

To **reimagine** the integration of **public transport**
with high-density neighbourhoods.

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University of Cape Town

Dissertation Report

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To reimagine the integration of public transport with high-density neighbourhoods.

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20 October 2015

This dissertation is presented as part fulfillment of the degree of Master of Architecture (Professional) in the School of Architecture, Planning and Geomatics, University of Cape Town

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Preface

I had relied on a car for transport up until the end of my school years (age 18) in Cape Town, South Africa. A gap year took me to Oxford, England, where I did not get in a car for a year.

Six years on, currently in my Masters in Architecture year at UCT, I choose to study public transport in Cape Town. The reason for this, is because there is public life to be experienced when using public transport and moving by foot. If affordable, the car is the most convenient way to travel within the sprawl of the city. If the car is unaffordable, people commute long distances and spend a large percentage of their income on public transport. There is an increasing contrast between the wealthy and the poor.

There is a plan for the upgrade of public transport in Cape Town. This paper seeks to understand the current physical, social and economic structure of the city, specifically in the area of Delft, in order to put forward a design proposition. There is a need for the social and economic divide to continue to be addressed. I ask the questions, *what are the transportation networks in Delft and how can a transport interchange contribute to a sense of place.*

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Abstract

Transport is the network that moves people between places. It provides a means of access and opportunity. Transport routes in Cape Town have become expansive due to urban sprawl. There is an unjust spatial economy due to modern and apartheid planning. Poorer urban residents live far away from places of opportunity and are forced to travel long distances and spend a high percentage of their income on transport.

Minibus taxis are the mode of transport best able to provide a flexible and on-demand service within this sprawling urban form. Public transport interchanges remain largely undeveloped and undesirable places. The concept of transit-oriented development (TOD) has the ability to transform these undesirable places into neighbourhoods of intensified mixed-use development, offering convenience, access and amenities to people who use the transport interchange or live nearby.

The project involves the analysis of the transportation network in Delft, a rapidly transforming settlement 21km from the inner city of Cape Town. Although the settlement is located far away from the historic city core, its main road follows an important desire line connecting Khayelitsha, a dense working-class neighbourhood and Belville, an important economic node. This has led to significant densification along Delft Main Road and people turning their homes into shops. Some 600 minibus taxis service the area because there is no high capacity train line or bus rapid transit (BRT) route.

The project is sited within an important civic node in Delft and is well located to the R300, N2 and Symphony Way (regional roads). Taxis currently hover on the side of the street due to the people count in the area. The design is a public transport interchange and mixed-use - retail, residential and commercial - hub, which adopts transit-oriented development principles. The design proposal suggests an urban design framework that responds to the existing context, and a predicted idea of what the neighbourhood could become. It aims to link the existing civic node to the new shopping mall development in a series of streets and active building edges. It responds to the life of the taxi by providing loading, holding, parking, servicing and washing areas. The taxi world evolves around the existing Caltex petrol station and Delft Main Road.

The architecture responds to the current socio-economic context of Delft and how people currently inhabit space. The live-work unit provides flexibility for tenant and occupation mix, whilst contributing to the necessary density of the project. The dissertation explores how transportation can contribute to city building, economic activity and residential densification in an existing underserved low-income suburb.

Introduction

The urban structure of Cape Town is designed for the movement of the vehicle. Transport routes are not only seen as movers of people and goods, but also as networks of economic opportunity (CoCT & TCT, 2013). I am interested in the question of the public transport network in Delft and the how a transport interchange can contribute to a sense of place.

Part I is an analysis of the spatial structure of the City of Cape Town, looking at the current public transport routes, the spatial economy and the plans for the future.

Part II is an analysis of the spatial structure of the Delft, looking at the current transport routes in and through Delft, the economic desire lines, and the plans for the future. Minibus taxis are the dominant mode, and the analysis looks at how they operate and where they operate from.

Part III is an analysis of the intermodal taxi network in Khayelitsha, drawing a comparison between two public transport interchanges (PTIs) – Nolungile and Kuyasa. Nolungile is a vibrant precinct due to the mixed of building uses within close proximity to the train and taxi hub. On the other hand, the recently built taxi rank and retail shops in Kuyasa is currently not in use. There are insufficient residential densities to support the taxi rank.

Part IV is an investigation into the technical and spatial requirements of the vehicle in embracing a vehicle dominated society. The section explores activities within vehicle dominated places, such as ranking, fuelling, washing and servicing.

Part I to IV has informed the location and programme for the design project, which is a taxi depot and mixed-use hub in Delft. The design aims to prioritise development around a transport hub by activating the ground floor with retail activity, and having commercial offices and residential units above. The design responds to Delft Main Road as the main thoroughfare for taxis.

Part V documents the design development process, including: siting, programming, site analysis, the design approach, urban design framework and sketch design.

Glossary

Intermodality - the point of interchange where one transport mode meets another, and the passenger has the option to transfer to another mode, or change direction. (Naude, S. et al. 2005);

Feeder – Short trips within an area to collect passengers and connect them to a high- capacity line-haul service;

Line-haul – Longer route, fewer stops, more efficient and a high passenger capacity to key destinations. Other definitions include, trunk and high order. Trunk routes include dedicated lanes and rights-of-way;

Mode – Movement of people via the train, bus, taxi and bicycle;

Urban node - Points of intensity and urban activity.

Activity corridor – Mixed-use development along sections of a route. Supported by direct access and interrupted movement flows such as, bus and taxi stops;

Development corridor – Greater mobility to the activity corridor. Mixed-use development and high density is nodal, where access is provided at intersections;

Mobility corridor – Serve a mobility and connectivity function, such as, high-order trunk bus and rail routes;

Connector route – smaller roads that connect corridors and residential properties

BRT – Bus Rapid Transit, where buses have dedicated rights-of-way. The MyCiTi bus is providing BRT services;

Typology - classification based on types or categories;

Road - accommodates fast speed transportation and connects places;

Street - serves both the pedestrian and the vehicle;

Support Structure - "Support structures are constructed without a final form in mind. The structure is incrementally completed as it is appropriated overtime. Therefore, it is not in itself a building or a dwelling, but rather an armature which facilitates occupation. The way in which the structure is inhabited determines its programme." (Papier, W. 2012)

Part I

The Problem: **SPRAWL**

Post-modern, post-apartheid, car dominated Cape Town

Transport is the network that moves people between places; it provides a means of access and opportunity. Transport routes have become expansive due to urban sprawl (Cox, 2010). With the introduction of the motor car, it became favourable to live on individual plots of land within suburbs dispersed over the city. With increasing urbanisation, modern and Apartheid Planning sought to separate the city by race (as seen in figure 02). The Group Areas Act (of 1950) forcibly removed people of colour to the periphery of the city (Fataar, R, 2014). There is an unsupportive spatial economy, where the poorer population are separated from the commerce of the inner city. They travel long distances for employment and spend a high percentage of their income on public transport, whilst the people who can afford to commute by private motor car prefer this, due to flexibility and safety concerns.

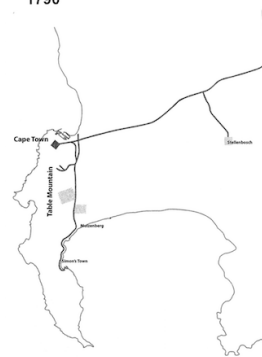
Refer to figure 01 alongside:

The Dutch East India Company established a settlement at the Cape in 1652 as a refreshment station en route the East. What is evident in the evolution of the city between 1790 and 1940, is the growth in settlement east and south of the Cape Town harbour. The settlement is supported by road and rail. Historically, public transport such as horse-drawn carriages, trams, buses and the train, supported the adjacent land-use.

With an increasing population, there is a decreasing density of persons per hectare. With the introduction of the motor car, and modern and Apartheid Planning, the city has become an economically, socially and spatially segregated landscape. Transport infrastructure is expansive: the 2004 map records 39 persons/ha, but public transport subsidy provision will only break even when there are 152 persons/ha, and become profitable with 285 persons/ha (tct.gov.za, 2016).

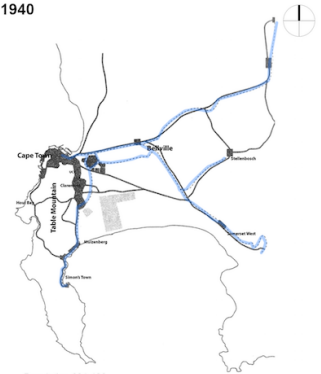
Delft is indicated on the 2004 map. It was established in 1989 to be one of Cape Town's first mixed race townships including 'coloured' and 'black' residents (MLH, 1995). It is a planned settlement approximately 21 km east of Cape Town, and 9km south of Bellville.

Urban Growth
1790



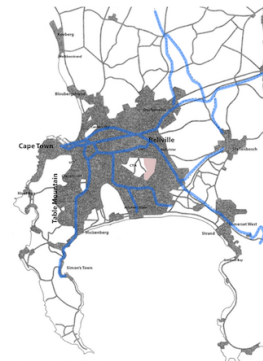
Population 157000
Built 23 sq km
Density 115 persons/ha

1940



Population 631 400
Built 86 sq km
Density 73 persons/ha

2004

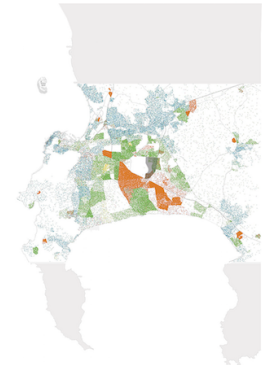


Population 3 000 000
Built 744 sq km
Density 39 persons/ha

Legend:
Farming (light grey)
Urban development (dark grey)
Rail (blue lines)
Delft (grey area)

Figures 01

Population Density by Race



1 dot represents 25 people
Black ● White ● Indian/Asian ● Coloured ●

Figure 02

0 10 20km

Intermodality | Interchange

Intermodality is the point of interchange where one transport mode meets another, and the passenger has the option to transfer to another mode or change direction. Interchanges are important elements of place-making above the need for an efficient transport service (Naude, S. et al. 2005). Due to the pedestrian count within the area of a transport service, there is potential for mixed-use development that includes: retail, residential, commercial and recreational activity.

State of public transport in Cape Town

The four public transport operators in Cape Town are the Metrorail train, Golden Arrow Bus, MyCiTi bus, and the minibus taxi. There is negligible integration between modes, physically and therefore operationally, where there is little transfer at the public transport interchange. Additionally, each service has a separate method of ticketing (CoCT & TCT, 2013). There is no coordination between the bus and the taxi, thus modes travel on the same routes (see figures).

Rail can carry a large capacity of passengers on a fixed line service. There has been an under investment in the service, and in most cases, land around the stations remains undeveloped (Behrens, et al. 2016). The rail map indicates the high demand for rail from the high residential densities of the Metro Southeast to the commerce of the CBD.

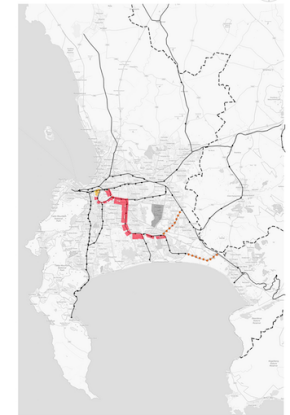
The Golden Arrow Bus service offers fixed routes at scheduled times. The MyCiTi bus is replacing the Golden Arrow bus in phases. It is both a trunk and feeder service, as seen in the completed phase one plan (see figure). There are however, large areas that are not serviced by these fixed infrastructures. Taxis provide a flexible, on demand service between scheduled transport. The industry has established itself within the sprawl in development of the post-apartheid city.

Road Network



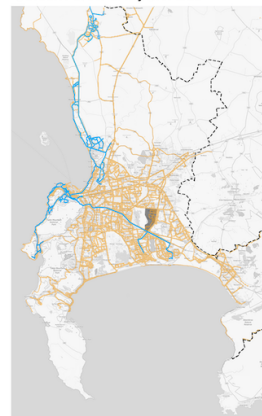
- Regional
- Arterial
- Local
- Deft
- Metropolitan Node
- Local node
- Future road

Metrorail



- Future rail
- High passenger demand

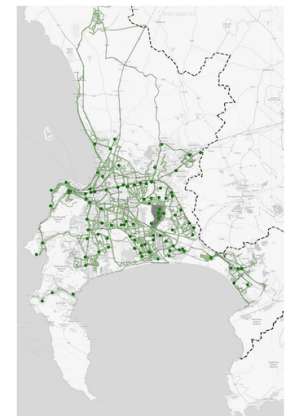
Golden Arrow & MyCiTi Bus



- MyCiTi bus
- Golden Arrow bus

Figures 03

Minibus Taxis



- Minibus taxi route
- Taxi rank

0 10 20km

State of PTIs in Cape Town

Public transport interchanges (PTIs) in Cape Town remain undeveloped, and in most cases the precinct merely functions as a transport service. It is evident in the following images that PTIs are undesirable places. This has a negative consequence on a commuters wellbeing and people avoid travelling during off-peak times for the threat of their safety. There is potential for the unoccupied land to be repurposed into mixed-use hubs. As more people live and work within the proximity of the train stations, there will be an increase in people using public transport.

Maitland train station

People walk alongside a fence to the station



Figures 04

MyCiti bus station

The option to transfer from the train station to the bus, is compromised due to the expansive links.



Observatory Train Station

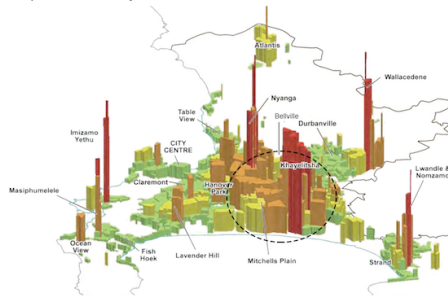
The park and ride facility is a contributing element to the interchange, yet the precinct merely functions as a transport service. This is an undesirable place to walk through at off peak hours.



Spatial economy

A comparison can be drawn between the residential areas (figure 05) and the economic areas (figure 06). In most cases the high residential areas have little economic base. For example, the metro southeast (Khayelitsha, Mitchells Plain and Nyanga) accounts for little turnover even though it accommodates a third of the city's population. Consequently, a large amount of the city's workforce commutes long distances for employment. This is highly inefficient and has substantial social and economic costs (capetown.gov.za, 2010). 25% of turnover is concentrated in the CBD, 43% is generated in the area between Salt River and Bellville and 10% is generated in the West Coast and Southern Suburbs (capetown.gov.za, 2010).

Population density



persons / ha



Figure 05

Economic areas

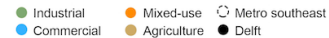


Figure 06

A strategy

Transit Oriented Development (TOD)

It has been realised that there is a need to address the spatial economy of Cape Town. Work opportunities need to be closer to where people live.

Peter Calthorpe, an Architect and Urban Planner in the USA, developed the concept of transit oriented development (TOD) in the 1990's. Through intensifying development around a transport interchange, more people have access to transport services and the precinct becomes an increasing place of economic opportunity and mixed-use activity.

Transit-oriented development can be explained by each word: "transit" (the public transport system); "oriented" (management of the interface between public transport and development, by legal and financial collaborations); and "development" (urban planning that supports public transport) (ACC-CoCT-TOD-Doc 2016). The project requires multiple stakeholders coming together, perseverance, a phased urban framework and a feasibility study on the financial, technical, socio-political and environmental aspects of the project (ACC-CoCT-TOD-Doc 2016). It is a long term strategy to change the space economy of an area and provide sustainable and efficient transport services.

Lee and Cervero (urban planners) did a study on the effect of housing near transit stations on transit trip generation in California in 2007. They use 5 D's to assess the characteristics of TOD neighbourhoods, such as:

- Distance to transit – high quality development within a 10-minute walk (800 metres) to transit;
- Diversity – improving relationships between jobs and housing;
- Net residential density (dwellings/ha) – affordable housing should be included, as well as pocket parks and local streets;
- Design for a walkable and cycle-friendly neighbourhood, with the pedestrian as the highest priority;
- Destination desire lines – people navigate themselves by connected streets, public space and the built fabric.

Benefits of transit-oriented development include:

- Higher quality of life
- Greater mobility with ease of moving around
- Reduced traffic congestion and driving
- Reduced household spending on transportation, resulting in more affordable housing
- Increased foot traffic and customers for area businesses;
- Reduced incentive to sprawl, increased incentive for compact development;
- Greatly reduced pollution and environmental destruction;
- Higher, more stable property values (Calthorpe, P. 1993).

TOD can have an impact on low-income neighbourhoods, but it is more influential in wealthy neighbourhoods due to 'value capture'. The market value of development is enhanced by a transport interchange. An increase in the market value can create more jobs and housing for people with less means. Value Capture is an approach to reusing public funding invested in infrastructure developments for the public good (Clacherty, A. 2011). Municipalities in South Africa have not sufficiently explored the opportunities that exist for creating and capturing value. Opportunities could contribute to funding transport infrastructure, and associated projects such as amenities, low-cost housing and parks.

'Creating and Capturing Value Around Transport Nodes' is a study by National Treasury, Urban LandMark and SA Cities Network, on TOD implementation in low income suburbs. It provides an opportunity to learn how value is created around a public transport interchange (PTI) and what instruments can be undertaken to capture the value for public good. Mechanisms include betterment tax, Business Improvement District levies, developer contributions, zoning tools, joint development agreements, land value increment taxes, air rights and Tax Increment Financing (Clacherty, A. 2011). The Government needs to become responsible for the broader development agenda, and not the developers.

The Gautrain rapid rail project provides an example where TOD projects have been implemented at station precincts. It has been realised that the success of major public transport interchanges depends on their integration with the surrounding urban environment (Dobrovolsky, Marsay, 2007). The Gautrain Management Agency (GMA) is responsible for the coordination between public and private stakeholders for the Gautrain project. They have expressed the importance of policies and preparing local spatial development frameworks for each station. Property developers expressed the importance of supportive policies and incentives, with recommendations on the need to reduce time of building approvals and the possibility for specific financing for TOD property development. There was also a concern that the Gautrain needed to be advertised more (Venter, et al. 2014).

The TOD concept has had a worldwide success in Curitiba, London and more recently the Gautrain project in Johannesburg, explained on the following page.

TOD examples

Curitiba, Brazil (figure 07)

Jamie Lerner, an architect, urban planner and previous mayor of Curitiba, implemented the bus rapid transit (BRT) system in the city. The system uses dedicated lanes and there has been an increase in densification along the main corridor. He makes a comment on his attitude towards the private motor car, "Your car is like your mother-in-law, you have to have a good relationship with her, but you can't let her control your life" (Lerner, J. 2014). The bus system has provided a catalyst for public life to evolve.

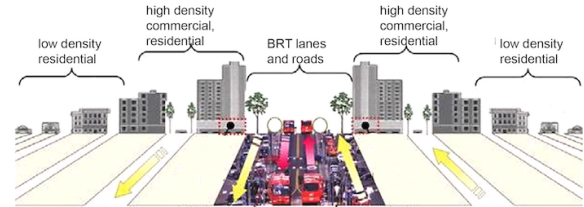


Figure 07

Kings Cross Station, London (figure 08)

The renovation included sinking the rail concourse below ground which allowed for shops and restaurants to exist on ground floor. The retail economy benefits from the high foot traffic (140 000 people) moving through the station daily. The overall masterplan contributes to the wider social, commercial, infrastructural transformation of the Kings Cross area (Fearson, A. 2012).

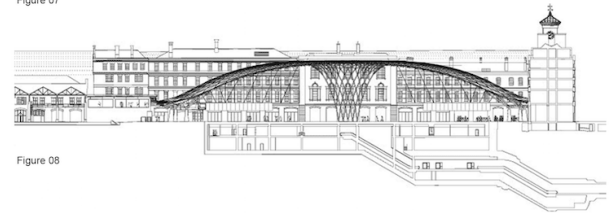


Figure 08

Metro Mall interchange, Johannesburg CBD (figure 09)

The architecture is a perimeter-block building, where retail exists on the interior and taxis and busses operate on the interior. A sense of pride and ownership is given to the trader and taxi operator because the architecture is significant. 200 000 commuters pass through the interchange daily (Hansen, L. 2016).

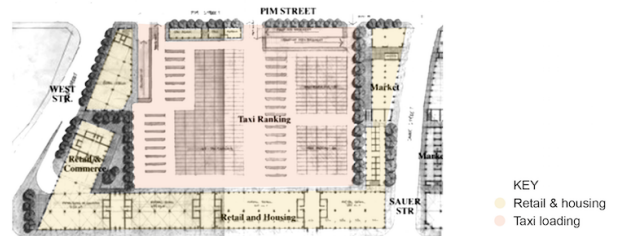


Figure 09

Baragwaneth interchange, Soweto, Johannesburg (figure 10)

The interchange is the gateway into Soweto, an urban settlement with a population of 900,000 people. An arcade forms a structural spine along the length of the site (1300 metres). It accommodates 500 street traders with accompanying amenities, such as management offices, support infrastructure and storage facilities (Hansen, L. 2016). There are multiple configurations for retail, such as a fruit-seller trading bay and a formal shop.



