

CHAPTER 3 URBAN VISION

bridging the gap to reclaiming lost space

3.1 URBAN FRAMEWORK

Using the Johannesburg SDF for 2040, 2016 as a point of departure the mining belt will be examined in a contextual sense. Its opportunities and problems will be identified and synthesized into a final urban plan. The research intention is to directly tie into the existing SDF, building on it and altering it where need be to create a stronger proposal that effectively deals with the mining belt.

When analyzing the City's spatial framework there are 2 apparent issues. The East-West Sprawl of the mine belt (depicted in purple) and its currently fragmenting nature. Located along a main railway line there is an opportunity for substantial, well connected and beneficial development. It is clear that the mining belt can be rehabilitated to not only act as a bridge to the South of the city but also to provide a desperately needed East-West connection, from the spatially disadvantaged areas of SOWETO to that of Germiston and the Further East-Rand.

This connection Would not only provide more job opportunities and a more reliable cheap public transit system however it would serve to activate the areas along the journey, that being the sites primed for rehabilitation along the mining belt. The railway is strategically placed along the mining belt as it was originally used to transport goods and materials. Today this passenger rail system is under utilized due to the dilapidated station's lack of multi-modal connections to other forms of transport, and distance to work opportunities.

Thus on an urban scale the intervention is focused on linkages and connections. These being the reconnection of the fragmented North-South connection, which stops traveling south at Park Station, JHB CBD, and reconnecting East-West and Central Rand to form a strengthened Metropolitan core. The problem if left untreated is a huge inhibitor to socio-economic growth within the city but beyond that it has the latent potential to positively contribute to the standard of urban living by becoming a much needed green lung and providing high density housing especially closer to the metropolitan core and thus jobs.

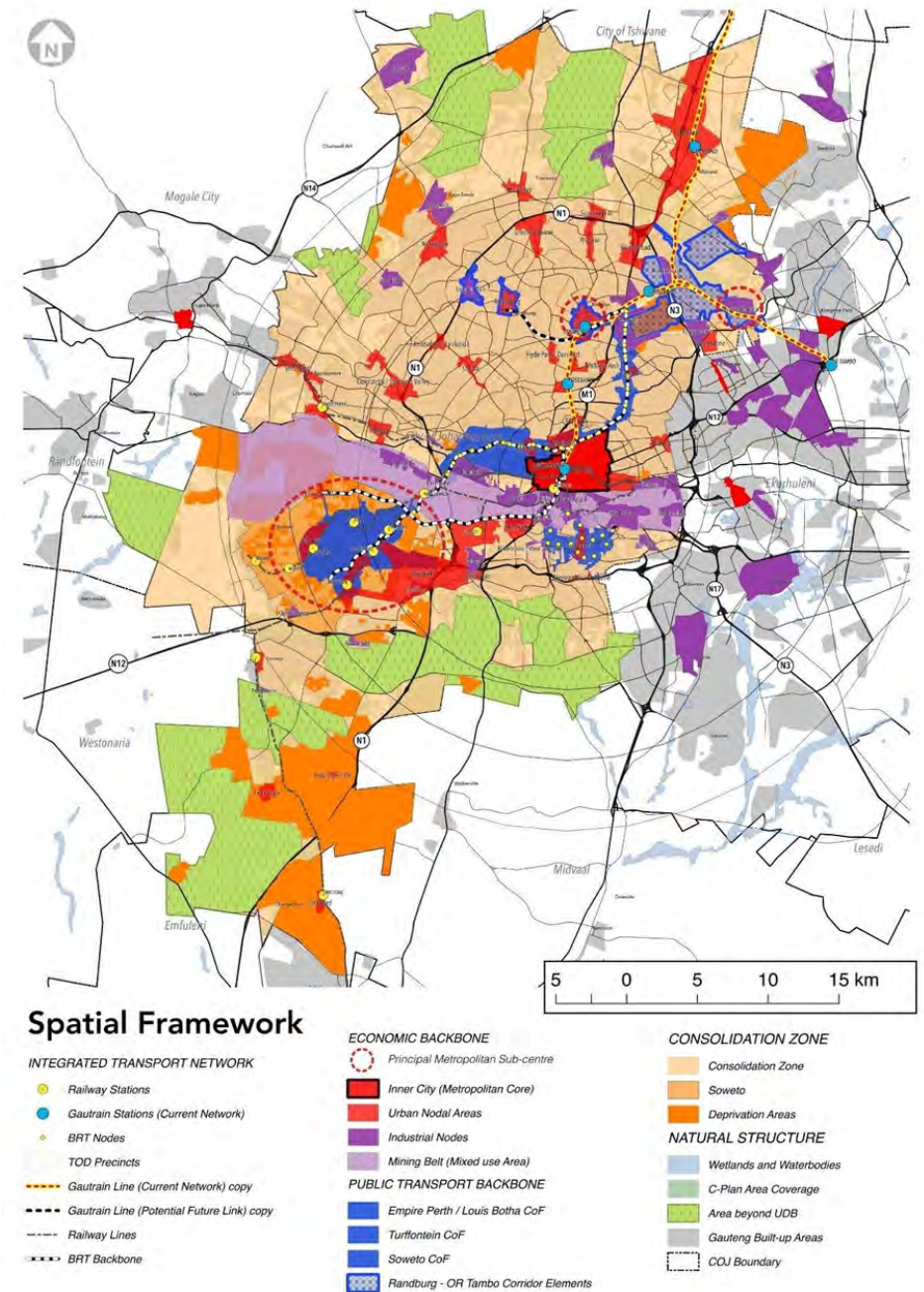


FIG 44 : Spatial Framework of Johannesburg (JHB SDF 2040, 2016)

