


[1.1] Collage
By author (2015)

A topographic map showing contour lines and a dashed arrow pointing to a specific site. The map is divided into a grid. The site is located in the lower-left quadrant of the map. The arrow starts from a black dot on the left edge of the map and points towards the site. The site is a small, dark, irregularly shaped area. The map shows a river or stream flowing through the area, and the terrain is hilly with contour lines.

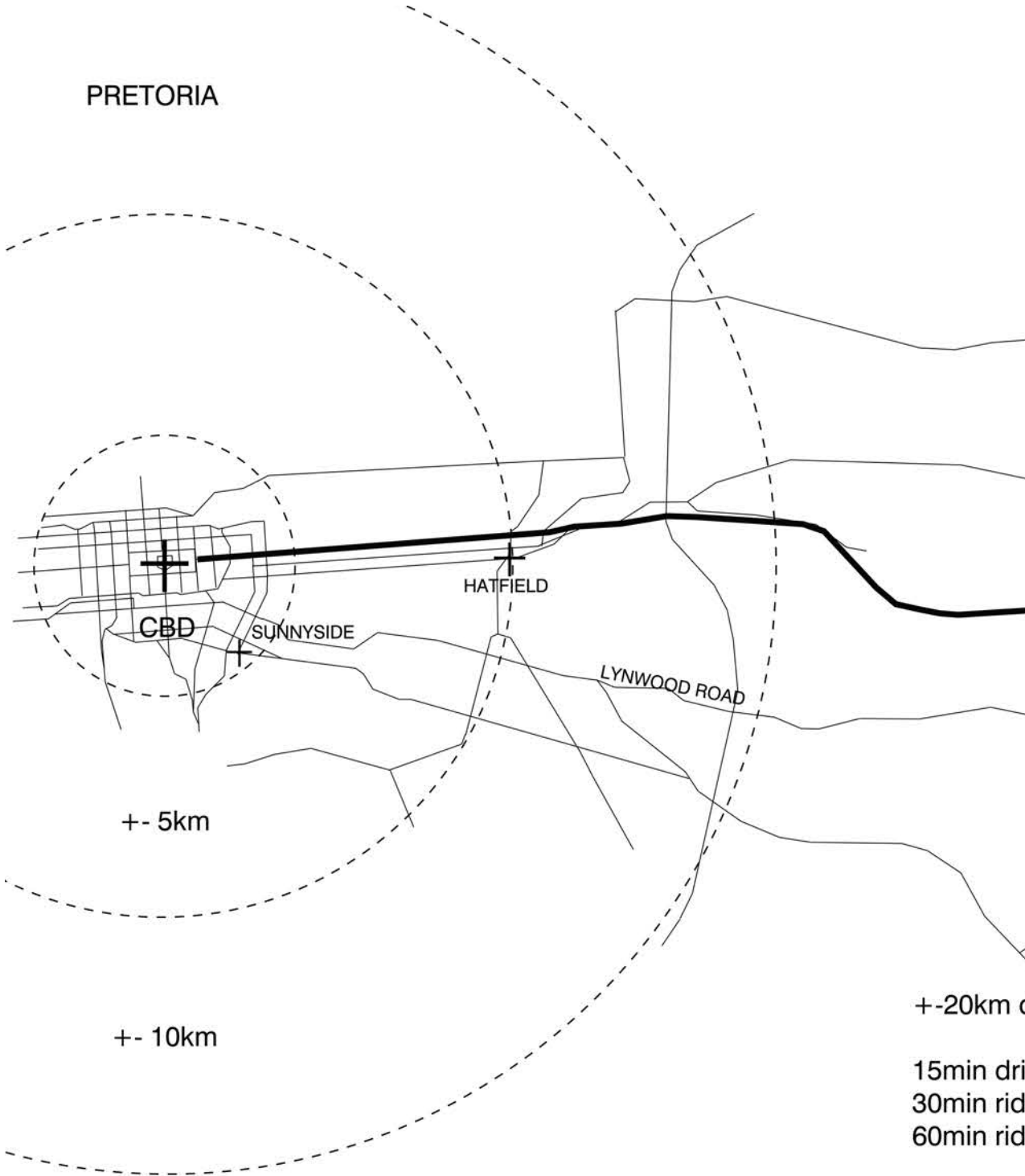
[1.41]
Study area.
(By Author, 2015)

SURVEYING LANDSCAPES

In considering relevant sites for the project, landfills are considered as sites that are commonly underutilised within city infrastructure. Landfills were born out of necessity to get rid of waste from within cities and today, while the environmental implication of landfills were often ignored. While there might be stricter policies around landfill operations, solid waste management principles haven't changed since the inception of landfills. As we are experiencing unprecedented environmental changes in the world with ever decreasing resources and an ever increasing populations and demand on resources, it is only inevitable that landfills will be reconsidered for the resources they contains as well as the space it takes up. Landfills are thus investigated as sites that could potentially successfully be re-integrated in social and cultural contexts, while at the same time augmenting the landscapes' natural processes and integrating it into a city infrastructure. The intention is to change it from a cost to society (contributing to global warming, groundwater pollution, smell and occupation of valuable land) (Jones et al. 2013:45) into a commodity that contributes economically, culturally and environmentally to our cities.

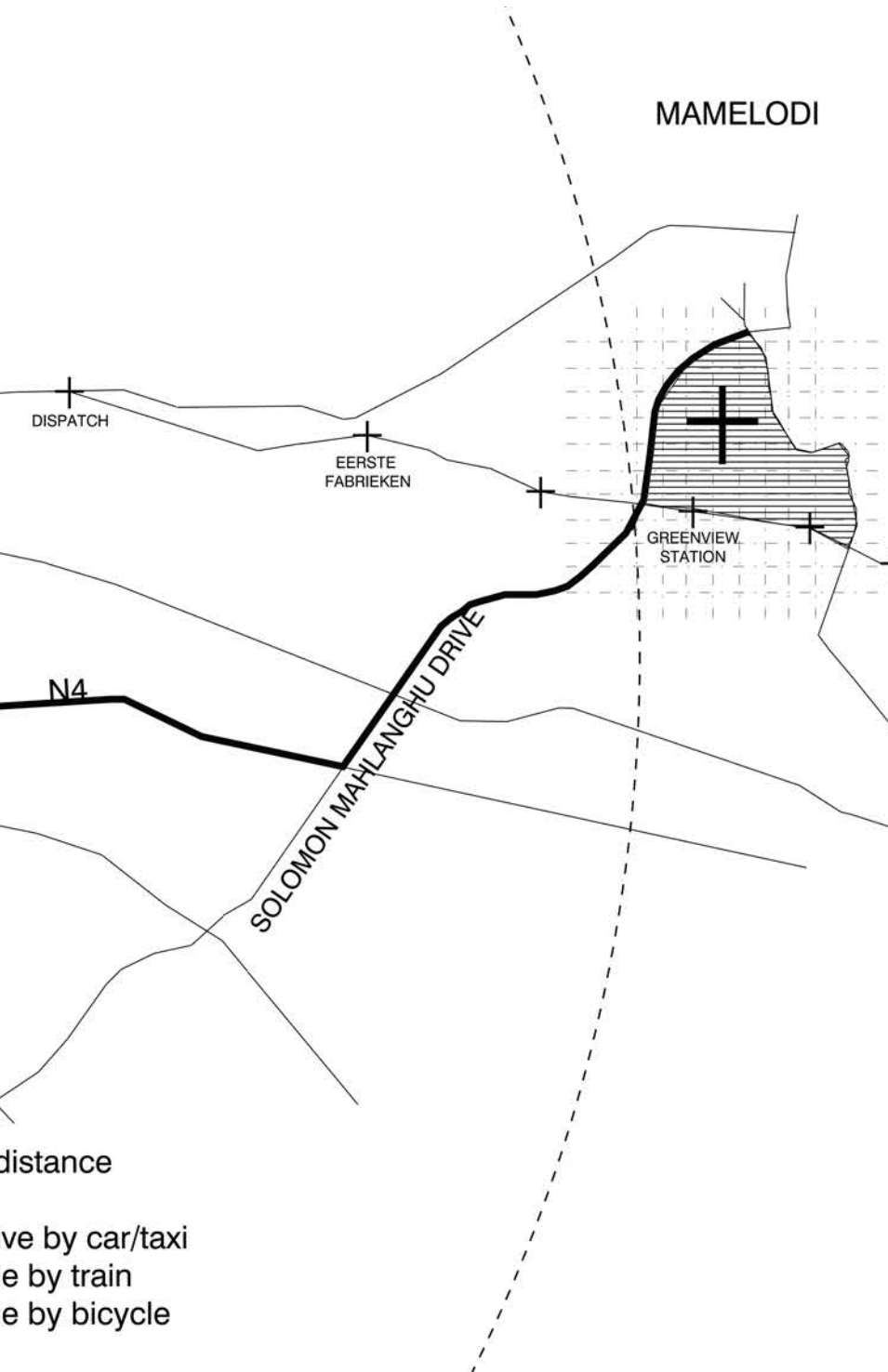
These opportunities are rarely recognised in a global context and even less so in our local context. In our local context, landfills were planned to be situated on the periphery of our cities. Apartheid spatial planning created buffer zones around city centres which included industrial areas and open spaces, increasing the inaccessibility from racially segregated residential areas (Philip et al. 2008:26,27). Landfill sites became part of this buffer around Pretoria, increasing the difficulty for the daily migration of workers living in informal settlements outside of the city centre. Today, there are a total of seven municipality owned landfills, however, two have recently been closed and many are soon to reach full capacity (Samson 2010:1). Ultimately Hatherley Landfill was chosen to be investigated, as it is one of Pretoria's oldest and its largest landfills (du Plessis 2010:109).

PRETORIA



[1.42]
Hatherley landfill also lies in close proximity to Mamelodi as well as Nellmapius Township and is also well connected in terms of in terms of transportation infrastructure, thus making it ideal to investigate its reintegration into city infrastructure.

