers; retail business big and small, and professional services.

a) Heavy Industries

Heavy industries in Merebank are those which use coal fire boilers, heavy fuel, or incinerators to manufacture products. These give off the most emissions, causing all kinds of pollution. Engen Refinery, SAPREF, Mondi Merebank and Durban International Airport constitute the heavy industries. Engen Refinery was the first crude oil company in South Africa (www.engen.co.za). Eighty percent of the company is owned by Petronas and 20% by World Wide Africa Investment Holdings. In 2001 Engen Refinery produced 4.21 million tons of crude oil (Danmarks Naturfredningsforening-DN and SDCEA, 2003). There are approximately 600 employees at the plant.

SAPREF is also a crude oil company. It is a joint venture between Shell South Africa Energy and BP Southern Africa. SAPREF refined 8.5 million tons in 2001 (DN and SDCEA, 2003). It employed 548 local workers in 1995 (www.sapref.com).

Mondi Merebank is a paper mill and produces a variety of office paper. The South African division of Mondi is made up of forestry, pulp and uncoated fine paper operations. Mondi Merebank has around 35 000 employees (www.mondigroup.com).

Durban International Airport is one of the busiest airports in South Africa, offering domestic and international flights. On average per day, approximately 45 aircrafts depart and 45 arrive (Naidoo, 2008). There are 3200 employees of which 250 are employed by the Airports Company South Africa (ACSA). The balance of employees are employed by service providers such as airport retailers, car rentals, airline companies, cargo operations, baggage handling, security, warehousing, medical staff, car park staff, air force base, catering, fuelling, air traffic and navigation services, weather station staff and

technical staff (Naidoo, 2008). See Appendix A for heavy industries in south Durban (highlighted in red).

b) Light Industries

Light industries are industries that do not heavily pollute. These industries use electric boilers, gas, or no boilers at all. They include scrap metal industries, carpentry, aluminum manufacturers, textile manufacturers, bakeries, panel beaters and dry cleansers. All light industries are highlighted in yellow, in Appendix A.

c) Other Small Businesses

According to the 'What's Up' Durban-South (2008) directory, the most prevalent small economic activities in Merebank include professional services such as carpentry, dressmakers, hairdressers, jewellers, home-decorators, electricians, attorneys, dental surgeons and financial consultants. Education services include crèches, schools and skills development training. Other businesses include refuse collection, manufacturing and designing of aluminum products, printing services and vehicle repair shops.

3.4.4 Social Facilities and Services

Social facilities include clinics, hospitals, libraries, schools, community halls, religious centres (churches, temples, mosques), sports fields, parks, playgrounds, outdoor gyms, Cuttings Beach, and Clairwood Racecourse (Map 9).

Social services include food and beverage retailers, banking services, legal services, postal services, waste disposal services, transportation services and communication services. The Bombay Walk Shopping Centre (Map 9) is the biggest shopping centre in Merebank. It is an excellent example of a primary use (as explained in section 2.3.1 b) as it attracts many people and businesses to site. The shopping centre opened opportunities to a variety of businesses and facilities. It is also a transport node as buses and mini bus taxis service the shopping centre. A taxi rank was built adjacent to the shopping centre (Gajan, 2001).

3.4.5 Demographics

In 2001, Merebank had a population of 20 560 people (Statistics S.A, 2001). Table 4 below shows the gender and racial split and Table 5 the age breakdown. Table 4

indicates that there are more women (52.1%) than men (47.9%), which could mean that the life expectancy is greater for women.

Table 4: Merebank Population and Gender

Race	Male	%	Female	%	Total %
Black African	200	2.0	308	2.8	2.4
Coloured	432	4.4	414	3.9	4.1
Indian/Asian	9209	93.4	9972	93.2	93.3
White	15	0.2	10	0.1	0.1
TOTAL	9856	100.0	10 704	100.0	100.0
TOTAL POPULATION		20 560			

Source: Statistics S.A (2001)

Table 5: Merebank Age Groups

Age	No.	%
0-24 years	8249	40.1
25-49 years	7970	38.8
50-74 years	3994	19.4
75-854 years	347	1.7
TOTAL	20560	100.0

Source: Statistics S.A (2001)

3.4.6 Religious Affiliation

Three main faiths are practised in Merebank: Hinduism, Christianity (which includes different churches) and Islam (Muslim faith), as indicated in Table 6.

Table 6: Merebank Religious Affiliation

Religious Status	Total	%
Hinduism	11 393	61.0
Christianity	5 535	29.7
Muslim	1 736	9.3
TOTAL	18 664	100.0

Source: Statistics S.A (2001)

3.4.7 Employment and Income

Table 7 shows that 32.7% of the population is employed, leaving the balance of the population either unemployed or not economically active. Those that fall under the category 'not applicable' are either too young (below 15) or too old (over 65) to work.

Table 8 indicates the monthly income level of Merebank, 52% of the population do not earn an income. These individuals are below 15 or above 65, making them too young or old to work.

Table 7: Merebank Employment

Status	Total	%
Employed	6 731	32.7
Unemployed	1 668	8.1
Not economically active	6 155	30.0
Not Applicable	6 006	29.2
TOTAL	20 560	100.0

Source: Statistics S.A (2001)

Table 8: Merebank Monthly Income levels

Income category	Total	%
No income	10 719	52.1
R1-R1600	4 836	23.5
R1601-R12 800	4 852	23.6
R12 801-R102 400	149	0.7
R102 401 or more	4	0.1
TOTAL	20 560	100.0

Source: Statistics S.A (2001)

3.4.8 Travel patterns

Table 9 shows that 17.6% of people travel to work or school on foot. This means that places to work and school are situated close to people's homes. It also indicates that facilities and services are in proportion to the number of dwelling units. Twelve and a half percent of the population own cars. This is a low percentage of the total population but illustrates that a portion of the population does earn enough to purchase vehicles. Of the total population, 44.6% (not applicable) do not go to school or work and are therefore unemployed.

Table 9: Merebank Mode of Travel to Work or School

Mode of Travel	Total	%
On foot	3 630	17.6
By bicycle	33	0.2
By motor cycle	33	0.2
By car as a driver	2 567	12.5
By car as a passenger	2 095	10.2
By minibus/taxi	1 560	7.6
By bus	1 367	6.6

By train	53	0.3
Do not travel	52	0.2
Not applicable	9 170	44.6
TOTAL	20 560	100.0

Source: Statistics S.A (2001)

3.5 Summary

Through a series of historical events, Merebank quickly took shape as an industrial and residential node. The most critical years were from the 1920's to the 1950's where industrialisation, modernist planning and racial planning took place. These years ultimately defined Merebank and surrounding areas as both an industrial and residential node. Industrialisation had both positive (job creation) and negative (pollution) spin-offs for this urban area and its surrounds. Merebank today is established with infrastructure, services, and facilities, which enable residents, small businesses and industries to operate collectively.

The next chapter analyses the surveys undertaken in the study area. It explains the main issues and problems experienced by residents, community-based organisations, surrounding industries, and built environment specialists.

CHAPTER 4

Analysis of Findings

4.1 Introduction

This chapter presents findings from the fieldwork conducted. The chapter is based on household questionnaires; in-depth interviews with community-based organisations (CBOs), surrounding industries, built environment specialists, and field observations. It identifies the issues affecting the quality of life in Merebank and explains how they manifest themselves. In addition, it identifies the affected parties, and the manner in which they are affected.

Household questionnaires enquired how people felt about their living space and their quality of life (Appendix B). Interviews with CBOs focused around major issues affecting the quality of life. It also questioned the initiatives undertaken to address these issues, and the aspects that would make their work more effective and easier (Appendix C). The interviews for the two surrounding industries (Engen Refinery and SAPREF) centred around the built environmental constraints and how they affect production. The interviews also focused on initiatives that industries undertook in solving particular problems (Appendix D).

Nine built environment specialists were interviewed. The interview questions dwelt on issues affecting the quality of life in Merebank. They also questioned possible design interventions that may be used to mitigate these problems; the recent development interventions and the problems they addressed; future development interventions, and the success and failure of urban design interventions (Appendix E).

4.2 Issues affecting the Quality of life in Merebank

This section identifies the main causes, and driving forces behind, the adverse living conditions in Merebank (see 1.2.3 subsidiary research questions). It also illustrates the concern and level of impact for each target group.

4.2.1 Pollution

a) Noise Pollution

According to the interviews conducted with all target groups (Merebank residents, community-based organisations in Merebank, polluting industries in Merebank and built environment specialists) three major problems were experienced in Merebank those include noise, air and water pollution. Merebank is in the direct flight path of Durban International Airport. As a consequence the noise caused by aircrafts flying over is unavoidable. Once aircraft reach south Durban, they prepare for landing. At this point, aircrafts are flying relatively lower to the ground and sound much louder. Three residents complained in their questionnaires that walls in their homes were damaged from air cracks caused by the vibration of the aircraft. Some experienced a loss of hearing over time, and others explained the noise was disturbing when watching television, studying, having telephone conversations, or sleeping. On average, approximately 90 aircraft fly over Merebank a day, during departure and arrival (Naidoo, 2008). For residents on Badulla Drive who live 20 metres from Engen Refinery, the loud operational noises from the refinery were a problem. This happens at any time of the day and is very disturbing.

b) Air Pollution

The air pollution in Merebank results from a variety of causes, such as exhaust emissions from light and heavy vehicles, aircraft and surrounding industries. The Southern Sewerage Works, Engen and SAPREF refineries, Mondi Paper Mill, and Durban International Airport give off the most emissions. Residents are concerned mostly when explosions and flaring occur (Photographs 7,8,9).

Flaring is used to describe a naked (open) flame that burns off excessive gas (Photograph 10). In this case, gases are generated when the process is not operating properly, when there is a loss of power or when gases are vented during maintenance (SDCEA, 2006). Flares release large volumes of gas into the atmosphere. Some of the harmful toxins released during flaring include benzene, mercury, arsenic, chromium, carbon dioxide, methane, sulphur dioxide and nitrogen oxides.

The most prevalent health problem amongst children as reported by their caregivers was asthma. Asthma is a respiratory illness, which causes poor lung function. Photograph 11 shows a Merebank father treating his son with an asthma inhaler and medicines. The

health problems among adults include: high blood pressure, arthritis, lung disorders, and diabetes (Naidoo, 2006).

Photograph 7: Explosion at Engen



Source: SDCEA (2007)

Photograph 8: Air Pollution: Engen Explosion



Source: SDCEA (2007)

Photograph 9: Air Pollution: SAPREF Refinery (2004)



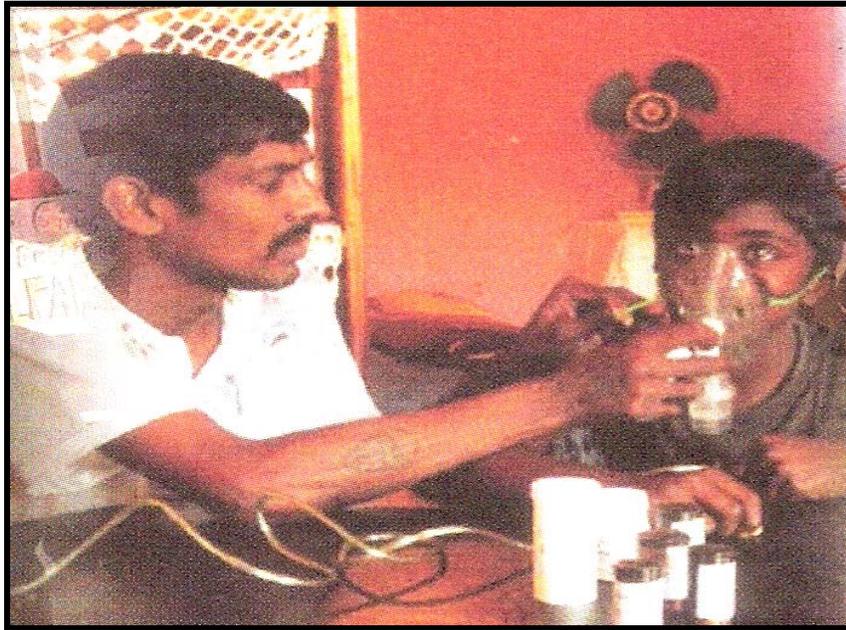
Source: DN and SDCEA (2005)

Photograph: 10 Flaring: Engen Refinery (2004)



Source: DN and SDCEA (2005)

Photograph 11: Father treating son with asthma in Merebank



Source: Friends of the Earth (2004)

c) Water Pollution

Water pollution is caused by burst pipes (Photograph 12), which release chemicals into the ground and oil spills, which are flushed into the drainage systems. These are pipes (owned by surrounding industries) carrying chemicals and other toxins. Chemicals have an adverse effect on all living plants, animals, and human life. In 2001, a major fuel leak occurred. It was caused by a rust defect in a pipe. This pipeline was owned by SAPREF and between 1-2 million litres of fuel were spilled (Photograph 13). SAPREF pipelines extend for 84 kilometres through the residential areas of south Durban. Figure 1 illustrates chemical and refining incidents from 1998 to 2002.