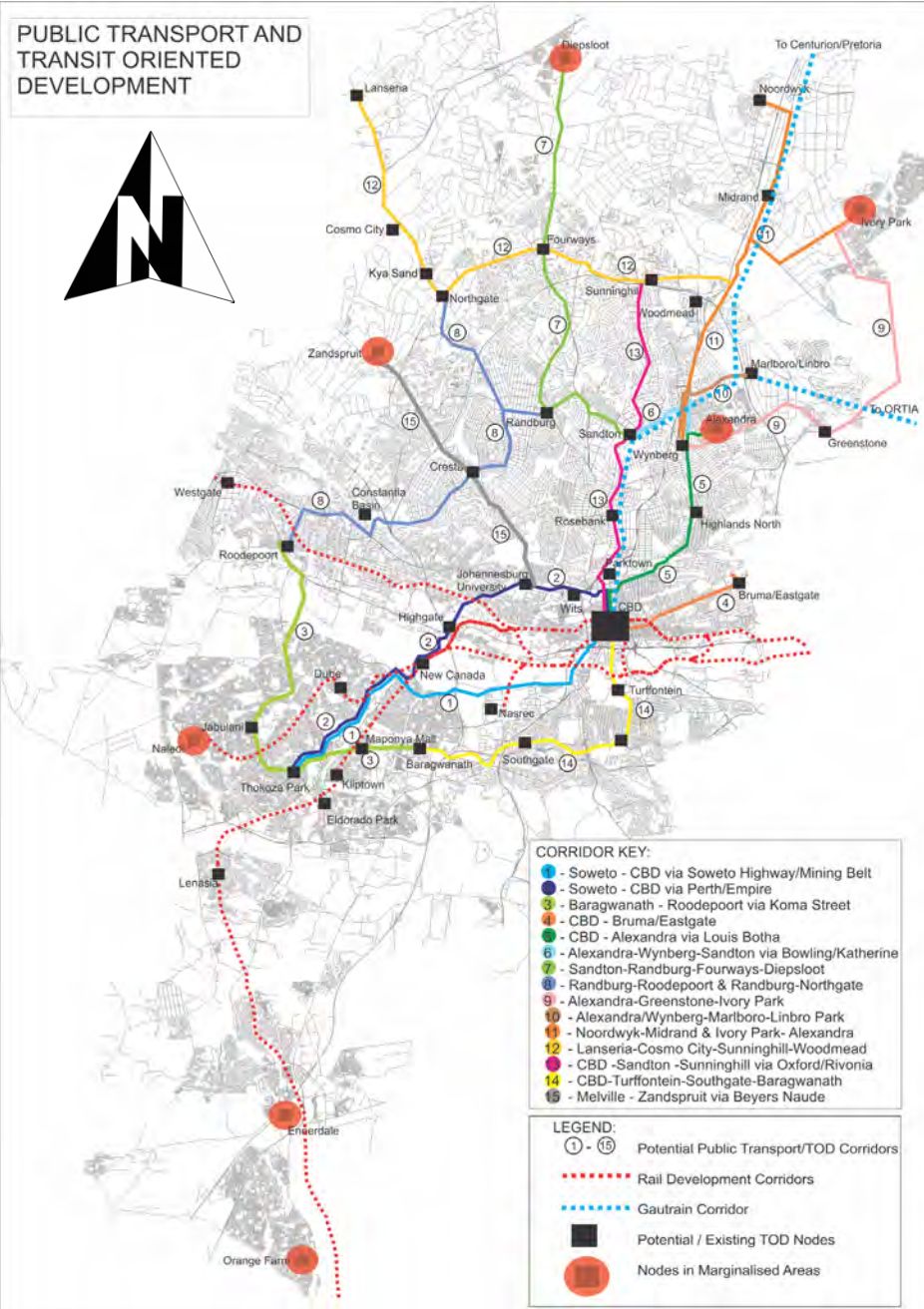


FIG 45 : Corridors of Freedom, Transit and development Corridors of Johannesburg (JHB SDF 2040, 2016)

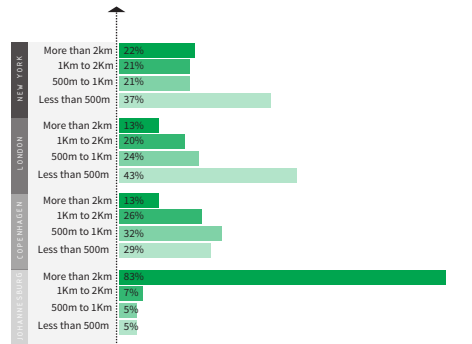


FIG 46 : Bar graph showing distance traveled from home to work in JHB, Copenhagen, London and New York (JHB SDF 2040, 2016)

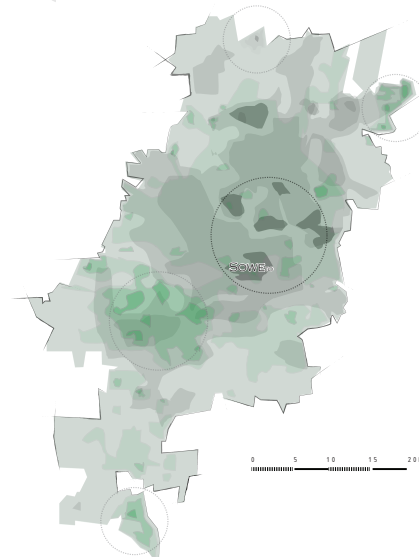


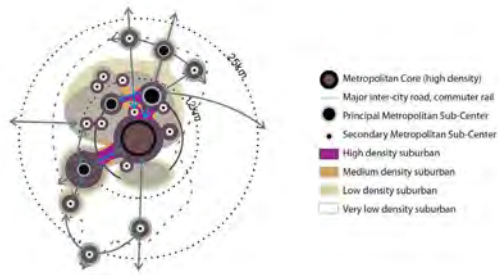
FIG 31 REPEATED : (Above) Spatial Inequalities job-housing mismatch (Johannesburg SDF 2040, 2016)

3.1.1 POLYCENTRICITY MODEL AND CORRIDORS OF FREEDOM

The goal is that of a compact polycentricity. A polycentricity is an urban structure that is characterized by a dense urban core interlinked by efficient transit networks to dense complementary sub-centres such as the Corridors of freedom. (Johannesburg SDF 2040, 2016) These work off of public transport corridors and transit orientated development nodes. They are placed around strategic movement axes such as the Turfontein and Soweto corridors. The current trend shows Johannesburg as a weak metropolitan core with weak linkages and transit corridors.

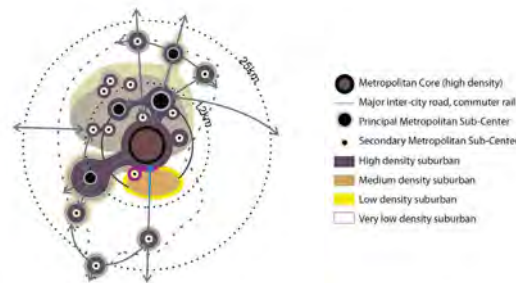
The key to achieving this polycentricity can be found in the mining belt. Which should be part of a densifying process of mixed-use typology established by strong transit networks. Because of the apparent job-housing mismatch (refer to image showing Job-housing density mismatch), whereby the spatial distribution of the city is fragmented in terms of distances people travel to find work, the creation of a polycentricity based on public transit infrastructure is paramount. The mining belt is presented as a spatial discontinuity and a transformation zone that could trigger positive city-wide change that would combat urban sprawl which is holding the city hostage. (Johannesburg SDF 2040, 2016) The effects of urban sprawl are apparent when looking at travel statistics, 83% of the population of Johannesburg live more than 2km away from their work, as opposed to London's 13%. This fact is worsened by weak transit linkages. The Mining belt itself is viewed as a transit corridor initially to spawn development and to connect the spatially disadvantaged areas of Soweto to jobs by connecting east and west (Soweto- Germiston).

This forms part of the larger urban framework of which the proposed intervention will tie into. This is thus a larger urban analysis that was needed to establish transit linkages and connection within the city. This general overview provides a base to select an Urban Site in which to establish an intervention.



CORRIDORS OF FREEDOM

Johannesburg's focus areas for development based on public transport corridors, with the potential to generated substantial economic growth and increase housing densities around strategic points and along the primary movement axes, Areas such as Turffontein, Louis Botha, Empire/ Perth, and Soweto have been identified as corridors of freedom



UNLOCKING THE MINING BELT

Johannesburg SDF 2040 acknowledged the mining belt as a mixed use zone but there is no proposed vision for the belt . This spatial discontinuity presents significant opportunities for: integrating the North with the South, improving cross border linkages between East and West Rand.