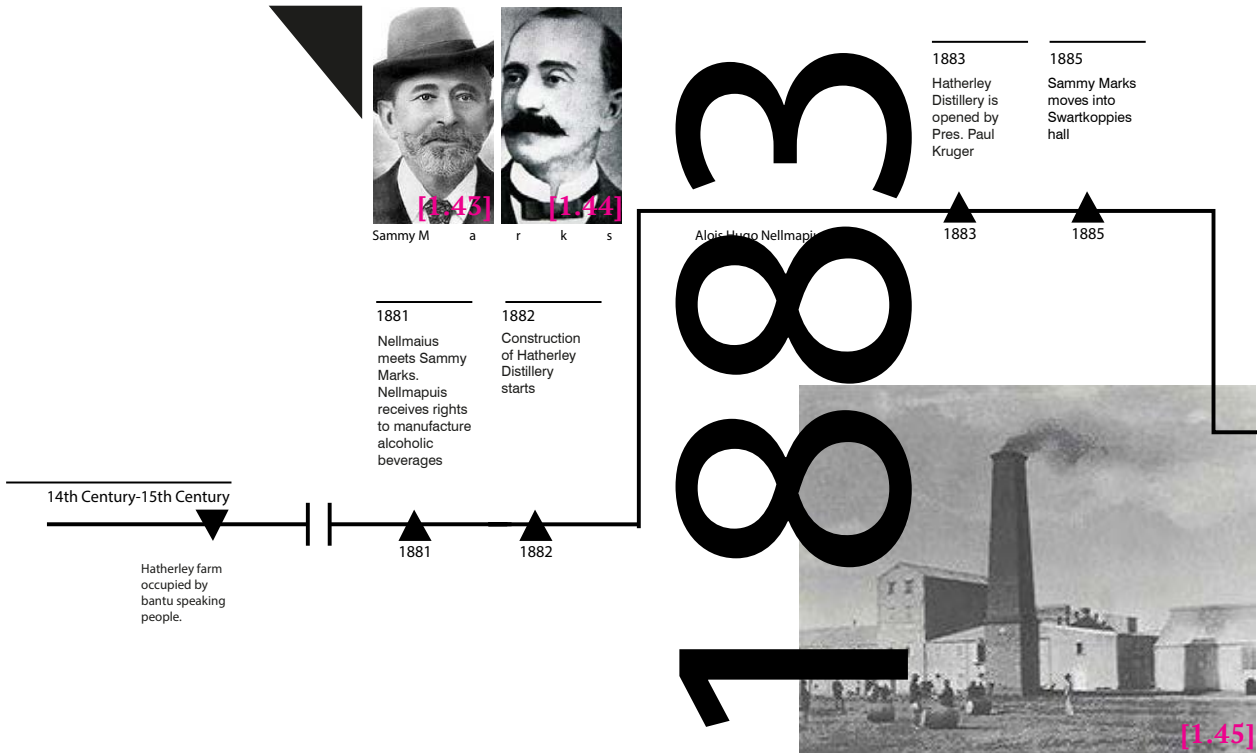
(By Author, 2015)



distance
ve by car/taxi
e by train
e by bicycle

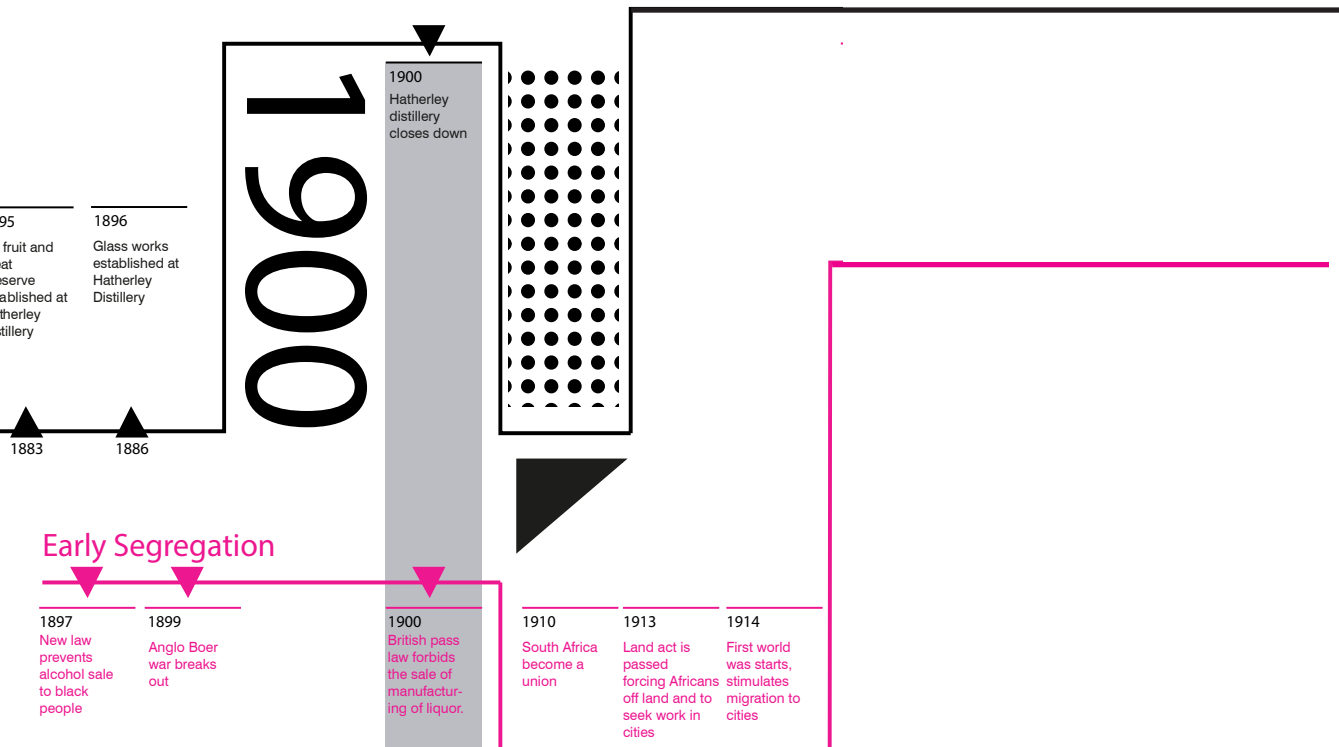
Surveying the city as memory:

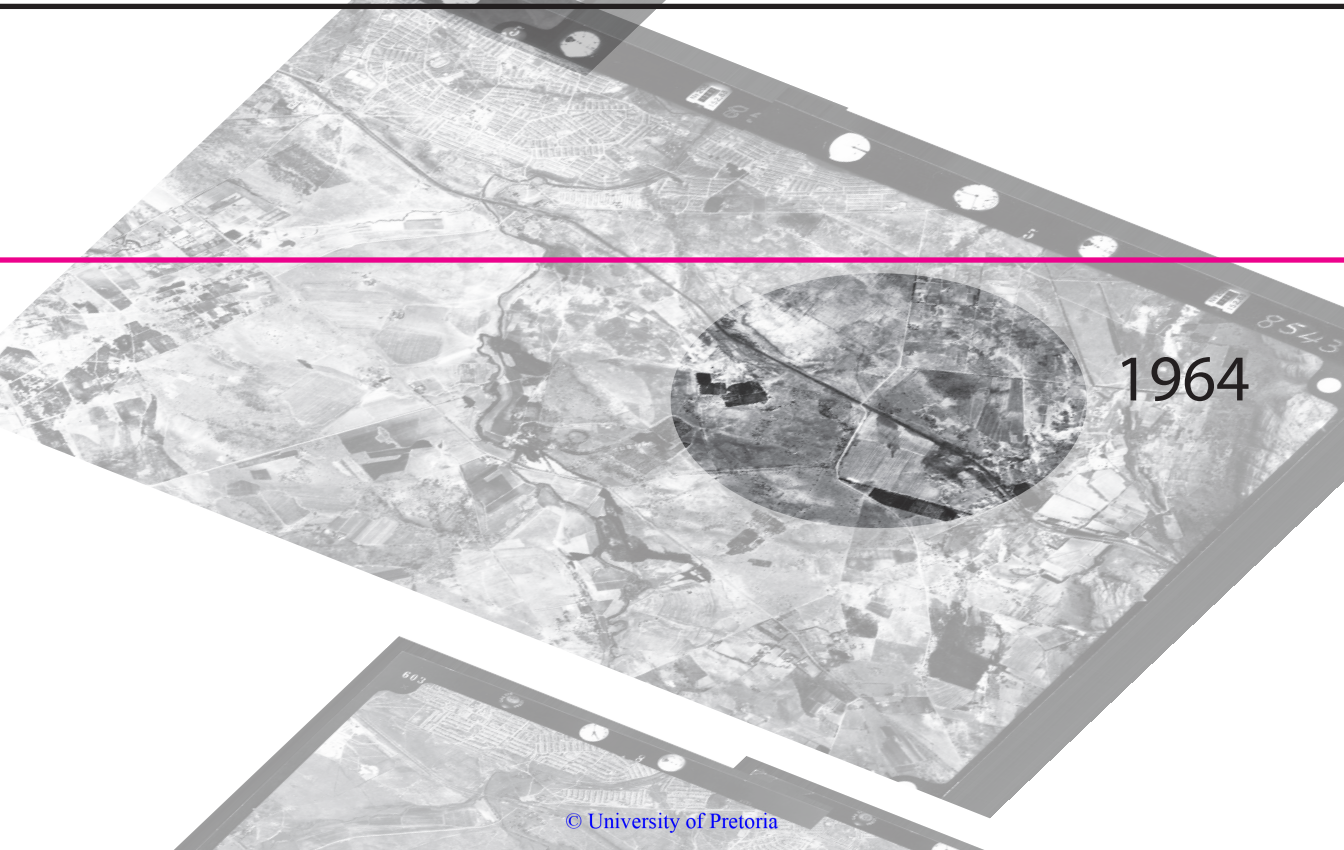
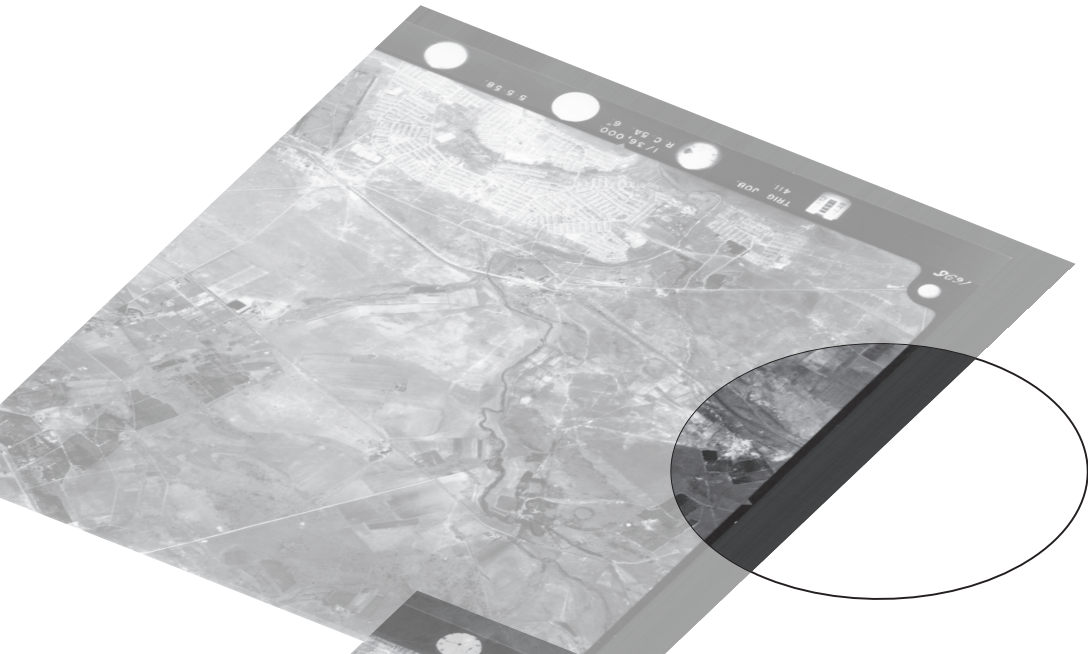
The history of the Hatherley landfill dates back to 15th century when Bantu nomads inhabited the area. Oral history and archaeological remains indicate it was inhabited from 1650 to 1820 (National cultural history museum 1996:ii). Artifacts such as ceramic fragments, stone tools, charcoal as well as stone enclosures were discovered on sites in close proximity to where the landfill sits today (National cultural history museum 1996:8,9). The archaeological surveys were undertaken to establish the heritage value of these sites as developments were proposed over the archaeological sites. Ultimately development of the area went ahead as the sites had no specific “cultural, emotional, historical or religious significance to the Ndebele people” (National cultural history museum 1996:ii). Today only one archaeological site remains close to Hatherley cemetery situated to the south of Hatherley landfill. There is, however a strong possibility that there are more historically significant sites that are located in the area that have not