Photograph 12: Burst Pipeline during a SAPREF pipeline replacement project



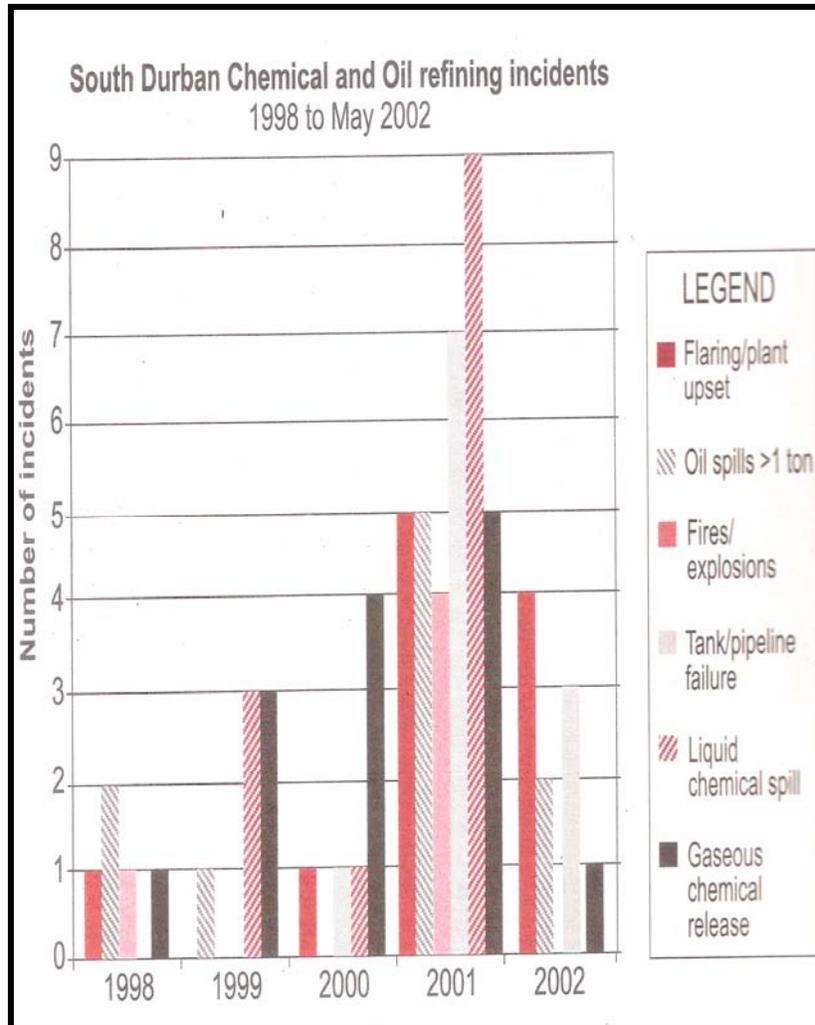
Source: SDCEA (2007)

Photograph 13: Oil Spill at SAPREF



Source: Friends of the Earth (2004)

Figure 1: South Durban Chemical and Oil Refining Incidents



Source: GroundWork (2002)

4.2.2 Verges and Landscaping

a) Verges

Residents complained that verges were poorly maintained. Wide verges such as the one on Ajmer Road (Map 10) has often been used as a dumping ground by nearby retailers and households (Photograph 14). Hazardous and non-hazardous materials such as glass bottles, cans, tiles, boxes, paper and garden refuse, are dumped. All target groups complained that dirty and unkept verges make the surrounding area look untidy. Parents expressed concern for the safety of their children, especially since many children pass by these verges while going to the shop or school. It is both the responsibility of

Merebank residents and eThekweni Municipality to make sure that waste is managed properly.

Photograph 14: Poor maintenance of verges (Ajmer Road)



Source: Author (2008)

b) Landscaping

Given the close proximity of Engen Refinery and households on Tara Road and Badulla Drive, the refinery cannot embark on large scale landscaping initiatives. A spokesperson at the refinery suggested that Engen would like to plant a green belt around the refinery. This would create a buffer between residents and the refinery. A soft buffer like this would contribute to cleaner air, and make the refinery look aesthetically pleasing.

4.2.3 Canals

A number of issues were reported regarding the Badulla and Umlaas Canals (Map 10). Residents complained of bad odours as a result of chemical and garbage dumping. Built environment specialists interviewed stated that there was little recreational amenity (along the Badulla and the Umlaas Canals) and poor integrity of the instream and riparian zones due to the concrete.

Observations were made by residents regarding the constant littering of the Badulla Canal (Photograph 15). Built environment specialists (Mr Crouch, Mr. Bhikha and Mr Brien) stated that littering hinders the flow of storm water. This may lead drainage pipes

to clog, causing water to back up, and flood roads and homes. Canals may also overflow and back up due to the increased water run off from residential properties. Many homes had tarred or concrete surfaces leaving little or no vegetation to absorb heavy rain. As a result, rainwater runs off the property into nearby manholes, drainage pipes and the canal. Built environment specialist Mr Brien pointed out that House 121 on Dinapur Road frequently floods after heavy rains for the same reasons mentioned above (Photograph 16).

Community-based organisations and residents observed that the Badulla Canal constantly had overgrown vegetation (Photograph 17). Parents feared the breeding of snakes and insects (such as mosquitoes) within the vegetation. If bitten by mosquitoes, ill health may result. Many children walk along the canal to school or home, and parents feared snake attacks, although no incidents have been reported.

The Umlaas Canal was reported to have poor water quality, as a result of local burst sewer mains (Photograph 18). The canal acts as an effective barrier to migration for those species dependant on getting to and from the sea/freshwater for various stages of their life cycle.

Photograph 15: Litter in the Badulla Canal



Source: Author (2008)

Photograph 16: House 121 Dinapur Road



Source: Author (2008)

Photograph 17: Overgrown vegetation in the Badulla Canal



Source: Author (2008)

Photograph 18: Raw Sewerage 'geysers' erupting in the Umlaas Canal



Source: Institute of Natural Resources (2007)

4.2.4 Safety and Security

a) Safety

An Engen spokesperson revealed that the close proximity of houses to Engen Refinery is a safety risk to both the refinery and nearby residents. In the event of a gas release, stoves and cars would have to be switched off, as these can be easily ignited, causing explosions. Ideally, residents would have to evacuate, and roads would have to be closed off in an attempt to restrict exposure to exhaust emissions. Close proximity means that there may not be adequate time to send out an evacuation notice or close off roads.

Punjab Circle Park is a common leisure spot for families and children. Situated here is a play gym and other recreational activities like swings, a jungle-gym, and a see-saw. Traffic becomes heavy at times causing a potential safety risk especially for children crossing the road. Residents and built environment specialists complained of a lack of traffic calming measures to slow down traffic. Residents reported that two or three accidents occurred every month in Merebank. Residents also complained that the park felt unsafe.

b) Security

All target groups made mention of high crime rates. Criminal incidents identified in this area included hi-jackings and house break-ins. Cargo trains servicing Engen and surrounding industries were reported to have been used as an escape vehicle by thieves (see Map 10); (Engen spokesperson, 2008.) Robbers have been reported to jump on moving trains with stolen goods.

Pathways and lanes such as the Shillong Road Lane (Map 10), have poor lighting and surveillance measures, which makes them a hot spot for muggings and other criminal activities (Photograph 19). Residents have reported two incidents to date.

Photograph 19: Lanes are unsafe and ill kept (Shillong Road Lane)



Source: Author (2008)

4.2.5 Social Issues

Merebank residents noted the following social issues: high poverty levels; lack of employment and job opportunities; drugs, and various health problems such as HIV/AIDS, skin irritations, and respiratory illnesses. Residents and CBO officials interviewed perceived the lack of job opportunities and employment as contributing factors to severe poverty and increased criminal activity. The high pollution levels are the cause of skin irritation and respiratory illnesses (as explained earlier). It also aggravates the condition of HIV/AIDS patients.

a) Public Facilities and Housing

Other social issues pertain to the poor maintenance of public facilities and inadequate housing. Many events such as soccer tournaments, charity fairs and concerts take place at the Badulla Drive Sports Ground (Map 10). The Environmental Forum lodged complaints about the restrooms which are unhygienic and messy (Photograph 20). The ground is also a potential hazard to children as it has broken glass and bottle pieces. This is an inconvenience for event organisers and a hazard to all patrons when events are held on the premises.

Photograph 20: Restroom at Badulla Sports Ground



Source: Author (2008)

Residents, CBOs and built environment specialists noted a lack of adequate housing and poor housing maintenance. Residents explained that houses are too close to each other (not specifying where), making Merebank look very congested and overcrowded. Too many people rent; residents were unhappy at the fact that there was not enough land available to build. They also complained that industries make Merebank look unsightly, which together with the pollution, decreases property value.

Many residents over the years have noted the unpleasant living conditions at Rainbow Gardens (Map 10). This is a low cost housing settlement at the bottom end of Tara Road, and is 20 metres away from the Engen Refinery. Houses are situated close together and are poorly maintained. Residents on Badulla Drive complained that the

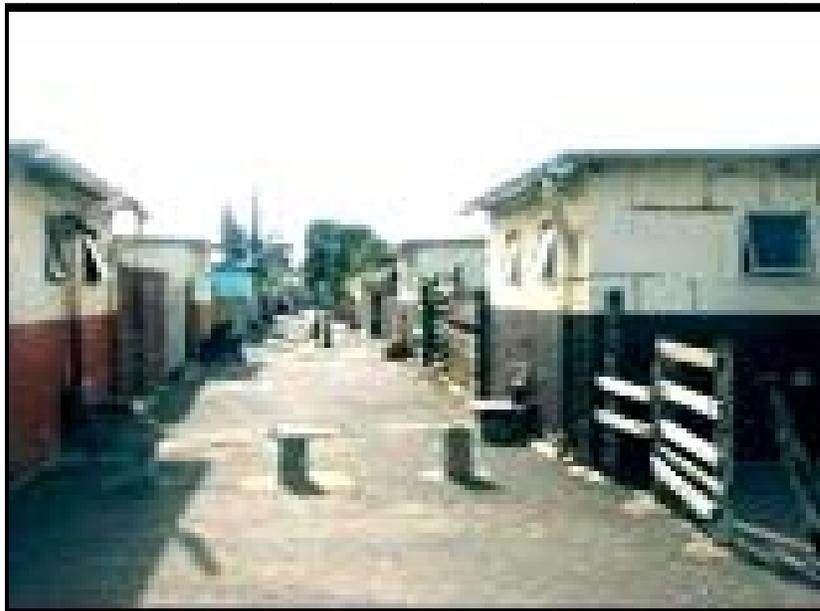
settlement makes surrounding areas look untidy (Photograph 21-24). The settlement lacks space to extend houses, grow a garden or park vehicles. The closeness of houses has resulted in many criminal activities such as drug dealing, prostitution, muggings and rapes. Residents also complained of unhygienic living conditions as a result of littering of broken bottles and household refuse, with resulting pollution. This they attribute to the close proximity of the refinery.

Photograph 21: Graffiti on walls



Source: eThekweni Municipality and Engen (2005)

Photograph 22: No play area for children



Source: eThekweni Municipality and Engen (2005)

Photograph 23: No parking space



Source: eThekweni Municipality and Engen (2005)

Photograph 24: Small living space



Source: eThekweni Municipality and Engen (2005)

Calicut Place is a popular leisure spot for many residents in Merebank (Photograph 25). It is situated on the ridge and overlooks the Indian Ocean (as well as the man-made

Cuttings Beach), Merebank Central, Durban International Airport and surrounding industries. It is for this reason that residents have named it 'View Point'. While residents deemed the spot spectacular for the view, many concerns were expressed regarding safety and poor maintenance (Photograph 26). During the day, viewers would prefer to walk around the area or sit down and enjoy the view but were reluctant to do so. At night the view is considered remarkable (when the airport runway and industries are lit up), but residents feared for their safety, as many fights and criminal activities occurred here.

Cuttings Beach was badly damaged as a result of the high tidal waves which occurred in March 2007. Since then, the beach has been seldom used as many of the structures and facilities have been damaged. Photograph 27 shows what remains of the road after the tidal waves.

Photograph 25: Social gathering spot



Source: Author (2008)

Photograph 26: Stairway down to Cuttings Beach (broken)



Source: Author (2008)

Photograph 27: Cuttings Beach with road washed away



Source: Author (2008)

4.2.6 Roads, Rail and Traffic

a) Roads

Roadworks are common, and take place frequently around Merebank (Photograph 28). Industries like the Engen Refinery, SAPREF, and Mondi have many pipes running beneath the roads and residential homes. Roads have been dug up many times to access these pipes during a pipe leak or replacement. Residents complained that the roadworks are noisy and an inconvenience when getting to work and school. It also takes months before the roads are fully restored and operational again.

Pavements are too narrow and badly maintained. Residents complained of graffiti, cracks and weeds on pavements (Photograph 29). It was reported that heavy-duty vehicles often drive half on the pavement causing it to crack and break. Trucks have been reported to frequently park on pavements, causing an obstruction to both pedestrians and moving vehicles. Mini-bus taxis also park on the pavement when picking up and dropping off passengers, causing the pavement to crack and break even more.

Roads were also found to be dirty, as they were not frequently swept. Residents noted that speed humps needed to be rebuilt, and that existing ones are either too high or too low.

Photograph 28: Pipeline construction outside Engen Refinery (Tara Road)



Source: Author (2006)

Photograph 29: Pavement not maintained (Bikaner Road)



Source: Author (2008)

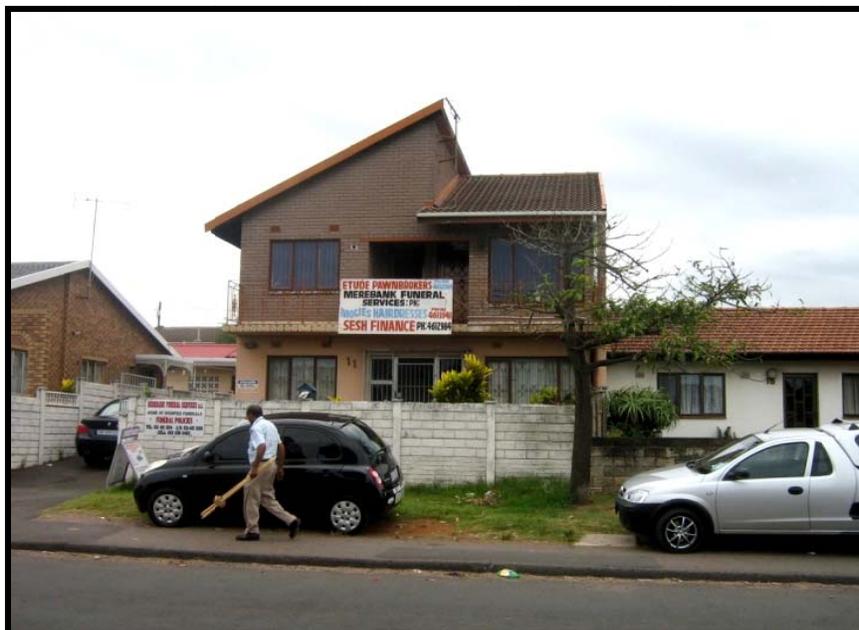
Due to house-to-office conversions, off-road parking has become an issue. Some houses on Dharwar Road have been converted from residential units to office units. In some cases more than one business operates from a dwelling unit (Photograph 30). This creates a demand for additional parking space as vehicles now have to park on the pavement (Photograph 31). Residents on Dharwar Road complained that pavement parking causes an obstruction to pedestrians and makes the area look congested.

Photograph 30: Four businesses operating at once



Source: Author (2008)

Photograph 31: Dharwar Road's house to office conversions



Source: Author (2008)

b) Rail

The Engen Spokesperson complained that cargo trains servicing the refinery operate on a very awkward route. The rail route is not positioned well, as it runs between a valley and behind houses (Photograph 32, Map 10). In the event of a de-rail, it may become difficult for emergency and other services to get to the incident quickly.