Figure 10

Gautrain Rosebank station, Johannesburg (figure 11)

The Gautrain is a massive investment to transport infrastructure in Johannesburg. It links JHB, Pretoria and the O.R. Tambo International Airport. The Rosebank station has seen 47 of 103 properties (see table) experience property development (planning or construction) since the inception of the Gautrain project in 2000 (Venter, et al. 2014). The TOD concept aimed to revitalise the existing urban node and promote a mix of uses, particularly residential densification.

Use	Total properties in study area	Properties developed since 2000	Height of buildings
Offices	40	6	1 to 8 storeys
Residential	38	8	1 to 7 storeys
Retail	3	3	1 storey
Parking	6	-	Ground level
Mixed-use	9	3	3 to 9 storeys
Hospitality	6	1	2 to 3 storeys
Educational	1	-	2 storeys
Total	100	21	

Property uses and density in Rosebank Station study area

Figure 11

TOD node and corridor

Transport needs to be efficient, but it also needs to enable delay and livelihood. The concept of TOD has been drawn in line with the concept of the node and the corridor. Figure 12 reveals how Cape Town has a corridor-type development (CitySpace Planning, 2012). There is a hierarchy of corridors with transit nodes that support them. There needs to be increased development at specific intersections (nodes) of these corridors. The hierarchy of corridors include: the mobility, development, and activity corridor (see glossary).

Figure 08 reveals the different corridors in Cape Town, such as:

- Main Road activity corridor - Cape Town CBD to Simon's Town;
- West-East activity corridor - Claremont/Wynberg to metro southeast to Somerset West;
- South-North development corridor – Metro southeast, past Delft, to Bellville
- Voortrekker Road activity corridor – Cape Town CBD to Bellville CBD

Integrated public transport network

Transport for Cape Town (TCT) as the Transport Authority has realised the need to integrate modes of transport. As the MyCiTi bus phases roll out, it replaces Golden Arrow Bus services. TCT also plan to create Vehicle Operating Companies (VOC) between the new MyCiTi and the minibus taxi services (CoCT & TCT, 2013). Stakeholders of the minibus industry have the opportunity to buy into a company with labour law benefits (Behrens, et al. 2016).

The integrated public transport network (IPTN) for 2032 is a plan for a completed network of corridors and nodes, which was developed through a series of transport demand modelling. It was realised there is a missing high-order trunk service from the metro southeast east to Wynberg / Claremont, and from the metro southeast passing Delft to Bellville. There are plans for Symphony Way to become a 'development corridor,' to have a mobility function with access provided at intersections (CitySpace Planning, 2012). There is a plan for mixed-use development (TOD) at these intersections. This will have a significant effect to Delft residents and the future minibus taxi operating network. The 'Blue-Downs rail link' plan will connect the rail into a closed loop (see figure). Residents from the Metro Southeast will have rail transportation to northern areas such as Bellville, Epping, Kuilsriver and Blackheath.

TOD nodes (existing & proposed) and corridors

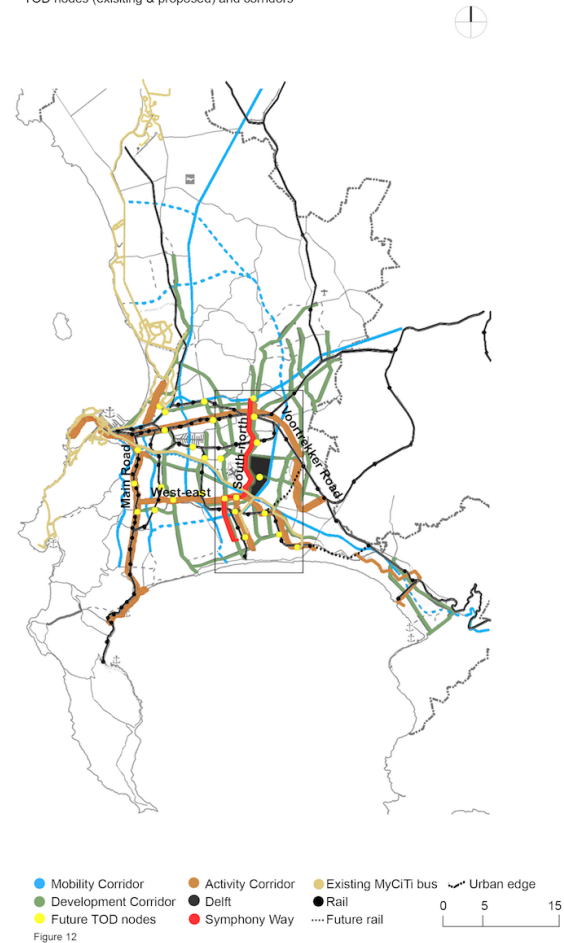


Figure 12

Part II | Meso & Micro

Delft as a site for research

South to north desire line | taxis responded

Structure of Delft | Delft Main Road as activity spine with anchors

Informal and formal economy in Delft

Density along the main road

Taxi economy in Delft

Analysis of taxi routes and ranks | temporal | no central place

Findings, questions and potentials

Delft as a site for research

Delft is a planned settlement approximately 21 km east of Cape Town, and 9 km south of Bellville. It is bordered by the Cape Town International Airport (west), Bellhar and Bellville (north), Blue Downs (east) and Khayelitsha and Mitchells Plain (south). Three high-speed roads border the suburb, Symphony Way (west), Stellenbosch Arterial (north) and the R300 (east). Delft Main Road runs through the centre of Delft as the 'activity spine' (MLH, 1995). The dominant mode of transport in Delft is the minibus taxi. The closest railway stations, Unibel and Pentech are 5km from the Hindle Road circle. The Golden Arrow Bus offers limited routes, at limited times of the day.

Delft Main Road; loop roads; train station disconnect

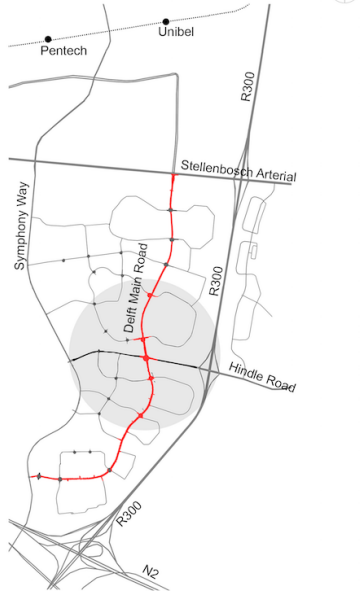


Figure 13, scale 1:50,000

Road and Rail



The key destinations for minibus taxi routes can be read in the figure below. Delft does not function as a unified suburb regarding the taxi network. 'Delft Taxi Association' used to exist, but has fallen away to seven route-licence associations (see table). In comparison, taxi associations in Khayelitsha have formed under one mother body – CODETA, and in Nyanga – CATA. There is intermodality between feeder and line-haul taxis. There are routes that CATA and CODETA operate from within Delft. For example, CATA operates the Delft-Nyanga-Wynberg and Claremont route. This has caused conflict in the past.

Taxi Key Destinations

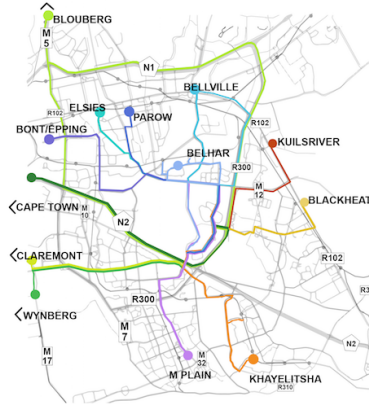


Figure 14 (above), 15 (below)

	Cost	No of Taxis
DELFT Route Associations		
● Delft - Cape Town	R11	90
● Delft - Unibel	R6	20
● Delft - Pentech	R6	3
● Delft - Bellville	R9	100
● Delft - Mitchells Plain	R9	90
● Delft - Elsies River	R9,50	80
● Delft - Parow	R9	100
CATA		
● Delft - Wynberg / Claremont	R11	45
● Delft - Bonteheuwel / Epping	R11	45
● Delft - Blouberg	R14	50
CODETA		
● Delft - Khayelitsha	R11	40
● Delft - Stellenbosch	R11	30
● Delft - Blackheath,	R9	30
● Kuilsriver		

Table 01

0 5km

South to North desire line

There is no high passenger-capacity transport service to the area, such as a rail line or BRT (bus rapid transit) route (figure 17) and therefore, minibus taxis have responded to the need for transport. Approximately six hundred taxis operate in the area. It has been realised there is a major desire line from the high population densities of the Metro Southeast (Khayelitsha, Mitchells Plain, Philippi) to economic opportunities in the north – Bellville, Parow, Elsies River and Epping, and other surrounding economic areas (figure 17 and 18). Due to the location of Delft within these economic desire lines, there is a high vehicular flow internally on the loop roads, and along Delft Main Road.

The desire line was explored in two ways - from being on site and witnessing the number of taxis moving along Delft Main Road, and analyzing transport modelling and surveys. It is true that rail and bus trunk routes have the capacity to carry more passengers, versus the stop and start bus or minibus. Figure 16 reveals the future plan of the bus trunk routes and the potential interchanges of transport routes. Symphony Way has been earmarked as a future MyCiTi trunk route to Bellville (figure 16). There will need to be negotiations with the minibus taxi industry. Taxis cannot be ignored in the future plans, as they provide a valuable service. There is the potential for intermodality, as well as the economic potential that public transport interchanges may liberate.

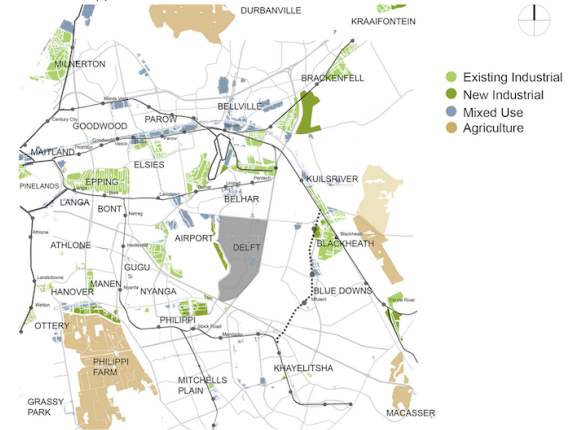
Figure 18 reveals how the taxi network functions in each suburb, and secondly the economic desire lines of people in the high residential suburbs. The taxi network in Delft does not function as a unified suburb, yet it is unified Khayelitsha, Nyanga and Mitchells Plain. The main road is a major vehicular route.

Future MyCiTi bus routes



Figure 16

Economic opportunities



Taxi Association territory & speculative size, and desire lines from the MSE residential areas to economic opportunities

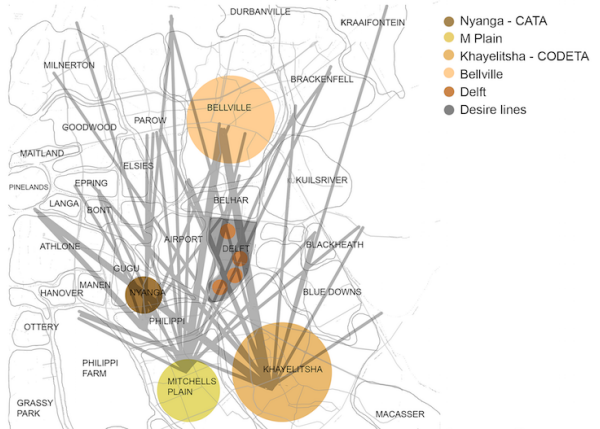


Figure 17 (above), 18 (below)

Structure

Delft Main Road as activity spine with anchors

Delft is structured by a main road through the centre, and loop roads that link neighbourhood cells together and to the main road. Pedestrians continually link back to the main road, where commercial activity exists. The concept for the 'activity spine' was based on the linear 'high street' development, as seen in Main Road (M4) and Voortrekker Road (R310), where residents have a 10-minute walk to Delft Main Road (MLH, 1995). A loop road on the west side of main road does not link up with a loop road on the east. The value of discontinuity was planned for, so that people use the main road.

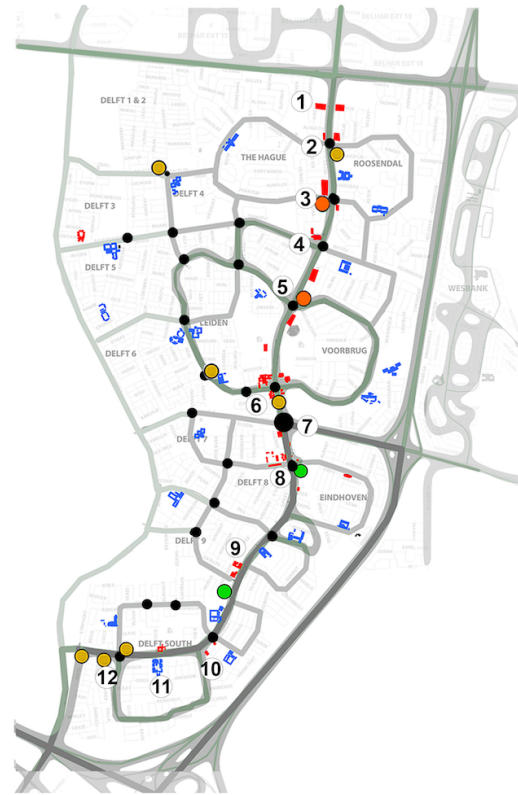
There are ten traffic circles along the main road, which allow the vehicular flow to be continuous, however, they undermine pedestrian flow. Institutions (retail, community, civic) form anchor points along Delft Main Road, and mainly at the corners of traffic circles. In most instances, not all corner plots of the traffic circle are developed, due to Delft being a planned settlement and not every public institution built at once. As a result, land remains undefined at these corners.

Public institutions and schools in relation to Main Road



Key

- | | |
|--|--|
| <p>1 East - Delft Hardware; Moslem Butchery West - Caltex</p> <p>2 West - Car wash, Driving School, informal fruit and veg trader
East - SaveRite supermarket, ATM
Inbetween - Roosendal Secondary</p> <p>3 North of circle
West - Delft Liquor Store, Surgery, USave Supermarket
East - Residential, Amanda Tyres
South of Circle
West - Unused taxi rank
East - Small police Station</p> <p>4 North of circle
West - The Hague Community Centre
East - open land
South of circle, west and east - open land
Inbetween - Church</p> <p>5 North of circle
West - Unused taxi Rank, Delft-Elisies Taxi Association, Delft-Belville
South of Circle
West - Delft Post Office, Price Club Supermarket, ATMs, Motor Spares, CareCross Medi Clinic, informal trade
East - Residential
Inbetween - Delft Sports Grounds</p> | <p>6 North of circle
West- Delft Day Clinic
East - Delft Library and Community Hall
South of Circle
West - Police Station
East - Caltex</p> <p>7 Hindle Circle
Golden Crust Bakery</p> <p>8 North
West - Engineering Depot
East - Electricity Depot
South
West- Residential
East - Eindhoven taxi rank
Inbetween - Church
Simunye Secondary</p> <p>9 Delft South Library
Delft South Hall
Spar
Market
Taxi Rank
Sunray Primary</p> <p>10 Rainbow Arts Foundation
Tent church and playground</p> <p>11 Delft South Clinic
Masibambisane Secondary</p> <p>12 Pocket Ranks</p> |
|--|--|



- Used Formal Rank
- Unused Formal Rank
- Pocket Rank
- Schools
- Institutions
- Circles



Figure 19

Informal and Formal Economy in Delft

Delft is both a transport route for vehicles going through to other destinations, and an internal transport network to the residents within Delft. Residents adjacent and nearest to Delft Main Road have responded to the high amount of foot and vehicular traffic, by converting their homes into shops, building additions, and in some instances, building a double storey addition (see figures). Local residents have thrived off the economic opportunity and started informal micro-businesses.

The attractiveness of informal trade is prominent and growing in Delft. There are a number of reasons for this. Firstly, because residents with a marginalised background often do not have a tertiary education, thus entrepreneurship and self-reliance becomes a means of survival. Secondly, Delft is isolated from institutional and economic opportunities, and people have to commute at a cost to achieve this. Thirdly, men are not the sole breadwinners, and women with babies have to stay home and contribute to the household income.

The Sustainable Livelihoods Foundation (SLF) did a study in 2010 and again in 2015 on the emerging economy in Delft South. What was revealed, is that micro-enterprise numbers doubled. The informal economy is not stagnant and can be an increasing contributor to South Africa's larger economy (Sustainable Livelihoods Foundation, 2015). The following maps reveal how residents have built additions to their original RDP house on individual plots of land. It is evident that the building additions are more dense than the planned buildings. Extended families stay together in existing and backyard homes, and people rent out desirable space.

Formal and informal trade: Informal trade exists in clusters around formal trade, or dispersed in spaza shops in residential areas. People build additions to their properties or convert residential space into retail space (Space of Good Hope, 2016).

Double storey building and retail space onto the main road.



34

Figure 20

Planned Density



Additions



Building additions onto existing RDP block houses (yellow) along Delft Main Road, opposite the market and Spar.



Figure 21

Total Density



Figures 22



Retail conditions along the main road

There are multiple typologies of micro-businesses along Delft Main Road such as mobile, temporary, display and permanent trade. For instance, traders lay out goods on blankets in the market place (between the taxi rank and the Spar). Their busiest hours are in the mornings and afternoons when people are commuting. The man with the mobile trolley moves to commuters within the taxi rank, and is able to store his goods safely at night. The tyre repair shop displays the tyres on the main road for advertising purposes. The container is able to be locked at night.



Blanket: clothes and small items



Items displayed outside a container



Mobile car



Mobile trolley



Fence: women selling food to school children



Container: TV repair and hair salon



Lockable, permanent container

Figures 23



Large corner plot: space for a mechanic



Formal shop: additions to existing house



Items displayed on the pavement

Taxi economy in Delft

The dominant mode of transport in Delft is the minibus taxi. Having spoken to the president of the Delft-Cape Town Taxi Association, Mr Daniels, there are approximately 600 minibus taxis operating in Delft, each having a specific route operating licence. The industry is a large economic generator and contributor in Delft. I have gained an understanding of the current operation by going in taxis, and speaking with a variety of relevant people in distinct locations, which is expressed in the following findings.

It is true that taxis are flexible and dependent on people, places and the demand. There are four formally built taxi ranks in Delft. There was no consultation between the CoCT and the relevant taxi associations at the time for the placement of taxi ranks; thus two remain vacant. As a result, taxi associations occupy open land known as 'pocket ranks,' near to desirable locations.

There are seven route associations. The Delft-Cape Town taxi association is used as an example in order to understand the temporal nature of the taxi industry. There are peak and off-peak times. In the case of Delft-Cape Town, 90 taxis operate from 04h00 to 09h00 (morning peak) at four destination ranks in Delft. Every taxi does feeder loops by driving around Delft to collect passengers. Once the taxi has 6 or so passengers, it can line-up at the rank to load more passengers that have arrived by foot, before going directly to Cape Town. Taxis usually do 3 trips in the morning peak. During the off-peak hours of 09h00 to 16h00, taxis either drive around Delft to pick up passengers, stay at the localised ranks, move to the Delft North node (Caltex, Police Station, Library, Community Hall, Day Hospital, and new Shoprite), drive around Cape Town CBD collecting passengers, or line-up at the Cape Town Station rank to bring passengers back to Delft. There is a continuous system of intermodality throughout the day, where there are feeder taxis that drive around Delft or the CBD, to take passengers to the closest rank. At night, there are some protected parking locations, but most of the time the drivers park the taxis in their yards, and sleep with 'one eye open, one eye closed' says Mr Daniels, President of the Delft-Cape Town Taxi Association.

CODETA (Khayelitsha) have an alliance with Delft-Cape Town Taxi Association, where taxis share the Eindhoven Rank in the morning (see figures to follow). CODETA taxis have different route licences, such as Stellenbosch, Blackheath, Kuilsriver and Epping.

CATA (Nyanga) have not formed an alliance with Delft-Cape Town Taxi Association. They occupy the Spar rank and 'pocket ranks' in Delft South, with competing routes to the Delft Route Associations. They operate a route to Cape Town, and thus take Delft-Cape Town Taxi Association's potential passengers. This has caused violence in the past.

