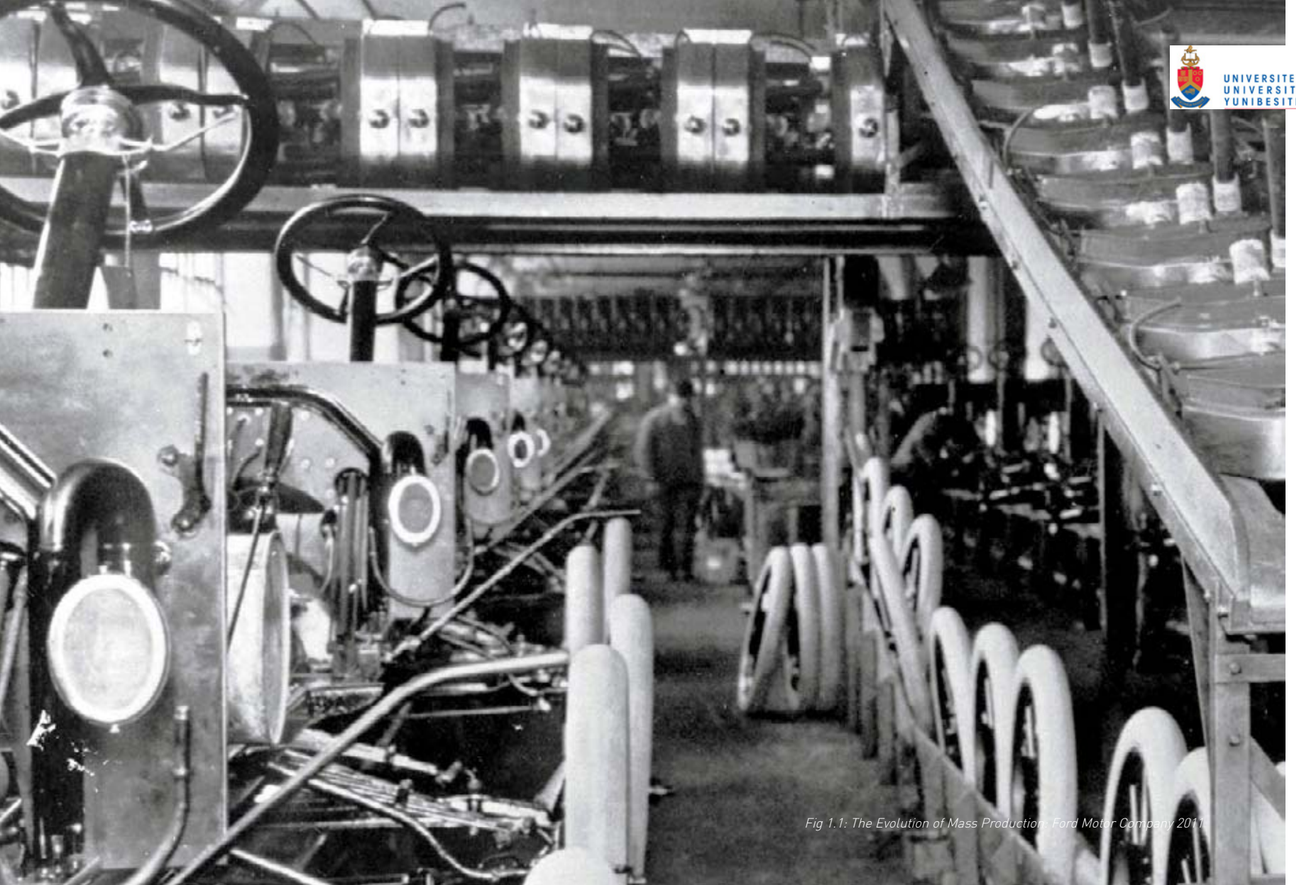

Fig 1.1: The Evolution of Mass Production, Ford Motor Company 2011

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01 introduction

Fig 1.2: Impact of the Car, Image Collage by Author 2011

"We have experienced it ourselves, and suffered it almost to the point of self-denial: the car is a destroyer of our cities, an enemy of traditional architecture. And no wonder, for when the car was born those cities were geared to the dimensions and speed of an oxcart, and not in the remotest prepared for the dynamism of the motor car. This encounter between archaic immobility and an impetuous longing for forward movement has not been without its consequences. The car threatens and disturbs/destroys our habitats. We do not defend ourselves: indeed - and this is where we have a screw loose, because we adore it - the car is one of the habitats we love most. To tell the whole truth: it is the Golden Calf of modernity. We have surrendered ourselves irredeemably to automobility. And one thing is clear: for a very long time to come, our societies north and south, east and west, will neither want nor be able to exist without the car, but only with it. What might peaceful coexistence look like?"