been discovered yet scattered across the greater region.

Hatherley landfill also has a strong industrial heritage as it sits on Hatherley farm which saw Pretoria's first industrial movement when Sammy Marks and Nellmapius obtained the rights to produce alcohol on the farm (Orton 2009, p.18). Hatherley distillery, also known as Eerste Fabrieke was as a result, established in 1883(Orton 2009, p.18). Other industries were established on the farm but by 1900, with the end of Anglo Boer war nearing, the British passed a law forbidding the sale and manufacturing of liquor and the distillery was closed (Orton 2009, p.18). By 1945 the city bought the farm and established Mamelodi as a black township. To this date many developments have been established around Hatherley landfill with a 4th Nellmapius RDP development, to the south east of the landfill currently under construction. By 2005, Phomolong started developing, an informal settlement to the north of Hatherley landfill.





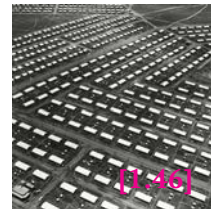
As the informal settlements expanded, many now live in close proximity to Hatherley landfill, and many have started depending on the landfill as sources of income, working daily on these landfills, sorting through and gathering valuable materials. These workers often refer to themselves as ‘bagariesi’, meaning “someone who is looking for something valuable” (Samson 2010:2) which shows a positive outlook to the work that they do. The workers are otherwise referred to as waste pickers or reclaimers. These workers do important work, forming an integral part in Tshwane’s waste management system, by reducing the amount of space required to bury the waste and reintroducing materials into the industrial network. Yet often these workers are neglected, not recognised for the important role that they perform with many stigmas still attached to the work of reclaiming. People are slow to realize that these are often trained workers, doing honest hard work on a daily basis, providing a steady income for themselves. With an unemployment rate of nearly 40% in Tshwane, it is simply not realistic not to recognize the value of waste picking as a possibility for job creation.

1924
Nationalist party wins election in coalition with South African labour party

1929
Great depression forces both white and black people of land and into urban areas

1940
World war 2 stimulates further migration of African into urban areas

1948
National party wins election Existing segregation policies are further reinforced through legislation



1960
Implementation of homeland policies commences

Segregation Consolidated

Apartheid - Control



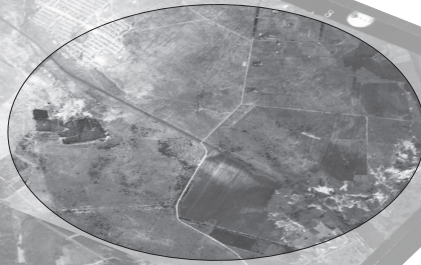
1945

1945
City bought farm to establish Mamelodi as a black township.

1950
Residents from lady selborne to mamelodi

1953
Mamelodi declared black township by government. First black school opens

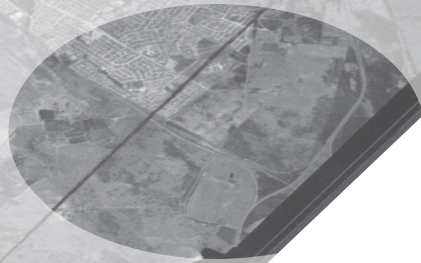
1952
Hatherley landfill opens



1968

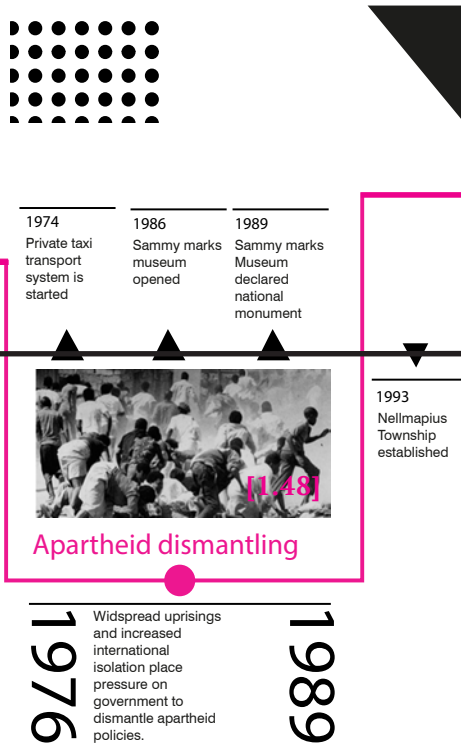


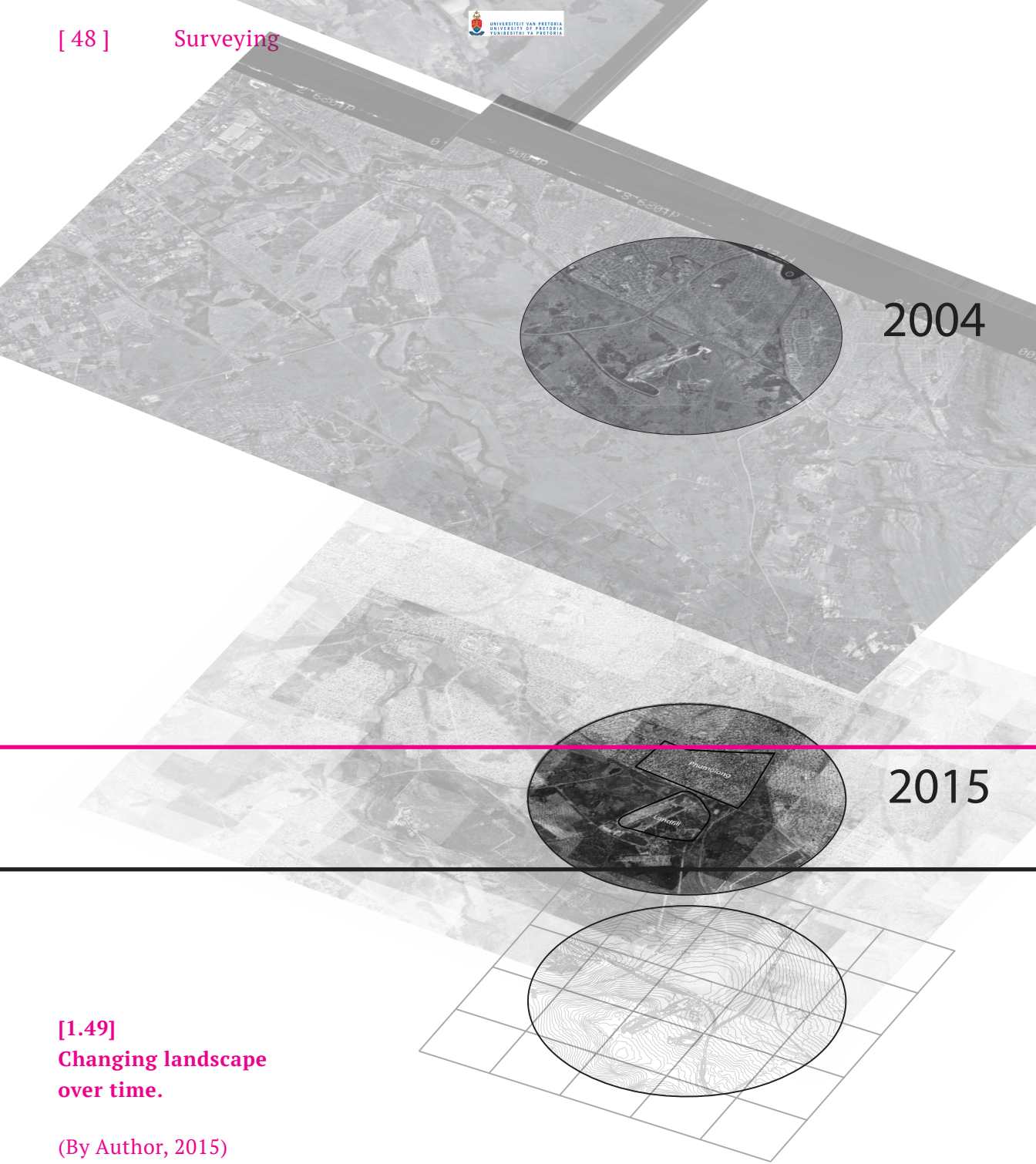
1976



1991

Waste picking has been happening in Tshwane for at least 30 years (Samson 2010, p.2) yet the municipality has been slow to recognise the reclaimers. Reclaimers, as a result, have often experienced trouble accessing landfills sites and while recent attempts have been made to integrate waste pickers into the waste management system, attempts have been slow and largely unsuccessful. The majority of the problem lies in that reclaiming is still a largely unrecognised and unmanaged practice and it is only in 2009 with the new waste act that any legislation mentions reclaimers (Samson 2010:2). The very disorganized nature of reclaiming leads to a host of problems: many are still untrained and often process toxic waste, at the same time doing it in a very unsafe and environmentally unfriendly manner. Furthermore, the electronic waste is often burned illegally for the precious metals it contains, which poses danger to the reclaimers in the form of toxic fumes and starting wildfires. The unmanaged nature of landfill sites also results in a large number of children working on landfills with





2004

2015

[1.49]
Changing landscape
over time.