Photograph 32: Railway track from Engen running behind houses



Source: Author (2008)

c) Traffic

Traffic congestion is a common problem which was observed by Merebank residents and built environment specialists. It is mainly caused by heavy-duty vehicles that service surrounding industries. Big tankers and paper trucks slow down traffic or bring it to a complete halt. Residents noted that traffic can build up on any route at any time. However, traffic congestion is most common on Tara Road and Badulla Drive because of the Engen Refinery; on Duranta Road, as it links to the M4 and N2, and Barrackpur Road because of the Illovo Sugar Industry (see Photograph 33); as well as other roads around Mondi Merebank and SAPREF.

Photograph 33: Traffic congestion on Barrackpur Road



Source: Author (2008)

4.2.7 Planning

As a result of apartheid planning, houses such as those on Tara Road and Badulla Drive were situated less than 20 metres from the Engen Refinery. The Engen spokesperson explained that this hinders any expansion that the refinery wishes to make in the near future. The refinery will not be able to expand to the east as it is restricted by the coastline, or to the south and west because of dwelling units on either side of the refinery. The refinery often gets complaints from nearby residents about operational noises, vibrations and air pollution. If residential areas were situated further away from the refinery, such disturbances and unpleasant living conditions would be avoided.

With the airport nearby, industries are restricted in terms of their stack (chimney) heights. Airport authorities cannot grant permission for this as aircraft may possibly collide into stacks. If industries are allowed to build higher stacks, air pollution levels will decrease. The Engen spokesperson explained that refinery stacks are below the inversion layer, which traps the emissions and keep them closer to the ground (Photograph 34). Taller stacks will allow emissions to blow higher past the inversion layer, making them less harmful to living organisms on the ground.

Photograph 34: Pollution in Merebank trapped below the inversion layer



Source: SDCEA and DANIDA (2005)

a) Residents' Perception of the Built Environment

Keeping the above issues in mind, what did residents had to say when asked how happy they were in their environment; whether or not they had a sense of pride in their area; and how they would describe their living space?

Ten of the twenty residents surveyed were generally happy and felt a sense of pride in their living environment. Merebank was regarded as a peaceful area, where people are friendly. Most residents felt neighbours and friends were more like family. Residents found Merebank to be convenient as places and facilities such as shops, schools, places of work and the CBD are nearby. One resident relocated to Johannesburg but returned to Merebank, explaining that there was no place like home!

In contrast, nine respondents expressed discontent. They described Merebank to be smelly, filthy, untidy and having a high crime rate. One respondent has already bought a home in Umkomaas (far south of Durban), and is due to move by the end of the year (2006). Another resident hoped to relocate to a cleaner safer environment, but found it hard to leave friends and family behind.

Only one resident felt Merebank and its living environment was satisfactory, explaining the positive and negative aspects. On a positive note, many friends were made; places and facilities are convenient, and Merebank is the birthplace of many, holding memories and history that cannot be forgotten. However, pollution is a problem together with traffic congestion, high crime rates, and lack of employment opportunities.

4.3 Summary

According to findings the main issues affecting the quality of life in Merebank focus around pollution; verges and landscaping; canals; safety and security; social issues; roads, rail and traffic; and planning. These issues were expressed during interview sessions and questionnaires with residents, community-based organisations, built environment specialists and surrounding industries.

Three types of pollution were highlighted namely noise pollution, air pollution and water pollution, air pollution and water pollution were expressed as been the most serious. Other issues identified included illegal dumping of domestic waste on verges and the lack of space to grow a green belt. The most serious issues concerning canals were overgrown vegetation inside and on the banks of the canal, domestic waste dumping and chemical dumping which posed a health risk and odours. Issues of safety focused around the evacuation procedure in case of an explosion and a lack of traffic calming measures at parks. Criminal activities such as hi-jackings and house break-ins were highlighted as severe security problems. The most crucial social issues were around the lack of maintenance of public facilities and the unpleasant living conditions at Rainbow Gardens. The untidy appearance and criminal activities that take place at Rainbow Gardens make surrounding residents uncomfortable and unsafe.

Roads and traffic problems were more severe than railway issues. The key issues with roads included roadworks which caused traffic congestion, ill maintenance of roads and pavements, pavement parking and a lack of on road parking space for businesses. Traffic congestion was also a major problem caused by heavy duty vehicles using the same route as residents. The foremost problem around the planning issue was apartheid planning which resulted in the close proximity of heavy polluting industries and the Merebank residential community next to each other. Household questionnaires confirm

that 50% of residents are happy in their living space, 40% feel discontent and 10% have a satisfactory feeling.

Although many issues were discussed, the main concerns were around pollution, canals, safety and security. These issues have a direct effect on human health and well-being. The overall perception of Merebank can be evaluated as being satisfactory, since half the respondents were happy with their living space. The following chapter (Chapter 5) looks at the recent and proposed urban design interventions in and around Merebank.

CHAPTER 5

Recent and Proposed Urban Design Interventions

5.1 Introduction

This chapter aims to validate the research hypothesis. It illustrates the outcomes and achievements of urban design interventions, in addressing adverse living conditions identified in the study. The chapter is divided into two sections. Section 5.2 focuses on the already completed urban design interventions in and around the study area. Section 5.3 discusses projects that are currently implemented in and around the study area.

5.2 Recent Urban Design Interventions

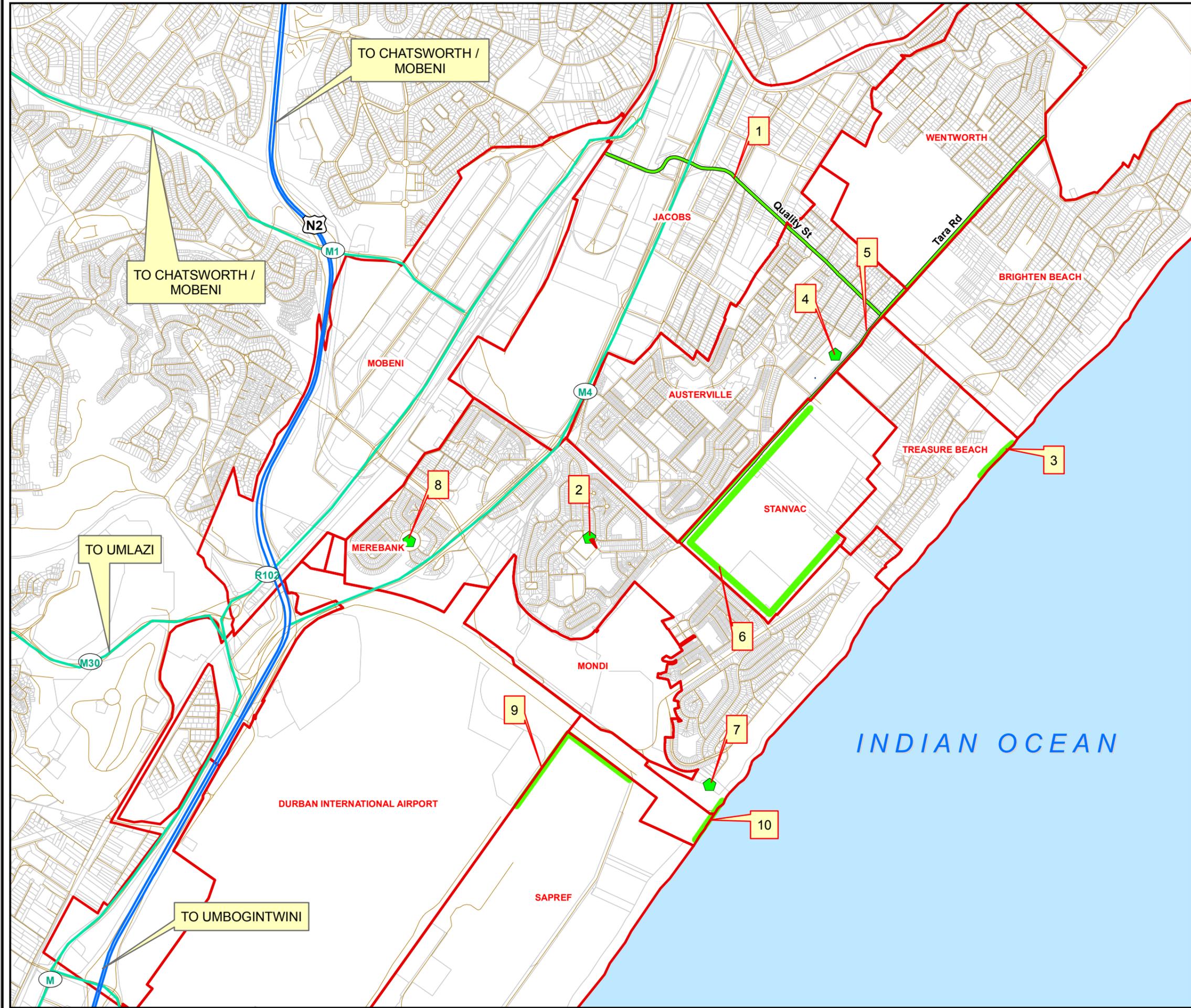
This section discusses the completed urban design interventions in and around Merebank. In each case, the problem is identified, followed by the intended solution and the outcome (determining how successful it was). Not all interventions were within the study area; however, it was still important to note them, to illustrate the achievement and credibility of urban design interventions. These projects are addressed from the earliest to the most recent. None of the projects was part of an urban renewal project. These were all stand-alone projects, which required urban design interventions to address built environment issues.

Nine urban design interventions are discussed, of which five projects are situated within the study area: the Taxi Rank Upgrade; landscape around Engen Refinery; Calicut Place Upgrade; Punjab Circle project, and the SAPREF Landscaping Project. Other projects which are located outside Merebank include the Quality Street Upgrade, Treasure Beach Boardwalk, the outdoor exercise facility, and the cycling jogging track.

5.2.1 Quality Street Upgrade

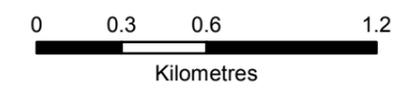
Built environment specialists reported that trucks frequently parked on the pavement and road verges on Quality Street. Quality Street is outside Merebank, and closer to the Bluff (see Map 11). Parking on pavements and the road verges caused heavy traffic congestion, and was deemed detrimental to the safety of pedestrians and moving vehicles. Residents and business owners complained that trucks made the area

URBAN DESIGN INTERVENTIONS IN MEREBANK AND SURROUNDING AREAS



No.	Name
1	Quality Street
2	Taxi Rank
3	Treasure Beach Broadwalk
4	Outdoor Exercise Facility
5	Cycling/Jogging Track
6	Engen Landscape
7	Calicut Place
8	Punjab Circle
9	Sapref Greenings
10	Cuttings Beach

- Area
- ◆ Urban Design Interventions
- National Roads
- Main Roads



Source: EtheKwini Municipality (2008)

congested and untidy. The Quality Street Upgrade Project was started in June 2003 and was completed in June 2004. It was initiated by the Area Based Management team of the South Durban Basin. In an attempt to address this issue bollards were put in place of where trucks use to park. However, after a short period these were knocked over by truck drivers and trucks continued to park on pavements. This attempt failed as the bollards were small in size and not strong enough to withstand the force of heavy vehicles.

A second attempt was made by the Area Based Management team in June 2003 and this proved to be more successful. Big rock boulders replaced the bollards. They were much larger than the bollards and could not be knocked down or run over. These boulders are still there today keeping trucks off the pavement. They also create a type of aesthetic feature in these surroundings (see Photograph 35).

Photograph 35: Boulders on Pavement



Source: Author (2008)

5.2.2 Taxi Rank Upgrade (At Bombay Walk Shopping Centre)

The Taxi Rank Upgrade was initiated to address the problem of unorganised pedestrian traffic at the taxi rank. The taxi rank is situated behind the Bombay Walk Shopping Centre. The aim of the project was to eliminate traffic congestion on the roads by

creating proper bays to pick up and drop off passengers. This project, developed by the eThekweni Municipality, was initiated in January 2006 and completed in June 2006 (Map 11). The taxi rank was designed with defined pedestrian and vehicular access to and from the taxi rank. Sidewalks were constructed with impervious non-slip materials. The present street lighting provides a sense of security. There are also waiting pads or accessory pads, which are paved and contain shelter for pedestrians and telephone booths (located to the back). Also present are trash receptacles to keep the taxi rank neat and tidy.

This project is deemed a success (by the Area Based Management team), as pedestrians are able to organise themselves, getting in taxis's and off taxis's safely and efficiently. In addition, taxis are able to drive in and pick up passengers in an organised manner, causing no traffic congestion on the road and ensuring pedestrian safety (Photograph 36).

Photograph 36: Taxi Rank Upgrade



Source: Author (2008)

5.2.3. Treasure Beach Board Walk

This project is in Treasure Beach (outside the study area) (Map 11). Built environment specialists explained the need to prevent the dune scrub from encroaching on the coastal grassland. eThekweni Municipality initiated this project which was started in January 2006 and was completed in June 2006.

The urban design solution to this problem was simple: a boardwalk was built to act as a buffer between the dune scrub and coastal grassland. The boardwalk was built with recycled plastic, to further protect the environment. The plan was two-fold: firstly the boardwalk helped to separate the two types of vegetation, hence protecting the coastal grassland. Secondly, it served as an educational tool allowing visitors and learners to explore the nature reserve while having a panoramic view of the sea (Photograph 37).

Although this plan works well (as it was relatively new), Wildlife Society of South Africa (WESSA) personnel anticipate that the dune scrub can still encroach on the grassland by growing under the boardwalk. The best solution is to burn the vegetation between the two, this will work well and should be done every two years.

Photograph 37: Board walk separating the dune scrub (left) from the grassland (right)



Source: Author (2008)

5.2.4 Outdoor Exercise Facility

The outdoor exercise facility project is situated in Austerville (Map 11), which is immediately outside Merebank. Area Based Management officials explained that various health institutions in the Austerville area had approached Provincial Departments to create an outdoor gym facility that was cheap and effective. Hence, this project was started in November 2006 and completed in January 2007. It was developed by the Provincial Government of Sports and Recreation.

The concept of an outdoor gym was utilised to meet the request for an outdoor exercise facility. The gym is located on one side of the Austerville soccer field. It was designed so that all workouts that take place in a conventional gym are offered here (Photograph 38). The gym is planned to allow for natural surveillance (some Austerville flats overlook the gym). Attempts are being made to integrate the outdoor gym facility with the jogging/ cycling track (to be discussed later).

Residents who use the outdoor gym stated that the facility lacks privacy, as it is located in an open space. Training is dependent on good weather conditions, especially since the gym is not under any type of shelter, and rain and cold winds may not be appealing conditions in which to train. As it may work well there still are constraints.