Dirk Meyhöfer, 2003: 8

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1.1 Background

One of the most relevant topics for urban planners in the past century has been traffic planning. Many historic cities in Europe and the oldest cities in America developed complex, irregular street patterns, shaped by the connection between urban growth and topography, and densely populated zones where housing was integrated with commerce and industry. These cities consisted of pedestrians and horse-drawn carts and carriages (Diefendorf, 2000: 175).

With the turn of the nineteenth century, industrialization brought a new dimension to transport in the form of railroads. Momentarily it seemed that rail transport was perfect for moving people and goods into city centres, which facilitated the development of urban sprawl.

However, the development of traffic planning in cities was transformed by the mass production of automobiles for private use from the 1920's. The low cost of automobiles, access to fuel and individual freedom influenced this transformation. Soon, automobiles started to compete with other modes of transport within the city (Diefendorf, 2000: 176).

Two opposing themes became evident: the desire to serve the automobile, and the desire that their use be subordinate to other needs within the city (Mumford, 1963: 548). Despite the planning, the number of automobiles in urban environments and the need for parking spaces has increased exponentially. In order to accommodate increasing automobile use, an infrastructure of motorways was constructed to provide direct access to city centres (Siemiatycki, 2010: 828).

Lower density developments started to emerge on the periphery of cities, resulting in better accessibility to commodities for the larger share of the population (Siemiatycki, 2010: 828).

According to Gerrit Jordaan (1989: 28), the growth of Pretoria is an example of peripheral development, where highway systems have been forced into the urban structure of the city. The vast portions of land used for suburb development towards the eastern boundaries of Pretoria are a result of the ease of transport. The focus has shifted from the historic city centre to new suburbanized developments, and changes in individual transport are the origin.

Traffic infrastructure is an integral part of the city; mobility cannot be separated from the urban environment. The ubiquity of automobiles has resulted in the importance of finding ways/methods to regulate the motor vehicle industry.

e: 'Running on Empty' Assembly Lines (Savaus 2010)

Fig 1.4. Disposed Cars: (N(

1.2 Problem statement

Today's society is increasingly dependent on disposability.

According to some accounts, more than 90% of materials used in the end-product of durable goods in the United States become waste almost immediately, with the product itself sometimes scarcely lasting longer (Braungart and McDonough, 2009: 27). Everything else is designed for you to throw away when you are finished with it. But where is "away"? Of course, "away" does not really exist. "Away" has gone away (Braungart and McDonough, 2009: 27).

Waste has become the social text on which a community's logic and illogic can be evaluated. The continual growth and expansion of cities has resulted in, amongst other issues, an increasing amount of automobiles in urban areas.

With an average life-span of 10 years, automobiles in South Africa are discarded due to accidents, mechanical problems, financial issues and the need for new models (Statistics South Africa, 2010). The discarded automobiles, depending on the condition, are either traded or resold, repaired for further use, stripped for parts, or end up as waste in the outer skirts of the city.

The industrial community of Pretoria West consists largely of local businesses specializing in different fields of vehicle maintenance. However, the vast majority of automobiles and materials taken from automobiles are left to decay, and regarded as useless.

The high embodied energy put into a motor vehicle during production, together with all the CO_2 emissions during its lifecycle need to be addressed by sustainable processes when getting rid of old and abandoned automobiles; possibly by reusing and recycling the different materials and parts.

"In spite of the urban highways, motor vehicles still clogged city streets, killed drivers and pedestrians in accidents, fouled the air, and claimed precious space for new roads and parking."

(Diefendorf, 2000: 177)

Fig 1.5: Industrial VS Residential (mle8

1.3 Aim of Study

The aim of this study is to investigate the relationship between architecture, automobiles (technology) and people – the connection between the social and industrial realm.

New systems and technologies housed in industrial architecture gave birth to the mass production of automobiles. It is the responsibility of architecture (design) and technology (process) to facilitate the manner in which end-of-life automobiles are put to rest. The unsustainable manner in which the industrial production process is currently operating will be addressed.