(By Author, 2015)

some sources claiming up to 1 in 4 reclaimers are aged younger than 18 although exact figures on the number of workers are not available.

Reclaimers have often been banned from accessing landfill sites when working independently and in many instances reclaimers were exploited by contractors who obtained sole rights for reclaiming recyclables from landfills where the reclaimers were paid exceptionally low prices for the materials they reclaimed. Reclaimers often had to resort to sneaking through holes in fences and working at night. At Hatherley landfill, reclaimers organised a toyi-toyi (protested) by preventing trucks from accessing the landfill in order to counteract this.

The reclaimers have since regained access to landfills, but were only allowed back on the landfill when reclaimers agreed to establish a committee to represent them (Samson 2010:3). It was also agreed by both the company running the landfill and the reclaimers that rules would be established to govern how reclaimers worked on site. Once



1994
First
Democratic
elections held

1995
Municipal
boundaries re-
demarcated

1996
Constitution of
South

2003
Social grant
program starts

2005
Phumolong
established

1999
Nellmapius ext
3 Township
established

Intergration

2005
Planned and
illegal protest
in townships
due to slow
service
delivery and
poor living
conditions

2007
Integrated
development
plans are
adopted by
municipality

2008
Xenophobic
violence occur
in townships

2009
Global
financial crisis
occurs

1994
Democratisation

2004



this happened waste management officials realized the valuable job these reclaimers were doing by reducing waste and minimize space and money required to bury the waste and at the same time was reducing poverty and creating employment opportunities.

At this stage it seems that reclaimers now have secure, regular and independent access to landfills, however companies running operations on landfills have not always had the reclaimers best interest at heart which has resulted in many projects aimed at uplifting reclaimers to be largely been unsuccessful; training provided by the company running landfill sites was not deemed to be useful by the reclaimers who also did not receive the certificates promised to them. An attempt was also made to introduce a buy-back centre on the landfill, but ultimately resulted simply being large sheds for the storage of reclaimed material and has also had many management issue without any cooperation or support for the reclaimers (Samson 2010:4). The company running Hatherley landfill was also tasked with training and organizing reclaimers, yet had conflicts of interest regarding regularizing the reclaiming of materials; the company ultimately claiming a monopoly over the materials gathered and offering low price to the reclaimers (Samson 2010:5). In the end all these projects aimed at uplifting reclaimers mostly did not benefit the reclaimers as it was intended to do.

At this point in time reclaimers have unrestricted access to landfills across the city and even though the projects aimed at reclaimers where largely unsuccessful, by encouraging the reclaimers to form committees, the projects laid the foundation for easier organisation and ultimately the reclaimers regained their independence. Reclaimers have also successfully formed citywide networks in order to engage and negotiate with both the municipality and buyers of recyclable materials and “has made progress in attracting new buyers to the landfills, negotiating prices and helping reclaimers deepen their understanding of their role in the recycling economy” (Samson 2010:25). Many hurdles, however, still remain and more formalized engagement by the municipality and landfill committees are required.

[1.51]
Sketch of Bagariesi.

(By Author, 2015)



Surveying the city as object:

[1.52]
Context mapping.

(By Author, 2015)

Separating the landfill and the informal settlement of Phomolong is a series of train tracks as well as Greenview train station. The station has recently undergone a major upgrade and a bridge addition which is still under construction. To the east of the landfill we see another train line, predominantly used as a goods rail transporting mostly industrial products. The train tracks currently isolate the landfill from the neighbouring communities with no formal crossing; with the exception of the bridge addition to the train station still under construction and Solomon Mahlango drive almost a kilometer away from the landfill. Despite this, daily, thousands of people cross the train tracks in order to access the landfill as well as to reach Nellmapius settlement to the south, by dirt road on foot, bicycle and in some cases even car as was observed during a site visit. In order to cross the train tracks is thus a very dangerous task especially for reclaimers who often carry large object, that cannot be sold to recycling companies back to Phomolong. The train lines however provide a great opportunity as the landfill can potentially utilise the rail system to receive and send goods.

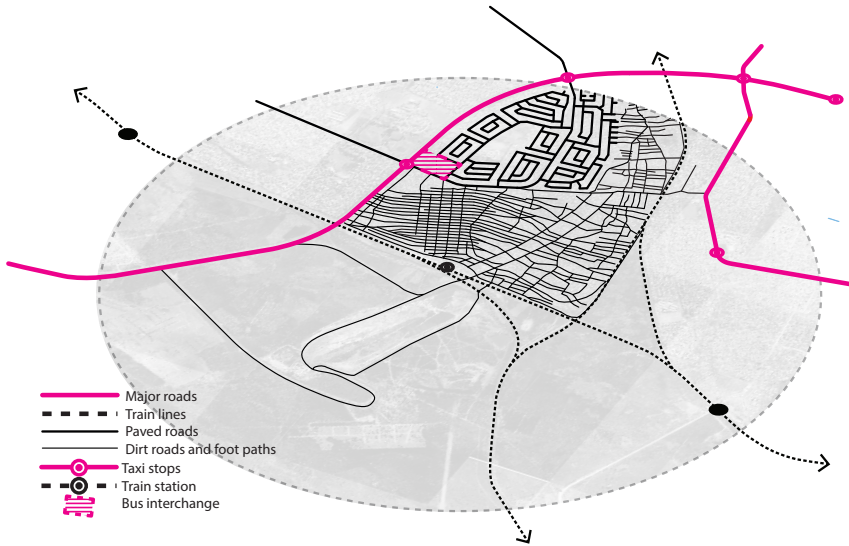
→ Metro Rail

[1.53]
Greenview station.

(By Author, 2015)

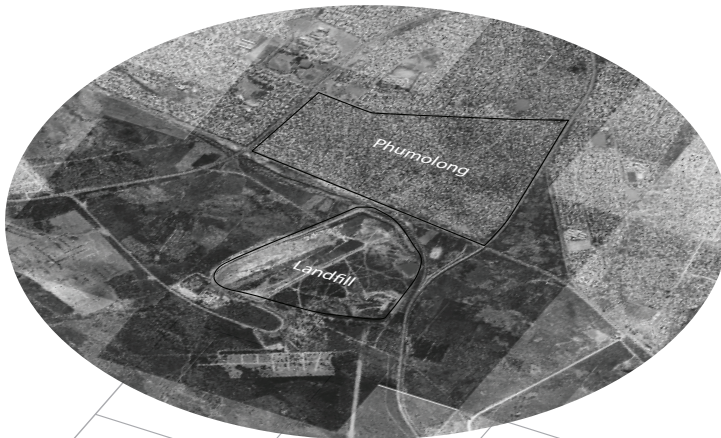
→ Major roads





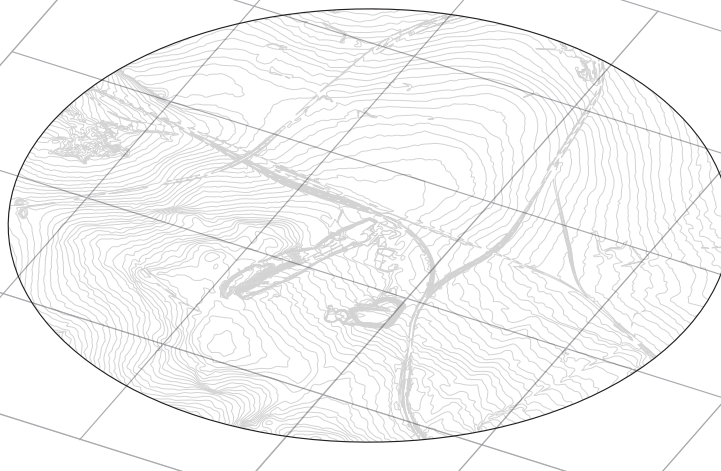
[1.54] Left
Meso mapping

(By Author, 2015)



[1.55] Right
Greenview station
and train service
road.

(By Author, 2015)



[1.56] Right
Bermed edge of
landfill in relation
to Phumolong.

(By Author, 2015)

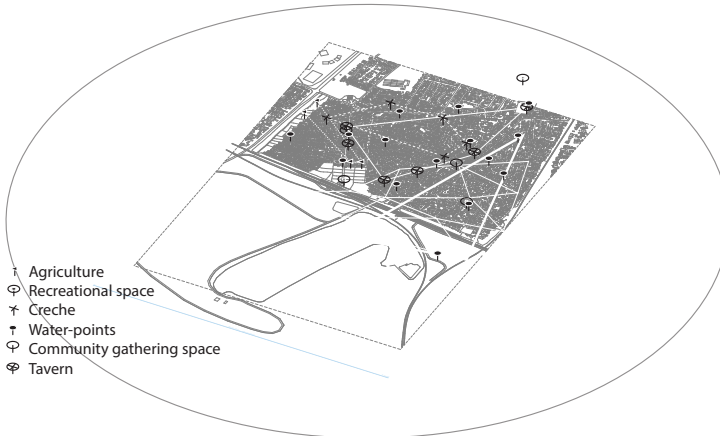
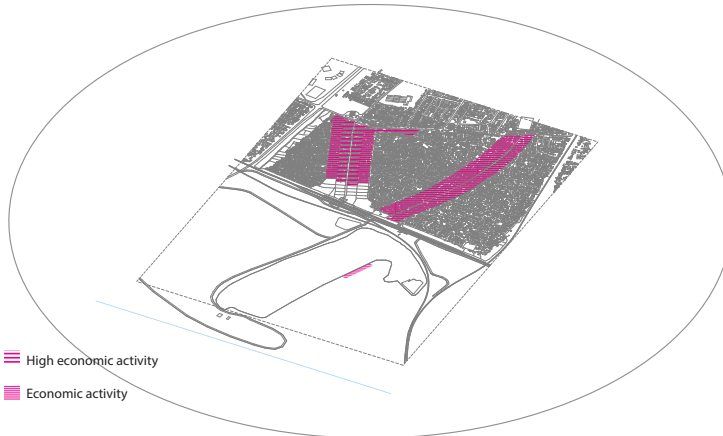
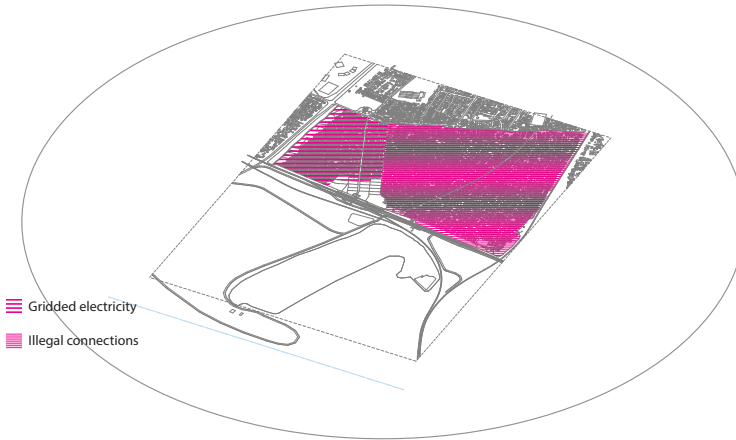
To the north of Greenview station a large portion of land was relocated to allow for construction of the station, creating a vast open area of land. To the northeast of the informal settlement is an important intersection splitting the bus interchange, suburban development, University of Pretoria Mamelodi campus and Phomolong collectively; showing the diverse nature of development in Mamelodi.