The figures alongside express the narratives of various stakeholders at taxi ranks.

Interviews at the Eindhoven and Spar rank



"Hi, I am Eunice.

I'm staying here in Delft...and I want to be a businesswoman...but I am struggling...I wake up at 3 o'clock and come to the rank at 4. I'm trying to put something on top of the table for my kids. First time I used to have a tent and now I have a container. I put on candles and paraffin...I don't have electricity...I would love to have a nice place. I cook vetkoek with Russian polony and umleqwa. Even though I have stress for health and children...when I come here I'm happy."



"Hi, I am Mr Daniels, they call me Harab.

I am in this industry for 22 years, I am the president of the Delft-Cape Town taxi association. 90 taxis have licenses with the association. I liaise with a City official on a monthly basis, and call meetings between the other associations in Delft. We want a central rank for all the routes to operate from - like Mitchells Plain."



"I am Nyaniso Jamame and this is my friend Eric Mguplwa, and we are taxi drivers for the Delft - Wynberg / Claremont route for R11. I have a permit with CATA in Nyanga.

I did the code 8 licence to drive a taxi, but can't do the code 14 (for trucks) as I have fines outstanding for overloading and reckless driving. My boss owns 6 taxis and he pays for the maintenance of the taxi. I pay R50 to wash the taxi at the Wynberg rank. My concern is that there is no shelter or toilets at the rank. Additionally, the taxi industry is a competitive business, we have to reach our targets everyday otherwise we get fired. The owners expect R1000 profit every day. Petrol is R500 a day. We get 25% commission - R270."

Figures 24

Analysis of taxi routes and ranks

What is the current taxi rank spatial typology and why? How do associations and territories work? How does a rank accommodate change and flexibility? How does it accommodate a full capacity, and what does it become after that? Can there be a formal rank where all route associations operate, to eliminate competition and violence? The following is an explanation of the different typologies of the taxi ranks in Delft, read in conjunction with the images and plan of Delft (on the following page).

● Circles:

Taxis not only use side-streets for stopping, but the many circles in Delft. They are the most visible to the pedestrian. Each taxi has to reach a target by the end of the day, therefore there is fierce competition for passengers. The driver and the gaatjie work as a team, as the driver lingers and the gaatjie calls out the taxi route.

● Unused Formal Ranks:

Two formally built ranks are not in use by the taxis and they have since been vandalised. The Roosendal Rank is instead used by a mechanic, as the rank offers him space work from. The Voorbrug rank is out of use permanently, and the canopy has been taken off. Both ranks are set back from the street with seven loading lanes.

● Used Formal Ranks:

The Eindhoven rank is used by the Delft-Cape Town Taxi Association and CODETA taxis. A mechanic uses the space after the morning peak taxi ranking period. The Spar rank is used by CATA and Delft-Cape Town taxis. It is well located near the Spar and market with high pedestrian traffic.

● Pocket Ranks:

Taxi rank infrastructure is dependent on the demand of passengers during the peak period. In the case of Delft, associations act separately with manageable passenger counts. For example, Delft-Cape Town Taxi Association (90 taxis) operates from four places, with the most - 30 taxis loading at a rank. This is the reason taxi associations do not need 'formal' taxi ranks to operate. Pocket ranks operate from open land and side streets. What defines the rank is the need for a territory to operate from. This poses the question of the formal and informal, what is needed to operate and how to design for the future. Does the operation inform form? Or will the operation organise itself if there is a well-designed, well-located form?

● CIRCLES as a taxi stop - Informal



Taxis hover and park informally around the circles, to cause delay with the potential of collecting more passengers

① ● UNUSED Voorbrug - Formally built



Location:
(South of Circle) Delft Post Office, Price Club Supermarket, Motor Spares

Spatial Quality: No roof canopy and facilities have been vandalised. Taxi Associations were not consulted in the design and location of taxi ranks, therefore formal boarding facility is not being used

② ● UNUSED - Roosendal - Formally built



Location:
(North of circle) USave Supermarket, Delft Liquor Store, Surgery, Amandla Tyres. (South of circle) Police Station, Golden arrow stop

Spatial Quality: Facilities have been vandalised. Mechanic alongside uses the rank to organise his cars

3 ● SPAR Rank - Formally built



Location: (From south) Sunray Primary; Rank; Market; Spar; Community Hall; Library

Spatial Quality: Open, no canopy, four taxi stands, no toilets and amenities

Notes: CATA Taxi Association operate at this rank on routes between Delft and Nyanga, as well as Delft to Wynberg / Claremont.

4 ● LEIDEN SCHOOL - Pocket Rank



Location: Circle of Leiden Avenue Primary; 500m from Delft Day Clinic & Police Station; 350m from Leiden Secondary & Kairos Primary. Informal trade around circle

Spatial Quality: Pocket rank; no canopy, containers, no toilets and amenities

5 ● ROADSIDE as a rank - Pocket Rank



Delft - Cape Town Taxi Association, OFF PEAK

Taxis move to a temporary location on Delft Main Road, within close proximity to the Caltex, Library & Community Hall, Delft Day Clinic and Police Station (north), and Hindle Circle, close to the R300 (south).

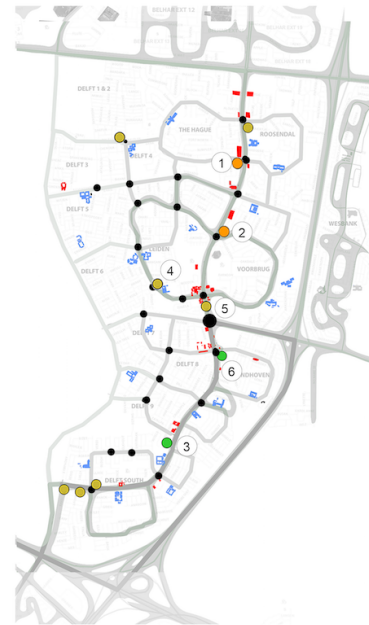
42

6 ● EINDHOVEN Rank - Formally built



Location: (From South) Church; Rank; Engineering Depot; Golden Crust and Hindle Circle 300m away. Fruit trader store, and mechanic on site

Spatial Quality: Canopy, seven taxi stands, no toilets and amenities



0 40m

Figures 25

Findings, questions and potentials

It is evident that the taxi network in Delft does not rely on fixed and formal infrastructure to operate. The reason for this, is because Delft is separated by seven route associations, all with a manageable amount of passengers to operate from 'pocket ranks'. Taxis operate differently for peak and off-peak times. Associations locate themselves near to the entrance/exit roads for the morning peak. During the off-peak, taxis either drive around Delft to collect passengers, or locate themselves near to civic buildings, such as a school, or the Delft North node. There is no well-located, big and central rank, where all route-association taxis can operate from, and a secure parking place at night. It has been realised that form informs the operational network. The current form demands a flexible operation. Fadly Isaacs, my Delft Studio supervisor, says: "If the spatial logic is powerful enough, it doesn't matter what the operating system is; the operating system will find a home in space if space is significant."

There is a plan for a bus trunk route along Symphony Way in the future. Bus and rail infrastructure are fixed. The question to ask is how to accommodate the flexible nature of the minibus into future plans of a fixed and formal system. Is there a potential intermodal operation in Delft, and how will this play out?

Part III | Case study

Part III is an analysis of the intermodal taxi network in Khayelitsha, drawing a comparison between two public transport interchanges (PTI's) – Nolongile and Kuyasa. Nolongile is a vibrant precinct due to the mixed of building uses within close proximity to the train and taxi hub. On the other hand, the recently built taxi rank and retail shops in Kuyasa is currently not in use. There are insufficient residential densities to support the taxi rank.

Intermodality in Khayelitsha

Taxis in Khayelitsha have formed a mother body association - CODETA. There is an intermodal taxi network between the feeder and line-haul taxis, but negligible intermodality between the train, bus and taxi. At the Nolungile interchange, feeder taxis drop passengers off and line-haul taxis queue to take passengers to direct destinations. There is a need for Nolungile to accommodate the demand of passengers it receives, thus there is a formally built rank that is occupied. It is a desirable location for line-haul taxis to depart from because it is the first public transport interchange within Khayelitsha (see figure 28). On the other hand, the formally built taxi rank in Kuyasa is not in operation. It is the last transport interchange within Khayelitsha and there is not sufficient demand for minibus taxi passengers. Instead, CODETA feeder taxis collect passengers informally and drop them at the Nolungile station. This is an example of intermodality within the taxi service.

The location map (figure 27) illustrates the 30km distance between Khayelitsha and the CBD, and locates Khayelitsha in relation to Delft.

Figure 28 reveals how Khayelitsha is supported by a central railway line with connecting roads. Nolungile is the first transport interchange in Khayelitsha; it is the busiest because of the location in relation to places of economic opportunity.

Transport, retail and people reinforce each other. It is evident in figure 26, that a shopping mall supports each train station, excluding the Kuyasa Interchange. The precinct has placemaking potential, yet there are not enough people to sustain it. The trading facilities are not rented out.

Location Map

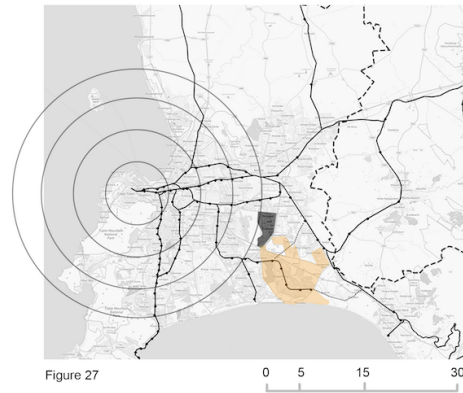
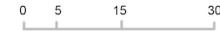


Figure 27



Site C - Nolungile



Site B - Nonkqabela



Khayelitsha



Kuyasa



Figures 26

High order rail line and main taxi rank

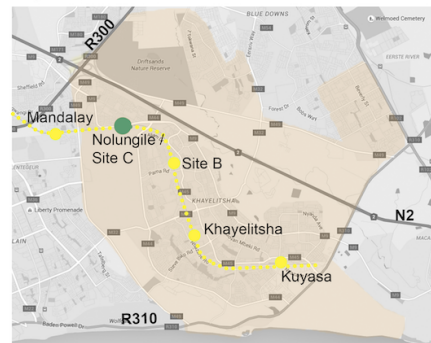


Figure 28



- Key
- Delft
- Khayelitsha
- Train Stations
- Train line
- Main Taxi rank
- Shopping mall

Nolungile

Nolungile Interchange is situated close to the off-ramp to the N2 highway, and is the first railway station for the Khayelitsha commuters (see figure 28). The main bus station is at Site B, although there is a bus stop at Nolungile. If people take a feeder taxi within Khayelitsha, they get dropped at the Nolungile Interchange to get in a line-haul taxi. People pay twice.

It is evident in PTI figure, that there is a mix of activities within close proximity of each other. The pedestrian count is high, as the taxi rank is in-between the mall and the train station. There is an order to the precinct, and vehicles and pedestrians are self-organised. Taxis move in a one-way circulation, and containers and offices form a perimeter edge around the rank. Height is provided by double-storey containers and advertising masts. The main CODETA taxi office is at the entrance. The site is due to be upgraded in the MyCiTi Phase II, linking the metro southeast to Wynberg and Claremont. Plans reveal the need for more informal trading facilities, and a purely pedestrian public square.

PTI Arrangement, scale 1:2000



Figure 29

● Taxi in ● Taxi out ● Bus ● Train



Figure 30: Taxi and retail economy

There are positive and negative qualities to this figure. It is evident that traders inhabit the space directly, on loading islands and adjacent pavements. It is a desirable location for pedestrian and taxi traffic, but it is not a comfortable space. The trader uses the crates for storage and as a table support. Goods are exposed to the weather and they are not secure. The canopy is an ordering device, yet it provides limited coverage for the queues of passengers during harsh weather conditions.



Figure 31: Legible organisation of offices

There is an intelligent order to the space and people have taken ownership. Taxi Associations, offices and trade have formed a perimeter edge to the taxi rank. Standard containers have been altered to include window and door openings. Double-storey containers have an advantage, with an overview of the site. Occupants may even live and work here. Companies have invested in advertising boards, due to the high pedestrian traffic in the area.

The five D's of the TOD approach are used to interpret the spatial quality of the precinct. The TOD approach assesses an 800 metre radius of the area.

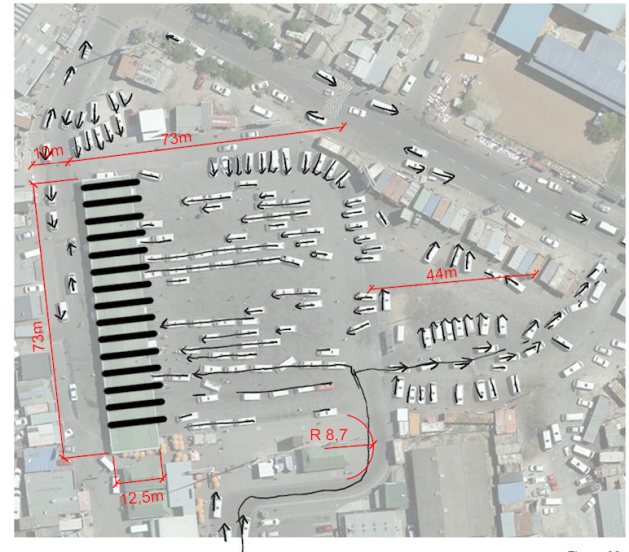
Distance to Transit – The high residential area suggests people live within close proximity to the interchange. The area south of the station is a conservation area; thus it is undeveloped.

Diversity – There is a mix of building uses that are supportive of people and one another. These include: The Shoprite, Community Hall and School. There are supportive taxi uses, such as: Taxi Association offices, car washes, mechanics, and a petrol station. Retail and informal trade is prominent in the area, although there is insufficient infrastructure.

Density – The main taxi rank transports approximately 30,000 people, and the train, 4600 daily (CoCT and TCT, 2013.) There is a high density of people moving through the area, and staying.

Design – The space accommodates both the pace of the vehicle and the pedestrian. It is an activated and compact space, but has limited potential for growth on the ground plane. There is no public square and insufficient infrastructure for informal traders.

Desire lines – It is not only a place of transfer, but a destination point for other activities. The taxi rank is busy during the morning peak, from 05h00 to 10h00. It quieters out in the day.



PTI Order, scale 1:1000

Figure 32

It is evident that the taxi network follows set rules for entering, holding, loading and exiting. There is an intelligent order, with a direct objective – to load passengers and take them on a specified route.

Kuyasa

The Kuyasa Interchange is at the end of the rail network for Khayelitsha residents and there is no high-order shopping facility, such as Shoprite (see figure 28). The taxi rank is currently not in use as there is an insufficient demand for minibus taxi passengers.

The interchange, designed by Meyer and Associates, is made up of two public spaces, the north and south squares on either side of the railway line. The squares are framed with formal trading spaces and colonnades (Samuel, A, 2011). The public bridge provides a crossing over the railway line. Roof level water tanks and the library clock tower provide verticality to the single storey houses that make up the Cape Flats.

PTI Arrangement, scale 1:2000



Figure 33

● Taxi in ● Taxi out ● Bus ● Train

TOD analysis:

Distance to Transit – The low residential area suggests people either take a taxi / walk to the train station and transfer, or use a taxi to Site C, or the bus.

Diversity – There is a mix of building uses that are not used to their full potential due to low residential densities. The recently built library, taxi rank, public square and sports hall would be occupied for longer if more people lived nearby. There is no formal shop in the precinct, thus informal trade is negligible. The recently built trading stores are unoccupied. This reinforces that traders position themselves near densities, and avoid high rentals. There are plans for the ground floor of the library to become a Spar.

Density – The train station transports approximately 4000 people daily (CoCT and TCT, 2013.) There is an insufficient density for people to stay.

Design – In comparison to the Nolongile Precinct, there is a public square and sufficient infrastructure for informal traders. There is potential for the space to host a large amount of people. The library is an important anchor; the clock-tower provides height to the area.



Figure 34: There has been a large investment into the precinct. The single-storey sprawl and low residential densities is evident. A large majority of people do not own cars, therefore commute by foot or public transport.



Figure 35: The architecture has responded to the needs of people in a public space, providing light poles and places to sit. Colonnades onto shops border the square; the paving is inventive. School children walk to the train station, and attend the newly built Library after school.

Part IV | Technical Investigation

Introduction

Transport Mode | Scale | Capacity

Ranking | PTI Analysis

Fuelling

Washing

Servicing

Introduction

What are the technical and spatial requirements of the vehicle in embracing the vehicle dominated society?

The urban structure of Cape Town is designed for the movement of the vehicle. Transport routes are not only seen as movers of people and goods, but also as economic opportunities for vehicle associated industries to generate income. I am interested in the question of public transport and intermodality, and the spatial and technical needs of the vehicle. What space and technologies are required to support an environment where vehicles are accommodated.

Public transport requires a point of interchange. There are activities that are associated with transport interchanges, such as, fuelling, car washing and servicing. This section seeks to explore the following environments where vehicles are accommodated:

Ranking: The way vehicles and pedestrians move within the public transport interchange;

Fuelling: Vehicles are dependent on fuel to move;

Servicing: Vehicles have a life span;

Washing: Vehicles need to be washed

These environments exist in different types and scales, such as formal and informal businesses. For example, vehicles can be washed at a formal car wash with a built drainage system, or at the side of the road. The investigation addresses both the formal and informal environments in the relevant context of Cape Town.

Transport mode | Scale | Capacity



Pedestrian



Bicycle **1**



Motorbike **2**

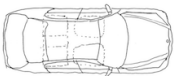


The table reveals the size and passenger capacity of each transport mode. Each mode requires specific infrastructure to function.

The pedestrian and bicycle are physical modes of movement. The motorbike is convenient, flexible and fuel efficient. The average car is a similar length to the taxi, but can only carry 5 passengers. Taxis carrying 14 passengers provide a flexible, on-demand service. The Golden Arrow Bus service offers fixed routes at scheduled times. The MyCiTi bus also offers fixed routes at scheduled times, but it has a trunk service, where buses have dedicated right of way. The train can carry a large capacity of passengers on a fixed line service.

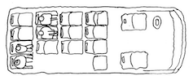
Each mode has an important role to play in the transport network of the city. In the context of Cape Town, there is negligible intermodality between different public transport modes, thus there are duplicate modes travelling the same route. It is evident in the table that 3 taxis are equivalent to a 9m bus, 6 taxis to one 12m bus, and 8 taxis to one 12m bus (Haider, 2016). It poses the question as to what is the most efficient intermodal service for the Cape Town.

The Golden Arrow Bus is a conventional bus service; the MyCiTi bus is both a conventional bus and a dedicated right of way bus service. The conventional service can carry 3,700 people per hour, versus the dedicated right of way bus – 9,500 people per hour. Rail is the most efficient with a capacity of 14,000 people per hour (Haider, 2016).



5

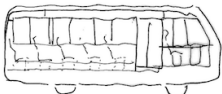
Car



15

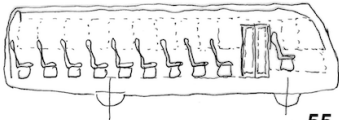
Minibus taxi

	Length(m)	Width(m)	Height(m)	Passenger capacity	Average speed (km/hr)
Pedestrian	0,2	0,5	1,8	NA	5
Bicycle	1,7	0,6	1	1	16
Car	4,8	1,6	1,4	5	50
Minibus taxi	5,1	1,8	1,95	15	50
Bus	9	2,2	2,7	40 sit 15 stand	30
Train	20	2,8	3,5	48 sit 32 stand x 10 = 800	40



24

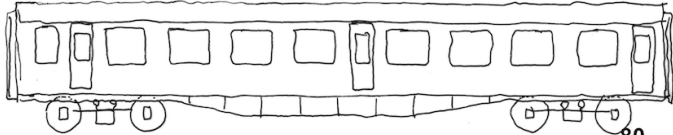
Minibus



55



Bus



80



Train

Figures 36

59

Ranking | PTI analysis

The dimensions of the interchange have to facilitate both an efficient transport service and create a place for people. Movement involves a variety of modes including the train, bus, taxi, pedestrian and bicycle, which can occur in different combinations and volumes (Chetty and Phayane, 2012). The train is a fixed line service. Road-based transport, such as taxis and buses, are different sizes and require different spatial geometries to function. Three transport interchanges (Retreat, Claremont and Nolongile) are assessed through the categories: spatial dimensions, circulation and access, geometry, spatial programme, signage and health and safety. A summary of the investigation follows.