Photograph 38: Outdoor exercise facility



Source: Author (2008)

5.2.5 Cycling/ Jogging Track

The cycling/jogging track, initiated by SAPREF began in December 2006 and was completed by December 2007. It runs parallel to Tara Road and is also located immediately outside the study area (Map 11). The (then) temporary road was used to divert traffic off Tara Road during pipeline upgrades in 2006. This track was built next to

and parallel to Tara Road. Once Tara Road was restored to its original state, the temporary track was used by nearby school children, cyclists and joggers.

There was a need to make sure that children who attended the nearby Fairvale Secondary School commuted to and from school safely. It was also a common stretch for early morning and late night joggers and cyclists. One of the most common problems occurred when trucks parked on the track. This caused traffic congestion and was an obstruction to joggers, cyclists and children (Akkiah 2006).

The route parallel to Tara Road was eventually converted into a cycling/jogging track. The cycling/jogging track project has many safety measures. Bollards were placed on the outside of the cycling/jogging track, which keep trucks off the track. The lighting system is bold and efficient: it makes the track and pedestrians visible, which is a good surveillance measure especially when it is dark at night and early parts of the morning (Photograph 39). The pavement is wide enough and allows children to socialise after school. In the past, children used to congregate on the road (after school) while waiting to be fetched, as they did not have sufficient place to stand. The track is used often by people who wish to exercise and by children who commute to school and home. This project is thus successful in its own right!

Photograph 39: Cycling/Jogging Track



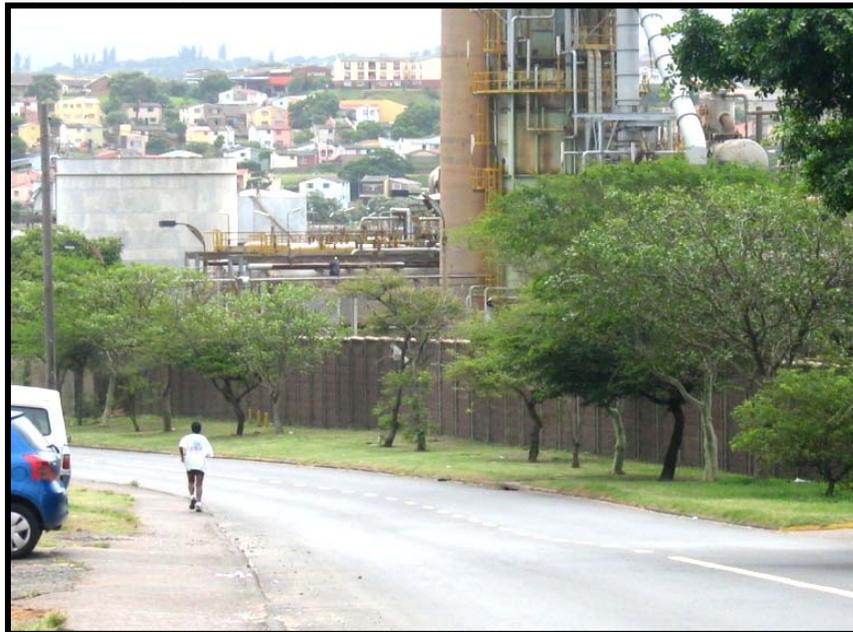
Source: Author (2008)

5.2.6 Landscaping around Engen

The Engen landscaping project is located in Merebank (Map 11) and was developed by Engen Refinery. The aim was to beautify the edge (a fence) of the refinery. Small trees were sparsely planted around the refinery in an attempt to fulfill this plan (see Photograph 40). The project was started in January 2007 and completed in January 2008.

The problem (as stated by built environment specialists) lies in the manner in which the trees were planted. Sparsely planted trees left gaps between them which left the hard edge still exposed. The hard edge made the noise caused by traffic even worse, by bouncing off the fence. The edge should have been fully (densely) landscaped, with thick vegetation planted closely. Stimuli as mentioned in Chapter 2, refers to the use of different types of material to either absorb or amplify sound. Hence, a dense landscaped edge would absorb noise, and also create a soft aesthetic feature around the refinery.

Photograph 40: Landscaping around Engen Refinery



Source: Author (2008)

5.2.7 Calicut Place Upgrade

Calicut Place is situated in Merebank (Map 11); it is a social gathering spot and commonly known as 'View Point'. From Calicut Place, Durban International Airport,

Merebank Central, and surrounding industries are in sight. Also in view are the Indian Ocean, Cuttings Beach, and the beautiful coastal dune. Residents complained that the area was completely deteriorated, with broken benches, no landscape, and no working street lights, and was in desperate need of restoration. The Calicut Place Upgrade began in June 2007 and was finished in January 2008. It was also a project undertaken by eThekweni Municipality. To address residents' concerns paving and landscaping were done by the eThekweni Municipality. Stronger better-looking benches replaced the old vandalised benches. New types of lighting replaced the old ones, these were built much higher and of better quality, allowing for safety.

The Calicut Place upgrade project is successful, 'View Point' is cleaner and looks aesthetically pleasing. It allows people to enjoy the many views in a safe and cared-for environment (Photograph 41).

Photograph 41: Calicut Place upgrade



Source: Author (2008)

5.2.8 Punjab Circle Project

The Merebank Ratepayers Association (MRA) developed the Punjab Circle Project in Merebank (Map 11), to create a safe park for families and children. The project started in November 2007 and was completed in October 2008. The park was given a major

revamp with playing equipment like swings, jungle gyms and see-saws for children. It has well-maintained picnic sites, and the area is well-secured with post and rail barriers around the park. There is also a paved cycling path around the park, a paved walking path through the park and, good lighting (for safety). The MRA hopes to build a volleyball and netball court here in the near future (see Photograph 42).

As good as the design and layout may be, built environment specialists and residents found a few faults. Firstly, the position of the play gym does not allow for natural surveillance, as it is situated towards the outside of homes as opposed to directly in front (Photograph 43). Secondly, the cycling/jogging track was put on the outside of the post and rail, which becomes dangerous for people, as they are closer to the road. The post and rail barrier should have been placed outside the cycling/jogging track, which would act as a safety barrier for pedestrians, and also prevent vehicles from parking around the park (Photograph 44). Thirdly, there was no traffic calming measure; no speed humps were in place as a safety measure when children crossed the road. Further, Section 2.4.5 (a) refers to safety measures like width restrictions, raised surfaces, gated closures and return loop layouts deterring cars, but encouraging free movement of pedestrians and cyclists: these, were not evident. Although the park is workable, it is problematic in many ways.

Photograph 42: Punjab Circle upgrade



Source: Author (2008)

Photograph 43: The play gym does not face houses



Source: Author (2008)

Photograph 44: Vehicle parked on cycling/jogging track



Source: Author (2008)

5.2.9 SAPREF Landscaping Project

SAPREF embarked on a landscaping project, which was initiated and completed in 2006. This project, situated in Merebank, was intended to revamp the refinery's

entrance, giving it a fresher and tidier look. This involved landscaping and planting of indigenous shrubs around the entrance. Not much information could be attained on this project as the personnel in charge had resigned.

According to observations made by the author and members of the Area Based Management team, most urban design interventions (already mentioned in this section) have successfully addressed the problem it was intended to resolve. In addition, the following issues were addressed: safety and security, traffic congestion and landscaping.

5.3 Projects Currently being Implemented

This section outlines projects that are currently being completed in and around Merebank. These projects are part of bigger projects, such as urban renewal and urban greening projects. There are five projects which exist in and around Merebank: the SAPREF projects; Cuttings Beach Urban Regeneration Project; eThekweni Metropolitan's Urban Greening Project, and the Tara Road Housing Project. Except for the first project, all are major projects.

5.3.1 SAPREF Projects

Attempts were made to acquire more detail on the following two projects by the researcher. However, the persons in charge had resigned. Thus, the information obtained from existing SAPREF staff was general. The two projects mentioned below exist in Merebank, and are not part of any large, urban renewal project.

a) Rehabilitation of Natural Dune

SAPREF has been involved in the rehabilitation of the natural dune, which forms the eastern boundary of their property. According to the SAPREF spokesperson, Margaret Rowe, the project was started some years ago and is ongoing. The estimated date of completion has not yet been determined. To date more than 120 000 indigenous species have been planted on the dune.

b) Revamping stacks

SAPREF embarked on a project to paint the refinery stacks (chimneys) in an attempt to improve the appearance of the skyline. The project was started in 2006 and is expected to be completed in 2009.

5.3.2 Cuttings Beach – Urban Regeneration Project

The aim of the Cuttings Beach Urban Regeneration Project is to rehabilitate parts of the beach that had been eroded. This project is important to mention in the dissertation as it is the largest ongoing project in Merebank. The Cuttings Beach Urban Regeneration project is based on many urban design interventions which are a good examples of urban design and very relevant to this dissertation. Cuttings Beach was subjected to tremendous devastation resulting from the high tidal waves that occurred in March 2007. This project, located in Merebank, was started in December 2007 and is expected to be completed in December 2008. In addition to this, eThekweni Municipality's IDP (2006-2007), has made sustainable development one of its key focus areas. The eThekweni municipality noticed a decline in business confidence, which resulted in loss of investment to the Central Business District (CBD) and the South Durban Basin (SDB). This was caused by poor maintenance or a lack of maintenance in these areas (Iyer Routaug Collaborative, 2004).

The municipality has seen the need for improvement and upliftment of the CBD and SDB. The Area Based Management (ABM) office in the SDB is one such initiative. The key action envisaged in this regard includes:

- Sustainable economic growth and job creation; ensuring appropriate conditions in which the majority of people can gain access to economic opportunities by providing decent facilities for informal traders for example, shelters.
- Upgrading management and infrastructure of core manufacturing locations especially the SDB; the IDP focuses strongly on reviving the central area and SDB, which have experienced degrees of migration to other parts of the city (IDP 2004-2005 in Maluleke Luthuli Associates, 2007).

Sections a-d below describe the Cuttings Beach-Urban Regeneration project in terms of location, current issues of the project, the proposed interventions and the urban design elements used in the project.

a) Location

Cuttings Beach is situated along the southern coast, between Merebank and the airport (Map 10). The current adjoining uses are mainly industrial with most areas taken up by Mondi Paper Mill. Access from the west is via Travencore Road, which is situated in-

between the Umlaas Canal and Mondi Merebank. Travencore Road extends north linking the community areas of Merebank, Treasure Beach, Austerville, Wentworth and Brighton Beach.

b) Current Issues at Cuttings Beach

The concrete-lined Umlaas Canal and Stanvac Canals are in very poor condition. Water quality is extremely poor and measures need to be put in place to upgrade the water quality; there is not enough signage informing people of the dangers of playing or dumping in the canal; the view point area is badly littered, and the pedestrian access route needs to be upgraded (Maluleke Luthuli Associates, 2007).

In addition, vandalism is rife with illegal activities taking place. The entrance to the beach needs to be clearly defined and enhanced. The coastline at this point is dangerous due to the wave action and sea rock, the Ethekwini Municipality has therefore temporarily banned swimming at Cuttings Beach. Extensive damage was caused to the parking area, drive-in entrance, and ablution facilities. Sewer pipes were also exposed in the process.

Furthermore, a rise in sea level due to climatic change has put pressure on the municipality to engage in “hard” development (such as concrete slabs) to avoid the sea shore from residing further. The current beach vegetation that provides protection will also come under threat (Maluleke Luthuli Associates, 2007).

c) Proposed Interventions

The proposed interventions discussed in this section are interventions made by Maluleke Luthuli Associates. Proposed interventions include external and internal access movement, in order to create on-street off-street parking areas at Cuttings Beach. This will be achieved using turning devices (turning circles), alleviating the current pedestrian/vehicular conflict. The traffic circles will slow traffic down and provide adequate traffic calming effects (Maluleke Luthuli Associates, 2007). Also, the entrance to the beach will have an active recreation and sport theme. A paddling pool and associated facilities are proposed to accommodate community needs and to appropriately utilise open spaces. Areas around the pool will be designed to provide sufficient seating, lighting, landscaping and braai facilities. A building will be proposed to

house toilets, kiosks, change rooms and administration (Maluleke Luthuli Associates, 2007).

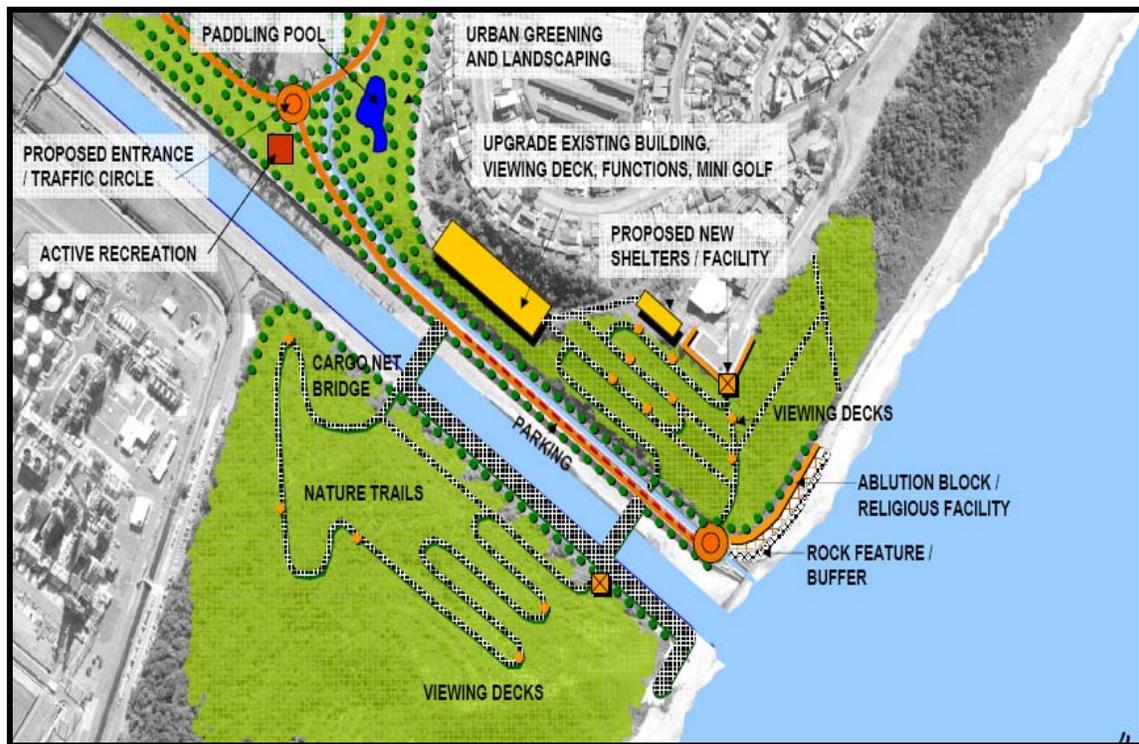
At the southern entrance, sports and recreation facilities are proposed, focusing on basketball, netball, mini golf and other small sports. An amphitheatre style grassed seating area is also planned, which will allow for viewing (Figure 2). The area around the sports facility will also blend in with the surroundings. Trees will be planted along the edge of the canal to give enclosure. Parking will be provided serving these land uses. Figure 3 illustrates the proposed layout (Maluleke Luthuli Associates, 2007).