Running down from the bus interchange to Greenview station is a corridor where we see the majority of commercial activity in Phomolong, mostly spaza shops and taverns, with a few shops that sell reclaimed materials gathered from the landfill. Social and gathering spaces are also located along this corridor centered around light and water points. Except for the major corridor the remainder of Phomolong's road network is a very fine grained dirt road, contrasting with the road network in the surrounding areas which have been formalised. When wet, the clay soils and the very level landscape make movement difficult along the informal road. The majority of users navigate these pathways on foot and some by bicycle with few roads accessible to cars.



[1.57] Meso mapping

(By Author, 2015)



[1.58]
Photo collage of area
relocated for Green-
view station con-
struction.

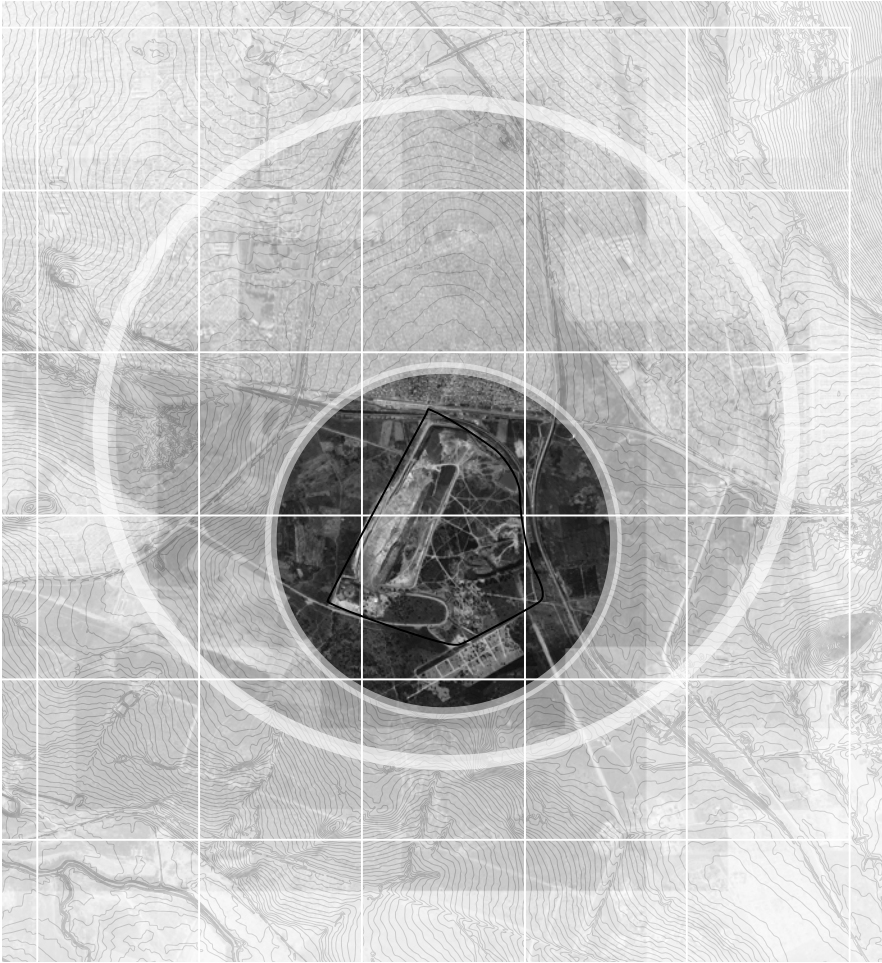
(By Author, 2015)



[1.59]
Main route leading
to Greenview sta-
tion.

(By Author, 2015)





[1.60] Landfill location.

(By Author, 2015)



[1.61] Landfill panorama.

(By Author, 2015)



[1.62]
View from landfill
edge into landfill.
(By Author, 2015)

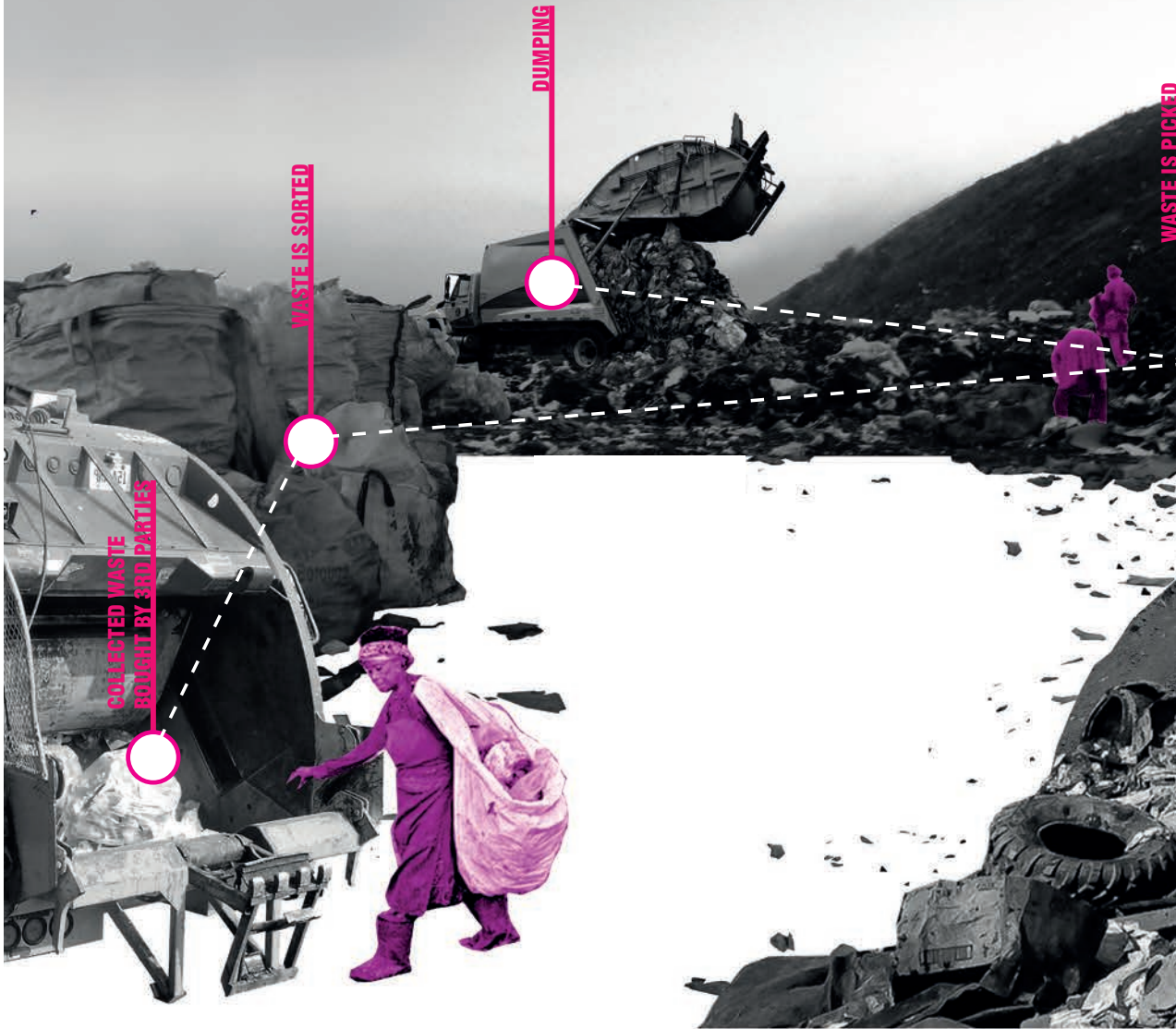


[1.63]
Northern edge of
landfill.

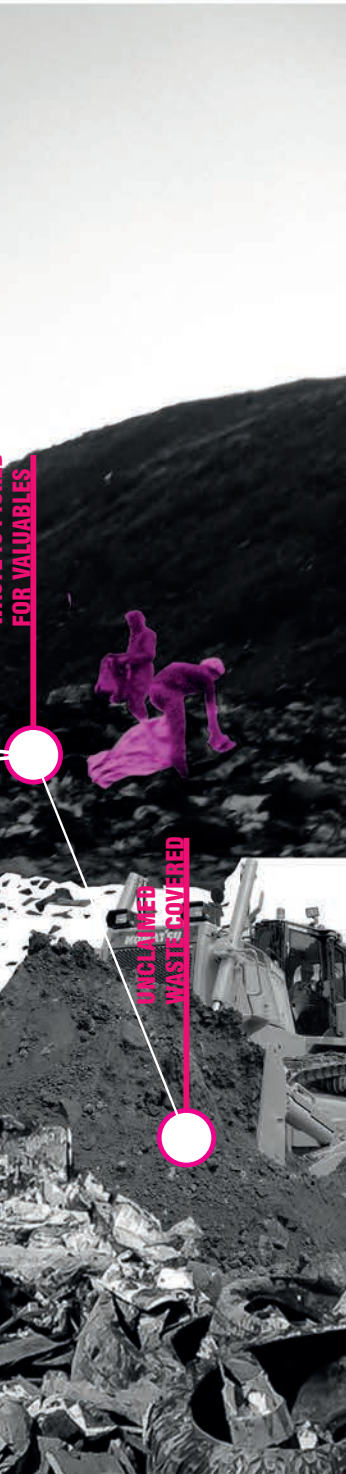
(By Author, 2015)



[1.64]
Daily activities on
landfill.