Ivan Illich (1973) explored the connection between technology and industrial production, looking at how both can serve people rather than dominate them. The systems and technologies which create waste can be harnessed to ensure sustainable growth.

This study aims to act as a catalyst to transform Pretoria West as a productive precinct of the City of Tshwane, where waste disposed of is reused and recycled making the city more sustainable and environmentally friendly.

Consolidation between economical (industrial) and social (residential) hierarchies can be reinstated and reorganised, resulting in a mutual benefit for both.

"Once these limits are recognized, it becomes possible to articulate the triadic relationship between persons, tools and a new collectivity"

(Illich, 1973: 5)

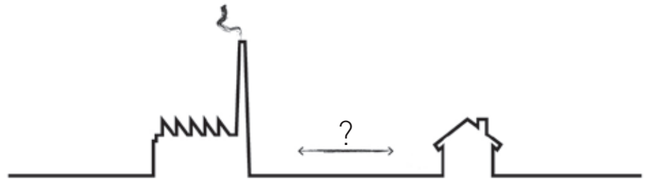


Fig 1.6: Connection between Industrial and Residential realm, Illustrated by Author 2011

1.4 Urban Context

Background:

Pretoria West was established in 1890s as a suburban residential area. Many of the Voortrekkers who rejected the idea of a farm in the Transvaal and preferred a large stand in close proximity to the city started settling in Pretoria West. Subsequently, an influx of farmers from the countryside entered the city. The residential area of Pretoria West, then called Goede Hoop, developed quickly (Pretoria News, 1996: 8).

Today Pretoria West is characterized by industrial activity, scrap yards, and impoverished citizens; it is dangerous, noisy and neglected. The growth of the area resulted in the urbanisation of Pretoria West. Critics, who commented on this issue, preferred the area with its rural character, parks and race course (today, Pretoria Show Grounds) (Jordaan 1989: 28)

Pretoria West underwent industrial growth with the establishment of Iscor (Pretoria News, 1996) in the area. Goede Hoop soon became the home of many industrial and railway employees and their families, and the need for housing increased.

The availability of transport via railway lines encouraged industrial growth and consequently the connection between industry and social programs was separated. The gradual conversion in character of Pretoria West has resulted in a low density residential area dominated by industry (Pretoria News, 1996: 8).