The Retreat Station (figure 37) accommodates large numbers of rail passengers, with a medium bus and taxi load. Buses circulate and stop around the taxi loading area. The taxi holding and loading areas are separate but support each other. The 13m wide road around the perimeter of the taxi area, accommodates the parked bus, the moving bus, and the kiss-and-ride car. There are 6 stopping bus bays and a passing lane. The 6m radius of the pavement facilitates the ease of turn for the bus. The kiss-and-ride vehicles also do a perimeter loop and can stop alongside the station entrance. There are formal shops, yet insufficient informal trading bays. Retreat is bordered by residential areas, and people commute for work to the CBD and other secondary centres, such as Claremont 10km away. The interchange is well located, and within an 800m radius there is: Blue Route Mall, False Bay College, a number of schools, a TB Hospital, Engen garage, and other supporting shops.

The Nolongile Station (figure 39) accommodates a large number of taxi passengers, with a medium train load and a negligible bus load. There is intermodality between feeder and line-haul taxis, and taxis move in a one-way circulation through the rank. The taxi rank loading area is 80 x 66m, has 15 loading berths (or routes) and a 12 x 69m (828m²) canopy. The area has evolved over time and people have created an edge to the perimeter of the rank. The site includes relevant taxi oriented trades, such as car washes, mechanics and a petrol station. A downfall is that there is insufficient informal trading infrastructure and no pedestrian-only public space.

The Claremont Station (figure 41) is the main bus interchange, and accommodates a large amount of train and taxi passengers. It is a secondary economic centre to the CBD, and well connected with the railway line running parallel to the main road. Retail, commerce, health and recreation are within close proximity to the transport interchange. The unoccupied Wermuller centre causes a 100m discontinuity between the taxi and bus facilities. Park and ride facilities are provided on both sides of the train track.

Retreat

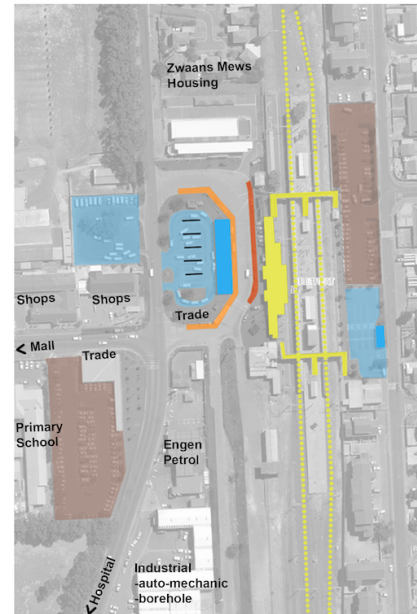


Figure 37, scale 1:2000

KEY

- train
- minibuss taxi
- bus
- kiss & ride
- pavement
- park & ride



Figure 38

View of the exit point of the taxi rank. Taxis arrange themselves in a parallel order. Traders occupy pavements to sell goods to pedestrians. Pavements are designed for the generous ease-of-turn of the taxi.

Nolungile



Figure 39, scale 1:2000



Figure 40

There is parking for the taxi operators using the CODETA office at the entrance to the taxi rank. The large canopy signifies the importance of the building.

Claremont

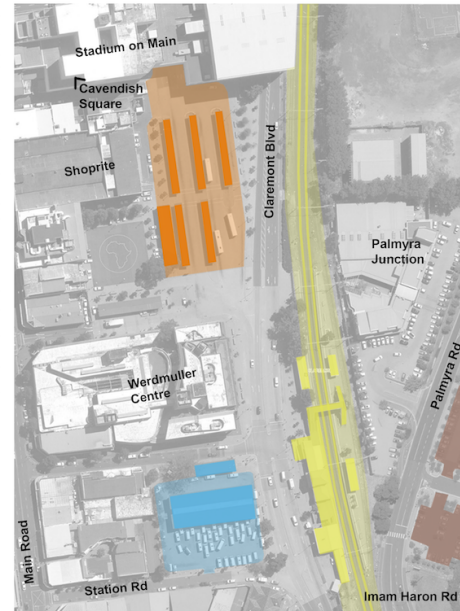


Figure 41, scale 1:2000



Figure 42

Barriers border the curve of the pavement. No entrance signs highlight the one direction flow of the bus. There is an entrance to the Shoprite from the station.

Fuelling | Petrol Station

Petrol stations are the safe havens within the physical sprawl of the city, due to light, 24-hour service, surveillance cameras and people on site. There is usually a convenience store with utilities such as ATMs and ablutions.

There are a variety of sizes and types of petrol stations, but the distinct architectural element is the canopy and the pole sign. They are visible from a distance to advertise the brand and price of the fuel on sale, and the accompanying facilities that are provided.

The figure depicts the alteration of the conventional single storey canopy, where alternatively, the petrol station is the ground floor to high rise buildings. The economy of space is taken advantage of.

Petrol stations are strategically located near other auto businesses, and visa versa, to achieve inter-business production.

Shell in Cape Town CBD



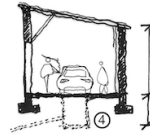
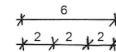
Figure 44: Google maps, 2016

Washing

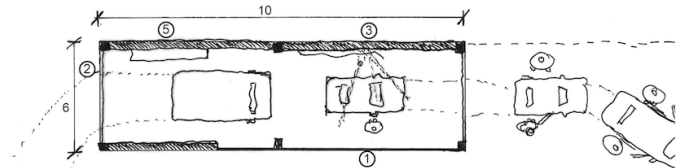
Three car washing facilities are analyzed: car washes at petrol stations, within shopping centre car-parks and informal roadside car washes. Drainage is a central issue for car washing. Stormwater and wastewater are two different underground pipe systems (CoCT, 2014). All wastewater (sewerage and industrial waste) needs to be treated before discharged into the environment, such as the sea and rivers. Wastewater from informal car washes enters the stormwater and is therefore harmful to the environment.

Petrol station

The structure of the car wash facilitates a job chain; two cars can be washed inside, and three cars can be vacuumed and polished outside. The order of the space allows for this to happen.



- ① Steel shell structure. Glazing allows for natural light and visual permeability; dimensions: 20 x 6 x 4m (lxbxh)
- ② 3 x 3,5m roller shutter door
- ③ High pressure hose reduces water usage
- ④ Filter is cleaned once a week. Water drains to second filter before going to the sewer
- ⑤ Ultrachem chemicals is an industrial, environment-friendly product



Figures 45: Author's photographs and drawings

Washing | Shopping Centre Parking

Dimensions, circulation and access

The parking dimensions accommodate the space for five vehicles at a time. The parking bay 2,5 x 5m and the column grid, provides adequate space for attendees to move around and wash the vehicle. The car wash is in a desirable and convenient location as people shop whilst their vehicle is washed. The manager controls the movement and vehicle queue.

Components

Equipment is adjacent to vehicles. Water points, electricity, sufficient light, and drainage facilities are provided

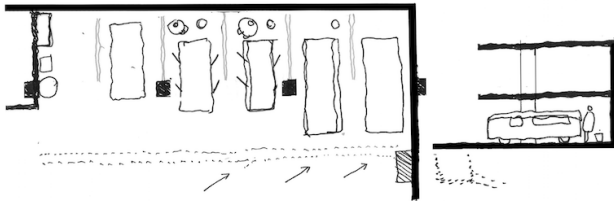
Drainage and contamination

Wastewater drains to inceptor drain before it enters the sewer drain where it is treated again.

Wastewater falls to drain



Plan and section, scale 1:200



Figures 46: Author's photographs and drawings.

Mobile Car Wash

Dimensions, circulation and access

The car wash is convenient and visible to the driver. The car pulls off to the side of the road and parks. The 2m by-lane is sufficient space to wash the vehicle.

Components

The attendant carries a bucket, soaps and brushes. He has an agreement with the adjacent house for the use of water and electricity.

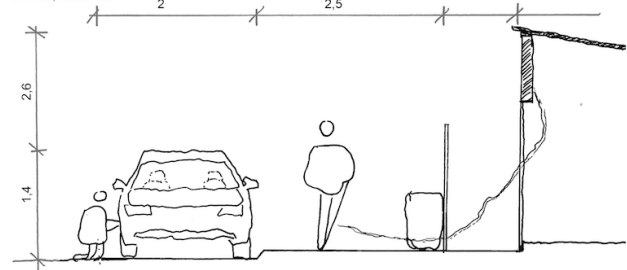
Drainage and contamination

Wastewater drains to the stormwater and not to the sewer. This has consequences to the environment.

Car wash attendant using water and electricity from the house



Section, scale 1:50



Servicing | Tyre Repairs

Location

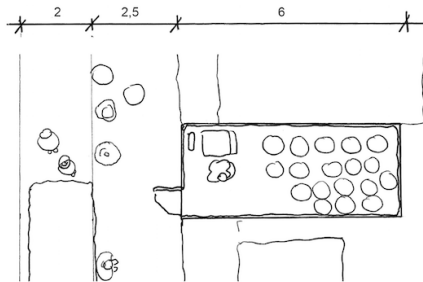
The business is strategically located on the main road opposite the Delft South Library, where there is high vehicle and pedestrian traffic. The robust structure can be locked up.

Dimensions and access

The 'Tyre repair centre & key cutter' operates from a 6 x 3,5 x 2,5m (lxbxh) container. The service extends onto the 2,5m pavement where tyres are advertised. Drivers can park and be assisted. The space contains the tyre machine and spare tyres. Electricity is supplied from the adjacent property to run the machine.

Signage

The blue container is recognizable from a distance. Tyres are displayed on the pavement.



68

Plan, scale 1:100

Service and Panel Beater

Location

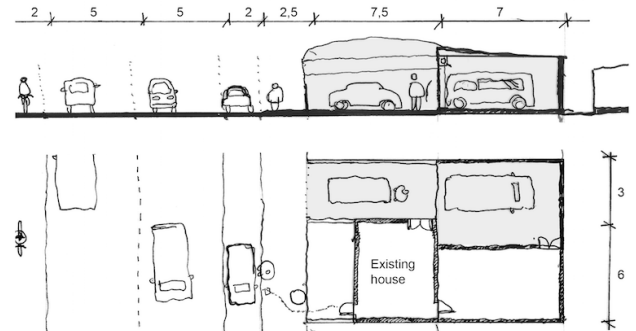
The Panelbeater business is also strategically located on the main road opposite the Delft South Library, where there is high vehicle and pedestrian traffic. The existing house has been extended to include a long driveway to a garage at the back.

Dimensions and access

The 14,5 x 3m driveway and garage can fit 4 small vehicles. The space is wide enough for mechanics to work. Security fencing and fabric covering keep the driveway secure and protected from the weather. Electricity is supplied from the house.

Signage

'Panelbeaters,' a number and opening hours are displayed on the driveway doors.



Plan and section, scale 1:200

Figures 47: Author's photographs and drawings

Part V | Design Development

Introduction

Siting

Site photographs

Nolli figure-ground analysis

Scale | Comparison to Nologile

Urban Design | Evolution of Delft Main Road

Programme | Ground floor

Programme | First floor

Programme | The hybrid taxi rank

Day and night in the life of the taxi depot

Section drawings

Model-building

Introduction

A design for a taxi depot and mixed-use (retail, commercial, educational, residential) hub

Findings –

The taxi network in Delft is decentralised, and taxi route associations operate from multiple locations within Delft. Due to the passenger count spread out over Delft, taxis can operate with little, or no infrastructure. On the other hand, the taxi network in Khayelitsha is centralised, and taxis operate under one mother body association – CODETA. There is intermodality between the feeder and line-haul taxis. The main taxi hub Nolongile, provides a space for taxis to load passengers, park at night, and there are washing, servicing and refuelling services in the precinct. There is a mix of building uses in the area.

The mapping has led to the understanding that taxis are temporal. There are peak and off-peak times. The reason taxis are temporal is because they accommodate people. They offer a flexible and on-demand service to commuter throughout the day. People, transport and retail are interrelated.

A strategy –

Siting – The project is located at the Delft North node due the current civic buildings in the precinct. Currently, taxis park alongside the main road and wait to load the high number of people in the area. It is well located to Hindle Road, Symphony Way and the R300.

Programme - The programme is a dignified and well-located rank for taxis to operate from during the morning peak period, a place for servicing and washing during the off-peak period, and a secure place to park at night. The design is not only transport related, but aims to promote the transit oriented development concept of prioritizing mixed-use development around a transport node. The challenge is to accommodate the flexible nature of the taxi, provide a dignified place of waiting for the commuter, activate retail opportunities, whilst keeping in mind that Delft Main Road is the main thoroughfare for taxis, and there will be changes in demand over the day. A shopping mall is currently being built south of my site. My design responds to the existing civic context and the new shopping mall development by continuing pedestrian foot traffic and creating a connected urban framework. The design has developed from specifying the occupation, such retail, commercial and residential, to thinking about a space as having the flexibility to accommodate all three occupations. The live-work unit provides the necessary supports, such as stairs and services, for a space to be modified by each occupant. For example, an owner of a live-work unit may rent out the retail space below to a tenant and derive an income. The transport interchange contributes to city building and becomes a catalyst for future development in the area.

Siting

Figure 48:

The choice of site is located on the corner of Delft Main Road and Hindle Road. There is direct access to the R300 and Symphony Way. There are plans for a MyCiTi bus service from Blue Downs, along Hindle Road and onto Symphony Way. As well as, from the metro southeast to Bellville along Symphony Way. The site provides ideal access to these main roads for the taxi operator.

Figure 49:

There are public buildings located along Delft Main Road. Schools are located on loop roads. The open areas include detention ponds, sports fields and large uncontained open spaces. There is a contrast between the dense inhabitation of the residential-zoned plots, to large unoccupied expanses of land.

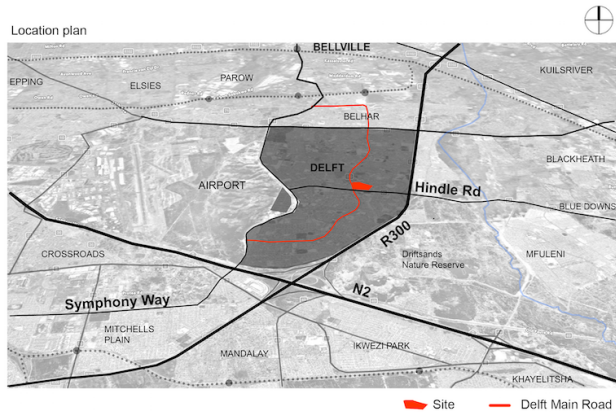


Figure 48: Author's analysis from an Apple Maps image, 2016

Site plan, scale 1:10000



Figure 49: Author's analysis from a Google Maps image and GIS, 2016

Siting

Existing foot traffic

The existing foot traffic map shows the pedestrian desire lines over the barren site. There is a defined foot path parallel to Delft Main Road, as well as diagonal paths.



Site informants:

The site sits between the neighbourhood scale of the civic node, and the regional scale with road access to areas beyond Delft. The smaller and bigger traffic circle demonstrate this. With the new shopping mall development, there will be a pedestrian movement crossing my site, between the civic node and the shopping mall.

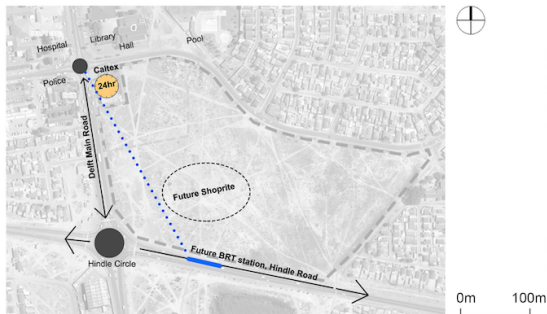


Figure 50: Author's analysis from a Google Maps image, 2016

Figure 61:

The main node in Delft North includes the following civic buildings: Delft Day Hospital, Caltex petrol station, the Police Station, Library and Community Hall. There is a high number of people in the area during the day. Taxis park alongside the main road and wait to load passengers. Taxis driving along the main road, stop on the circle to collect passengers. The public buildings are set back from the street with fences as the boundary. There is no civic presence on the street.

Site plan, scale 1:5000

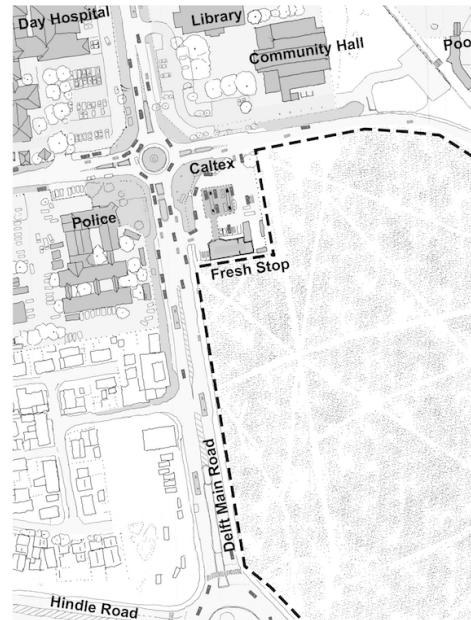


Figure 51: Author's analysis from a Google Maps image, 2016

Siting

Shoprite Plan

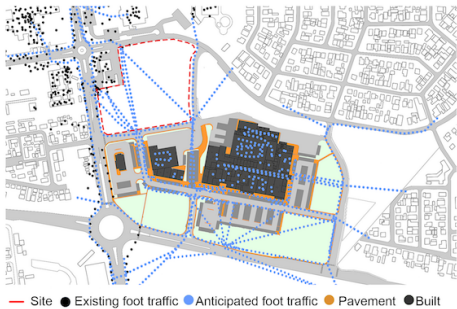


Phase one of the Delft Mall complex, designed by Stauch Vorster Architects, is currently being built with a completion date for July 2017. Phase one includes Delft Mall with a Shoprite and small tenants, a Cashbuild and a food drive-through. Fences are designed to surround the property with controlled access at gates.

Shoprite Holdings Ltd currently rents the site from the City of Cape Town. There is a portion of the site that has been zoned partly for residential, and partly for community. The CoCT has requested Shoprite to develop the residential / community zoned site. My intervention utilizes this residential / community zoned site, in a design for a transport and mixed-use hub.

The anticipated foot traffic plan (see figure) reinforces the prime location of my site between the existing civic node and the new mall complex. There will be high numbers of foot traffic across my site.

Anticipated foot traffic

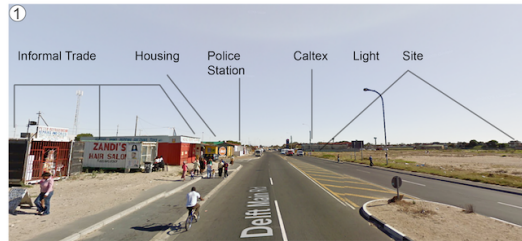


North-west view of Phase 01



Figures 52: Plan accessed from Stauch Vorster Architects and analysed by author, 2016.

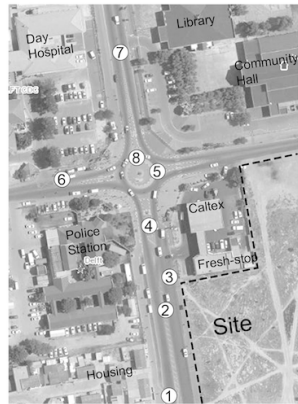
Site Photographs



There are currently informal traders opposite my site. The shops serve pedestrians and vehicles moving along Delft Main Road.



Taxis park alongside the main road and near to the civic buildings due to the number of people in the area. My design plans to incorporate these taxis.



0 20m

Figures 53



The Caltex and Fresh Stop shop is one of two 24-hour service stations in Delft. There are approximately 600 taxis in Delft that have the option of refuelling at this station. School children wait for the bus after school. They walk or take a taxi to get to the bus stop.



The public space includes greenery and a few trees, but lacks shade and places to sit. The police station is set back from the street.

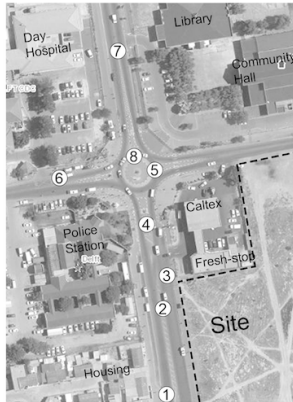
Site Photographs



View of the police station and Delft Day Hospital. A fence forms the boundary to the hospital. The circle undermines pedestrian movement.