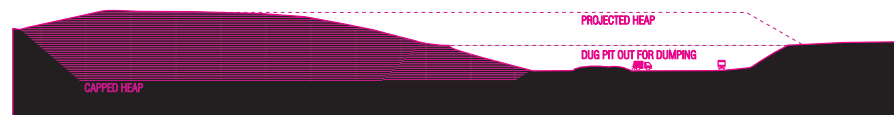


Activity in the area is very little during the day and majority of activity takes place early morning and early evening when large numbers of the community use public transport in the form of bus, train and taxi to commute to and from work. During the day we see large numbers of activity on the landfill starting early in the morning up until sunset. Trucks start coming in early in the mornings and are diverted to certain areas of the landfill where the specific types of wastes are dumped. Reclaimers then gather and sort valuable items that they either take home and use to make products, or sell to recycling companies that access the site regularly, providing the reclaimers the majority of their income. The waste that is unclaimed is then covered in a layer of soil. Once an area has been filled a new area is excavated where the unclaimed trash is dumped and covered with the excavated soil.



[1.65]
Section through landfill capped heaps.

(By Author, 2015)



[1.66]
Section through active dumping area on landfill.

(By Author, 2015)



<https://vimeo.com/148023177>

Link to video mapping of Phomolong.



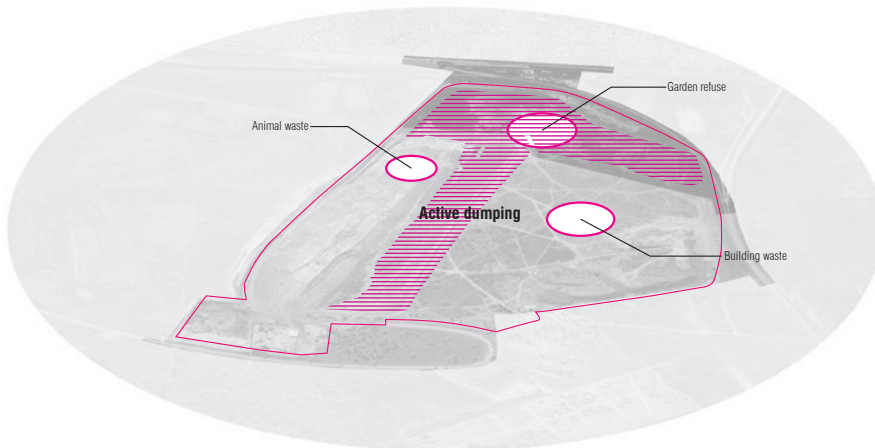
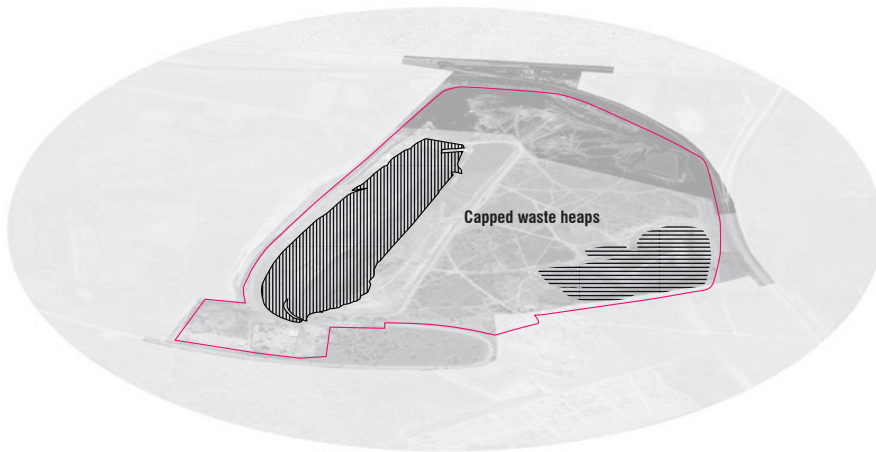
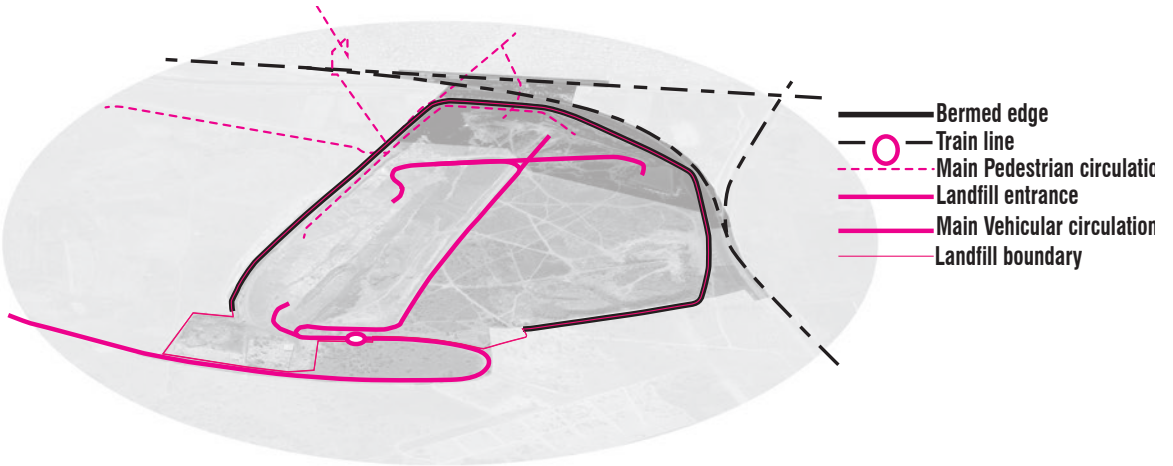


<https://vimeo.com/148022478>

Link to video mapping of Hatherley landfill.

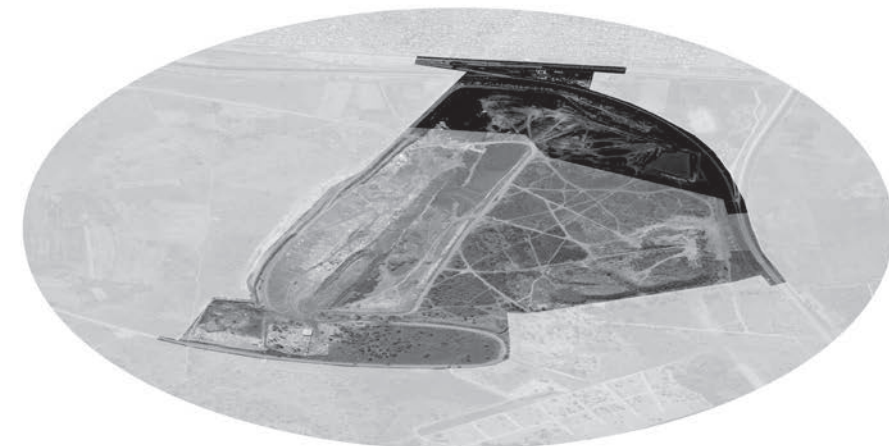
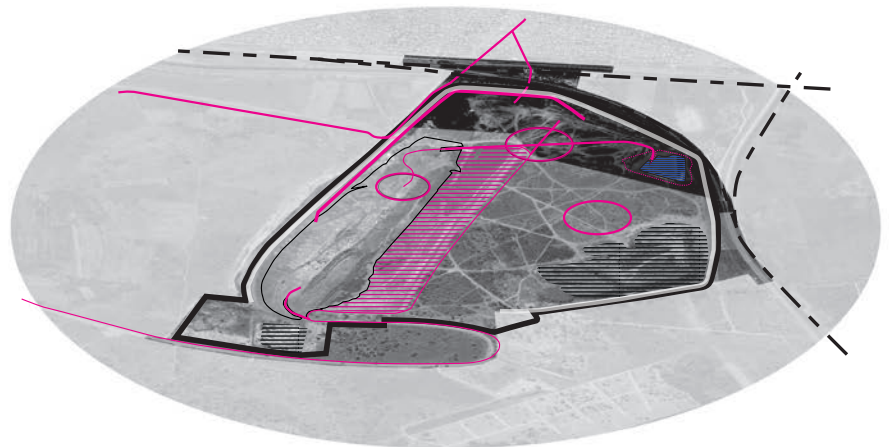
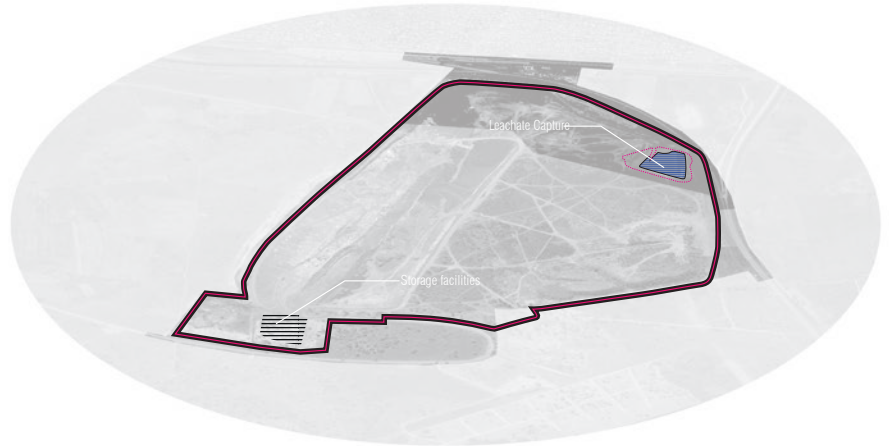