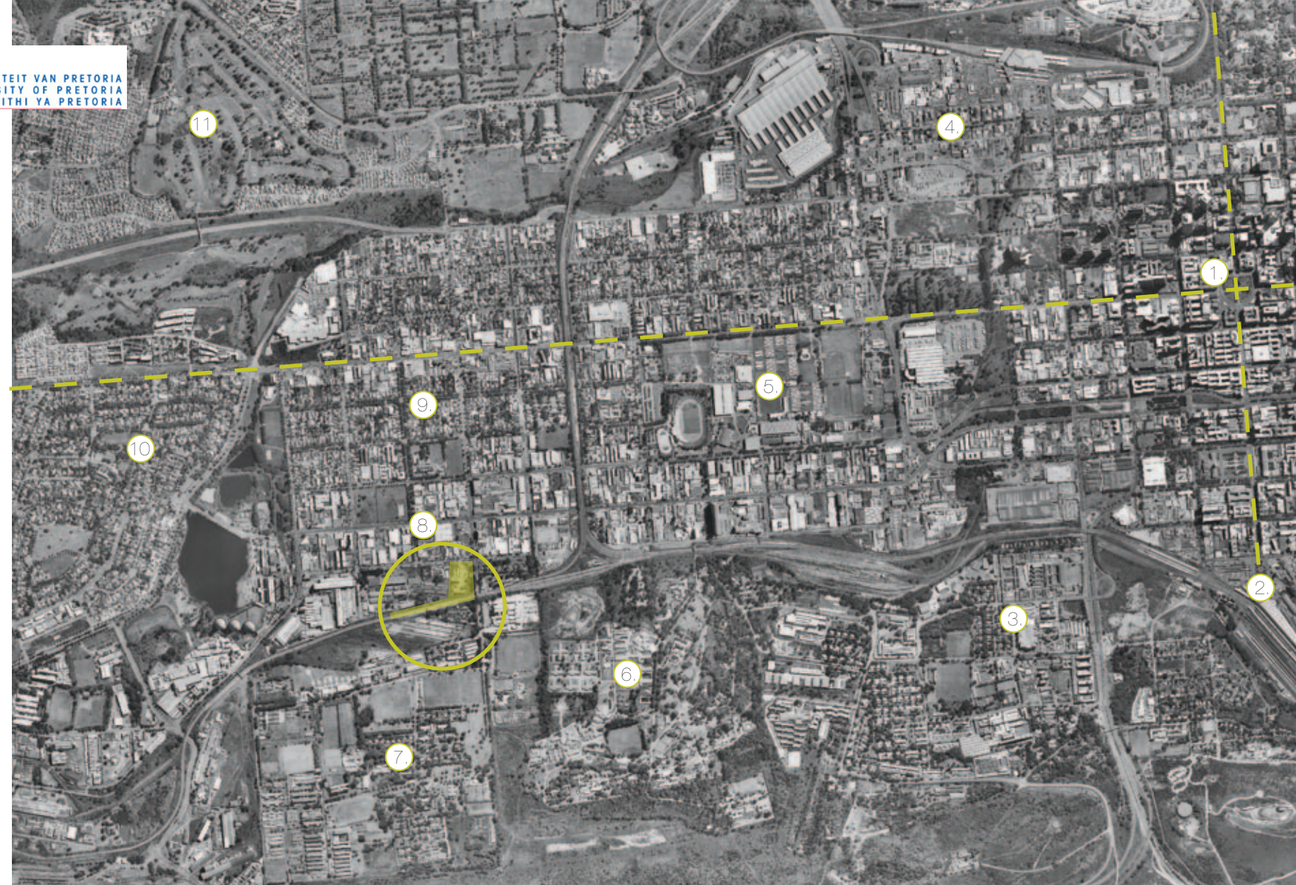
Due to the close proximity to Pretoria's CBD and connection with major public transport modes, Pretoria West could be regenerated as a whole, restoring the relationship between industry and social activities.

Map Legend: Pretoria (Oppisite Page)

1. Church Square
2. Pretoria Main Station
3. Pretoria Military
4. Marabastad
5. Pretoria Show Grounds
6. Weskoppies Mental Hospital
7. S.A.P.S Training Facilities
8. Pretoria West Industrial
9. Pretoria West Residential
10. Proclamation Hill
11. Pretoria West Golf Course

Proposed Study Area

Fig 1.7: Aerial photo of Pretoria West in context to Church Square: City of Tshwane Municipality, Edited by Author 2011



1.5 Site Selection

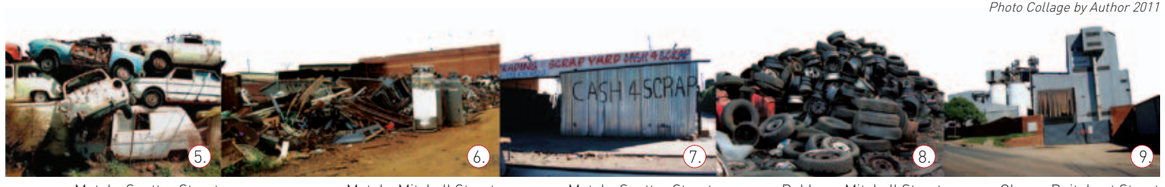
The City of Tshwane is cluttered with growing amounts of waste and dump sites, especially in areas that are poorly developed and disconnected from the city. The spectrum of waste types can often be a reflection on how a community treats its surroundings.

The industrial area of Pretoria West consists predominantly of small, car-related businesses like panel beaters, scrap yards, parts shops and mechanics, as well as open lots filled with disposed automobiles. Vacant spaces in the area have become dumping/storage sites for abandoned automobiles. While new automobiles are introduced to the city, these 'graveyards' overflow with unused material. Pretoria West consists of various types of dumping and technical harvesting sites where materials can be obtained from.