Figure 2: Concept Design for Active Recreational Area



Source: Maluleke Luthuli Associates (2007)

Figure 3: Proposed Layout



Source: Maluleke Luthuli Associates (2007)

d) Urban Design Elements

In an attempt to ensure that Cuttings Beach is safe and secured, the urban design elements in this project are based on 4 principles: territorial definition, natural surveillance, building form and hierarchy of space (Maluleke Luthuli Associates, (2007).

- **Territorial Definition**

This refers to the area of influence of the residence. It works by sub-dividing the residential environment into zones for which residents become responsible, for in terms of cleanliness and safety (Maluleke Luthuli Associates, 2007).

- **Natural Surveillance**

The moto “All eyes on the street” is applied to areas where people and their activities can be naturally and readily observed within exterior and interior public areas of their living environment. Such areas can be created by designing landscapes that allow clear views of surrounding areas. In addition, properly designed and appropriate lighting can enhance user safety and security, as well as night time activity opportunity (Maluleke Luthuli Associates, 2007).

- **Building Form**
A clean and well-maintained location will instil pride in residents, promoting ownership and territoriality. This means revitalisation and cleaning, eliminating litter and graffiti; repairing any broken or damaged windows, and general maintenance such as painting. Target hardening is a last resort recommendation that may be used to ensure safety and security, and includes the installation of hardware like video cameras, and the use of vandal-resistant materials.
- **Hierarchy of Space**
This enhances safety by locating residential developments in functionally sympathetic urban areas adjacent to non-threatening activities. It can be achieved by creating a clear definition between public, semi-public, semi-private and private spaces, and using symbolic barriers between these spaces by landscaping with alternate paving stones, different vegetation and changes in grade (Maluleke Luthuli Associates, 2007).

Keeping the above in mind the following urban design elements were proposed:

- **Streetscape Elements**
This gives character to the area: street paving will be used to show significant areas. The paving patterns, colours and textures will complement surrounding streets and buildings (Maluleke Luthuli Associates, 2007).
- **Sidewalks**
Sidewalks will be compromised for a “pedestrian zone”. They will be a higher level of finish on pedestrian orientated, mixed-use streets. Openings for planting will be provided in the amenity zone and should be consistent.
- **Street Lighting**
This will be located as part of the streetscape, and function as a unifying element of other streetscape items including trees, benches and paving. The style will integrate and complement the architectural vocabulary of the eThekweni Municipality (Maluleke Luthuli Associates, 2007).

- **Seating, Benches and Bus/Taxi Shelters**
 These will be grouped together as much as possible and placed at busier pedestrian nodes or gathering places. They will be designed and placed appropriately to provide an amenity to the public and can be manifested in permanent plant edges. They should not obstruct views for vehicles, sidewalks for pedestrians, or signs and displays for businesses, but should blend in with surroundings or be specified in complementary accent colour. Bus and taxi locations should be co-ordinated with streetscape design (Maluleke Luthuli Associates, 2007).

- **Public Art**
 This will be “accessible” physically and intellectually. It will be in accordance to the history of the area or tell a story significant to the area. It may include water, seating, planting, and decorative architectural elements as part of the design. It should be visible but not interface with pedestrian circulation or create a traffic hazard. It will be made of durable, waterproof materials. It should be crafted, not sharp. It will be designed to avoid physical hazards to the public (Maluleke Luthuli Associates, 2007).

- **Trash Receptacles**
 These will be located conveniently to allow for easy pedestrian use, and service access in gathering places. They will be permanently attached to avoid vandalism. Sealed bottom and tops will keep contents dry and out of pedestrian view. They will blend in with the surroundings or be specified in a complementary style or colour (Maluleke Luthuli Associates, 2007).

- **Bollards**
 Bollards will integrate with and aesthetically complement the overall streetscape concept. The design will respond to the area they support.

According to Mr. Akkiah from the Area Based Management team, implementation has commenced as of 2008. Phase one has been completed: paving of the area, demarcation of new parking areas, and upgrade of the access from ‘View Point’ to the beach area have been accomplished (see Photographs 45, 46, 47. Phase two is in procurement.

Photograph 45: New paving



Source: Author (2008)

Photograph 46: New stairway up to 'View Point'



Source: Author (2008)

Photograph 47: New parking bays



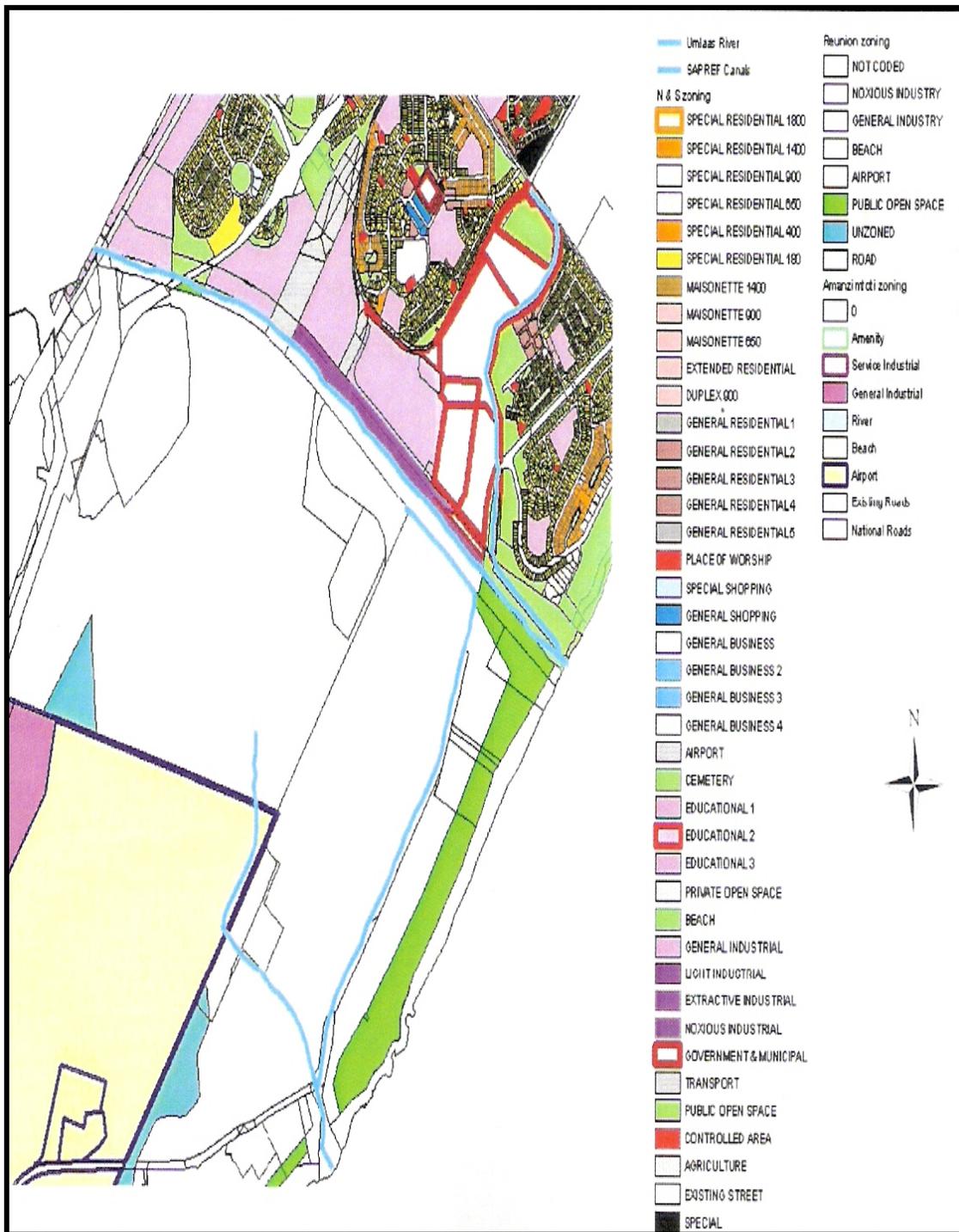
Source: Author (2008)

5.3.3 Accelerated Greening Project

The eThekweni Metropolitan's Integrated Development Plan (IDP) identified the regeneration of the South Durban Basin (SDB) as key to strengthening the metro economy. This features under its Economic Development Priority Programme. The Accelerated Greening Project was initiated in 2007 as part of the regeneration process, this project is continuing. The vision is to restore business confidence, renew investor interest and improve quality of life by addressing environmental issues; addressing operational deficiencies and improving the built environment in a sustainable manner (Institute of Natural Resources, 2007). The Umlaas Canal (situated in the study area; see Map 10) is one of the many canals studied in the SDB. It includes all associated canals such as the Badulla, SAPREF and DIA canals. Each canal in the SDB has an Accelerated Greening Management Plan, which is ongoing.

The Umlaas Canal is one of the largest of the canals in the SDB. The land uses adjacent are generally industrial and open space. However, there is also residential land near the vicinity of the canal. The landowners are Airports Company South Africa (ACSA), Mondi Ltd and the eThekweni Municipality (see Zoning Map, 12; Institute of Natural Resources, 2007).

Map 12: Umlaas Canal zoning



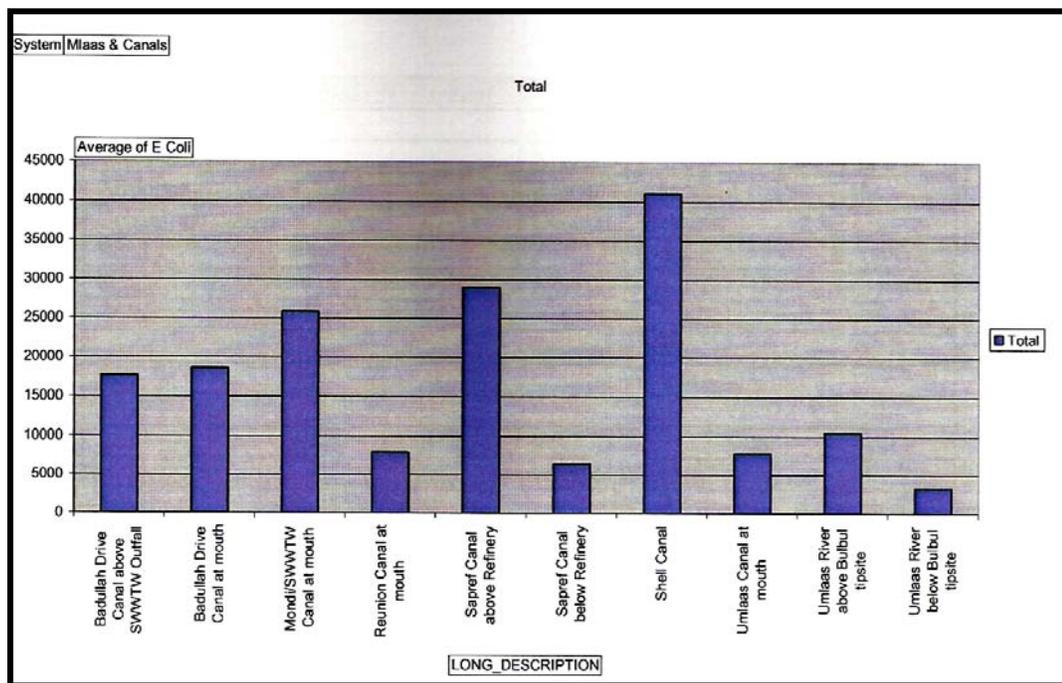
Source: Institute of Natural Resources (2007)

The Accelerated Greening Programme report analysed rivers and canals in various categories. Some are listed below, as are the findings for the Umlaas Canal:

a) **Present Health Status**

The Umlaas River is highly modified with very little cover and structure for aquatic organisms. Certain estuarine and fresh water fish species such as the Longfin Eel require obstacle-free migrations to and from the sea for various phases of their life cycle. The Umlaas canal does not allow this to happen as it is highly polluted with insufficient habitat and cover to allow safe passage to and from the sea. The water quality is very poor. Figure 4 shows a range of pollutants in these systems (Institute of Natural Resources, 2007).

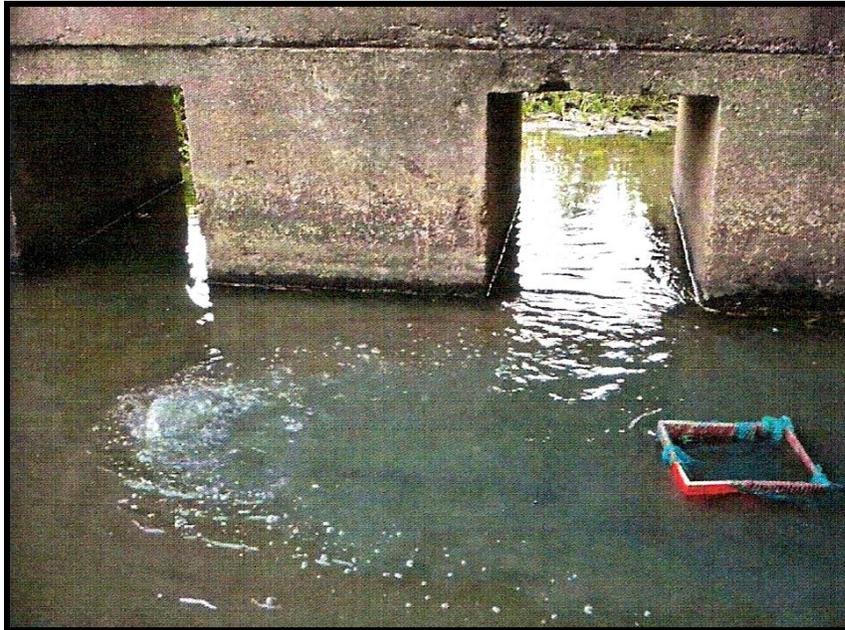
Figure 4: Umlaas River system- Water quality in and adjacent to the SDB



Source: Institute of Natural Resources (2007)

Photograph 48 shows raw sewerage plumes infiltrating into the Umlaas River at the concrete canal. A water sample collected from the geysers confirms the presence of raw sewerage with over 280 000 counts of E.Coli recorded at the site (Institute of Natural Resources, 2007).