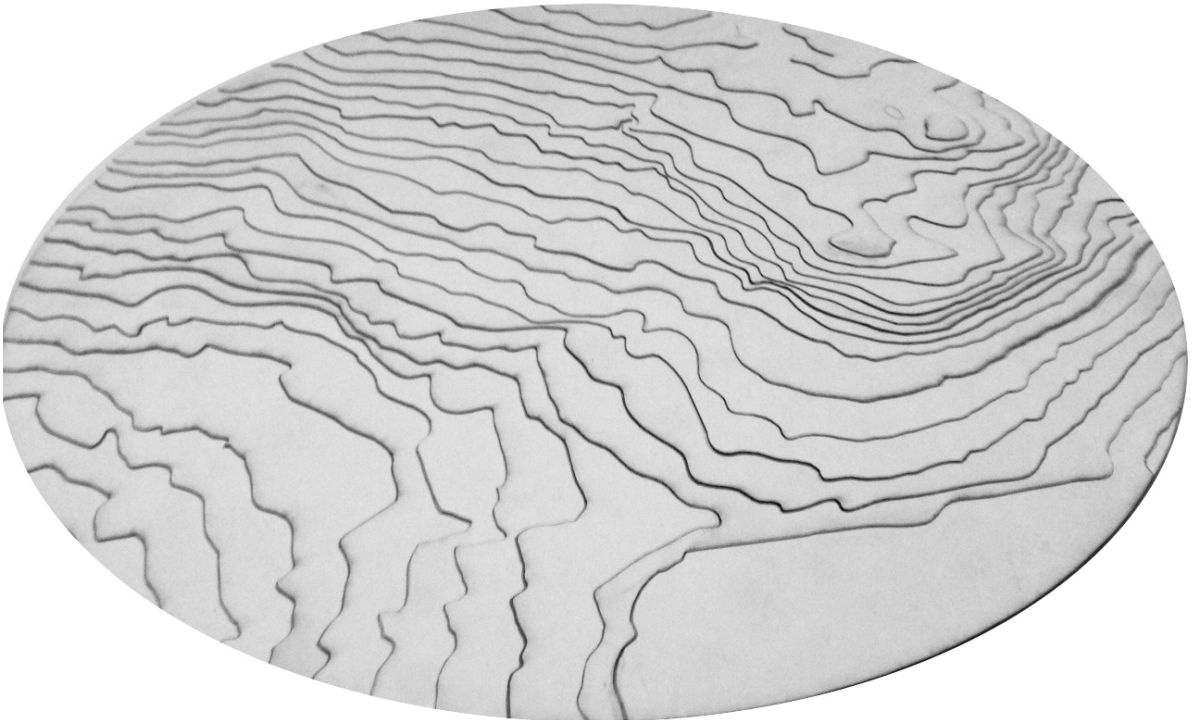
[1.67]
Landfill activity.
(By Author, 2015)



[1.68]
Landfill mapping.

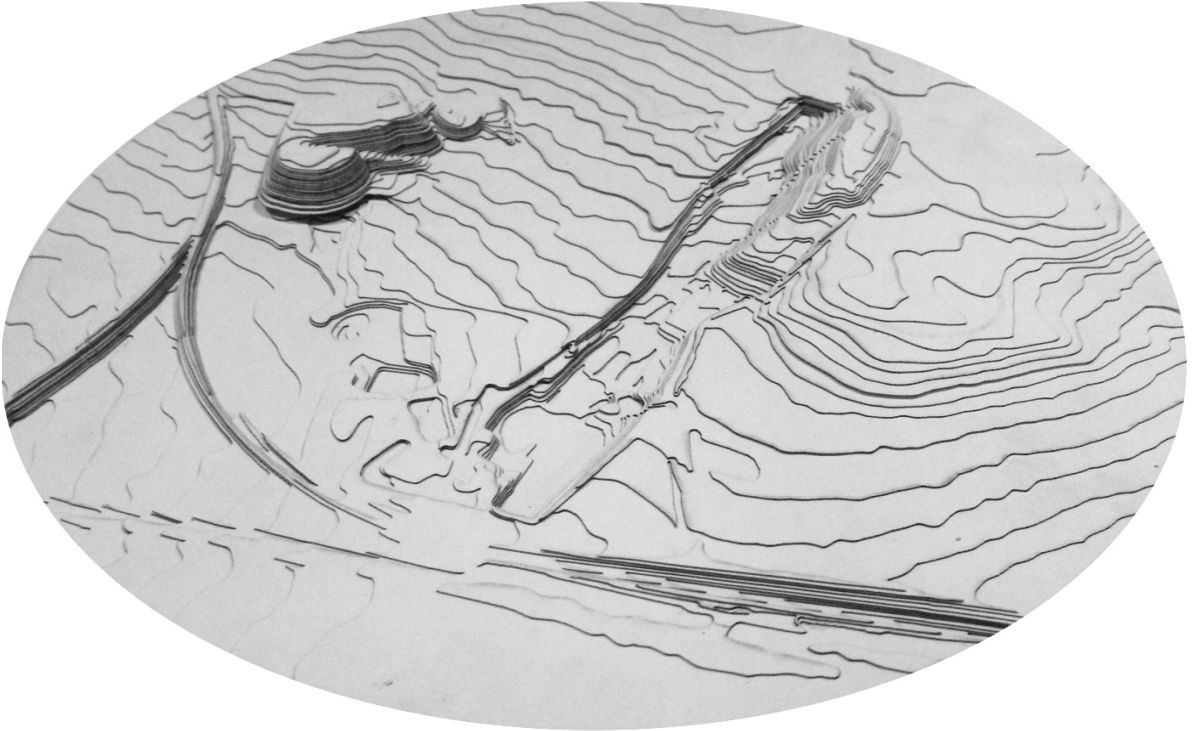
(By Author, 2015)





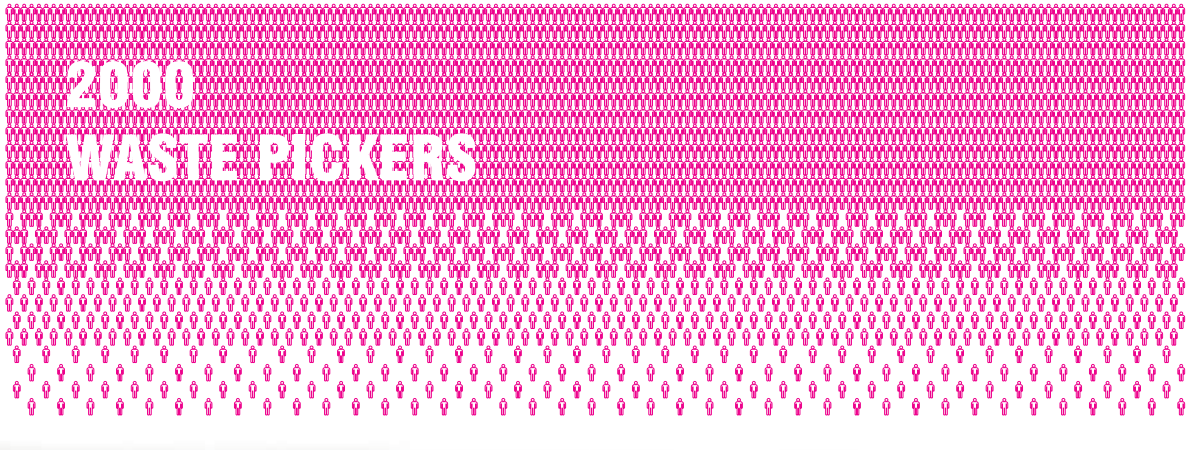
[1.69]
**Photo of physical
model showing his-
toric topography.**

(By Author, 2015)



[1.70]
Photo of physical
model showing cur-
rent topography.

(By Author, 2015)



MAMELODI - Tshwane Region 6
 established 1953
 45.9km²



334 577 People
 48.02% Female
 51.98% Male

Demographics: Language:
 B-98.89% 42.35% Sepedi
 C- 0.40% 12.15% isiZulu
 A - 0.22% 2.08% English
 W - 0.14% 0.39% Sign

Transport:
 50% - Taxi
 33% - Train (5 stations)
 6.4% - Bus
 10.6% - Walk/Bicycle

Civic Functions:
 12 Schools
 10 Clinics/ Hospitals
 2 Police stations
 1 University

PHUMOLONG- Mamelodi ext. 6
 established 2005
 6.07km²



27 164 People

Civic Functions:
 0 Schools
 0 Clinics/ Hospitals
 0 Police stations
 0 University

110 703 Households *DO NOT* have access to running water, electricity or a basic education

The average person has a monthly income of less than R3000.

30 374 Shacks with an average of 5 people per shack

24 359 households do not have access to rubbish disposal.

In 2014 there was 5146 reported crimes.

[1.71]
 Mamelodi, Phomolong and Hatherley landfill datasheet.

(By Author, 2015)

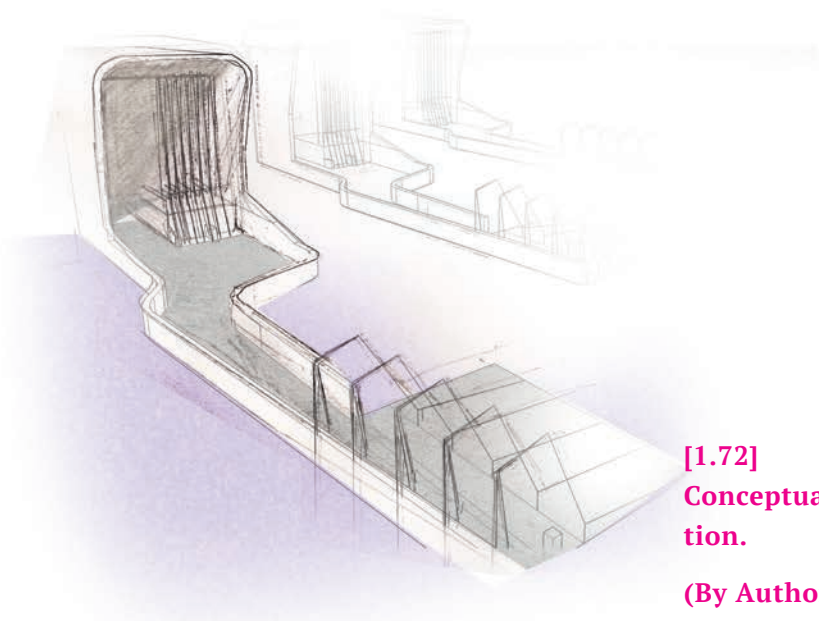
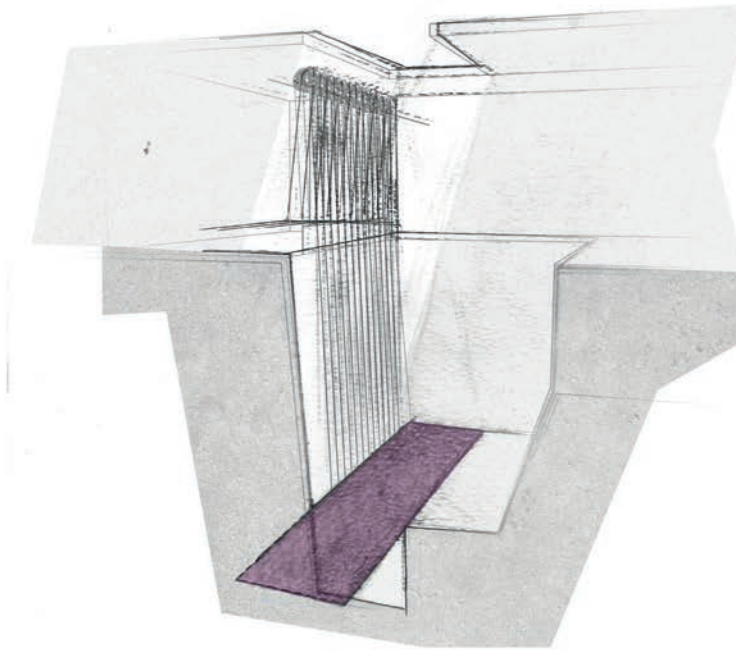


Surveying the city as data:

Daily almost 2000 reclaimers work on the landfill (Sanyal 2014). Figures indicate that the landfill has received between 120 000 (Snyman 2009:26) and 300 000 (Gauteng department of agriculture, conservation environment and land affair 2008:12) tons of waste each year and the volume is likely to increase. Approximately around 20% of waste is reclaimed (Gauteng department of agriculture, conservation environment and land affair 2008, p.12) yet the accuracy of these figures are debatable. None the less, massive amounts of waste has accumulated on the landfill over the years. The waste received on the landfill is mixed with the majority coming from households and only 10% garden refuse, 5% industrial waste (by products from industrial processes) and 10% building waste (du Plessis 2010:26). Making up 20% of household waste is electronic waste, potentially the most financially valuable waste, however processing this type of waste is the most difficult and the most dangerous. At the moment, very little electronic waste ever makes it to formal recyclers, unlike glass, paper and certain types of plastics (Sanyal 2014).