Fig 1.8: Dumping Sites in the Pretoria West Precinct
Photo Collage by Author 2011

Proposed Site - Rebecca Street | Open Lot in Servaas Street | Park in Mitchell Street | Open Lot - Car Street

Fig 1.9: Technical Harvesting Sites in the Pretoria West Precinct
Photo Collage by Author 2011



Metal - Soutter Street | Metal - Mitchell Street | Metal - Soutter Street | Rubber - Mitchell Street | Glass - Buitekant Street

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Fig 1.10: Precinct in context with Pretoria CBD. City of Tshwane Municipality, Edited by Author 2011

(position of dumping & harvesting sites in context)

1.5.1 Resource Sites:

The identified sites in the surrounding precinct can serve as sites of resource for recycling. The unused materials on these sites should be sorted and taken through the necessary processes in order to be reused.

The resource sites form part of the research discussed in Chapter 4: Context

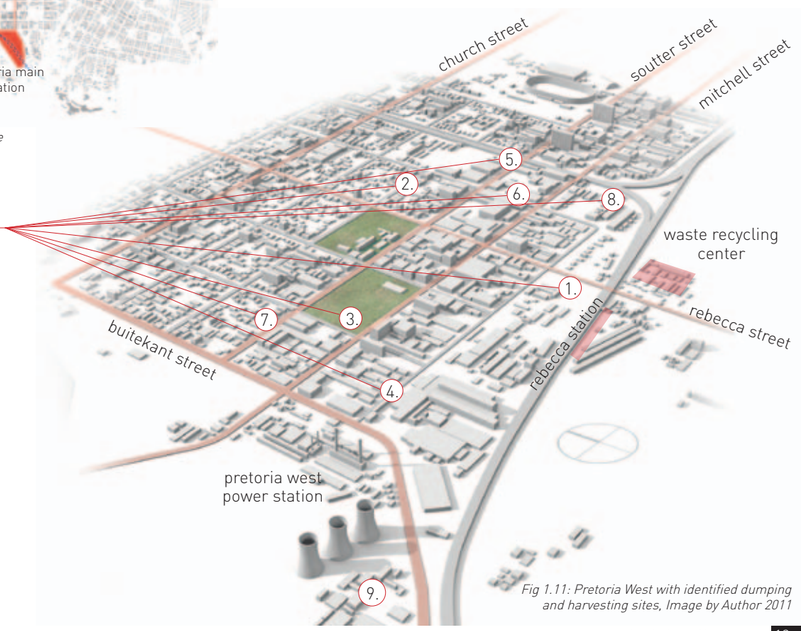

Fig 1.11: Pretoria West with identified dumping and harvesting sites, Image by Author 2011

1.6 Site Introduction

The study area is located in the predominantly industrial area of Pretoria West. The site is situated on the corner of Rebecca Street and Carl Street, which is bordered by the railway line to the South, connected to Rebecca Station. The study area also includes the surrounding residential and industrial precincts of Pretoria West.

Potential:
- Economic and urban regeneration
- Connection between social and industrial activities
- Can allocate a new identity to Pretoria West as a sustainable industrial area of The City of Tshwane
- Formalize recycling in the area of Pretoria West
- Creation of new job opportunities for semi- or un-skilled individuals
- Existing small businesses in the precinct can form part of the recycling/re-using process, creating a community based project
- Promotes emerging development, focused on sustainability
- Recycled and re-used materials can be redistributed into the surrounding community

Delimitations:
-Author will rely on the expertise and knowledge of an industrial engineers to determine disassembly process. The spatial requirements for these processes will be considered throughout the design of the plant.