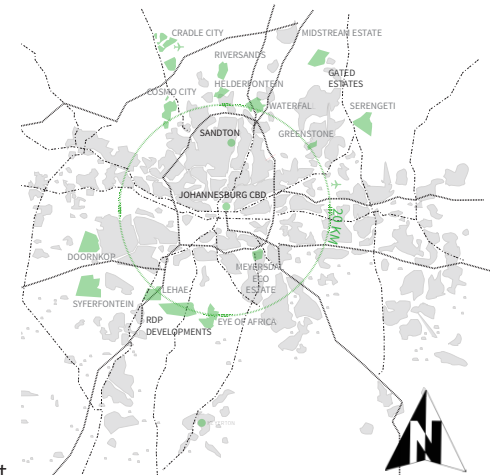


FIG 48 : Spatial plan showing distance of residential developments and RDP developments in relation to JHB CBD, green line signifies the 20km mark (JHB SDF 2040, 2016)

COMPACT POLYCENTRICITY MODELS

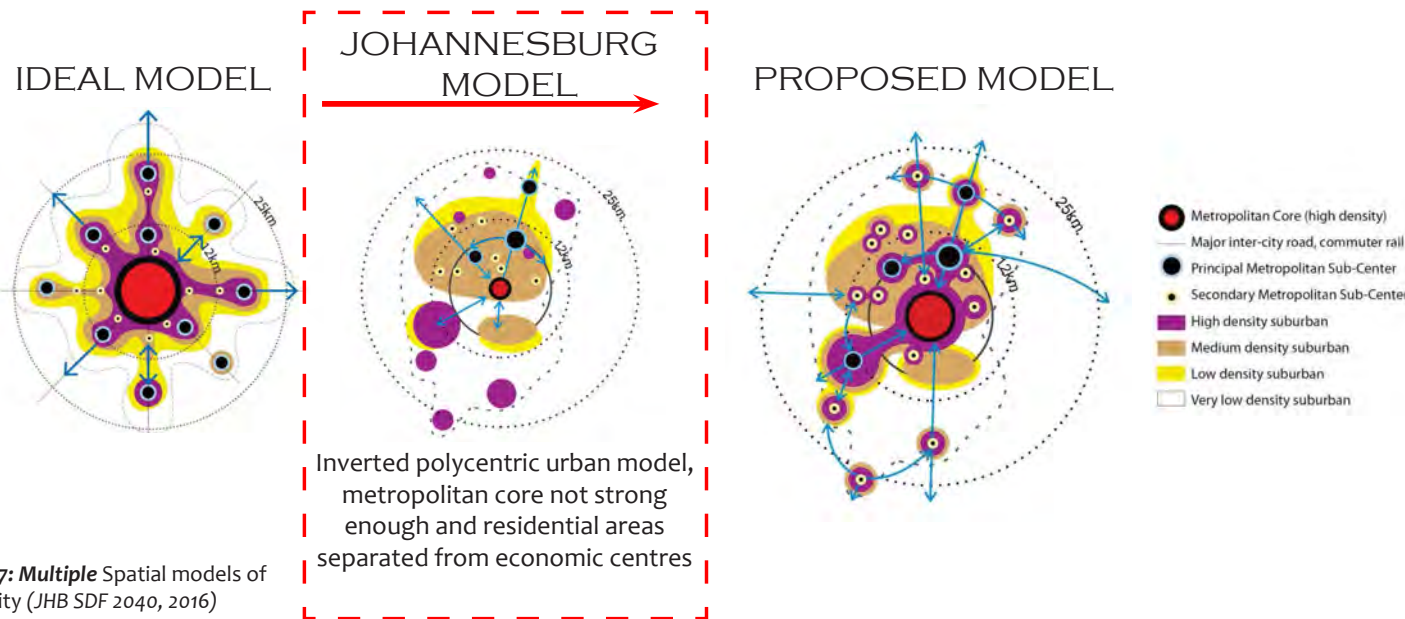


FIG 47: Multiple Spatial models of the city (JHB SDF 2040, 2016)

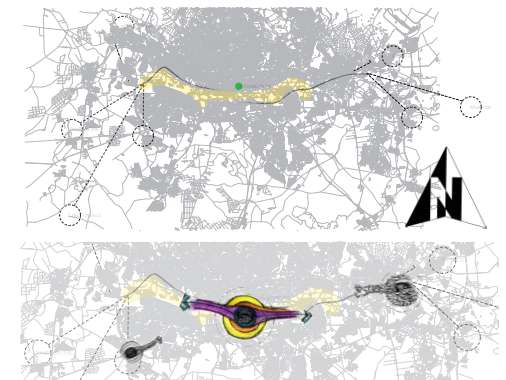


FIG 49 : Existing condition (top) with conceptual proposed condition (bottom) connecting north and south (Author, 2017)

EXISTING URBAN CONDITION

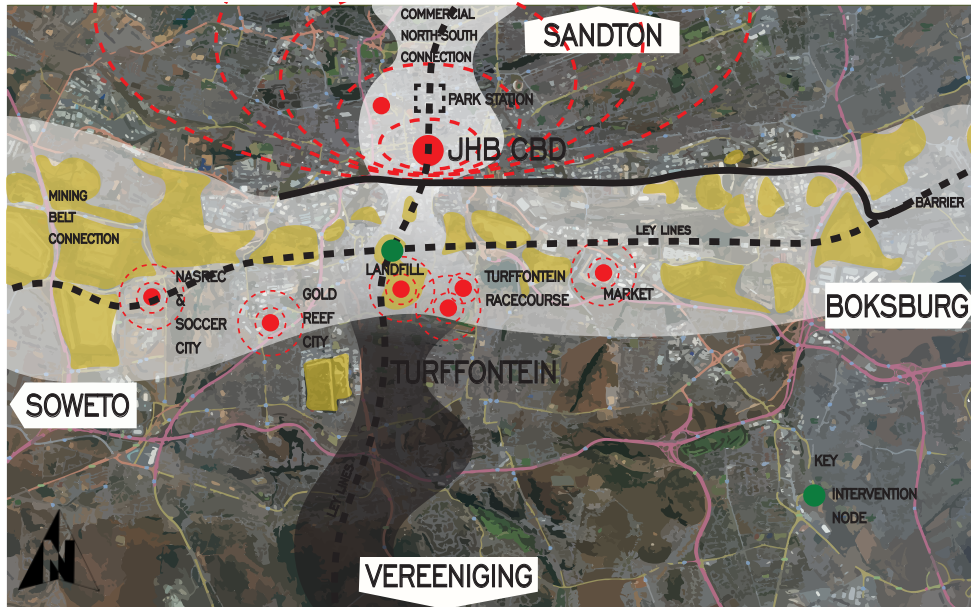


FIG 50 : Existing urban condition mapping (Author, 2017)

PROPOSED URBAN CONDITION



FIG 51 : Proposed urban condition mapping (Author, 2017)

3.2 URBAN SITE SELECTION

Choosing a site within the mining belt is thus a product of spatial intentions. This is in relation to proximity to transit connections, planned interventions, frameworks and upgrades as well as linkages. This also includes proximity to mine shafts, pump stations, piping networks, services and the city. To discover the “goldilocks” point Ley lines were drawn along the crucial North-South and East-West connection. These Ley lines or energy lines were centralized around nodes of activity, the mining belt and decanting points which resulted in the selection of the Robinson Deep or Village Deep Area. Consulting the other aforementioned parameters, specifically transit networks and proposed upgrades an excavated mine dump was chosen next to the Robinson Deep Landfill along Booyens Station Road.