Photograph 48: Geyser erupting from cracks in the Umlaas Canal



Source: Institute of Natural Resources (2007)

b) Management Priorities

Management priorities as recommended by the Institute of Natural Resources, include fixing the main sewer line under the M4 road bridge, which is discharging raw sewage directly into the Umlaas River. This issue remains outstanding for over a year, although the practice used in Cape Town can be utilised here. This involves investigating the possibilities of “softening” the hard surfaces of the concrete canal to introduce more biological elements and restore connectivity with the ground water in this area. It will allow greater nutrient and biological processing and improvement to the functioning of the river, and ultimately make it possible for this important “aquatic corridor” to reconnect with the sea (Institute of Natural Resources, 2007).

The implementation of the Accelerated Greening Project project is on hold, due to the lack of quality water supply in the river and canal system. The plan of action is to look at improving water quality, which is been done through the catchment management process set up by the Department of Water Affairs and Forestry (DWAf).

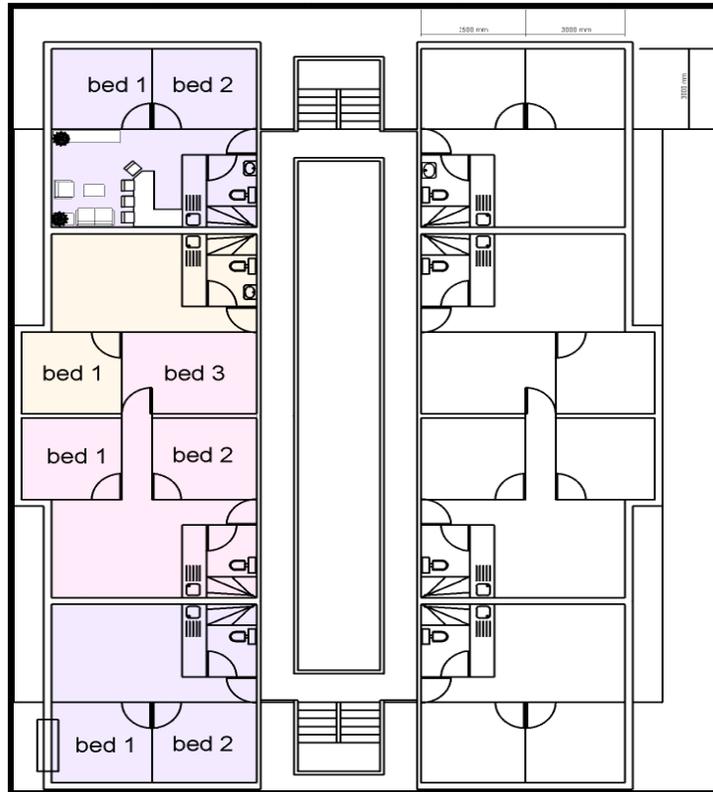
5.3.4 Tara Road Housing Project

The aim of the Tara Road Housing Project is to address the adverse living conditions of the Rainbow Gardens Housing Scheme and to replace it with a green belt. Rainbow Garden is situated on Tara Road. A meeting was held in 2002 with the Housing, Land and Human Resource Committee of the eThekweni Municipality, to make the Tara Road Housing Project a lead project within the South Industrial Basin (eThekweni Municipality and Engen, 2005). The intention is to relocate residents to Lansdowne Road. This is a 1.3 hectare site and is approximately 5 kilometres from their present location. It was decided that the City's Steering Committee will lead the process with Engen Refinery. The existing conditions are extremely poor (see Photographs 21,23,24). There is inadequate lighting, lack of ventilation, structural defects, lack of privacy, and non-compliance with National Building Regulations and Public Health by Laws (eThekweni Municipality and Engen, 2005).

Overcrowding is prevalent (see Photograph 22). There are social problems of alcohol and drug abuse, and current situations could favour the spread of communicable diseases. In addition, the possibility of harm befalling the residents during a major incident occurring at Engen is a real possibility. In order to address these issues as mentioned, it was decided to relocate residents to Lansdowne Road. This would be in line with Engen's vision of providing social and environmental benefits; and especially Engen's policy of being a 'provider of solutions' and a 'good corporate citizen' (eThekweni Municipality, 2003).

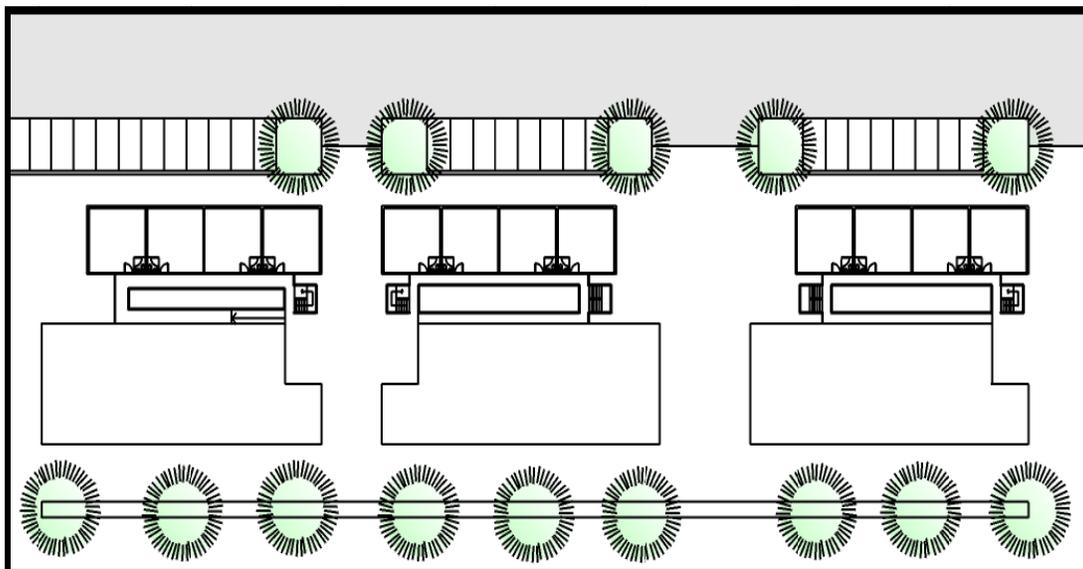
Engen has offered to pay half the funds to build the necessary housing units as proposed by Metro Housing. There will be three types of units, all able to accommodate existing family situations. Figure 5 shows the different type of unit layout. It will be affordable, and will include four flats per floor, in 2/3 storey units, with 12 units per block. There will be 3 blocks on site with 3 people per flat, which equals 36 people per block (eThekweni Municipality and Engen, 2005). Figure 6 illustrates the block layout, and Figure 7 shows the proposed housing design.

Figure 5: Proposed unit layout



Source: eThekweni Municipality and Engen (2005)

Figure 6: Proposed block layout



Source: eThekweni Municipality and Engen (2005)

Figure 7: Proposed housing design

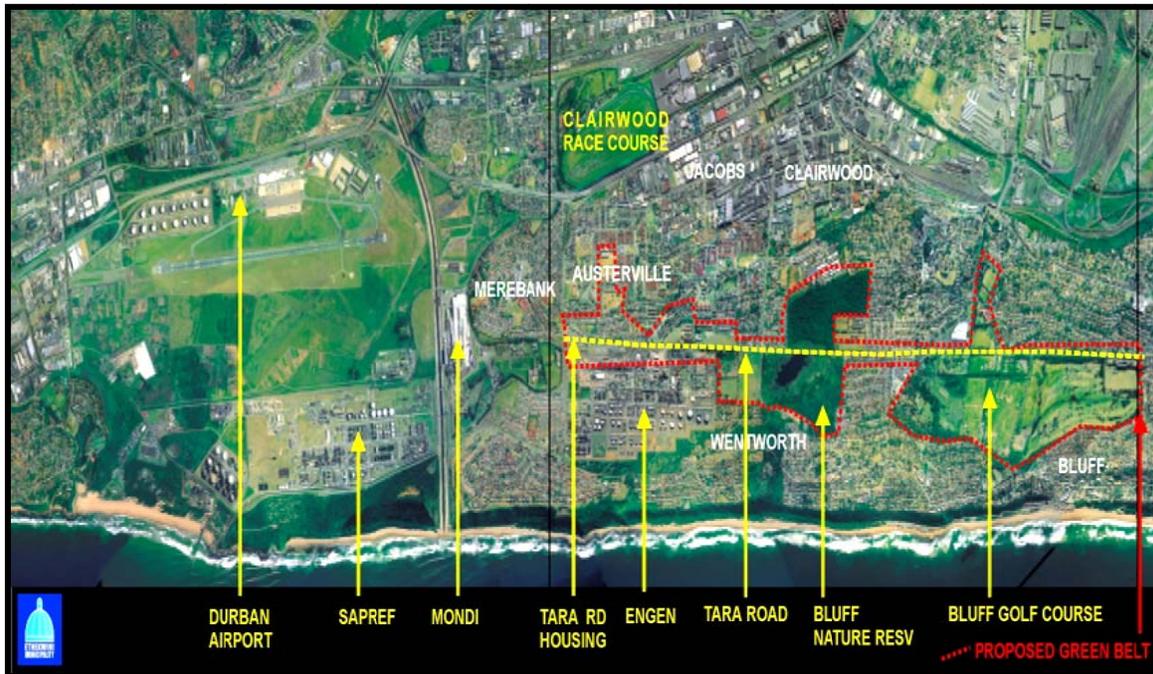


Source: eThekweni Municipality and Engen (2005)

According to a proposal by ANTS Unlimited Development (2003), 110 houses will be constructed. During the development phase 50% of the local Black Economic Empowerment (BEE) contractors, from the community, will be utilised (ANTS Unlimited Development, 2003). Once the relocation is completed, the proposed green belt can be built. This will commence along Tara Road and extend approximately 200 metres. The proposal will cost an estimated R10 million. It will result in cleaner air. Figure 8 illustrates the proposed green belt.

The Tara Road Housing project is currently at a standstill as there is confusion between the municipality and residents at Rainbow Gardens. Residents were promised duplexes but the municipality prefers to build flats, with either 6 or 8 units. Residents are not in favour of flats and sectional title units; instead individual title units are preferred (Engen Spokesperson, 2008). In addition, residents outside Rainbow Gardens are involved in the project, which residents at Rainbow Gardens find inappropriate. When these issues are resolved, there will be a signed agreement, after which the building can commence (Engen Spokesperson, 2008)

Figure 8: Proposed green belt in the South Durban Basin



Source: eThekweni Municipality and Engen (2005)

5.4 Summary

This chapter was divided into two parts which included, recent urban design interventions and projects currently being completed. The aim of the chapter was to authenticate the use of urban design to address different problems identified in Merebank (Chapter 4). Section 5.2 (recent urban design interventions) proved that not all urban design interventions are successful, however 6 of the 9 interventions identified were highly successful in addressing the problem. The successful urban design interventions were as follows: rock boulders were used to prevent pavement parking; proper pedestrian and vehicular access at the Merebank taxi rank prevented traffic congestion and possible risk to pedestrians; the boardwalk separated two plant species from encroaching on each other; the cycling/jogging track ensured pedestrian safety; high mast lighting ensured security at Calicut Place; landscaping and paving addressed the untidy appearance of Merebank; and the landscaping intervention at SAPREF created an appealing outlook for the refinery. The least successful interventions were the outdoor exercise facility; landscaping around Engen and the Punjab Circle upgrade project. Although these were least successful, additional interventions can turn the project into a success. As discussed thicker denser landscaping around Engen will make the project more of a success; building speed humps and moving the post and rail

barrier outside the cycling/jogging track at Punjab Circle will ensure pedestrian safety and prevent parking. The privacy and weather constraints of the outdoor facility cannot be helped nevertheless it is a facility that is used.

The 3 main projects in section 5.3 (projects currently been completed) are SAPREF Projects; Cuttings Beach-Urban Regeneration Project; Accelerated Greening Project and the Tara Road Housing Project. The Cuttings Beach Urban Regeneration Project illustrated excellent examples of urban design intervention via the design of streetscape elements; sidewalks; street lighting; seating, benches, and bus/taxi shelters; public art; trash receptacles and bollards. The Accelerated Greening Project is a means of addressing environmental issues to restore business confidence, renew investor issues and improve the quality of life in Merebank and other areas. The focus is on the upgrade and management of all major canals in the South Durban Basin. The Tara Road Housing Project addresses the living conditions at Rainbow Gardens. Relocating the community into a better living space with proper housing addresses the social problems discussed.

This chapter has shown how urban design interventions have been used to alleviate adverse conditions. Although not all interventions are entirely successful, most are effective and serve the purpose for which they were intended. The future/proposed interventions seem to be well designed and planned, and address social, landscaping, and housing issues. However they will have to be tried and tested if their success or failures are to be evaluated. The next chapter is the concluding chapter of the dissertation; it summarises the findings thus far, and makes recommendations.

CHAPTER 6

Potential Urban Design Strategies

6.1 Introduction

This concluding chapter is divided into two sections. The first section sums up the findings in response to the research aims and subsidiary research questions. The second section makes recommendations on the issues expressed in Chapter 4. The suggestions/recommendations reported in this chapter have been made by all target groups during interview and questionnaire sessions. However, it must be mentioned that not all suggestions, especially those made by CBOs and community residents, are based on urban design interventions. Although neither group has a professional background in urban design or town planning, it is still important to include their ideas. These target groups make suggestions to address most of the major issues that urban design cannot achieve alone.

The Town Planner and Urban Designer, Markewicz (2006) strongly believes that urban design interventions alone cannot result in better living conditions. He explains that, urban design can only do as much as physical intervention; it is important to know the role and function of something before design, as “form follows function” (Interview with Markewicz, 2006). Theron (Cape Town, Planner and Architect) also agrees that, urban design is the “cohesive glue that pulls daily life together” (Interview with Theron, 2006). Other aspects such as community participation and government policies are fundamental aspects that make urban design interventions effective. There is a need to meet social, environmental and political requirements. Keeping this in mind, below are possible interventions for the issues affecting the quality of life in Merebank.

6.2 Summary of Findings

The apartheid policy and modernist planning models shaped the development of Merebank. Due to these historical events, residential areas were segregated according to race groups and situated around polluting industries. Despite these historical events, Merebank has a growing population of 20 560 people. Economic activities range from heavy and light industrial manufacturers, to professional and

retail businesses. Merebank is well-equipped with adequate and appropriate infrastructure, which accommodates commercial and residential uses. According to household interviews, Merebank is rated as a satisfactory living space.