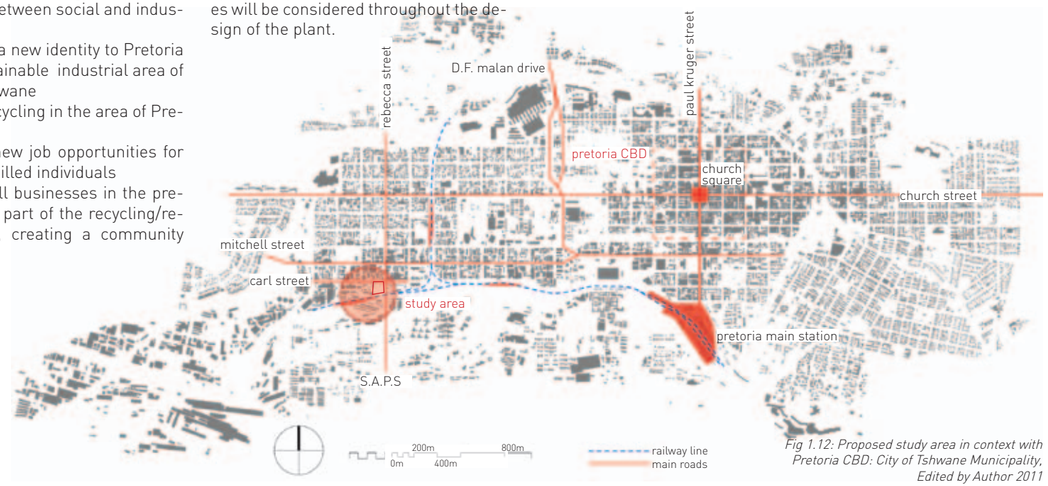

Fig 1.12: Proposed study area in context with Pretoria CBD: City of Tshwane Municipality, Edited by Author 2011

Fig 1.13: (Opposite) Proposed site in context to study a City of Tshwane Municipality, Edited by Author 2011

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Map Legend: Study Area (Opposite Page)

1. Proposed Site
2. Old Houses (Protected by Heritage Act)
3. Railway Storage
4. Municipal Mixed Waste Facility
5. S.A.P.S Gate
6. Old Train Shunting Yards
7. Rebecca Station
8. Dilapidated Warehouses
9. Department: Water Affairs
10. Public Green Space

a. Soutter Street
b. Mitchell Street
c. Carl Street
d. Ct Street
e. Rose-Etta Street
f. Rebecca Street
g. Zeller Street
h. Railway Line

1.7 Automobile Statistics

In order to substantiate the real-world problem concerning the amount of unused automobiles in the City of Tshwane, a study of the automotive industry, worldwide and in South Africa, will briefly be discussed.

The estimated global population in the year 2009 stood at 6.6 billion people, with 50% of these living in urbanised conditions. The projection of these numbers to the year 2050 estimates a population size of 9.2 billion people, of which 71% will be urbanised (UN FOA 2009).

With the majority of the global population starting to flock towards urban areas, the need for transport and the supporting infrastructure will increase exponentially.

It is estimated that over 750,000,000 passenger automobiles are on the roads of the world today, and this number is predicted to reach the 2 billion meter mark by 2030. The amount of automobiles produced around the world, stands at an alarming 150,000 units per day, with South Africa producing over 220,000 passenger vehicles and 150,000 commercial vehicles per year (IOCA. [sa]).

Human demand for resources has passed unprecedented heights. In the light of the following statistics it has become evident that drastic plans need to be formulated to reduce the amount of waste produced by the automotive industry.

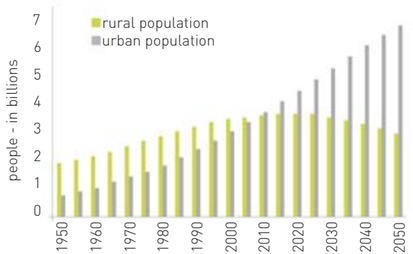


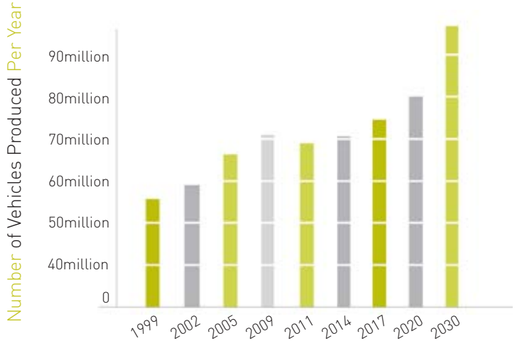
Fig 1.14: Urbanization of the population. Statistics adopted from UN FOA 2009

Fig 1.15: If 2 billion cars were parked bumper-to-bumper, they would encircle the Earth over 200 times. Illustrated by Author 2011

Fig 1.16: N1 Freeway Passing Midrand, Johannesburg: Axel Bührmann 2009

1.7.1 Growth of Production

worldwide



1.2b

Estimated number (in billions) of passenger cars around the world by 2030 (estimated around 750million in 2011)