With the selection of this Urban site the proposed Urban condition becomes strengthened by the integration of the mining belt. The mining belt which used to be toxic will be transformed incrementally, first into a green lung and then into an economic ecological hub. This site fulfills the urban intention of restitching the Urban Fabric in both the North-South and East-West directions, thus forming strong linkages.

The Urban site sits as a central node that is in-between the Turffontein Corridor of Freedom and the city as well as in between SOWETO and Germiston. It is located near major transport routes and proposals and is primed for rehabilitation due to the fact it has been re-excavated. The site selection is still an Urban site selection informed by the aforementioned Urban Framework and thus an Urban Analysis and Urban Plan must be developed.

The mining belt’s vision as a whole works off of the SDF by starting with strong linkages and a catalytic project, with the intention to create development after the land has been rehabilitated. This Mixed-use development corridor is seen as offering high density housing and jobs and thus becoming an ecological, economic node. (50% open ecological space 50% built up mixed-use) This activity will strengthen the Metropolitan core while offering a new subcentre and high-density housing. The fragmenting 1200ha of mining land could become one of inclusive productive land. Providing 40-60U/ha of housing as per the SDF proposal and furthermore recreational parks and green spaces

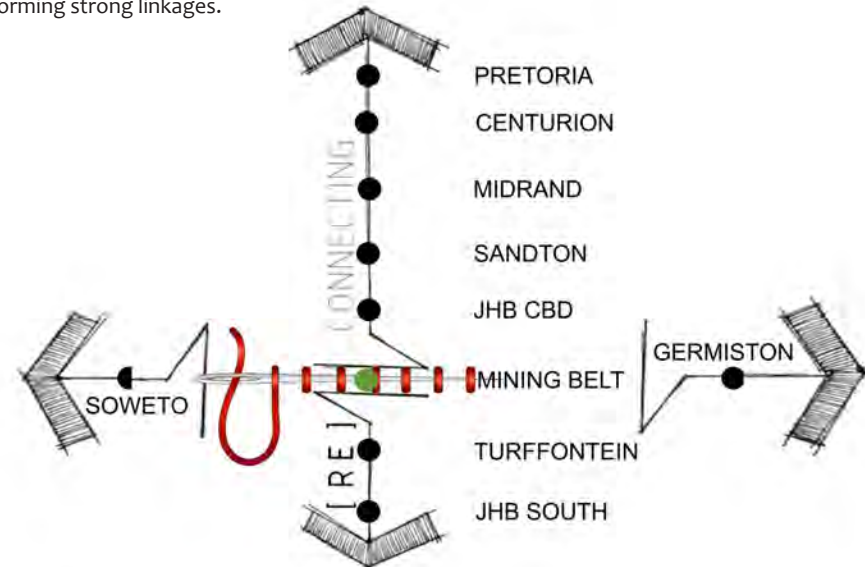


FIG 51 : Proposed urban condition graphic representation (Author, 2017)

3.2.1 URBAN SITE

The Urban Focus Area is represented in the aerial photo to the right. This is the Urban Area chosen through the Larger Urban Framework and it is the area in which the Urban plan and intervention will be focused. The Urban Area will be analyzed according to, transit connections and routes, upgrades and future developments, key points of interest in terms of Heritage and Socio- Economic Value as well as ecologically. From there an Urban Plan will be developed and a final site will be selected

SITE POSITION INDICATED BY YELLOW DOT

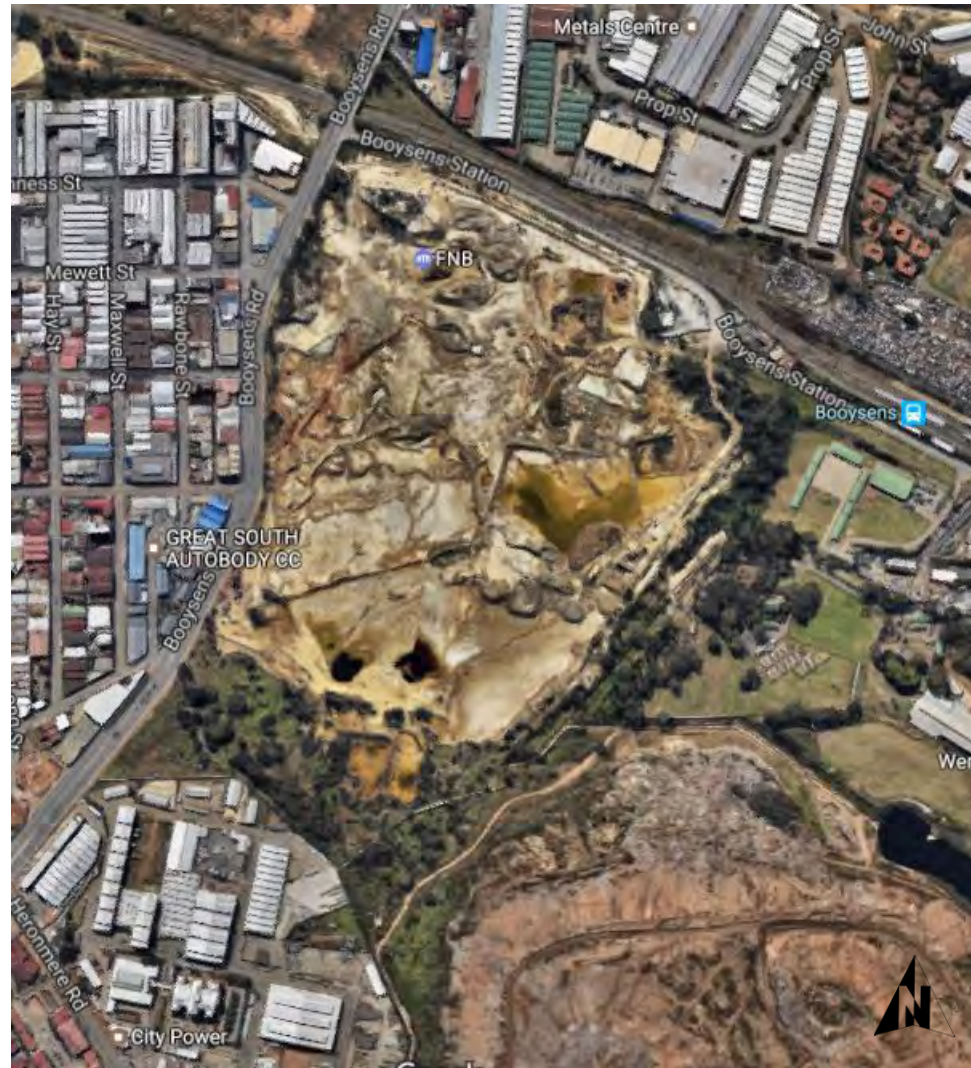


FIG 52 : Urban Site Orthophotos (Google maps, 2017)

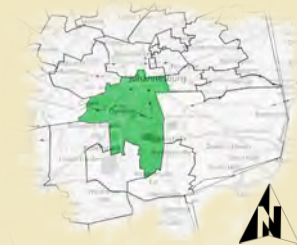
LOCALITY



GAUTENG



JOHANNESBURG



WARD 126

ROBINSONS DEEP

81-IR MINE DUMP

FIG 53 : Site Locality (Author, 2017)



Figure 28: Residential

The map clearly shows the dominance of residential uses in the southern part of the study area (55% residential). These residential uses are mostly detached single residential in nature with a few higher densities, 3 story walk up type of housing scattered throughout the area.