The majority of electronic waste is usually burned illegally on the landfill which poses a danger to the reclaimers as potentially toxic elements are released into the air. Electronic waste is usually burned for the metals it contains such as copper, however, burning the electronic waste is ineffective in extracting more precious metals such as gold, silver and palladium, that usually appear in smaller quantities and can only properly be extracted with large scale recycling. Despite this, reclaimers on the landfill can earn anything from R 4 000 - R 8 000 per month selling metals, compared to R 800 – R 1 200 reclaimers earn per month selling glass, paper and plastics (Samson 2010:16).

The neighbouring community of Phomolong, where the majority of these waste pickers live, there are just under 27 000 households. There are no official water connections and only about 30% have legal electrical connections with the majority of households resorting to illegal connections.



[1.72]
Conceptual exploration.

(By Author, 2015)

SURVEYING POTENTIAL FUTURES

The intention of the project is to re-establish waste as valuable resource in our communities both economically, culturally and environmentally. In surveying possible outcomes for the site the complex layers are unpacked and exposed in the project. The project doesn't attempt to propose an end-state for the landfill, but rather seeks to explore a series of catalytic interventions that actively engage with the complex and diverse layers contained within the landscape. The site's most basic processes are explored and is augmented by architecture by embedding the architecture and its functions into the landscape.

What is thus proposed is the mining of Hatherley landfill, mining its waste for its energy, data, narrative, nostalgic and material value, while exploring the environmental potential for landscapes of waste and establishing the landfill as an environmental, cultural and economic infrastructure within our city. It is proposed that materials contained in the site be excavated and the materials' cultural value be exacted, through a series of archaeological processes and is then broken down to be reconsumed and ultimately re-entering into the material stream creating and industrial ecology. The project seeks to challenge traditional waste management operations by not merely excavating materials to be recycled, but rather also explores its cultural opportunities. Mining as well as archaeological strategies are examined to exact the value contained within the landfill.

The archaeological excavation.

The archaeological process is a complex process and was thus simplified into three stages. First, Surveying; searching for sites of significant historical value, surveying the land and its context and conducting research in the form of mapping and examining documents from previous studies. Secondly, excavating; consisting of overlaying new geometry onto the site in the form of a grid before excavating in order to accurately analyse the fragments excavated and be able

to place them into context. Stratification is also an important concept in archaeological excavation to properly place the fragments in context and accurately date its history. Artifacts are thus dug up layer by layers and the location and depth is documented. Artifacts are then cleaned and cataloged. Thirdly; analysis and communication: Artifacts are analysed to determine history and relevance of the object and findings are then communicated.

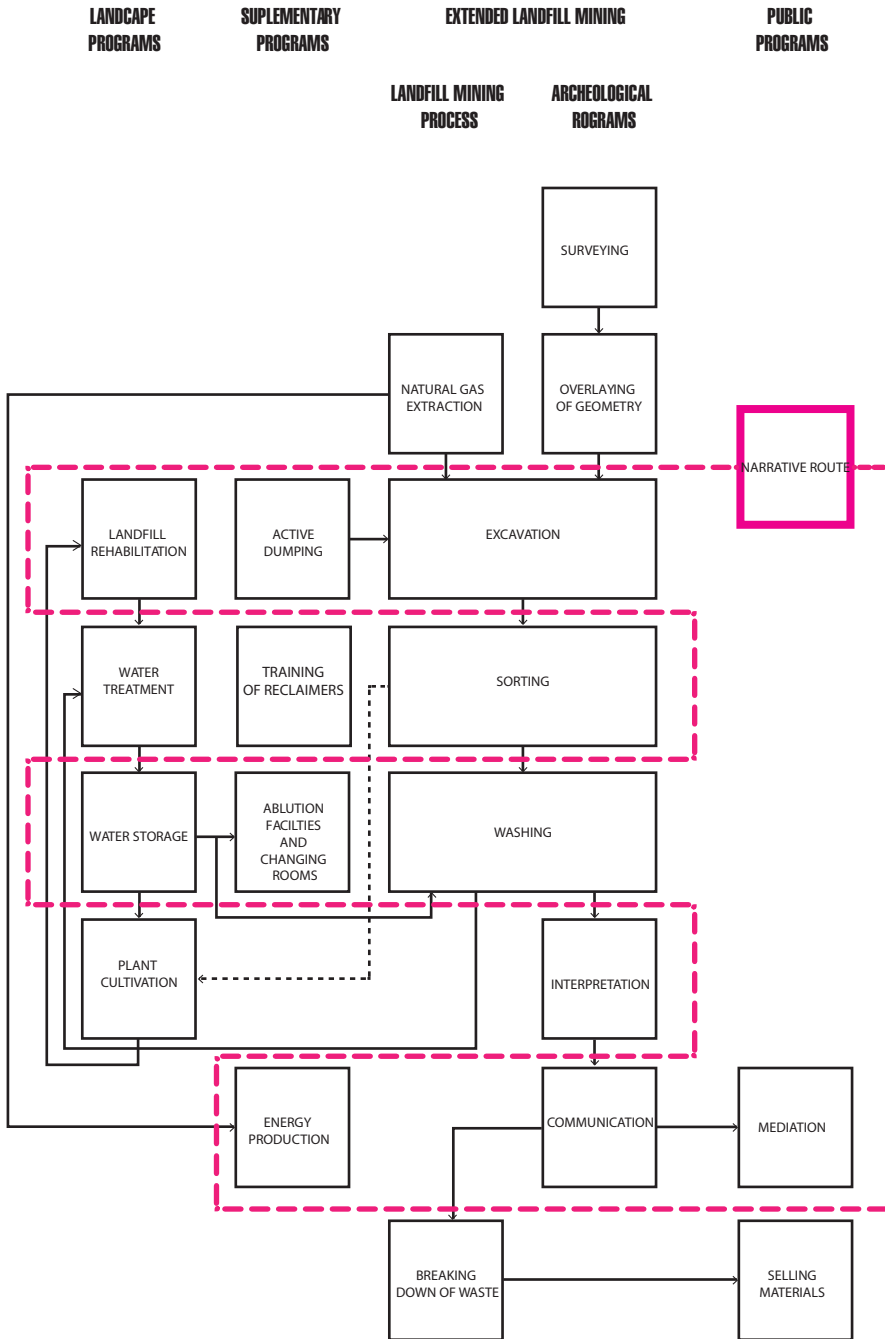
Landfill mining.

Landfill mining differs significantly from traditional mining as there are other challenges involved. Landfill mining is a new concept. Very few examples exist and very little literature exists on the subject. Initial concerns in landfill mining involve the natural gas contained within the mounds. These concerns are related to the safety of mining as natural gas is dangerous when released in large quantities and at the same time poses environmental pollution as a potent greenhouse gas. It is therefore necessary to extract natural gas, prior to excavation. Excavation then follows, usually involving heavy machinery. Materials then need to be separated from the soil. Soil can be recovered and used in rehabilitation of the landfill. Separated materials then need to be sorted and separated in the different waste types.

In order to recycle waste, the waste need to be thoroughly cleaned before it is broken down using various processes depending on the waste type. The project however aims to challenge contemporary recycling methods which largely depends on machinery, by embedding the technology into the architecture.

The establishment of proper infrastructure will also help create a safer and more pleasant working environment for the reclaimers at the same time making waste management more efficient and effective. The intention of the project is to build on the networks already established on the landfill thus establishing a more stable future for the reclaimers while developing new skills. Supplementary programs are thus also explored in order to improve working conditions for the reclaimers along with providing ablution and changing facilities. Essential to the project is to also to expose the processes of landfill mining to the public and create a public interface that can be engaged with, exposing the other programs on site, yet separating users from dangerous processes.

Extended landfill mining provides many financial benefits thus making it feasible to be implemented on existing landfills subject to a number of variables (Jones et al. 2013:53). Landfill gas extraction is a very feasible operation, economically viable and has frequently successfully been integrated into existing landfills (Jones et al. 2013:46).



[1.73] Program diagram.

(By Author, 2015)

There is increasing financial viability in the presence of industrial waste such as slags (Jones et al. 2013, p.46) which is prevalent on Hatherley landfill and regularly dumped. The recycling of glass, paper and plastic has been proven to provide a regular income to the reclaimers, yet with proper infrastructure and by processing materials on site, the efficiency and economic benefit can increase. Recycling electronic waste, the fastest growing waste stream (Sanyal 2014), also has great economic feasibility. Electronic waste, when melted down, can extract valuable metals such as copper, gold, silver and palladium. It is estimated that in each ton of electronic waste there is between 2 and 5 grams of gold (Al Jazeera 2014). With the volume of electronic waste Hatherley landfill receives, considering the value of gold alone, establishing an infrastructure to process electronic waste, could mean millions of Rands that a facility such as this can generate.

Ultimately, contemporary waste management strategies are ineffective and need to be reconsidered. Extended landfill mining is financially viable and is a relevant program to be implemented on the landfill. Cultural opportunities of waste are mostly neglected and it is thus a necessary exploration in order to realise the full potential of the landfill. The environmental benefits to landfill mining also creates the possibility for Hatherley landfill to positively impact the environment. With growing pressure on resources and unprecedented environmental change the world is experiencing, it is inevitable that landfill mining will have to be seriously considered in the near future.