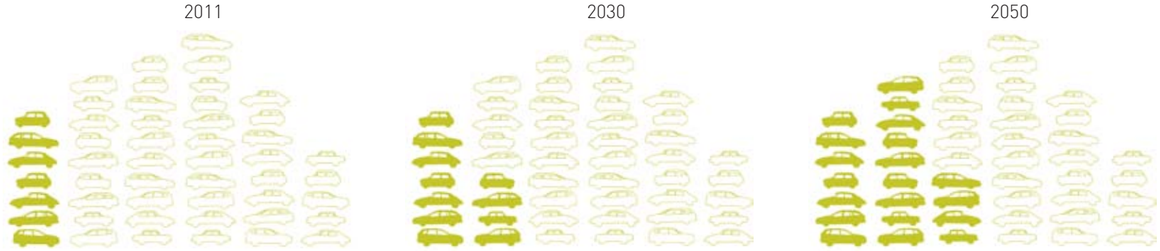
62.5%

Estimated increase in the amount of passenger cars in the next 20 years

Fig 1.17: Growth of Production Worldwide - Passenger Cars: (OICA 2011) Illustrated by Author 2011

1.7.2 Growth of Ownership

south africa



146 motor vehicles per 1000 people

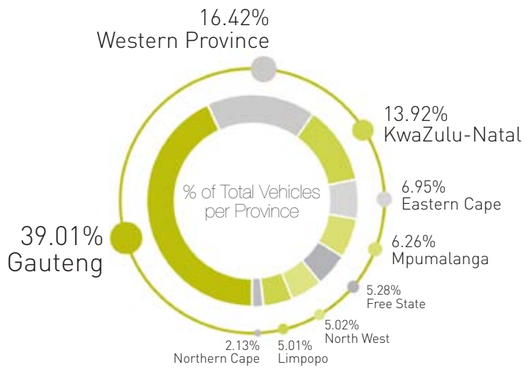
200 motor vehicles per 1000 people

380 motor vehicles per 1000 people

Fig 1.18: Number of Motor Vehicles per capita in South Africa: Statistics South Africa 2010, Illustrated by Author 2011

1.7.3 Number of Vehicles

south africa



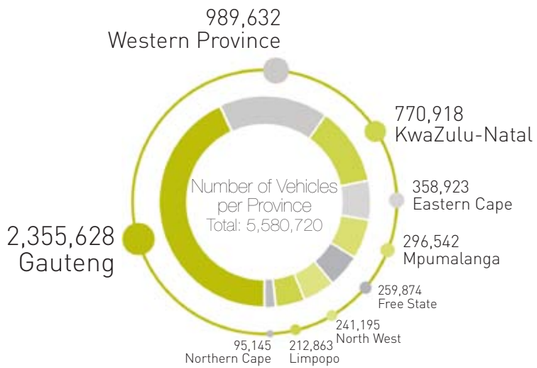
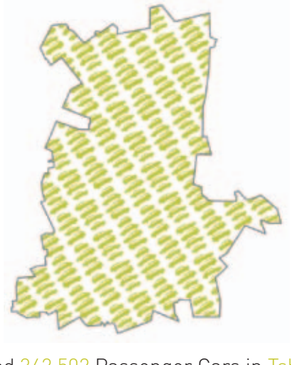


Fig 1.19: Number of Vehicles and Percentage per Province [Statistics South Africa 2010] Illustrated by Author 2011

1.7.4 Vehicle Statistics

city of tshwane



Estimated 342 502 Passenger Cars in Tshwane

4.5% cars dis[car]ded

that is: 15 412 disposed cars Per Year in Tshwane

Fig 1.120 Vehicle Statistics - City of Tshwane [Statistics South Africa 2010] Illustrated by Author 2011

1.8 Hypothesis

Automobile manufacturers take little responsibility in producing a product that is environmentally sustainable. At its deepest foundation, the industrial infrastructure we have today is linear: it is focused on making a product and getting it to a customer quickly and cheaply without considering much else (Braungart and McDonough, 2009: 26).

This linear process results in manufacturers producing automobiles which are not designed to be disassembled and which are constructed from a wide spectrum of materials. This increases the problem of disposal of end-of-life automobiles which is left to the private sector.

However, taking a cradle-to-cradle approach to how we use materials (as well as looking at waste as nutrients for the future), creates a production process that forms a closed loop; an industrial ecosystem.

A cyclical production process, enforced by governing bodies (NAAMSA – National Association of Automobile Manufacturers of South Africa), would result in the development of automobiles that are easy to be disposed of, recycled and disassembled. The production and dismantling processes would be seen as equally important. Emergence takes place when novelty and creativity acts in response to change: New organizations form through emergence and this need to be designed. It is a cyclical, progressive and non-linear process, emerging exponentially (Hamdi 2004: 115).