Figure 29: Business / Commercial

The land uses indicated as business/commercial uses in the northern part of the study area are mostly large industrial uses. In the southern part, small retail facilities are located mostly along important internal roads. There is very little mixing of uses as can clearly be seen.

FIG 54 : Residential vs business densities (Turffontein Corridor of Freedom final draft, 2016)

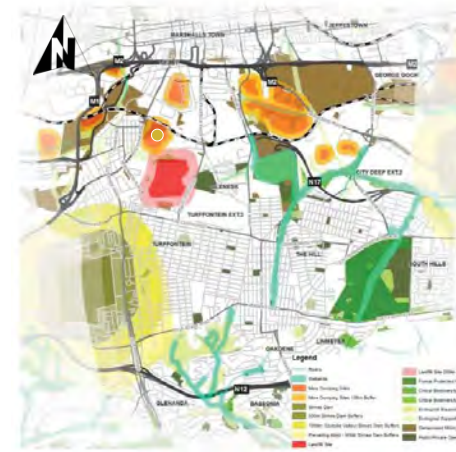


FIG 56 : Ecological mapping (Turffontein Corridor of Freedom final draft, 2016)

3.2.2 URBAN SITE ANALYSIS

The ecological state of the larger area is a mix of built up city and suburban area, recreational landscapes and toxic infected mounds of mining waste. The mining networks also form a network of pumping stations and pipes which pass just north of the Urban Site. These networks can be used to contribute to the central rands AMD decanting efforts. Two mines flank the Urban Site, that being Crown and Village Deep Mine both of which have pump stations that could be tapped into. None of these sites Treat the AMD water to an ecologically safe level. The larger Ecological mapping also shows the alarming proximity of the mining sites to populated areas, an ever present threat that must be incrementally dealt with.

“Transport affordability and access are critical development concerns due to high day-to-day costs of travel, the unavailability of public transport in many peripheral areas is a major issue along with poor home-to-work connections, because of badly defined routes and weak inter-modal integration. These all impact severely on the poor, especially in a sprawling city-region where poverty and spatial dislocation are often synonymous.” (Gauteng Mobility Report, 2014)

This is the major urban issue which areas along the mining belt face. When analysing the Transit networks existing such as busses and taxi routes it becomes apparent that the mining belt is a disconnected pass-through zone whereby people are either trying to get to Turffontein or the JHB city. The only population currently interacting with the mining belt are those working in the surrounding industrial belt. The mix of zones is strictly business commercial and residential. The Density of the area is mainly made up of low-rise industrial buildings broken up by mining waste sites as can be seen by the Nolly diagram.



FIG 57 : Nolly map of Urban area (MapAble, 2017)



Figure 11: Rea Vaya and Metrobus Routes



Figure 12: Minibus & Metered Taxi Routes and Facilities

FIG 55 : Residential vs business densities (Turffontein Corridor of Freedom final draft, 2016)

It is important to note the position of Boosens station and its lack of connectivity to other forms of transport which ignore the rail system completely. The Johannesburg SDF 2040 has extended the BRT Rae Vaya system down and through turffontein which is shown in the transport mapping.

3.2.2.1 BOOYSENS STATION

Booyens station is a key point in this intervention not only because of its position in relation to the site but also because of its proposed upgrade scheme to a Multi-Nodal Station, including a taxi rank and BRT station. It is the perfect driver for this intervention as it deals with one of the main urban issues of connectivity. The city has proposed to do this upgrade on land which houses an informal settlement, with no indication of how the informal settlers will be accommodated. Although it would be cheaper to displace informal settlements there is a clear question of social justice and this coupled with the legacy of the mining belt is a unethical response.



FIG 62 : Booyens station (Author, 2017)

An alternate proposal would be to move that station to the nearest mine dump and use it as a driver for this regeneration. By doing this it targets a central site within the mining belt, that being the mine dump adjacent to Robinson Deep Landfill. This site is just off Booyens Road and has an existing Metro Railway line bordering it which connects it to the rest of the mining landscape. This creates a point of acupuncture from which to start a regenerative intervention while activating the site. About 10000 commuters use Booyens station daily however the areas main modes of transport are cars and taxi's while public transit systems like bus and rail systems are not utilized. This is a huge problem as these forms are public transport are cost effective and critical to a cities connectivity.

By also proposing an N17-M70 linkage through this site, from Soweto to Boksburg (explored in the transport mapping), that artery can support an effective BRT and Taxi system. This can be coupled with an additional North-South Gautrain line, which forms a gateway to the south, thus bridging the gap between North-South and Park Station-The mining belt. This begins the process of re-stitching the urban fabric together and can create a strengthened Multi-nodal station which activates the area effectively. This deals not only with the major issues of Booyens Station, that being a single entry, mono-modal station that is far removed from movement routes, but it also deals with the linkages issues of the mining belt.

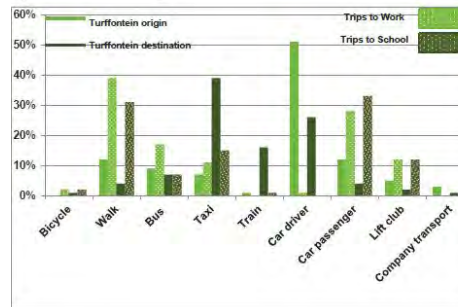


FIG 58 : Graph showing mode of transport movement in and out of Turffontein (Turffontein Corridor of Freedom final draft, 2016)

Table 6: 2007 Gautrain Passenger Rail Census

Station	Description	Time Period					Total
		> 06:00 06:00-08:30	06:00-08:30	08:30-16:00 16:00-18:30	16:00-18:30	18:30 <	
Booyens	Board	138	871	490	4156	88	5743
	Alight	873	2615	259	918	15	4680
Village Main	Board	2	214	17	827	19	1079
	Alight	50	717	30	161	0	958
Kaserne West	Board	348	599	606	1835	51	3439
	Alight	1005	1402	199	919	125	3650
Total	Board	488	1664	1113	6818	158	
	Alight	1928	4734	488	1998	140	

FIG 59 : Graph showing commuters in surrounding Train Stations (Turffontein Corridor of Freedom final draft, 2016)



FIG 60 : Booyens station upgrade proposal (Turffontein Corridor of Freedom final draft, 2016)

Table 4: Main mode of transport for people working or studying within Turffontein (residents and non-residents)

Main mode of transport	Employment	Education
Bicycle	~1%	2%
Bus	7%	7%
Car driver	26%	0%
Car passenger	4%	33%
Company transport	~1%	0%
Lift Club	2%	12%
Motor cycle	0%	0%
Taxi	3%	15%
Train	16%	1%
Walk	4%	31%
Total	100%	100%
Total trips	36,957	13,522

Important Note...
70% of Turffontein residents do not work within the Turffontein area. This translates to morning and afternoon peak trips from and to the area, and supports the largely "commuter-commuter-nature" of the area.