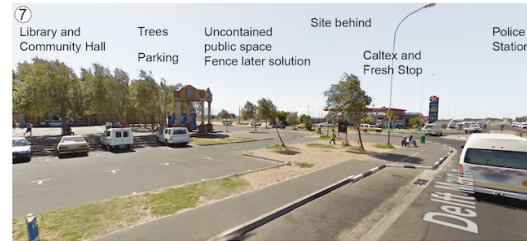


Informal traders operate outside the entrance to the Hospital. A large parking lot and fence form the boundary to the busy main road.



0 20m

Figures 53



The Library and Hall are located at the back of the site, with the parking-lot at the entrance. As a result, there is no building frontage to the street. The green public space is undefined.



The Caltex is visible from a distance due to the recognisable canopy and tall pole sign. Circles enable vehicles to keep driving which limits the movement of the pedestrian.

Nolli map of Delft north (planned settlement)



Figure 54, scale 1:2000

Nolli map of Rome (evolutionary settlement)

It is useful to compare the fine-grained urban fabric of Rome (evolutionary settlement) to the undefined fabric of Delft (pre-planned settlement) using the Nolli map technique. Giambattista Nolli uses the traditional figure-ground representation of built and unbuilt space, to analyse public and private space. He represents enclosed public spaces as open civic spaces, for example the street (void) continues into the church.

Dewar and Todeschini describe an evolutionary settlement as the distribution and accommodation of human activities in space, where land use is not the focus. Settlements have a "functional and social hierarchy...there is a controlled transition from public to private" (Dewar, D. Todeschini, F. 2004). It is evident in the Nolli map that the built fabric constitutes the coherent public space. Negotiated spaces are formed like the evolutionary growth in informal settlements. On the other hand, the built fabric of Delft north (planned settlement) floats in open space.

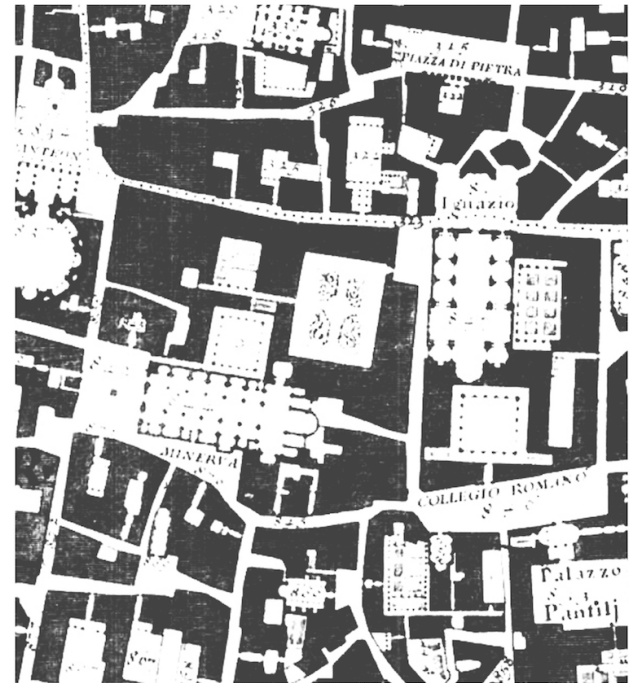
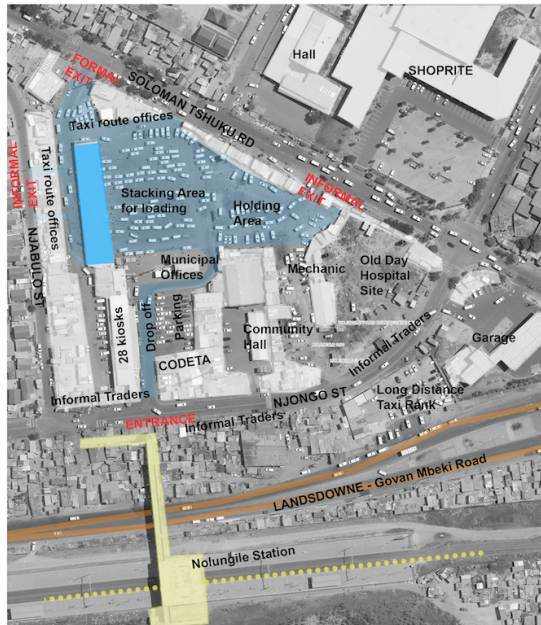
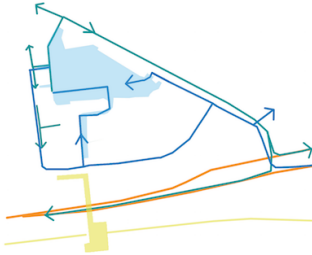


Figure 55

Sense of scale

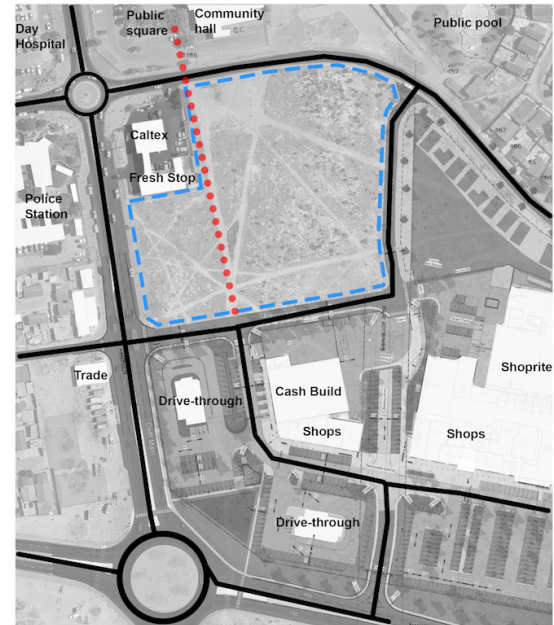
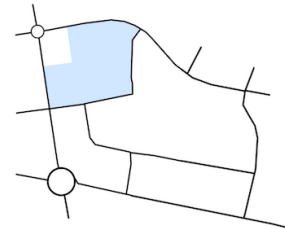
It was appropriate to compare the size of the Nolungile Interchange to the size of my site. What is evident in the Nolungile precinct, is that a taxi rank is a network of roads, and not just the loading facility. Taxis move in a one-way and two-way road system of entrances and exits, and the curve of the pavement and building edge defines this.



● Minibus taxi ● Taxi in ● Taxi out ● Bus ● Train Nolungile, scale 1:2000
Figure 56

Urban design | road network

The movement routes (vehicular and pedestrian) are informants for the urban design and how to break up the site. The red axis reveals the movement route from the Cashbuild through to the Community Hall and public square.

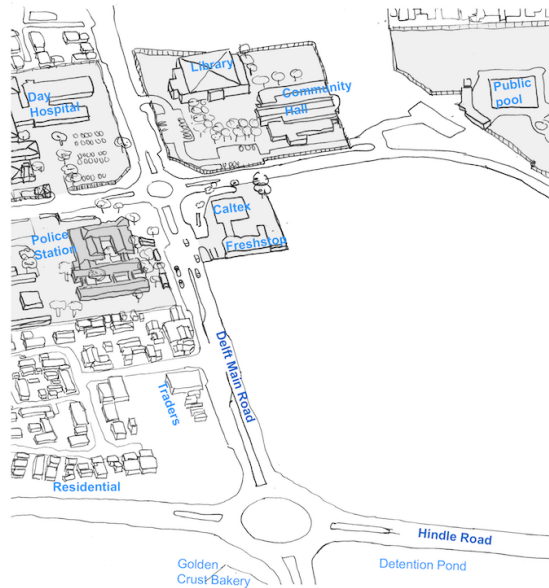


● Site ● Axis Delft site, scale 1:2000
Figure 57

Urban Design | Evolution of Delft Main Road

Existing

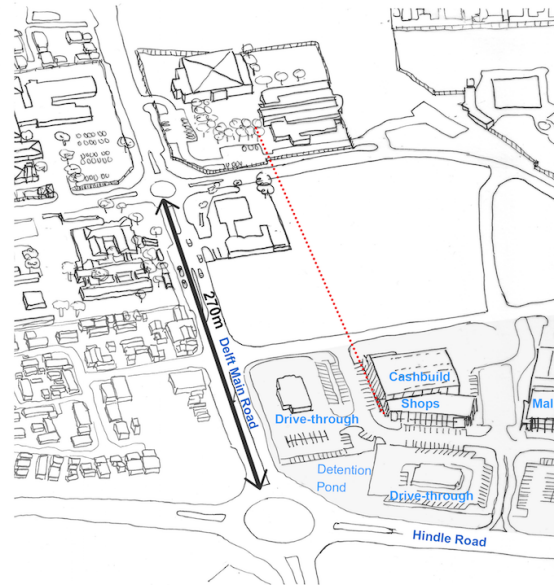
The current civic buildings offer no presence to the street, and instead the fence is the boundary. The 5-metre-high Community Hall is the tallest building; the remaining structures are single storey. Residential plots include the existing RDP house and built additions. Hindle Road is a regional road, versus the main road is a local road. Taxis hover on the sides of the roads due to the number of people in the area.



Figures 58

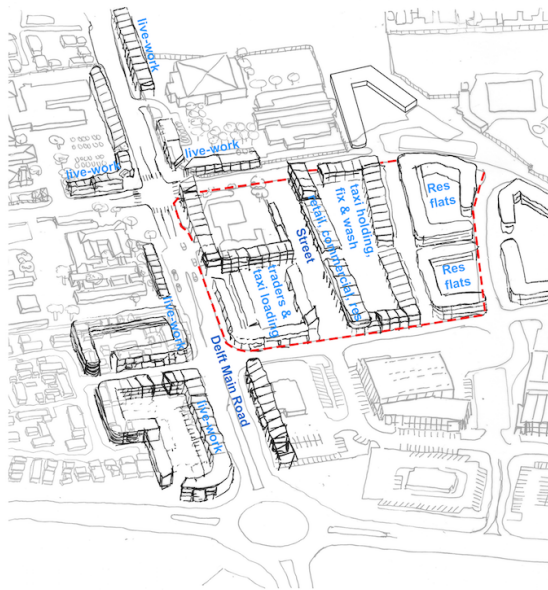
Shopping mall

The shopping mall complex is designed to be accessed by car with generous parking provision. It is set back from the main road, and the main entrance faces Hindle Road. Eight gates and fences border the property for security purposes. The precinct can be locked. A system of roads create permeability through the site. It is inevitable that the taxis are going to locate themselves in the parking lot where the people will be entering the shopping mall. A vehicle and foot axis is created along a series of shops and the Cashbuild, through my site and to the Community Hall and Library precinct. This is an informant to my design.



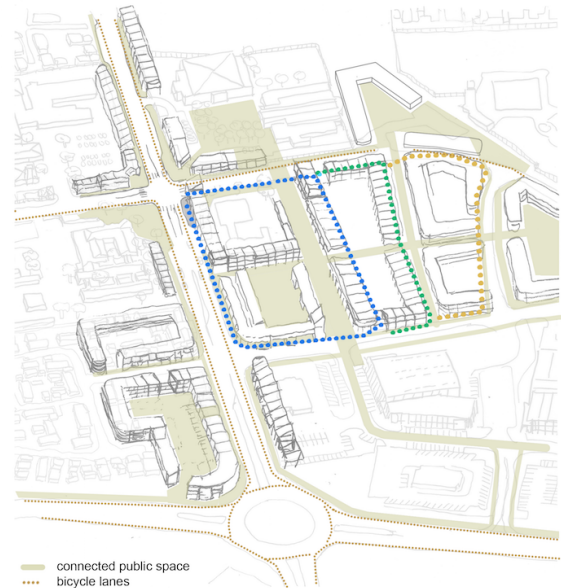
My vision

My vision is to create active edges and building height along Delft Main Road, where there is retail and residential occupation. The traffic circle is reconfigured to be an intersection for the benefit of the pedestrian. The design of a taxi rank (loading) off Delft Main Road is informed by this vision of what the main road could become. I propose there to be a strong movement route from the existing civic node to the new shopping mall. The live-work unit is used as a template for multiple occupations (retail, residential and commercial) to exist. The unit provides the necessary supports such as services and stairs for occupants to suit their needs. The architecture creates an interesting edge for everyday life to unfold. In essence, it is not about the design of the object, but rather the space in-between. The design aims to offer permeability and choice to the pedestrian. The taxi has a fluid ground plane with multiple entrances and exits.

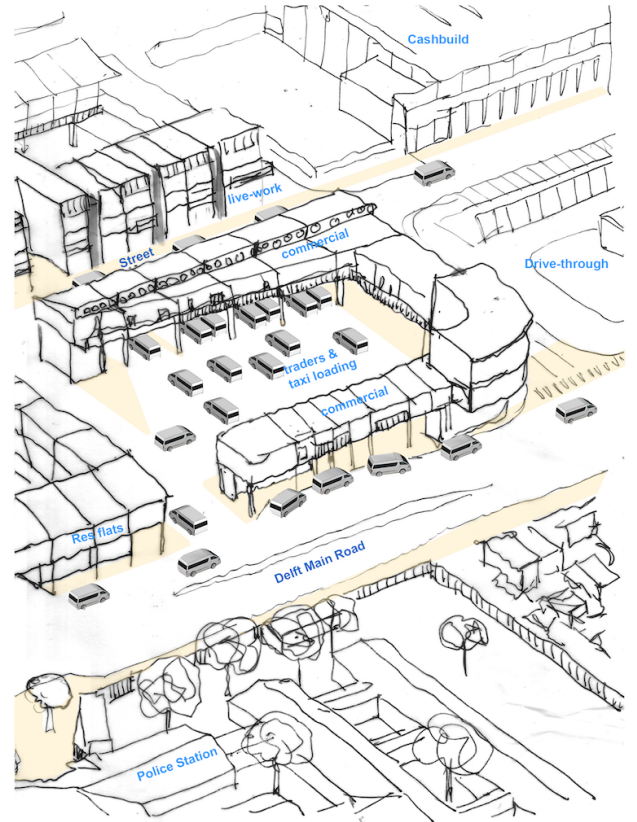
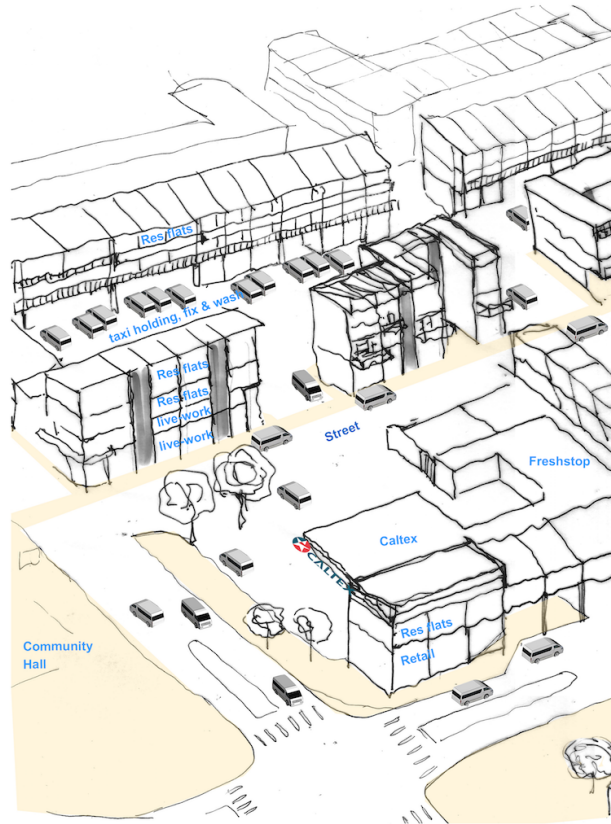


Layering

There is a layering to the design – from high, medium to low intensity. The **high intensity zone** is adjacent to Delft Main Road, which includes the existing Caltex and Freshstop shop, and my design for a public space, retail and taxi loading area. A secondary street follows the axes from the Cashbuild to the Community Hall and Library. It forms a boundary and active edge to high intensity zone. The street includes retail (ground floor), commercial (first floor) and residential activity (second, third floor). The building height addresses the need for increased density near a transport interchange. The **medium intensity zone** includes a holding area for taxis, parking for cars, and flexible space for mechanics and car washes to operate from. The **low intensity zone** becomes purely residential.



View from the north-west (day hospital)



Programme | ground floor



Figure 58

Taxi loading

During the peak morning period the space needs to facilitate a high flow of pedestrians and vehicles. There is a taxi drop off on the left and right side of Delft Main Road. Taxis enter the taxi loading square from the main road and holding area. The building above provides shelter to the commuter waiting in the queue.

Taxi holding | washing | servicing

The taxi holding area includes areas for vehicle washing, servicing and parking. The column grid of 8m x 8m, provides a space for 3 taxis. This starts to lay out a scenario for mechanics and car washers to occupy the space. For example, a mechanic may rent out a bay (8 x 8m) which includes space for 2 taxis and a small office (4 x 2.5m). Another mechanic may rent out 2 bays, which includes space for 4 taxis and a bigger office (8 x 4m). The commercial office floor may rent 3 bays for parking, thus 9 parking places. At night the area accommodates the parking for taxis.

The floor surface is concrete in order to drain the wash water on the site to an inceptor drain where it is recycled and stored for re-use.

Retail edge | ground floor

An axis road is defined between the new mall development (south) and the existing public square (bordered by the library and the community hall in the north). The work component of the live-work unit exists on ground floor along the axis, and forms a threshold between the high and medium intensity zones. There are other retail opportunities, such as space for informal traders, small spaza shops or bigger corner shops. The taxi loading square could be used in a variety of ways, such as a market on the weekends or a 5-a-side soccer field. The design strategically incorporates formal retail shops around the square, which increases activity during off-peak hours. Amenities, such as deliveries, waste collection, storage, water and electricity, and public and private ablutions have to be considered. The role of the shop owner is thought out, such as if they are a young mother, there is the need for a local crèche for the baby.

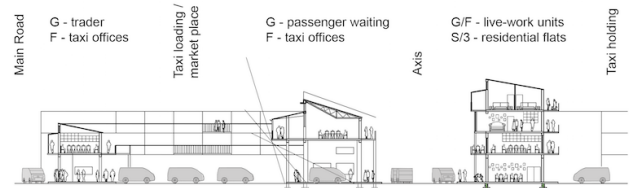
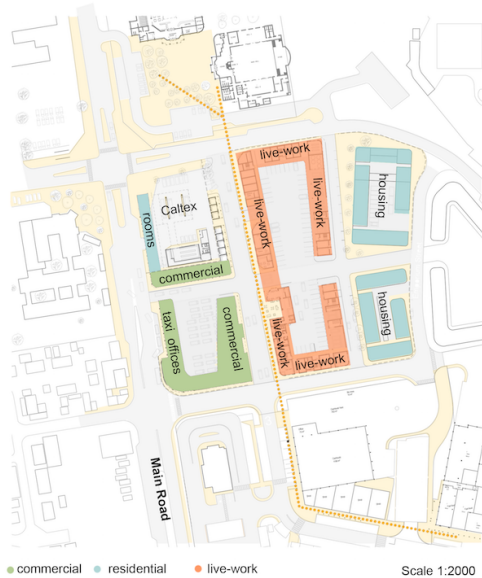


Figure 59

Programme | first floor



Taxi office in Nyanga
Figures 60

Delft-Cape Town stakeholders

- 1 president
- 1 chairperson
- 1 bookkeeper
- 70 owners
- 90 taxi drivers
- 20 gaatjies
- 5 rank marshalls

No. of people = 188



Generic commercial space

The design provides generic office space that could be inhabited by taxi associations, transport administration and other stakeholders such as NGO's, micro-enterprises or a doctor. The plan provides the structure and services to allow for this flexibility and change in use. For the purposes of the project I have speculated how stakeholders may occupy the space.

Taxi route offices and common rooms

Taxi associations currently use office space to host meetings between management and taxi owners. The office space includes mobile chairs that can be arranged in a circle for a discussion, a TV and a small kitchen. The current model for taxi offices in Khayelitsha and Nyanga is the form of a container that is positioned on the perimeter of the taxi rank (see figures). The Delft-Cape Town taxi association uses an office space in a random location as there is no sense of permanence at the pocket ranks.

There are a number of stakeholders involved in the taxi operation, such as the president, chairperson, bookkeeper, owners, taxi drivers, gaatjies and rank marshalls (see Delft-Cape Town example below). The current office arrangement only provides a place for the president, chairperson, bookkeeper and the owners to occupy, but no place for the drivers. My design plans to incorporate a space for the drivers (separate to the owners) to come back to. Ablution and shower facilities are an important part of the design and the space offers dignity to the driver who often works late hours.

Transport administration

There is a need for a shared administration office for transport routes to be coordinated. The presidents from each route office would be required to meet here on a daily basis. Stakeholders include, human resources person, technical manager, operations manager, financial manager and CEO.