As a result of historical events many factors contributed towards adverse living conditions in Merebank. These factors include pollution; verges and landscaping; canals; safety and security; social issues; roads, rail, and traffic, and planning. Urban design interventions have improved many of these conditions in Merebank, as discussed in Chapter 5. Understanding the urban design concept, principles and other dimensions of urban design discussed in Chapter 2 and looking at the recent and proposed urban design interventions (Chapter 5) it is evident that urban design initiatives can change adverse living conditions. This verifies the hypothesis.

6.3. Recommendations

While Chapter 4 recognised the problems affecting the living conditions in Merebank, Chapter 5 discussed the existing and proposed urban design interventions addressing these problems. This section makes recommendations on the issues not addressed, and specifically to those urban design interventions that did not work well. It also makes suggestions on issues that have not been addressed in the previous chapter. Recommendations conveyed throughout this chapter have been made by all target groups.

6.3.1 Pollution

a) Noise Pollution

Achieving aural richness is only possible in spaces large enough for people to escape from the sound sources, as mentioned in section 2.2 (f). This would be hardly possible for Merebank residents as the Durban International Airport is in such close proximity to the area. Merebank is also in the direct flight path, which means that residents would not be able to escape the noise, even if they were to move to neighbouring Bluff or Prospecton.

Residents and built environment specialists believe that the only way to curtail noise pollution is to relocate the airport. This is set to happen in the first quarter of

2010, as the airport will be relocating to Durban North. Proposals have been made by the Department of Trade and Industry to make the land available to petrochemical industries. Residents objected to this and instead recommended that the land be used for a mix of light environmentally friendly industries, market gardening, or residential purposes (SDCEA, 2006).

To avoid disturbances caused during refinery operations, all target groups suggest industries should invest in modern machinery to replace machinery that is old and noisy. A thick landscape around industries will absorb sounds and reduce the noise impact. Alternatively, built environment specialists and industries recommend that residents on the fence line of industries relocate further away.

b) Air Pollution and Water Pollution

An all-encompassing reduction plan may minimise emissions produced by industries, aircrafts, vehicles, spillages, and pipeline leaks (SDCEA, 2006). In addition, parties responsible for pollution should develop rehabilitation projects, to address affected areas (SDCEA, 2006). These projects should be mandatory and enforced by government. Government can also play its part by making provisions for a substantial budget to promote and plan renewable energy sources and energy efficiency. This should be linked to the Multi-Point Plan and the Permitting Plan with regard to the phasing out of dirty fuels. All new development must be encouraged to use clean and/or renewable energy sources as well as adopt energy saving plans (SDCEA, 2006).

The Multi-Point Plan (MPP) for the SDB was endorsed in 2000. The aim was to provide an improved and integrated decision-making framework for air quality management at local government level, and to move towards a reduction in air pollution to meet health-based air quality standards. One of the outcomes of the plan is the air quality monitoring station, which monitors the air for toxic chemicals. A monitoring station has been set up at Settlers Primary School in Merebank (Chetty, 2004). With reference to section 2.2 (f), a sense of smell (or olfactory experience) can be achieved by moving away from one place to another. This is possible only in relatively large areas. Merebank, unfortunately, is not a large area;

even if it was, it still would not make much difference, as it is surrounded by industries.

The MRA launched the Environmental Project Unit to address air pollution in Merebank. This organisation acts as a watchdog for the community, reporting on flaring and chemical spills to authorities in charge. An educational action plan was developed to promote a clean and healthy environment. The target groups include the Bombay Walk Shopping Centre shop owners, other retailers and professionals, schools, and industries (light and heavy). The organisation recommends that residents mobilise themselves to initiate similar projects.

6.3.2 Verges and Landscaping

a) Verges

To avoid verges turning into dumping sites, built environment specialists recommended that verges be well-landscaped with thick shrub or flower beds. Residents and businesses should be encouraged to adopt-a-spot (look after verges). This campaign ensures that verges are kept clean and well maintained. 'No dumping' signs and fines should be erected as a means of deterring culprits. Government should make adequate funding available to ensure that verges are kept tidy. Residents recommend that local people be hired, which will create employment and cut added government expenses like transport costs. An arrangement like this will guarantee that verges are supervised and maintained.

b) Landscaping

Landscaping is a useful tool, which can be used to address many issues such as noise pollution. Built environment specialists suggest the planting off thick dense vegetation around the edge of light and heavy industries. This will help absorb disturbances caused by machinery and other operational equipment. Landscaping provides an aesthetically pleasing outer appearance, cleaner air, and a sense of place. Adequate landscaping can also protect houses and buildings from becoming flooded during heavy rains, by means of absorbing excess water.

6.3.3 Canals

The Badulla Canal has a dual purpose it channels water to the sea, and is a common route for commuters. Built environment specialists therefore recommend

the beautification of the outside of the canal, and development of recreational amenities. A cycling and jogging track can be built and equipped with lighting for people who often use this route. Vegetation can be planted to create a soft edge creating an aesthetically pleasing look.

Planting the right type of vegetation will keep the canal clean and eliminate the breeding of mosquitoes and snakes. To curb canal littering, educational programmes are pivotal, and should be targeted at residents, retailers and schools that are closest to canals. Visible fines and 'no dumping' signs are excellent measures as well (Built environment specialists, 2006).

Trash traps can be used in canals to stop litter before it enters pipes causing it to clog (Photograph 49). Trash traps act like sieves catching the dirt, allowing only water to escape. Once the dirt is separated from the water, it can be easily removed and disposed.

Photograph 49: Trash trap (not in Merebank)



Source: City Engineers (2001)

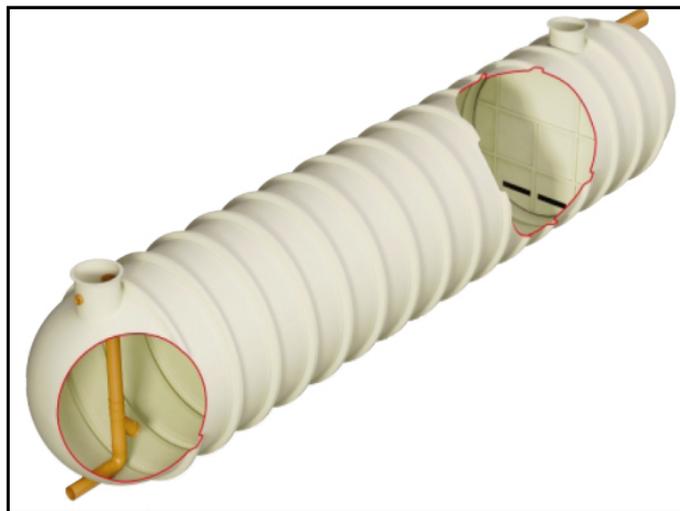
To prevent canals from breaking and cracking, built environment specialist suggest the use of robust material and durable concrete of up to 40 mega pascals (strongest strength). This creates resistance to abrasion from the flow of water. In turn, canals last longer and are more efficient.

High volumes of storm water run-off can be decreased if residents and businesses refrain from hardening green surfaces on their property. Green areas are important as they absorb water. This measure will assist in managing water from backing up and flooding homes, businesses and roads. As per building regulations, only 40% of surface area around homes is allowed to be hardened (Built environment specialists, 2006).

Soak-a-way pits, attenuation tanks and retention ponds are useful measures to limit the heavy flow of storm water systems. An attenuation system works when the peak in flow rate in a storm exceeds the allowed discharge into the watercourse, the excess flow has to be 'attenuated' on the site for the duration of the storm. This is then released at or less than, the allowed discharge rate after the storm (<http://www.klargester.com/products/attenuation/>). To store the excess volume and allow the correct discharge rate to go to the watercourse, a flow regulator is installed to 'bleed off' the correct maximum flow rate. The flow regulator can be a vortex type system or a simple orifice plate system. The remainder of the water is stored in either in-line or off-line, depending on the design.

The In-line Orifice Tank System is an orifice tank plate that works on the principle that the pressure created at a particular head will result in a particular flow based on the head versus hole size (Figure 9). This is simple and inexpensive (<http://www.klargester.com/products/attenuation/>).

Figure 9: In-line orifice tank system



Source: <http://www.klargester.com/products/attenuation>

6.3.4 Safety and Security

a) Safety

Merebank residents and CBO's recommend that well-organised and efficient evacuation procedures need to be planned in the event of unforeseen industrial related accidents. The procedures must make sure that industrial workers and residents on the fence line are protected. Evacuation procedures can be discussed at workshops and meetings between residents and industry representatives. This will ensure that residents know what warning signs to look out for, and what action to follow. Meetings should be held on a regular basis to keep the public abreast of changes in the plan (Built environment specialists, 2006).

To ensure safety in parks and playgrounds, good adequate lighting is essential. Natural surveillance can be achieved by constructing recreational activities opposite houses. Parks should be landscaped with long barked trees, to allow for transparency.

In the case of the Punjab Circle Park, the installation of traffic calming measures like speed humps can reduce pedestrian accidents. Other useful measures are signs indicating that children are at play, and the speed limit around the park area.

b) Security

To reduce criminal activities like household robberies, muggings, rapes and drug use, street patrols are recommended. The Urban Improvement Precinct (UIP) has launched a 24-hour street patrol with security guards on bicycles and in cars patrolling high crime areas. They are equipped with two-way radio systems, which are linked to nearby police stations for assistance. The UIP (2007) recommends that residents organise themselves to initiate similar patrols in their area. Quiet isolated areas like Shillong Lane need to be frequently patrolled. Other security measures include good lighting systems in dark quiet spots. Homes should also be equipped with burglar guards and electronic security systems.

6.3.5 Social Issues

The Community Policing Forum (CPF) has established feeding schemes to alleviate the plight of poverty in Merebank. The CPF recommended that local

residents, businesses and industries mobilise themselves to create sustainable programmes which address poverty. Feeding schemes, grocery hampers, and clothing can assist families in poverty (CPF, 2007).

Job creation and employment are also useful methods. The Merebank Ratepayers Association (MRA) has devised a practical plan to create job opportunities in Merebank. A business directory was published advertising local businesses. The directory was made available to big companies in and around the South Durban Basin, encouraging the use of local businesses in their line of work (MRA, 2006).

To promote businesses in the directory, the MRA administers meetings with human resource departments of various companies. The organisation mediates on behalf of businesses, researching the requirements needed to take on jobs offered by surrounding companies. The MRA assists local businesses to obtain relevant documents so that they may operate as legitimate entities. Businesses are also guided on bidding for tenders. In addition to this, industries facilitate businesses with basic book-keeping and other relevant entrepreneurial skills.

All physical developments (like the Tara Road Housing Project) in Merebank should aim to utilise businesses and local residents during their operation. For long-term, projects residents can be trained with relevant skills required for the project.

Thus far, practical recommendations addressing pertinent issues have been made. Most recommendations require manpower to be executed. In these instances unemployed residents may be hired as informed speakers to educate the public on how to maintain a clean and healthy environment; landscaping; cleaning and maintaining verges, parks, canals, and public facilities. Residents may be employed as security guards, nurses, or work for organisations engaged in projects addressing poverty issues.

The UIP has initiated a 24-hour clinic project, which aims to deal with pollution-related illness like asthma and skin-related diseases. Medical personnel are recruited or members of the public trained to address emergency incidents. Clinics

are not built; instead, particular homes are equipped with the resources to handle emergency cases.

a) Public Facilities and Housing

To ensure that public facilities are clean, safe and up-to-standard, built environment specialists suggest that residents take ownership. Local organisations should be encouraged to act as watch dogs ensuring that places like Badulla Sports Ground, Calicut Place and Cuttings Beach are safe, in good working condition and presentable.

In an attempt to address the housing congestion in Merebank, built environment specialists recommended the development of flats. An increase in rates will pay for better infrastructure and amenities. Upgrading Merebank in this sense will encourage outside investors to invest in the area, hence increasing the property value (Built environment specialists, 2006). There is no visual richness especially for those houses looking into industries such as Engen Refinery, SAPREF, and Mondi. It was hence suggested that urban designers plan with a theme in mind. Ideas need to blend in with the character of the area, for example using steel lighting structures to complement the industry outlook.

To ensure that the relocation of Rainbow Gardens is successful and effective, community participation is important. Residents should be consulted at all phases of the development to make sure that the development suits the needs of the owners (CBOs, 2006). Once the project is complete and residents take occupation, built environment specialists suggest that body corporates are formed. Through maintenance guidelines, principles and standards, body corporates can ensure that the spaces in and around dwelling units are clean and tidy to avoid a repetition of the present Rainbow Garden situation.

6.3.6 Roads, Rail, and Traffic

a) Roads and Traffic

Built environment specialists recommend that the upgrade of pedestrian routes such as widening of the pavement will ensure pedestrian safety and more order on

the roads. A new parallel economic activity street with north to south linkages that integrates into the CBD and reduces congestion and conflict of residential and industrial traffic, can be done (Iyer Routaug Collaborative, 2004). New east to west linkages will improve mobility and create a lattice of opportunity here (Iyer Routaug Collaborative, 2004). Landscaping and the upgrade of major movement routes is necessary. Rail transportation can be encouraged as an alternate system within the SDB, incorporating the upgrading and development of stations (Iyer Routaug Collaborative, 2004).

The Government's legislated transportation programme must include the promotion of non-polluting/renewable transportation. Government must allocate funding for the development of this infrastructure. Heavy-duty trucks should be banned from certain routes and their access to other routes should be restricted. For example, some roads would only be opened to heavy-duty trucks at specific times of the day (Built environment specialists, 2006). Investigations into new modes of transporting goods need to be undertaken. Canals with small floating crafts can be used instead. Government should be improving and maintaining the current roads, as potholes also cause traffic congestion (Residents, 2006).

b) Rail

Surrounding industries recommended building a fence on either side of the rail route as a measure to minimise household robberies. Bus systems need to be devised so that they link into other forms of public transport, such as rail. Government needs to develop proper rail infrastructure and related services for people and goods, and to encourage and subsidise the use of rail. The number of trucks on the road needs to be reduced, and a shift to rail should be considered. No new development should be allowed that would significantly increase the use of trucks on the roads (SDCEA, 2006).

6.3.7 Planning

A guiding framework should be provided for future planning, in terms of a broad intent for particular areas (Iyer Routaug Collaborative, 2004). Residents recommend that meaningful participation and transparent processes should take place, involving all interested and affected parties in development plans.

Elected ward councillors need to be present and available during disputes between developers and residents (Residents, 2006). Councillors should develop a programme based on the needs of the community, in conjunction with the community. This programme will stipulate the kind of development projects residents favour.