Table 3: Main mode of transport for Turffontein residents (internal and regional movement), based on 2004 NHTS

Main mode of transport	Employment	Education
Bicycle	0%	2%
Bus	9%	17%
Car driver	51%	1%
Car passenger	12%	28%
Company transport	3%	0%
Lift Club	5%	12%
Taxi	7%	11%
Train	1%	0%
Walk	12%	38%
Total	100%	100%
Total trips	14,300	10,300

The predominant mode of travel for employment is via private car (52% as driver or passenger), whilst walking (30%) is the mode most likely to be used to go to school based on NHTS 2004. These figures show where Turffontein residents travel for work and education based on mode of transport, according to the NHTS 2004.

Important Note...
The majority of Turffontein residents either use private transport (43% as driver or non-motorised transport (walking 12%) as mode to access employment opportunities. The majority of education trips within the study area occur on foot as the education facilities are all located within the residential areas.

FIG 61 : Transport distribution in Turffontein (Turffontein Corridor of Freedom final draft, 2016)



FIG 63 : Transport And nodal mapping (Author, 2017)

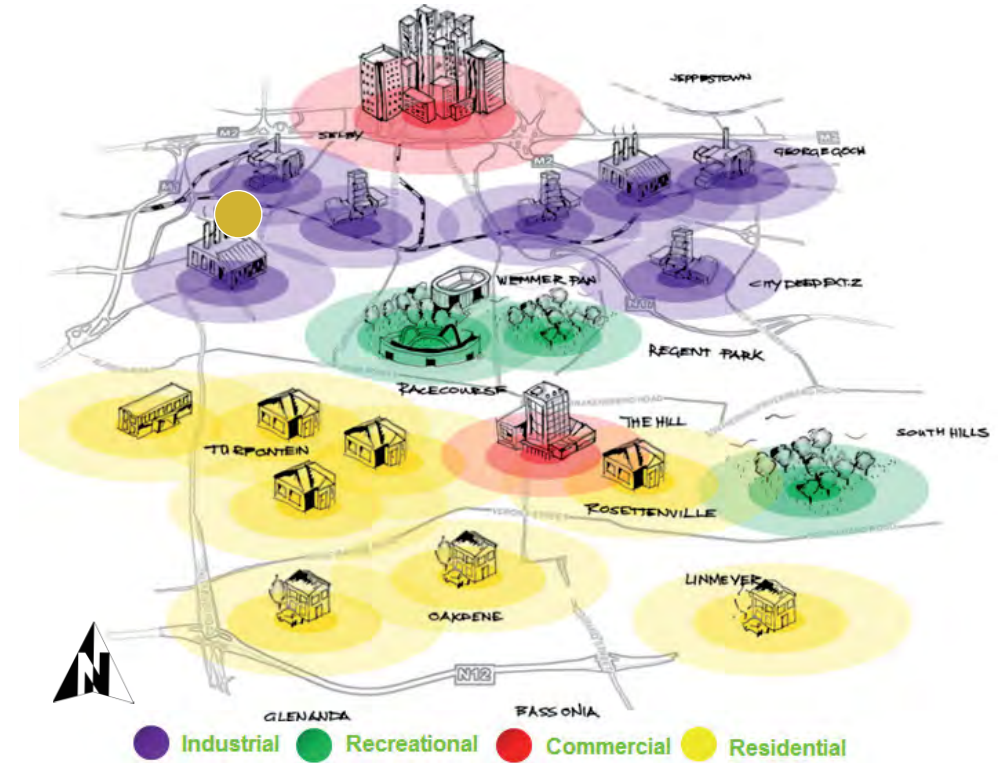


FIG 65 : 3d Land use (Turffontein Corridor of Freedom final draft, 2016)

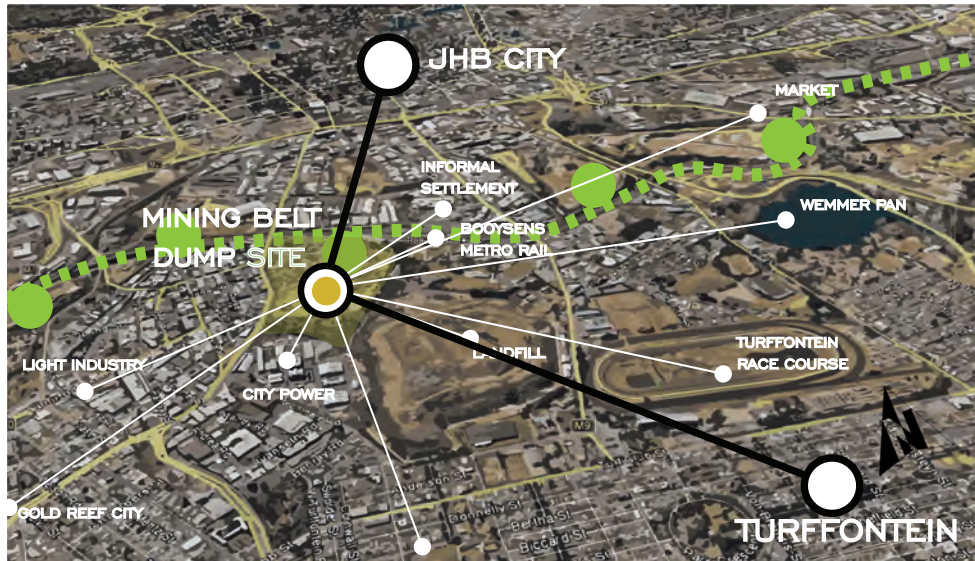


FIG 64 : Linkages Mapping (Author, 2017)



FIG 66 : Turfontein Corridor of freedom 3D (Turffontein Corridor of Freedom final draft, 2016)