Live-work units & residential flats

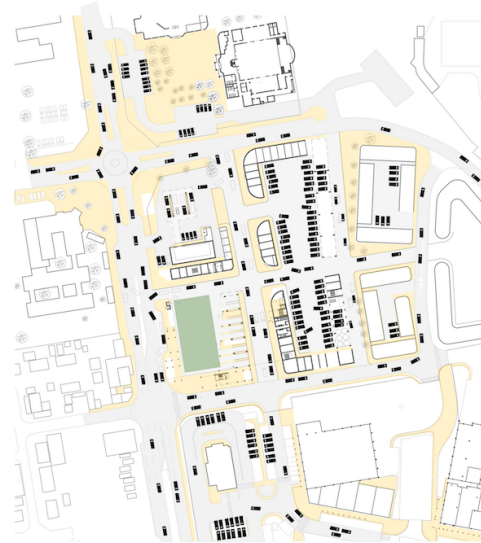
The live-work unit includes a stair from ground to first floor. There are additional communal stairs for residents who wish to rent out the work unit on ground floor. The communal stair also allows for a second and third residential floor for flat units. The live-work unit provides the basic infrastructure that responds to the current socio-economic context of Delft. The occupation and configuration of the unit can develop in time as the property value of the area increases. For example, two live-work units can combine to function as a commercial office on first floor.

Morning peak | Day & night in the life of the taxi depot



Ground floor, scale 1:2000

Off peak



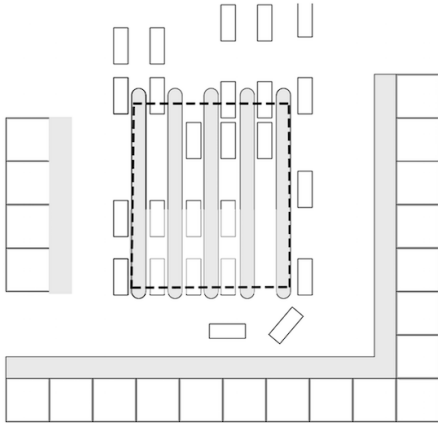
● 5-a-side soccer field / market

From 05h00 to 09h00 the taxi loading area is used to its full potential. Commuters can walk from all directions and line up at the rank. As it becomes off-peak, the holding area starts to fill up where taxis are serviced, washed or parked. The loading area can be used as a 5-a-side soccer field for school children to play in after school. It can also function as a market space on the weekend.

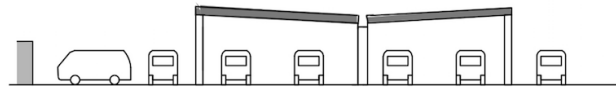
Programme

The conventional taxi rank layout (parallel loading and kerb side loading) is reconfigured into a 'new type.' Can the column and pedestrian island be reconfigured to become a usable and multifunctional space? How can the life of the taxi rank extend beyond the morning peak? Can the space be used as a 5-a-side soccer court and a market space on weekends? Can the taxi rank typology move towards a more economical approach, where instead of the conventional single storey roof covering, there is building occupancy above the taxi rank?

Conventional Rank



Scale 1:1000



Figures 62, scale 1:500

Hybrid Taxi Rank

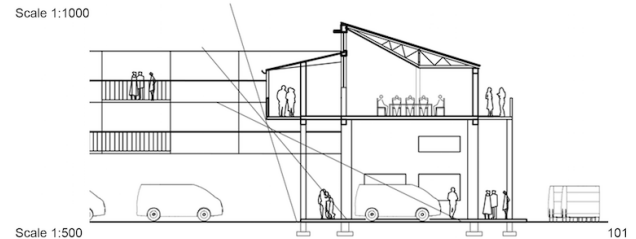
Trader occupies the kerb of the Notunglie taxi rank



Figure 63



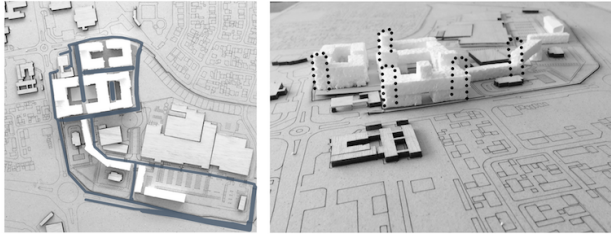
Scale 1:1000



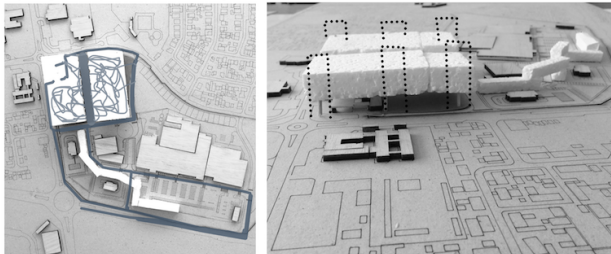
Scale 1:500

Model studies

Perimeter blocks. Internal square



Open ground plane. Permeability.



System of roads and active edges



Figures 64

Theoretical Underpinnings | Words

Edge In-between

Contained public space

Systems, processes

Fluid, continuous, movement, energies, dynamic

Surfaces

Formal and informal

Irony, contradiction, tongue and cheek

Peak and off-peak, dual utilitarian, overlapping

Support structures, incremental, choice, flexibility, self-organisation

Landmarks, reference points

Ordering the site, growth, time, set of spatial principles, informants

Public, semi-public, private, threshold, permeability, geometry

City. Suburb. Neighbourhood. House. Living Room. How do we occupy, dwell?

Street edges

Nuance

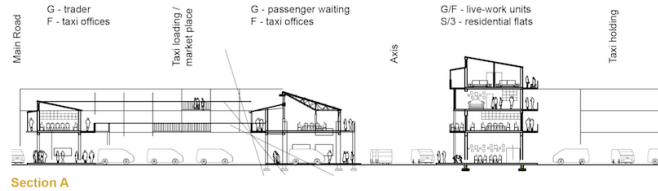
Narrative

Continuity, discontinuity, define space within fluid structure

Client? Builder? Economic structure

Section studies

The sections illustrate the priority for density. A paradox is created between the low densities of the existing site and my site.



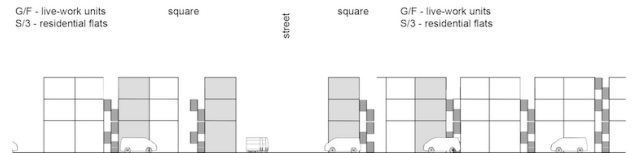
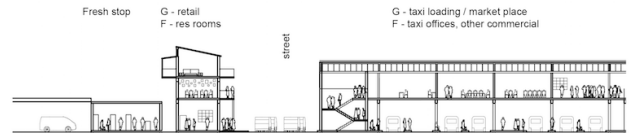
Section A

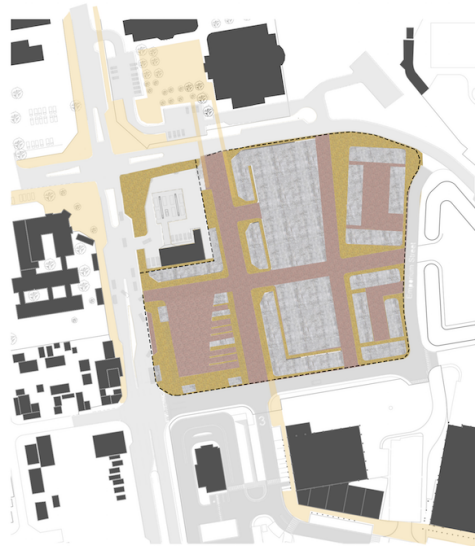


Section B



Section C





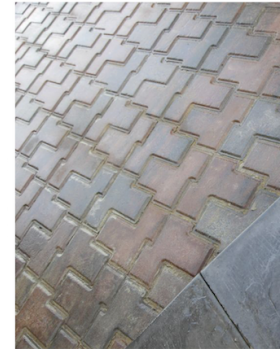
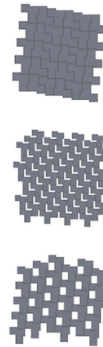
The ground surface supports various activities over time. As it rises and falls, and as the material / paving changes, so the pedestrian can navigate their way. Alex Wall in his essay, 'Programming the Urban Surface,' claims that designers need to shift from forms of urban space to process of urbanisation. There is a renewed concern with the surface for its capacity to support and diversify activities in time.

Pedestrian pavements (yellow) surround the taxi loading area. The column sits between the pavement for safety purposes from the moving taxi. A generous 4m wide sidewalk is provided to the new retail street. This allows for food stores to spill out onto the pavement, and for people to stay for longer periods. The paving is semi-permeable, which allows water to filter into underground pipes that lead to a nearby swale.

The pedestrian and taxi surface (brown paving) is also semi-permeable paving. It is 150mm below the pedestrian pavement.

The taxi holding area has a hard surface (concrete) to collect contaminated wash water. The water collects in an inceptor drain where it begins a recycling process to be stored and re-used.

The 'Bosun Waterwise' paver is a specially engineered permeable paving brick. This paver anchors itself to pavers from adjoining rows, while leaving gaps between the joining areas for water to drain.



Figures 66

Conclusion

My interests this year were foregrounded in a jobshadow at Transport for Cape Town (TCT) at the Civic Centre. I was eager to know everything to do with public transport. I continue to feel the contrast between the wealthy and the poor. I wanted my project to provide a real and possible solution to a disadvantaged area in post-apartheid Cape Town.

The design project involves layers of information, from speaking to people, analysing, reading, thinking and drawing. It proposes a taxi depot and mixed-use (retail, residential, commercial) hub in the context of the low-income suburb Delft.

The design required an urban design framework that responds to the existing context, while imagining what the neighbourhood could become. It aims to link the existing civic node to the new shopping mall development in a series of streets and building edges. There is an interconnected public space, and in essence the design not about the architecture, but about the spaces in-between.

It responds to the life of the taxi, by providing loading, holding, parking, servicing and washing areas. The taxi world exists and evolves around the current Caltex petrol station.

The architecture responds to the current socio-economic context of Delft and how people currently inhabit space. People have proved to be architects and builders themselves, by building additions to their homes, and renting out valuable space. The live-work unit provides flexibility for a tenant and occupation mix, whilst contributing to the necessary density of the project. Residential flats above further contribute to prioritised density.

The project emerged in dealing with my primary interests. I never got bored, and I hope to keep exploring the transport / urban / social / architecture field.

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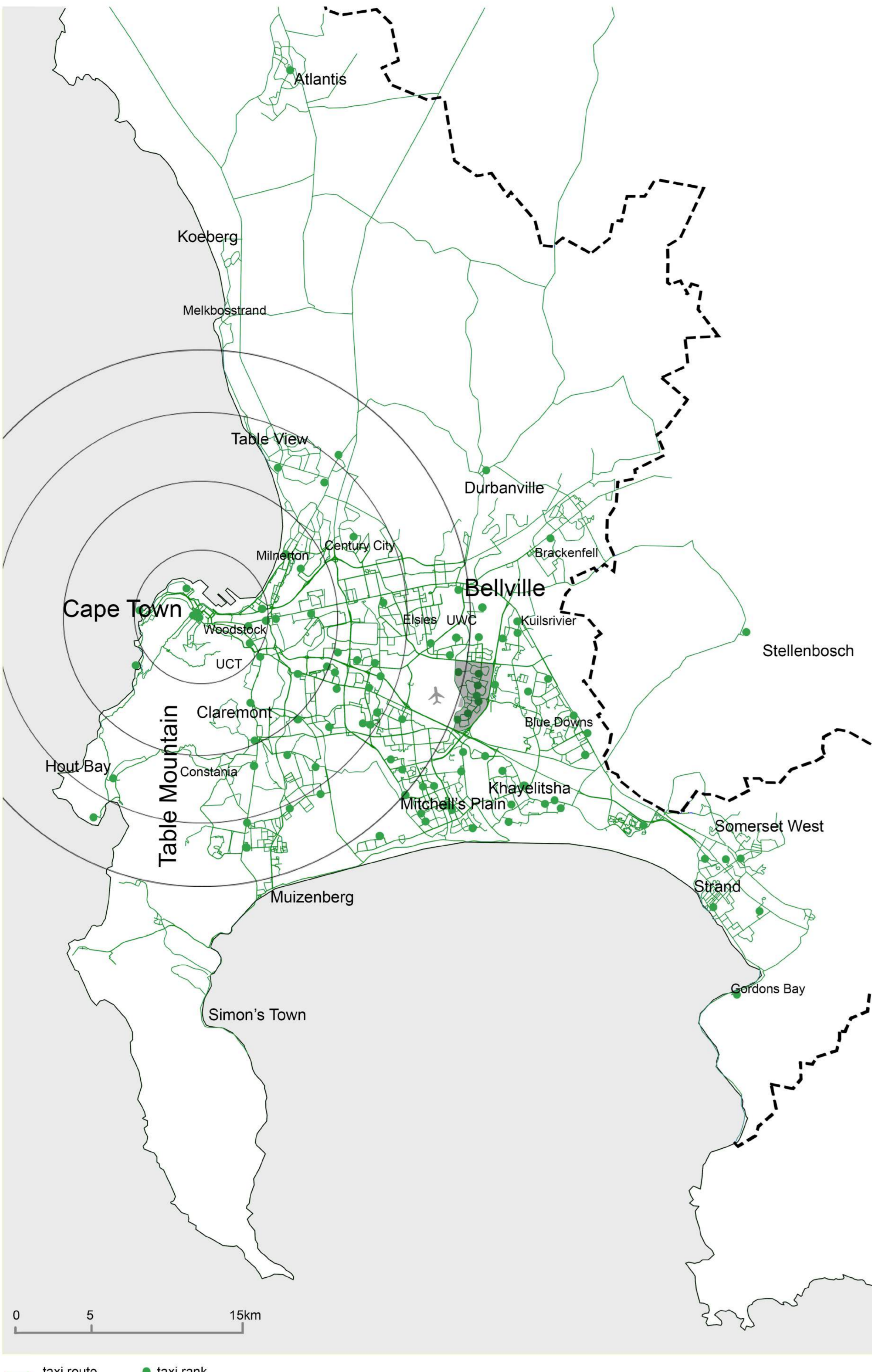
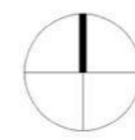
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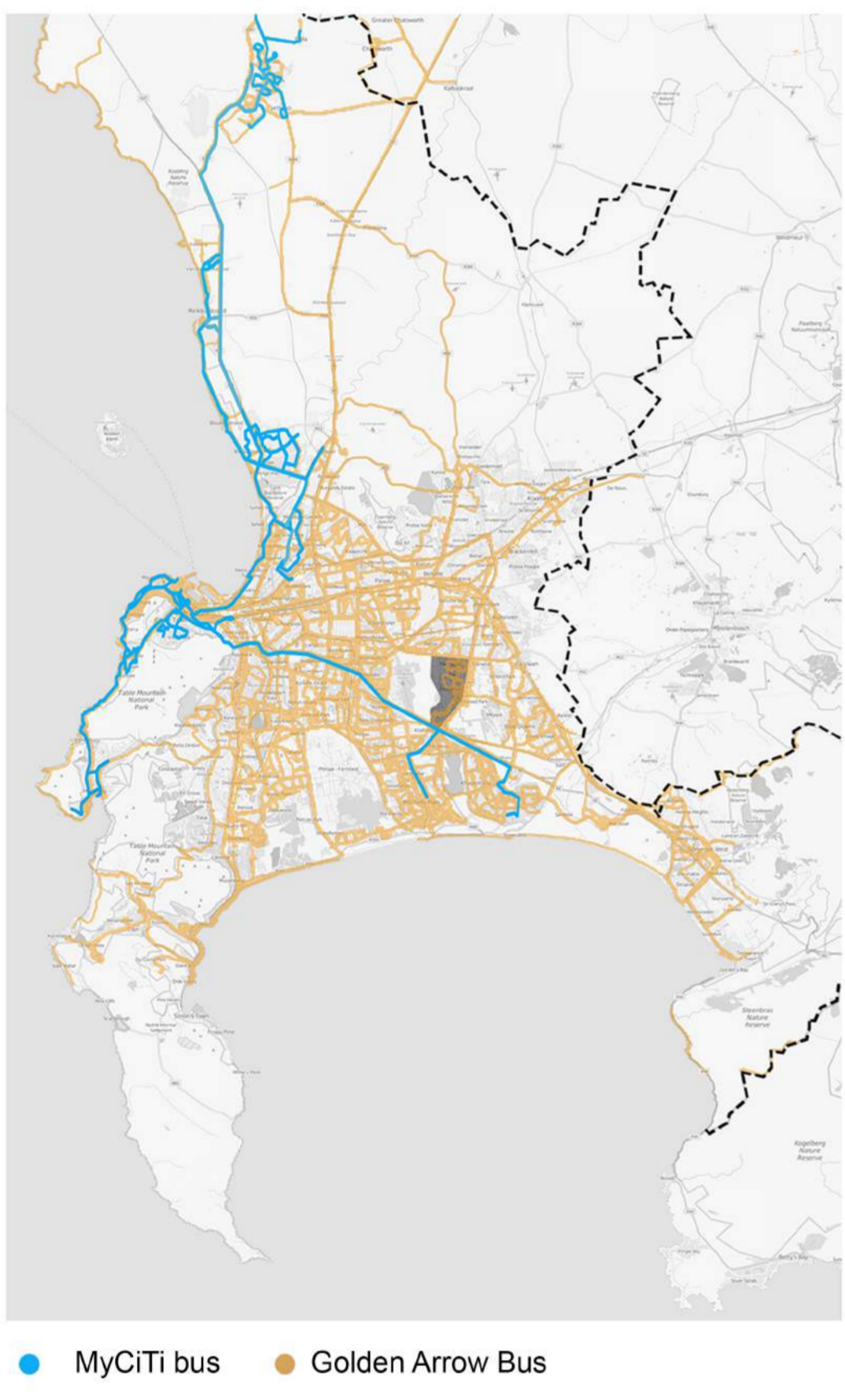
Urban growth | 1940