Residents recommend that many things need to be done to create a sense of place. Government needs to get its house in order and start to enforce all existing legislation, and monitor all development. The municipality needs to be more effective in ensuring that the zoning by-laws of the various areas within the SDB are adhered to by industries (SDCEA, 2006). Pollution needs to be reduced through enforcement and sanction. The 'polluter pays' principle needs to be utilised. Chemical and oil spillages from tankers and pipes should be prevented, and offenders must be prosecuted. Industries need to invest in modern machinery and methods to reduce oil spills and toxic emissions.

In addition, residents implore politicians, officials, business people and consultants to respect community input and engage meaningfully with communities before handing out large documents. To capture community knowledge in their documents and include communities in planning future development; place the needs of people before profits and include the community as part of the solution and not the problem. And to protect all present green lungs such as the Clairwood Racecourse, airport land and all environmentally sensitive areas and parks, for present and future generations.

When people or businesses decide to further develop their premises, building plans need to be properly analysed making sure that they abide by building regulations. It is essential that the required percentage of land is greened, which allows for water absorption.

6.4 Conclusion

This chapter provided informed recommendations to factors affecting the quality of life in Merebank. In summary it was recommended that the relocation of Durban International Airport would decrease noise levels, in addition industries should

invest in modern machinery which are quieter, and thicker landscape should be planted around all industries to absorb the noise impact. In terms of air and water pollution it was recommended that parties responsible for pollution should develop rehabilitation projects for the damaged caused by operation, like the Multi-Point Plan. It was also recommended that residents mobilise themselves to initiate projects or watch groups to monitor and report environmental issues.

To avoid dumping on verges it was suggested that verges be well landscaped with thick shrub or flower beds, residents should be encouraged to adopt-a-spot which allows them to care for vacant spaces and “No Dumping” signs should be erected. Thick landscaping around the edge of the Engen and SAPREF refineries help absorb operational noises. This also makes the refinery look aesthetically pleasing, contributes towards cleaner air and creates a sense of place. Adequate landscaping also absorbs excessive rainwater which prevents houses from flooding. In terms of the canal, built environment specialist recommend that the external area of the canal should be beautified and developed with recreational amenities as it is a popular commuter route. Planting the right type of vegetation will keep the canal clean; educational programmes are important to educate children about the dangers of playing in the canal and other target groups about the hazards of dumping. Dumping fines can also help curb the dumping problem and trash traps are an excellent tool for separating the garbage from water. To avoid canals from cracking and breaking, built environment specialists recommend robust material and durable concrete up to 40 mega pascals. Built environment specialists also suggest soak-away pits, attenuation tanks and retention ponds to assist in limiting the heavy flow of stormwater systems.

To curb the safety issues, residents and built environment specialists suggest that efficient evacuation procedures need to be planned and regularly discussed at public meetings keeping residents informed should a dangerous situation arise. At parks and playgrounds, measures to ensure safety include good lighting, building recreational activities opposite houses, planting long barked trees, traffic calming measures and sign posts indicating children are at play. In terms of security all target groups suggest street patrols, good lighting systems especially in barren dark alleys, burglar guards and electronic security systems. To address the social

issues expressed all target groups suggested feeding schemes, job creation and employment such as the MRA's business directory. Looking at public facilities and housing, built environment specialists suggest that residents take ownership to ensure that public facilities are clean, safe and up to standard. To address housing congestions built environment specialists recommended the development of flats and an increase in rates for better infrastructure and amenities. Planners also need to plan with a theme in mind, one that captures the concept of Merebank and the lifestyle of residents. To ensure the success of the relocation of Rainbow Gardens, community participation is imperative as well as an active body corporate. This will ensure that living spaces are safe, secure and clean at all times. To address the issues of road and traffic built environment specialists suggest the upgrade of pedestrian routes, new parallel economic activity streets, landscaping and upgrading of major movement routes, encouraging rail transport, promotion of non-polluting/renewable transportation, introduction of stricter by-laws restricting heavy and light vehicles to different routes and the investigation into new modes of transportation goods.

In terms of rail issues built environment specialists and residents suggest building a rail on either side of the rail route to minimise house robberies, bus transportation systems need to link with other forms of public transport like rail. To address poor planning built environment specialists and residents suggest a guiding framework for future planning, meaningful community participation and transparency, ward councillors should develop a program based on the needs of the community, to create a sense of place government needs to enforce all existing legislation and monitor all development. The 'polluter pays' principle needs to be adopted to curb pollution, industries also need to invest in modern machinery.

Finally, it is important to bear in mind that urban design initiatives alone cannot change the living conditions in Merebank. The suggestions/recommendations made above support this assertion. Equally important is the timeframe, as some interventions can be put into effect immediately (such as traffic calming measures), whilst others (such as legislation) take some time before being enacted. There is no doubt that the analysis of adverse conditions in the Merebank area and existing

and new urban design interventions will continue to command attention in the future.

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- Gammage, A Urban Designer and Town Planner. Durban
- Glanville, J Architect, Urban Designer, Planner. Durban
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Appendix A

Heavy and Light Industries in South Durban		
*Heavy Industries are highlighted in red and Light Industries in yellow		
Company	Location	Nature of Business
1. ABE Prospecton		
2. AECI Operating services	Umbogintwini	
3. Albany Bakeries Ltd	Mobeni	Bread
4. Alpha Stone & ReadyMix (Coedmore plant)	Bellair	Stone and Readymix Concrete
5. Alpha Stone & ReadyMix (Isipingo plant)	Prospecton	Ready mix Concrete
6. B B Cereals Pty Ltd		Cereals
7. Bayside Distillers	Jacobs	
8. Bayer (SA) (Pty) Ltd	Merebank	Chrome tanning salts
9. Beacon Sweets	Mobeni	Sweets
10. Beier Wool Pty Ltd	Isipingo	Clean and Process Wool
11. Bev Can Durban	Mobeni	Beverage Cans
12. BLENDCOR (SHELL & B.P.)	Island View	Lukee oil (Blending plant)
13. Blue Ribbon	Mobeni	Cake flour
14. Caltex Oil SA (Pty) Ltd	Island View	Refinery (Oil Blending)
15. Castrol SA (Pty) Ltd	Island View	Lubricant (Blending Plant)
16. Chemical Specialities (Pty) Ltd (Adhesives; oleo; resins)	Rosburgh	Water based adhesives; oleochemical products; resins
17. City Steam Laundry	Jacobs	Washing of garments
18. Coates Bros. SA Ltd	Isipingo	Printing inks; resins can coatings
19. Cookson Chemicals (Pty) Ltd	Jacobs	Metal oxides; phosphates; stearates; phosphites; sulphates; carbonates
20. Colas East (Pty) Ltd	Jacobs	Bitumen, Hydrochloric Acid and Bitumous Emulsions
21. Corruseal Packaging Industries Pty Ltd	Prospecton	Manufacture of corrugated Cardboard
22. Courtaulds Textiles SA Pty Ltd	Rosburgh	Textiles
23. DEFY Industries / DEFY Appliance Prop	Jacobs	Make appliances
24. DIVPAK	Mobeni	Tin plate and aluminium cans for paint; fuels; polish and aerosols
25. Divpak - Paper products	Jacobs	Manufacturing papers in form of cores and ink

26. Downtown Dry Cleaners	UMBILO	Dry cleaning
27. Drum Services	Jacobs	Drum reconditioners (200l)
28. Dunlop Slazenger	MOBENI	Rubber manufactures
29. Dunlop Tyres Pty Ltd	Durban	tyres
30. Durban Bulk Shipping	Island View	Handle stuff on conveyer belts
31. Durban Clothing Manufacturers	MOBENI	Formal Menswear
32. Durban Fibres (HOECHST)	JACOBS	Manufacture of polyester
33. ENGEN Petroleum LTD		Refiner oil
35. Enviroserv Medi-Waste (Pty) Ltd	Prospecton, Durban	Medical waste incinerator
36. F.F.S. REFINERIES	Jacobs	Refinery
37. Feltex Automotive Components	Jacobs	Woollen fel, Cotton wool, Automobile Carpets, Heat and sound insulators
38. Ferron Engineers	Jacobs	General Engineering
39. Frame Textile Corporation-Textfin Mill	MOBENI	Textiles
40. Genrec Engineering - Elgin Works	Bayhead	Steel fabricollers
41. Gwyneira Textiles	Jacobs	Bleaching and dyeing of fabrics
42. Hermes Laundry Works CC	Maydon Wharf	Industrial Laundry
43. HOECHST SA LTD	Mobeni	
44. Island View Industrials Ltd	Jacobs	Manufacture of polyurifarus
45. Javellin Trucking	Prospecton	Trucking company
46. Kenprint	Jacobs	Fabric Dyers
47. KING EDWARD VIII HOSPITAL	Congella	Hospital
48. Kingsdale Steam Laundry	Mobeni	Laundry
49. LEVER BROTHERS/Unifoods	Maydon Wharf	Foods
50. M.B.Glass	Prospecton	Glass Containers
51. Microsteel (Pty) Ltd	Prospecton	Stainless steel Billitts
52. Mondi Paper Co Ltd	Merebank	Paper
53. National Sorghum Breweries- IJUBA	Congella	Breweries
54. NATYRE (Pty) Ltd	Mobeni	Manufacture of car tyres
55. NCP Isipingo	Isipingo	Cement
56. Non Ferrous Metals		Metals
57. Paperkem (Pty) Ltd	Jacobs	Paper size and paper improvers
58. Plascon Paints		Paint
59. Premier Milling	Umbilo	Wheat and Maize Milling to flour

60. Quality Products Pty Ltd	Jacobs	Soap Personal Products
70. Reckitt & Colman	Mobeni	Pharmaceutical Chemicals
71. Revertex Chemicals SA (Pty) Ltd	Mobeni	Chemicals
72. Robertsons Trade Marks Pty Ltd	Prospecton	Bovillon cubes, Soup powders
73. S A Breweries Ltd	Isipingo	Breweries
74. S A S K O Pty Ltd	Mobeni	Flour production
75. S.A.CLOTHING INDUSTRIES LTD	Mobeni	Clothing
76. SASOL FIBERS	Reunion	
77. SCI (Pty) Ltd	Mobeni	Industrial Chemical and Foods
78. Shave and Gibson	Mobeni	Printing and packaging
79. Shell & Bp SA Petroleum Refineries	Prospecton	Oil Refinery
80. Shell SA (Pty) Ltd Chemical Division	Reunion	Epoxy resins; detergent alkylate; solvents
81. Smith C G Sugar Ltd (Illovo Branch)	Merebank	Alcohols and Bv Products (Industrial) Dexoan, Lactose
82. Suncrush Ltd	Jacobs	Coca cola Bottlers
83. Tanker Services	Jacobs	Trucking products
84. The Port Engineer- Bayhead Truckwash		Port Engineer Design
85. The Van Dyk Carpets Company	Reunion	Carpet Manufacture
86. Tongaat Hulett Sugar Refinery	Rosburgh	Sugar
87. TOTAL SA (Pty) Ltd	Island View	Lubricants Blending plant
88. TOYOTA Automotive Components	Jacobs	Motor Vehicle Components
89. TRANSWERK	Durban	Repairs on train, blacksmith and foundry
90. Ulster Carpets	Reunion	Caperts manufacture
91. UNITRANS Natal	Clairwood	Transport organic liquids
92. Van Ommeren Tank Terminal South Africa (Pty) Ltd	Island View	Tank farm
93. Wayne Rubber company (PTY) LTD	Prospecton	Manufacture of rubber products
94. Wentworth Hospital	Wentworth	Hospital

Source: Chetty (2008). Department of City Health

Appendix B

Household Questionnaire

Respondent #: _____

Area: _____ Rd name: _____ House number: _____

1. Gender	a) male	()	b) female	()
2. Age category	a) 20-40	()	b) 41-60	()
	c) 61+	()		
3) Head of household		()	Spouse	()
4) Occupation				
5) How long have you lived in the area?				
6) Are you happy in your living environment? Reason				
7) Do you have a sense of pride about your area? If yes why? If no Why?				
8) How would you describe your physical environment?				
9) What do you think are the major problems in the area?				
10) How long does it take you to reach the following facilities? How do you get to these facilities? What does it cost you to get there?				

Facilities	Frequency of use	Time taken	Mode of transport	Cost
Library				
School				
Clinic				
Community hall				
Post office				
Municipal office				
Parks				
Playgrounds				
Work				
Corner shop				
Convenience store				
Shopping centre				

11) In terms of design, how safe do you think are the routes to the following: for children to walk to on their own? For example are there zebra crossings marked, enough street lights, minimal levels of traffic etc.

a) parks and playgrounds

b) shop

c) schools

d) library

e) friends

12) Are they in good working condition?

Parks

Playgrounds

Community grounds

13) What do you think are the physical aspect/s in the area that needs to be changed

or improved upon?
14) What other changes do you think should be made?

Appendix C

Community Based Organisations- Interview Questions			
1. Personal information:			
Name			
Tel:	F:	E-mail:	
Organisation			
Position			
No. of years experience in this position			
2. How long has your organisation been established in the area and what do you do? Number of people involved?			
3. Information on organisation:			
a) number of people who participate in activities			
b) where do you meet			
c) how often do you meet			
4. What do you regard as the major issues affecting the quality of life in the Merebank area?			
5. What initiatives have you undertaken to address these and how well as it worked?			
6. What interventions do you think should be implemented in addressing these problems?			
7. What would make your work more effective? ie:			
a) funding			
b) venue for meetings			
c) participation			
d) other			

Appendix D

Industries – Interview Questions			
1. Personal information:			
Name:			
Tel:		F:	E-mail:
Profession			
Company			
Gender			
Position			
No. of years experience			
Do you live in the area?			
2. Looking at the current situation in the Merebank area what do you think are the environmental constraints?			
3. How does this negatively impact on production?			
4. What needs to be changed? Do you think urban design can solve all problems? Do you have suggestions?			
5. What complaints have you lodged to the municipality and what has been done about it?			
6. Does your company embark on a greening strategy? What have you done to enhance the built environment?			

Appendix E

Built Environment Professionals- Interview Questions

1. Personal information:
Name
Tel: F: E-mail:
Profession
Company
Gender
Position
No. of years experience
Do you live in the area?
2. Looking at the current situation in the Merebank area what urban design interventions do you think may contribute towards better living conditions?
3. What is needed to ensure that these interventions are sustainable and effective?
4. What indicators should be used to measure success and failure?
5. Do you think that urban design interventions alone will result in better living conditions? Motivate your answer.
6. What other interventions can improve living conditions?
7. Other comments concerning the topic?