3.2.2.2 MAPPING

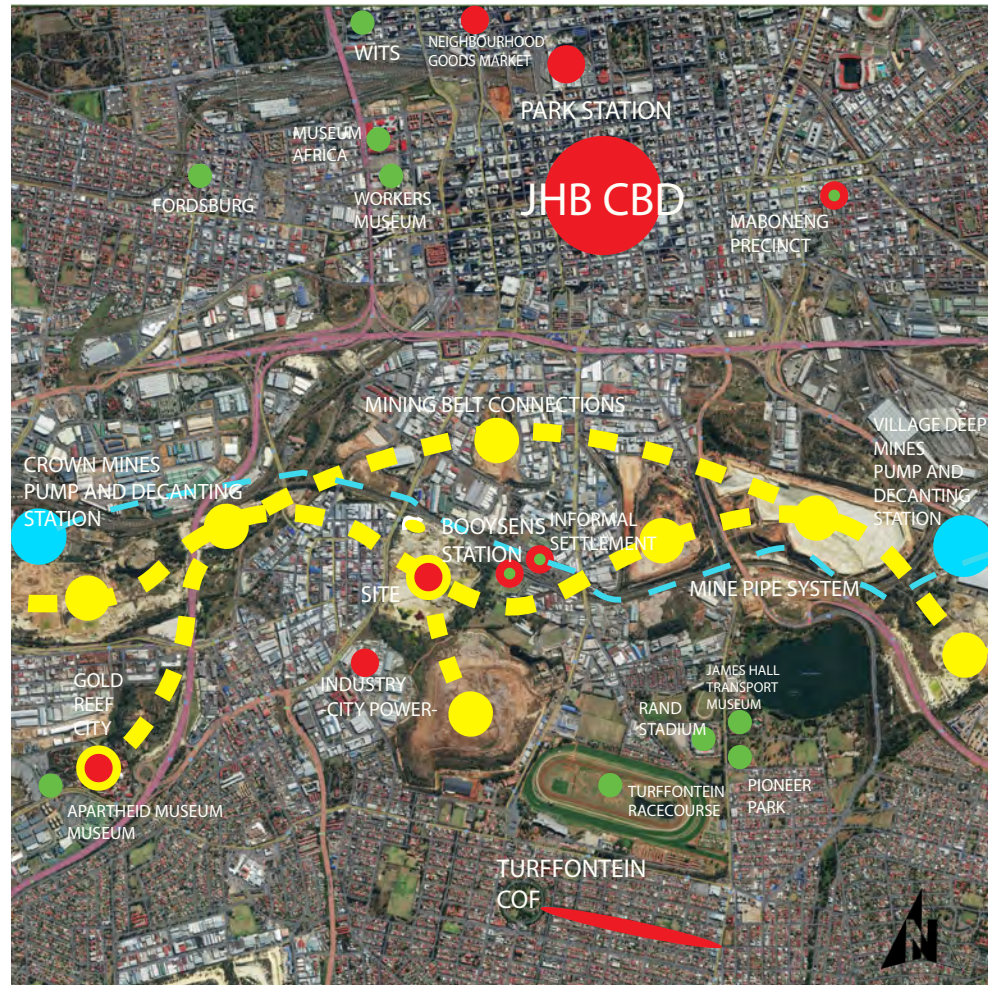
There is a varied mix of land-uses within the study area, moving from a residential South (Turffontein); to a low rise industrial belt sprinkled with mine tailings and recreational activities; to the high rise silhouette of Johannesburg CBD. As can be seen in the 3D representation The Turffontein Corridor of Freedom looks at densifying that area into an active city node.

The Urban Area is surrounded by a myriad of informants that being recreational zones like Turffontein Racecourse, Wemmer pan Dam and Rand Stadium as well as Heritage Sites like The James Hall Transport Museum, however only the informants relative to the lenses of Heritage, Ecology and Socio-Economic Value will be considered. Notable influences are aspects such as the Markets surrounding the area including the Fresh produce and night markets, The Network of mining sites and the network of subsequent pipes, The Turffontein Corridor of Freedom, The Braamfontein Arts precinct of which this site will feed off of in terms of its momentum within art facilitation. The South portion of the site houses a Large landfill which was a re-purposed mine dump. This will be converted into a park after the landfill has closed. There are many industrial activities taking place directly around the site such as the Telkom training Centre and City power. Most of the activities are warehouses, wholesalers and car service yards. The North of the site is flanked by a rail network that has an Informal Settlement which has developed around what is now Booyens Station.

The ecological mapping of the site brought attention to some key features, such as the isolation of the site apart from Zama's Zama's and squatters. There Are some clear zones where the vegetation is thriving and encroaching onto the harmed soil. The landscape is an infected yellowish colour, typical of mine tailings. The soil itself covers most of the site however only one significant mound of waste remains, the rest has been re-mined for gold. There are large deposits of natural stone on site as well as formations

of stagnant water on site, infected by the soil. These catchments of water fall to the south of the site and form in large pools. The trees on site are indigenous however the reeds will have to be removed as they can cause respiratory problems. Around the stagnant pools of water dead birds can be found, as a direct result of the toxic water. The varied contours are typical of a re-mined site and form an interesting series of levels.

The Urban site is a blank canvas in terms of transit points with roads flanking the edges of the site. There is one clear travel route which is marked by a dirt road and footpaths. This cuts through the site from Booyens Station to the M70. The site is an isolated island of toxic waste at the moment but is surrounded by bustling activities and busy roads such as Booyens road, which the proposed BRT extension passes through. All the elements are there to create a strong transit node. The North East of the site is the main point of entry with a dirt road being located there. The North-East corner also hosts a cement factory. the rest of the site forms barriers in the form of low mound walls.



POINTS OF INTEREST

FIG 67 : Points of interest in heritage and socio-economic value(Author, 2017)



ECOLOGY MAPPING

FIG 68 : Ecological mapping of harmed, industrial, vegetated and stone landscapes with water masses(Author, 2017)



BARRIERS AND MOVEMENT

FIG 69 : Transit, Access and movement mapping(Author, 2017)

3.2.2.3 TROLLEY PUSHERS

The Informal Settlement is a typical result of necessity where the impoverished and under-skilled have situated themselves next to employment opportunities, although this intervention does not specifically deal with informal housing, it rather seeks to empower in the form of skills development and other means to support and enable a contextual response.

One key feature of not only this informal settlement but Johannesburg South are the Trolley Pushers, who collect valuable trash for recycling and processing in exchange for money. They are readily employed by the landfill and pikitup(waste services company) as they do not have many other potential buyers or privatized clients. This is a monopolized situation in which there is no growth opportunities or accountability.

The trolley pushers face harsh conditions from having to sort through large amounts of trash to carting that trash around the city on roads that do not accommodate their movement or business. They are not enabled in any way by government or police often times inhibiting their business. Although they avoid taxes in their informal businesses they also avoid protection and consideration. (Zack, Chalton, Kotzen, 2012)

The trolley pushers offer a sensitive alternative to trash trucks. They provide this recycled waste to the formal economy. It is important to know trolley pushers are also a victim of pendulum migration having to travel far distances.