2004



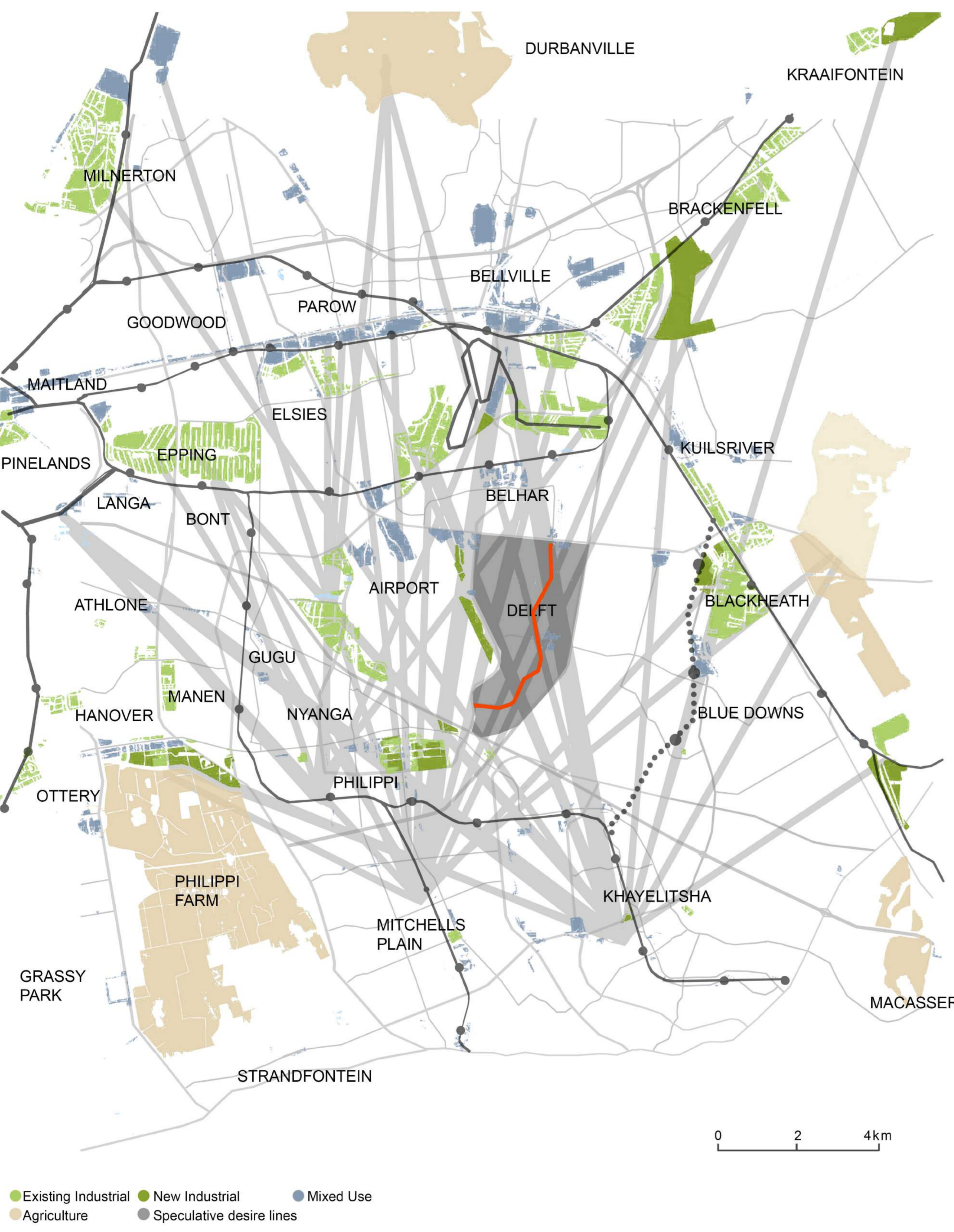
Golden Arrow Bus & MyCiTi



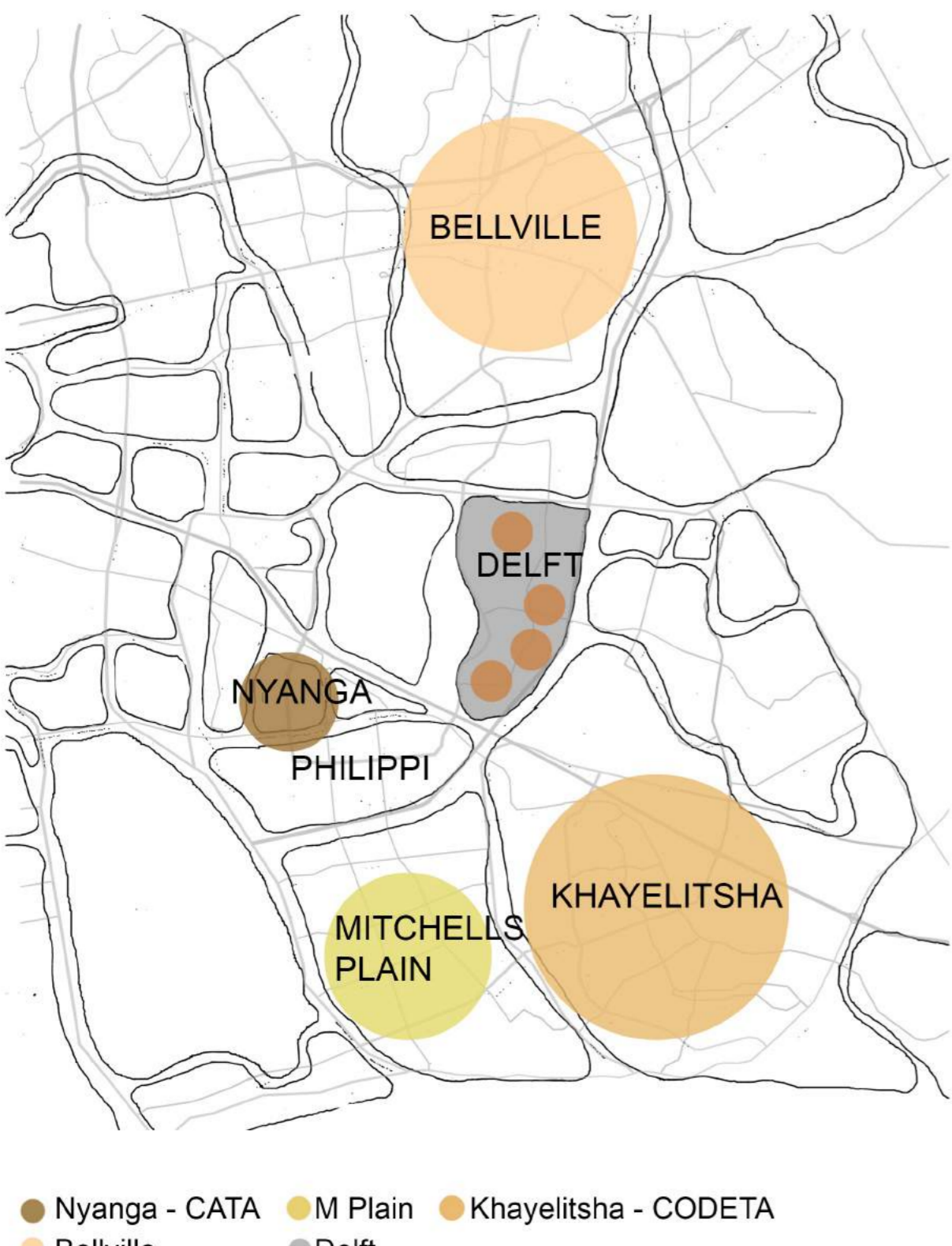
Maitland train station



meso | economic desire lines from high residential MSE area



Taxi association territories



Taxi route destinations



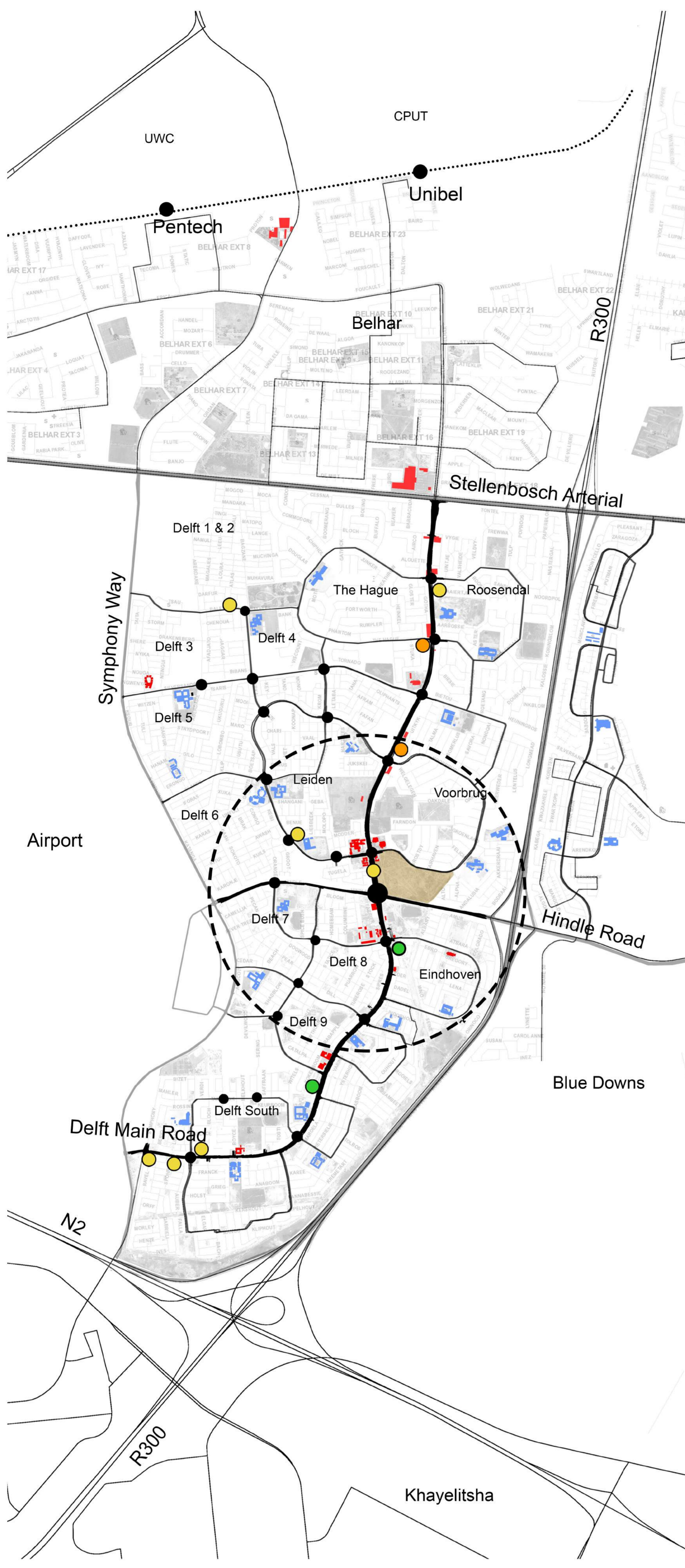
DELT Route Associations	Cost	No of Taxis
Delft - Cape Town	R11	90
Delft - Unibel	R6	20
Delft - Pentech	R6	3
Delft - Bellville	R9	100
Delft - Mitchells Plain	R9	90
Delft - Elsies River	R9,50	80
Delft - Parow	R9	100
CATA		
Delft - Wynberg / Claremont	R11	45
Delft - Bonteheuwel / Epping	R11	45
Delft - Blouberg	R14	50
CODETA		
Delft - Khayelitsha	R11	40
Delft - Stellenbosch	R11	30
Delft - Blackheath, Kuilsriver	R9	30