Automobile manufacturers would want people to turn in their old automobiles in order to regain valuable industrial nutrients, instead of waving industrial resources good-bye as the customer drives off in a new car, never to enter the dealership again... Designing products as products of service means designing them to be disassembled (Braungart and McDonough, 2009: 114).

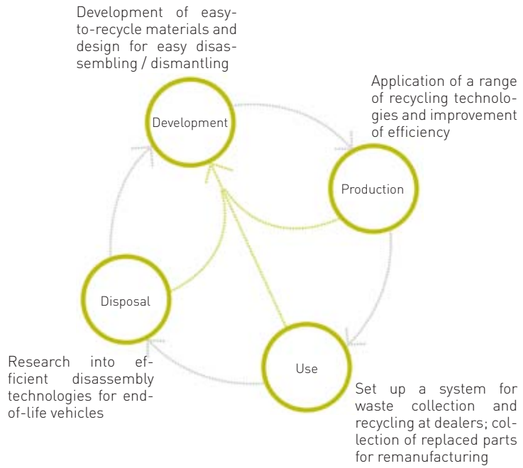


Fig 1.21: Cyclical Production process - Industrial Ecosystem, Illustrated by Author 2011

Fig 1.22: Dissection of a VW Beetle - Installation by Damian Ortega (wbur.org 2009)

1.9 Methodology

A brief summary of different modes of data collection will be listed in order to gain a better understanding of the context and the proposed framework of this study. These methods inform the critical issue that this dissertation aims to address: connection between the social and industrial realm.

Due to the nature of the proposed project and the connection with the railway line, mapping plays an integral part of the methods used for data collection in terms of movement and access.

Mapping: The layering of different relating patterns to reach an understanding of the context of Pretoria West - comparing the quantitative with the qualitative. The capturing of data consists of the following different techniques:
Psychogeographical & Drifting – The Situationists International;
Study of Cognitive Maps – Kevin Lynch;
Map Layering – Bernard Tschumi.

Participant Observation: The aim of this method is to get involved in the activities with a hands-on approach, but at the same time, stepping back to observe and reflect on the different aspects of the situation (which is in contrast to the Situationist approach). The observer should attempt to record the information in an objective manner, distinguishing between information which can be used and that which is useless.

Systematic Observation: This form of observation is space and time specific, where the space, users, programs, time and objects are identified by means of observation and examined – discovering the social patterns between these elements.

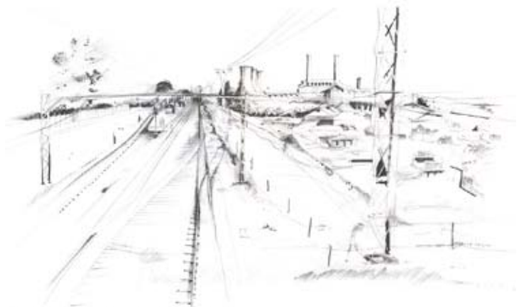


Fig 1.23: Station Mapping in Pretoria West, Illustrated by Bertus van Sittert 2010

1.10 Client & Brief

Client:
National Association of Automobile Manufacturers of South Africa (NAAMSA) member of, and in association with, the International Organization of Motor Vehicle Manufacturers (OICA).

Client Background:
OICA is the governing body of the international automotive industry. Automobile manufacturers worldwide must adhere to regulations specified by OICA. The focus of the organization over the last five years has shifted to the sustainability of the industry and how today's automobiles are designed. New regulations regarding the different types of materials as well as the disassembly and recyclable properties of materials have been put into place by OICA.

The local association, NAAMSA (a member of OICA), is responsible for enforcing these regulations in South Africa.

In a joint operation, these two organizations aim to provide vehicle disassembly plants to support the new regulations.

Funding: OICA

Brief:
The role of the architect is to assist the client in selecting an appropriate site and designing a vehicle disassembly plant which will focus on the treatment methods of and solutions to end-of-life automobiles.

Programmes:
- Research and development
- Waste management
- Public education and awareness
- Sustainability

Fig 1.24: International Organization of Motor Vehicle Manufacturers (OICA 2010)

Fig 1.25: National Association of Automobile Manufacturers of South Africa (NAAMSA 2010)