Nyanga - CATA, M Plain, Bellville, Delft, Khayelitsha - CODETA

0 4 8km

micro

Scale: 15 000



ROADSIDE as a rank - Pocket Rank



LEIDEN SCHOOL - Pocket Rank



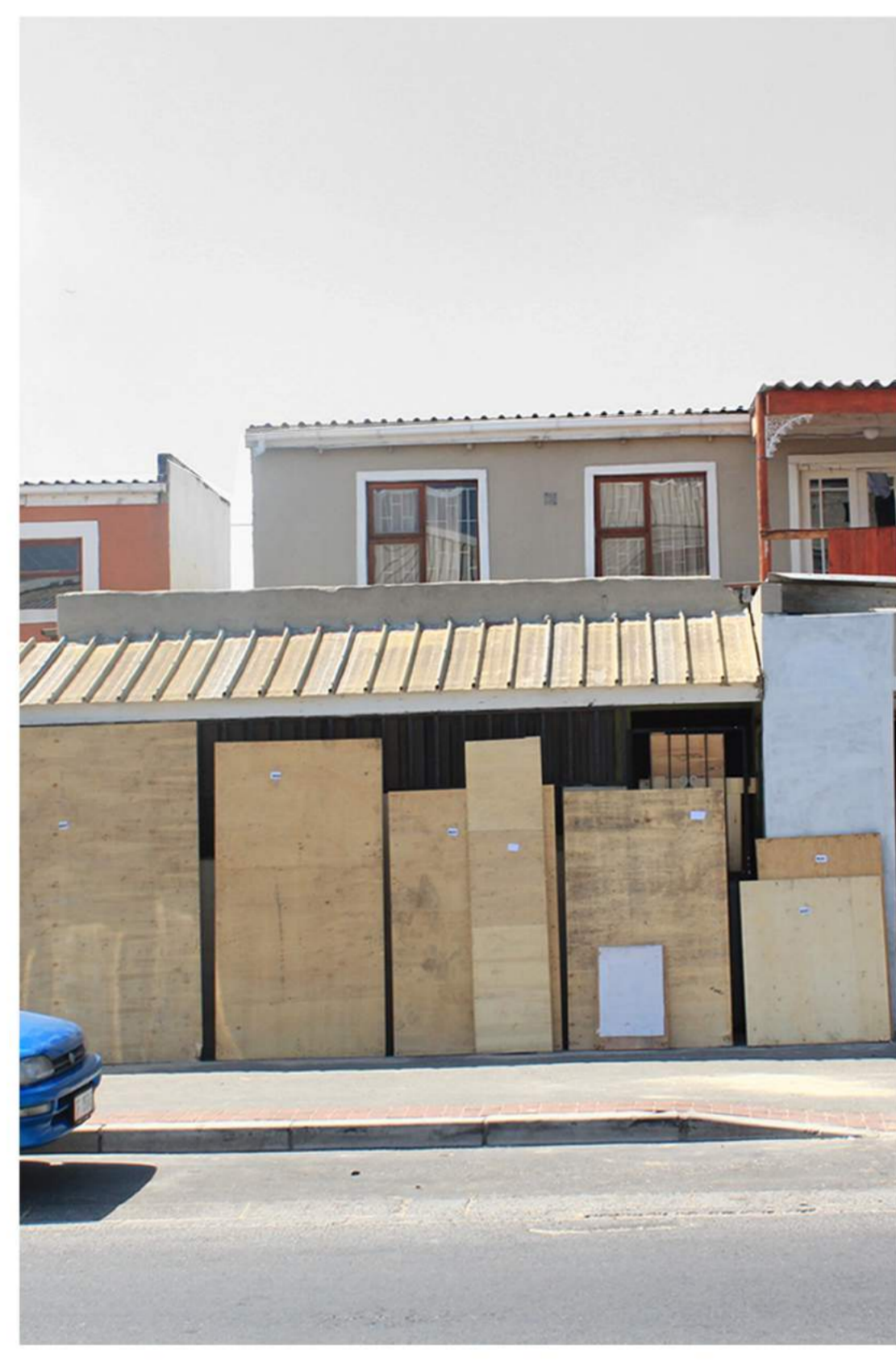
CIRCLES as a taxi stop



UNUSED Voorbrug - Formally built



Retail along Delft Main Road



Building additions



existing RDP self-built additions

Vehicle economy

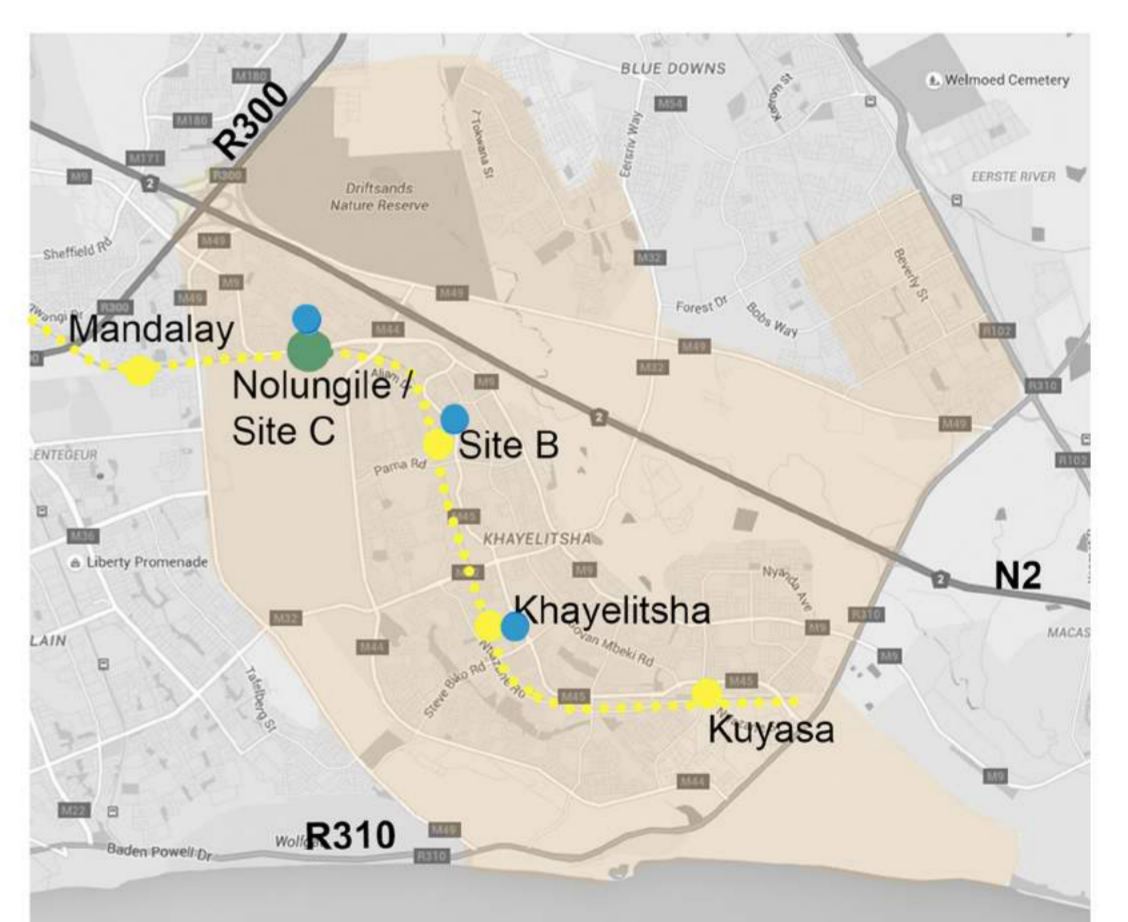


case study | khayelitsha

nolungile



Scale 1: 1000

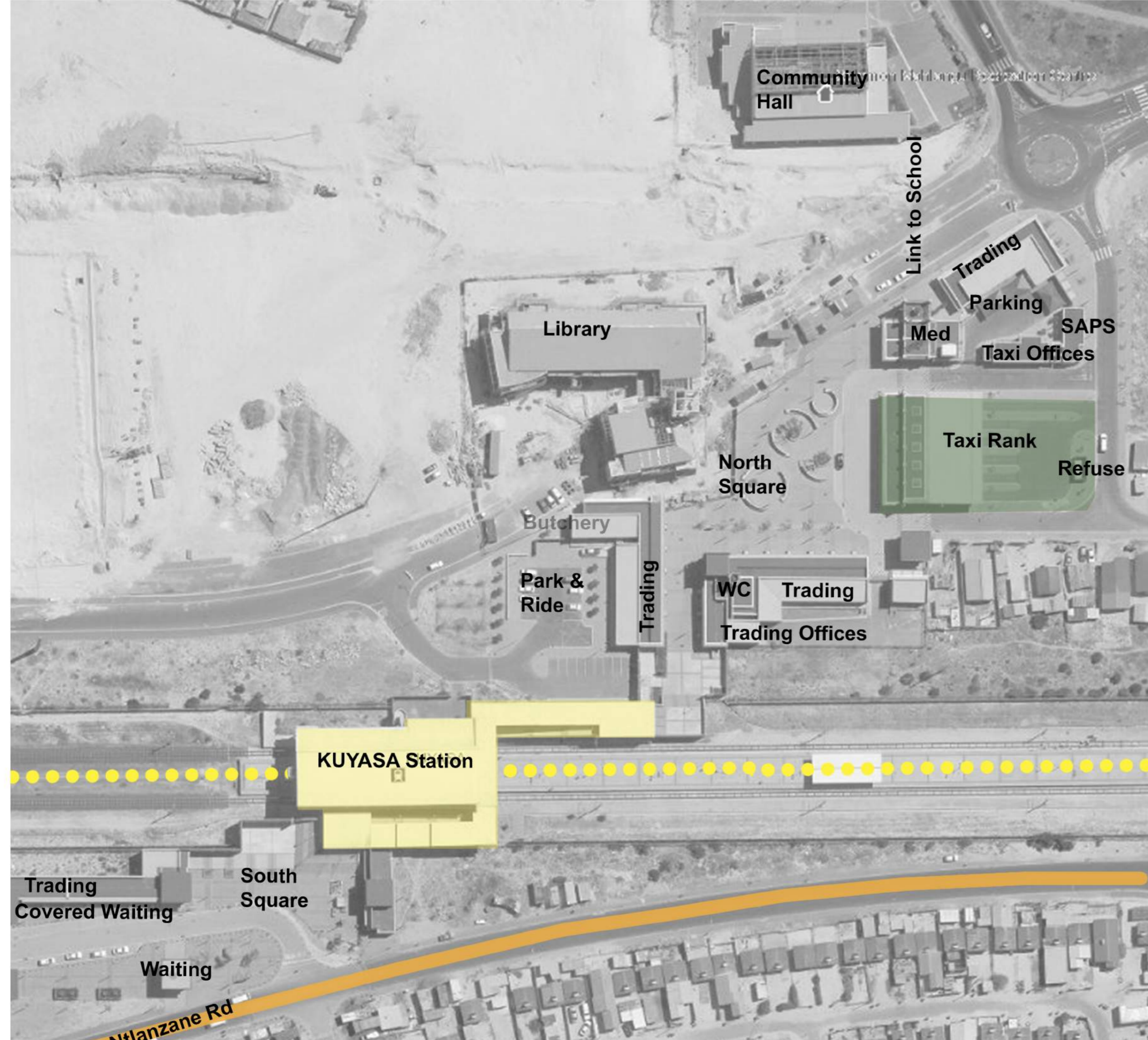


shopping mall train main taxi rank



taxi and retail economy

kuyasa



Scale 1: 1000



low residential densities

siting: nolli map



● existing civic node ● new shopping mall ● site

0 50m Scale 1:1000

site photographs



phasing

Transport depot and live-work units 5 years

Connected public parks and mixed-use density 10 years



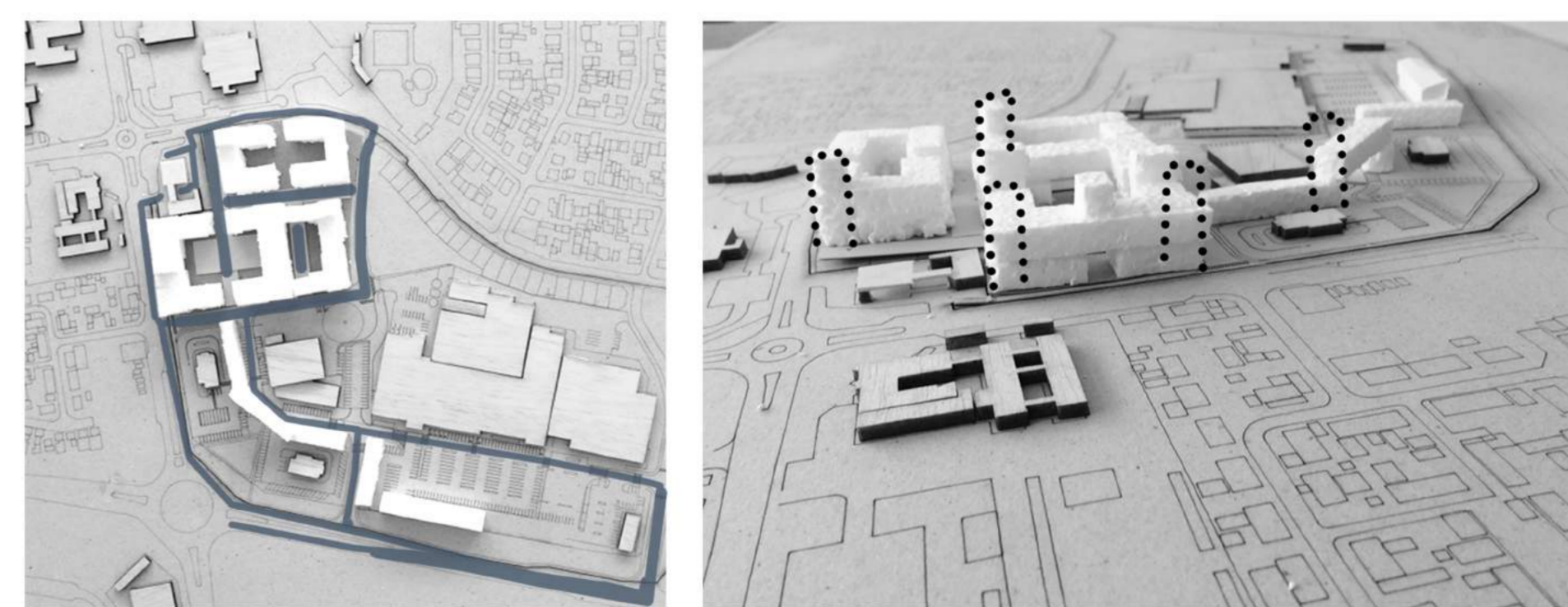
0 100m Scale 1:2000

Urban design informed by existing desire lines. Building height along Delft Main Road. 20 years

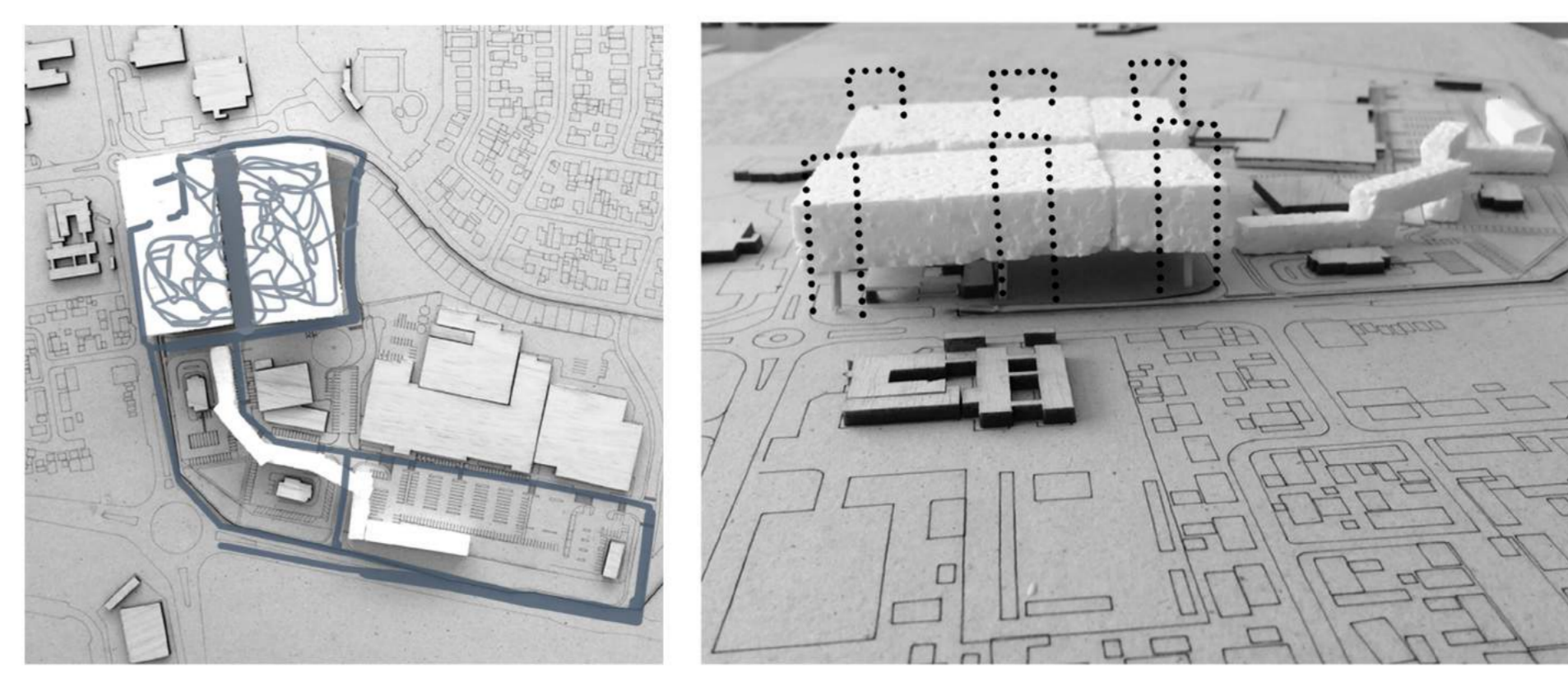


model building

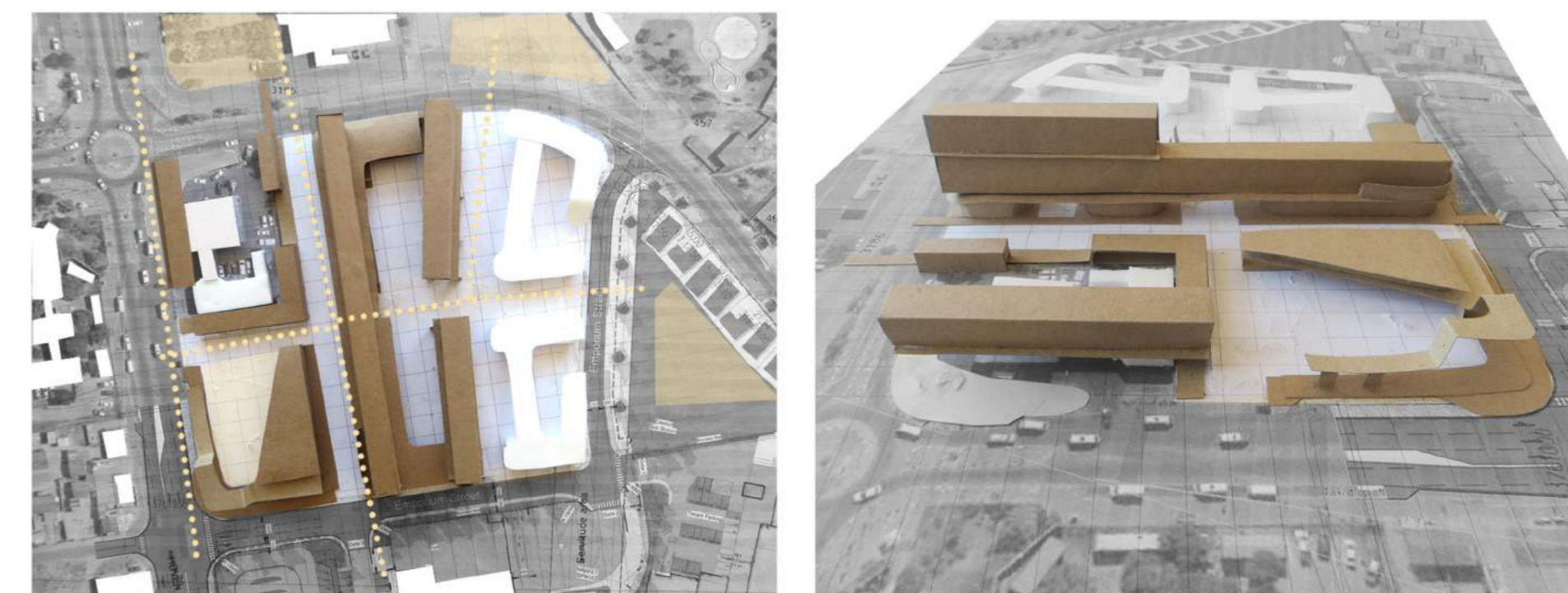
Perimeter blocks. Internal square



Open ground plane. Permeability.



System of roads and active edges

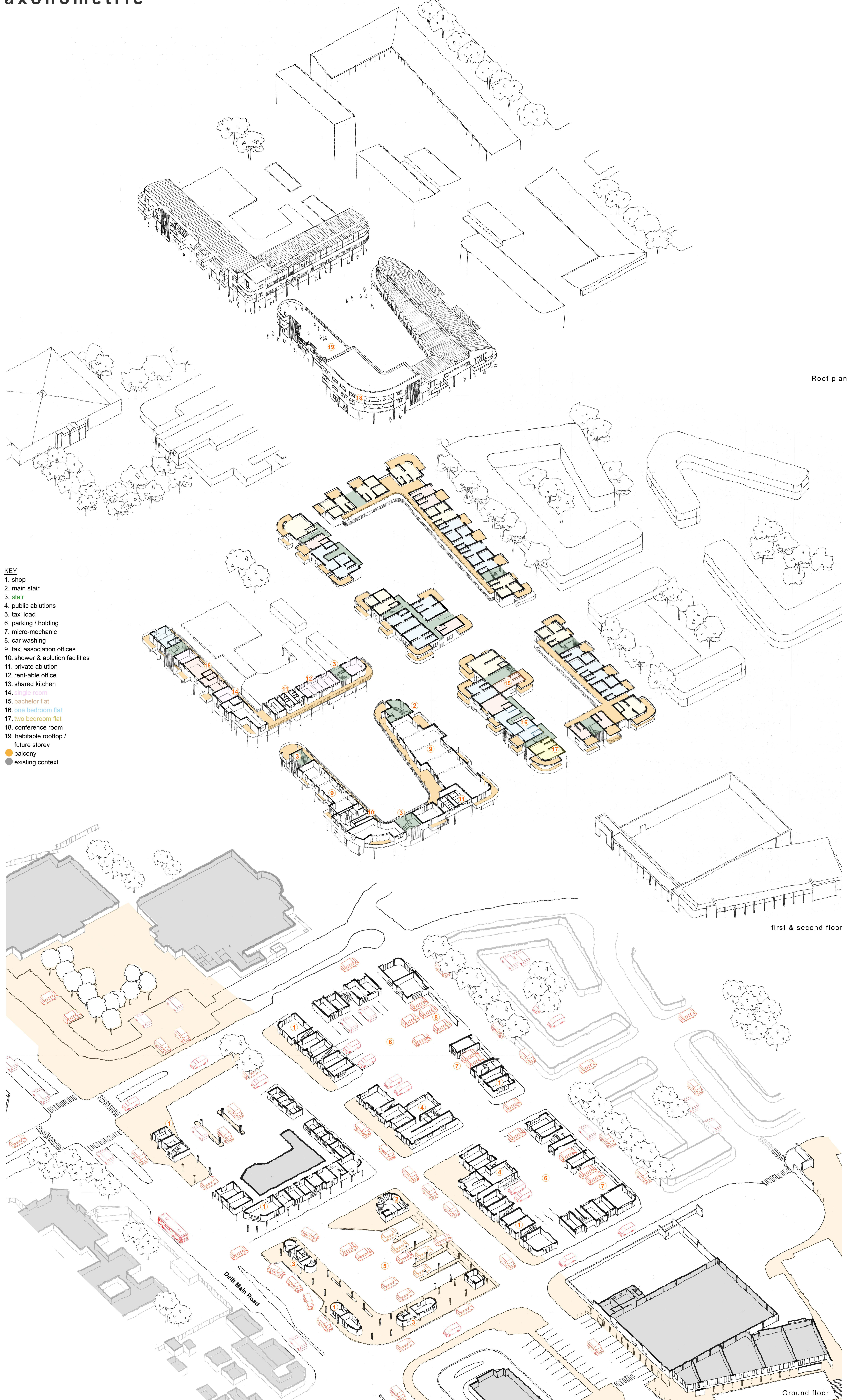


ground floor plan

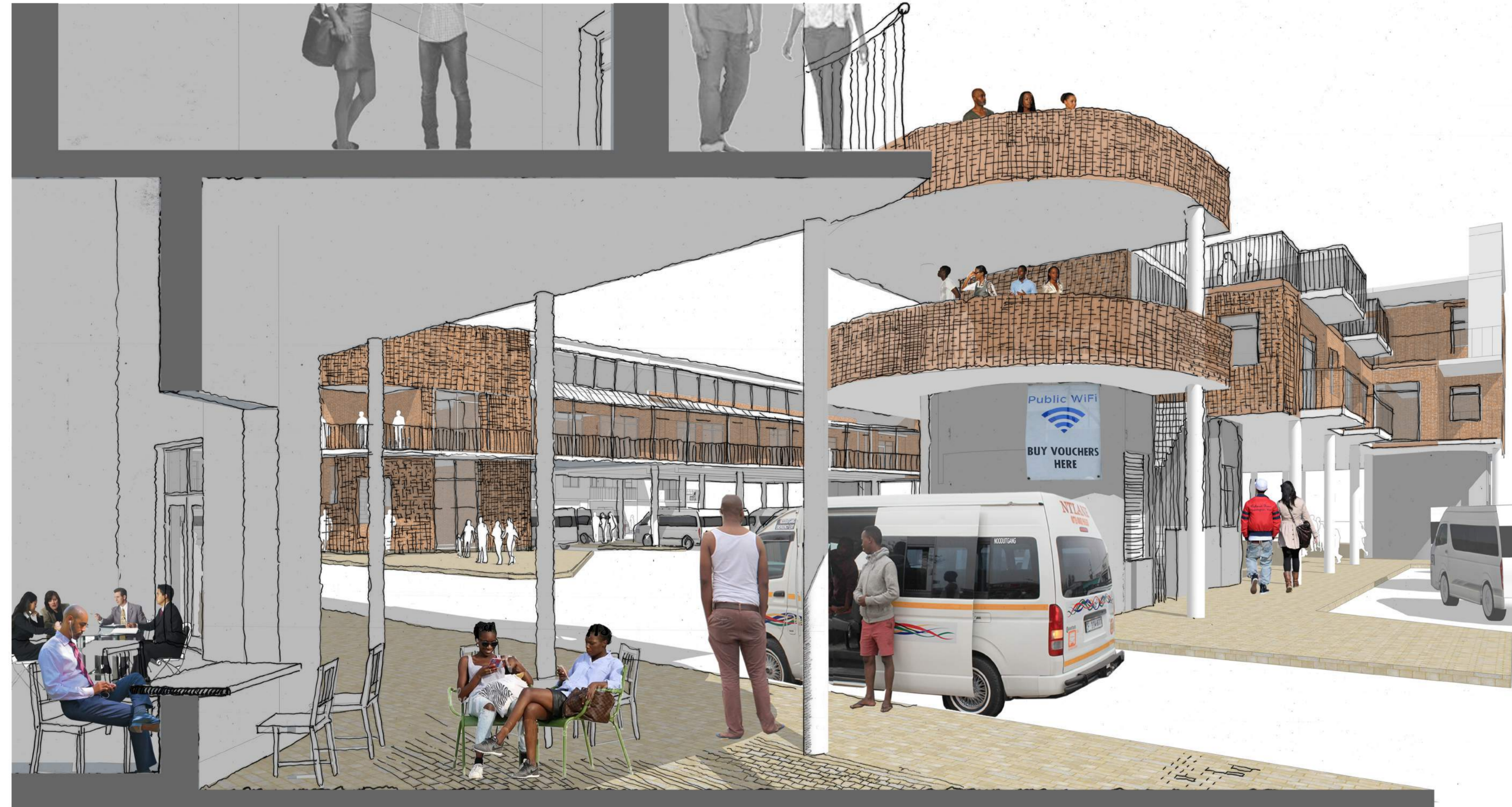
scale 1:250



axonometric



views



Corner view of everyday life along Delft Main Road.

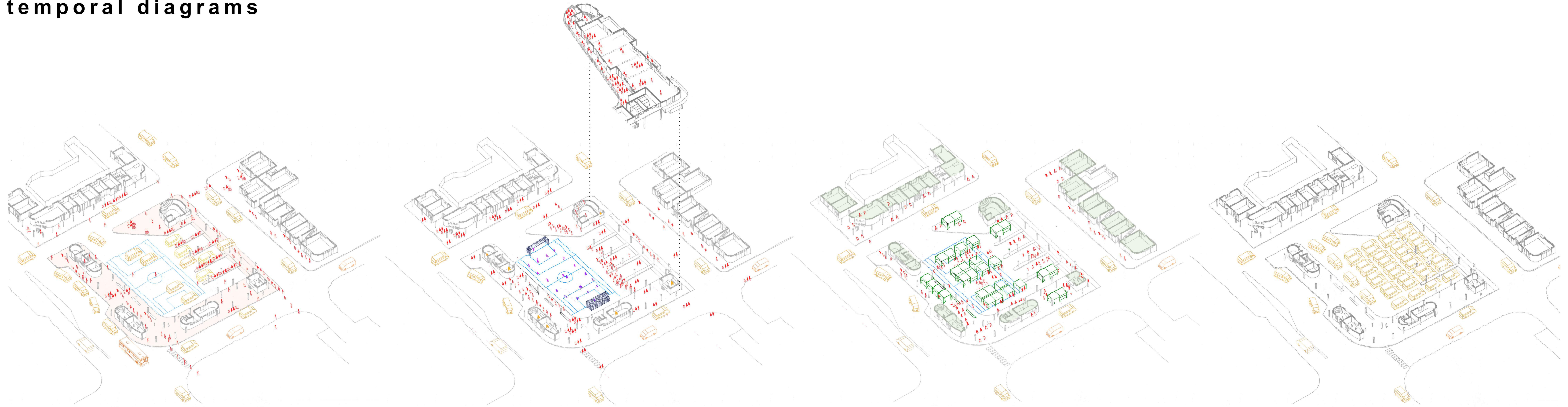


Covered colonnades provide shade to the informal trader.



Shops sit separate to the structural frame and placement is informed by peoples movement routes. They provide anchors to the open square, and prolong activity over the day.

temporal diagrams



05h00 - 10h00
taxi loading

10h00 - 15h00 & other occasions
sport & play

15h00 - 19h00 & weekends
market

19h00 - 05h00 daily
parking

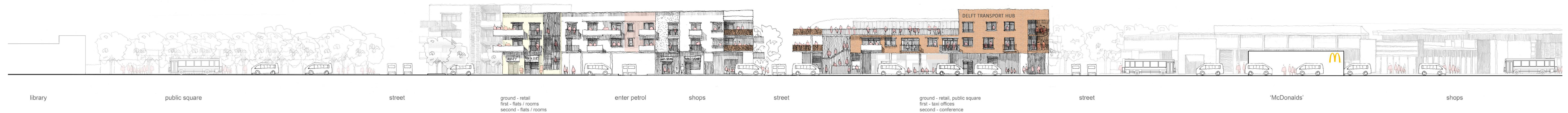
sections



Section AA



Section BB



Section CC

section dd