Paul the trolley pusher, travels almost 120kms every week pushing his trolley through Johannesburg’s suburbs to collect enough waste to feed his family. He earns about R1100 on a good work week, but he is a success story (Zack, Chalton, Kotzen, 2012)



FIG 70 : Trolley pusher city condition(Author, 2017)

Paul the Trolley Pusher

RECYCLABLES



FIG 72 : Informal settlement condition(Zack, Chalton, Kotzen, 2012)

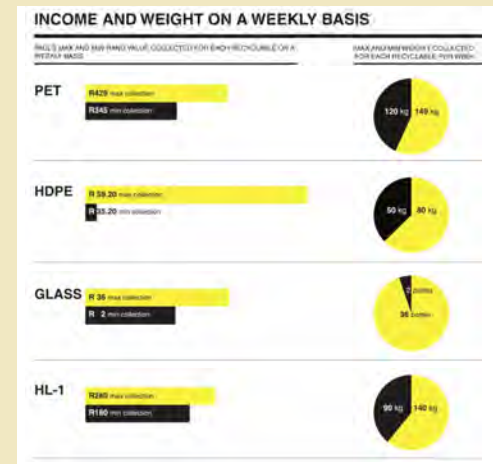


FIG 71 : Info graphics depicting price of recyclables(Zack, Chalton, Kotzen, 2012)

3.2.3 PICTORIAL URBAN CONTEXT EXPLORATION (ALL IMAGES TAKEN BY AUTHOR, 2017)



FIG 73 :Urban Exploration through pictures depicting industrial condition amongst the toxic waste mounds (Author, 2017)

3.3 URBAN VISION

An urban strategy was formulated, by our urban group which comprises of 2 landscape students and thus 2 landscape interventionist as well, in which these issues are dealt with. As the site needs rehabilitation, a 35-year plan will be implemented as follows:

- 5years: The toxic land will be re-formed into mounds and processed to remove the uranium and then will be made into bricks by the cement factory on site. This will happen while the remaining land is vegetated to rehabilitate the soil. A wetland system will process the water on site in conjunction with an AMD treatment centre and a transport node will form the first intervention to activate the area.
- 5-35 years: All road facing edges will be developed into mixed-use facilities. By this point the toxic land will have been processed and the brick facility can start processing other sites toxic material.
- 35+ The inner portions of the site will be built up with high density mixed-use buildings and varying typologies, establishing a firm economic presence within the city. This effort can then trickle out from this central site into the remaining mining sites. The processing of the site is a long process but it also gives it time to establish itself in an incremental manner which allows for a sustainable and resilient intervention.



FIG 74 :Urban Vision large Walkable streets with mixed uses that open to the street (Urban Group, 2017)

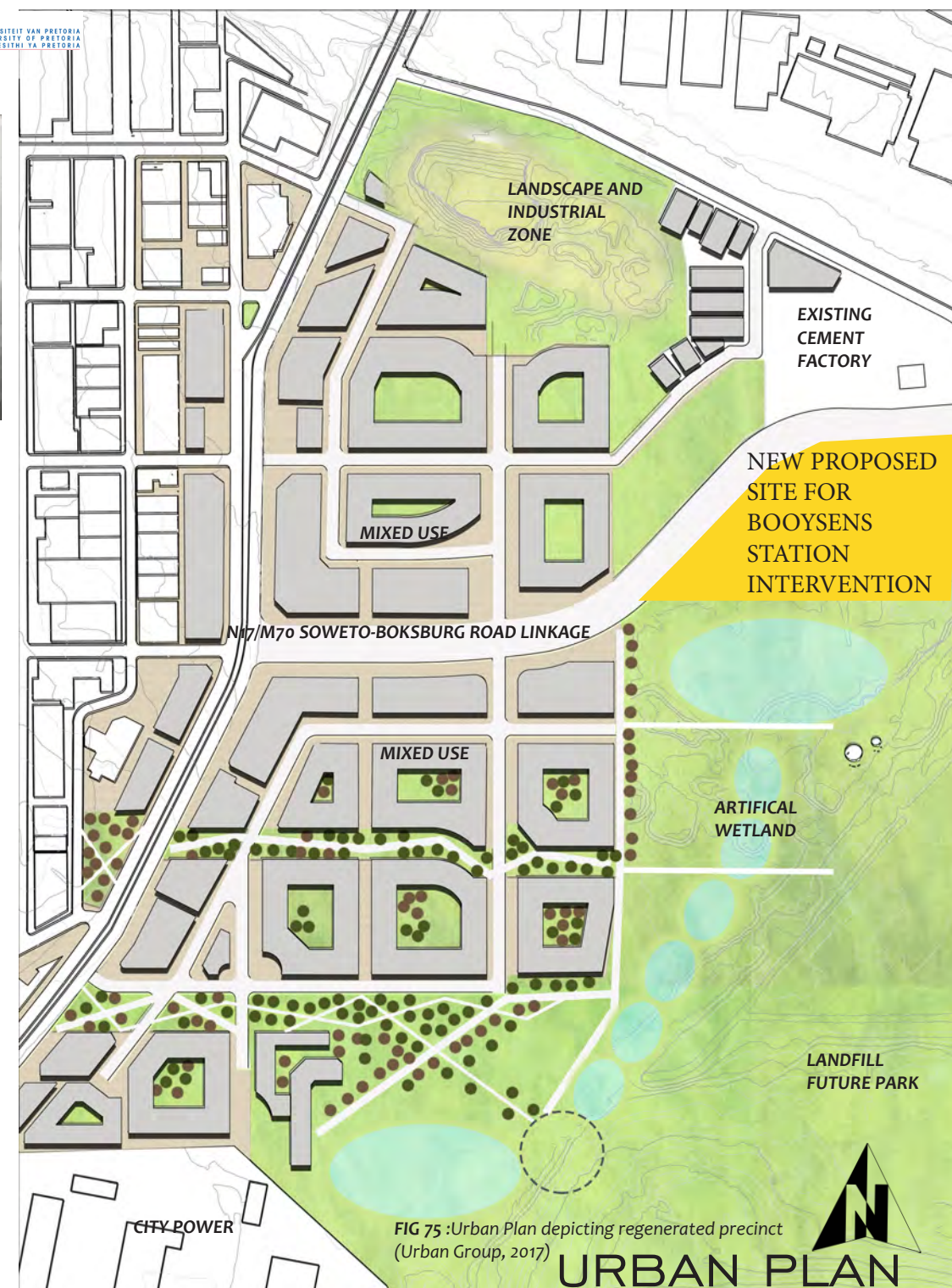
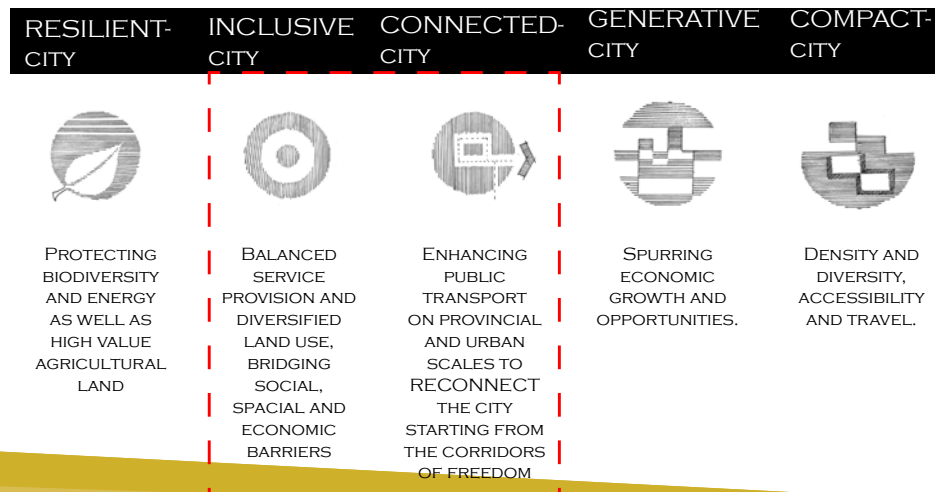


FIG 75 :Urban Plan depicting regenerated precinct (Urban Group, 2017)

URBAN PLAN

PHASING OF DEVELOPMENT

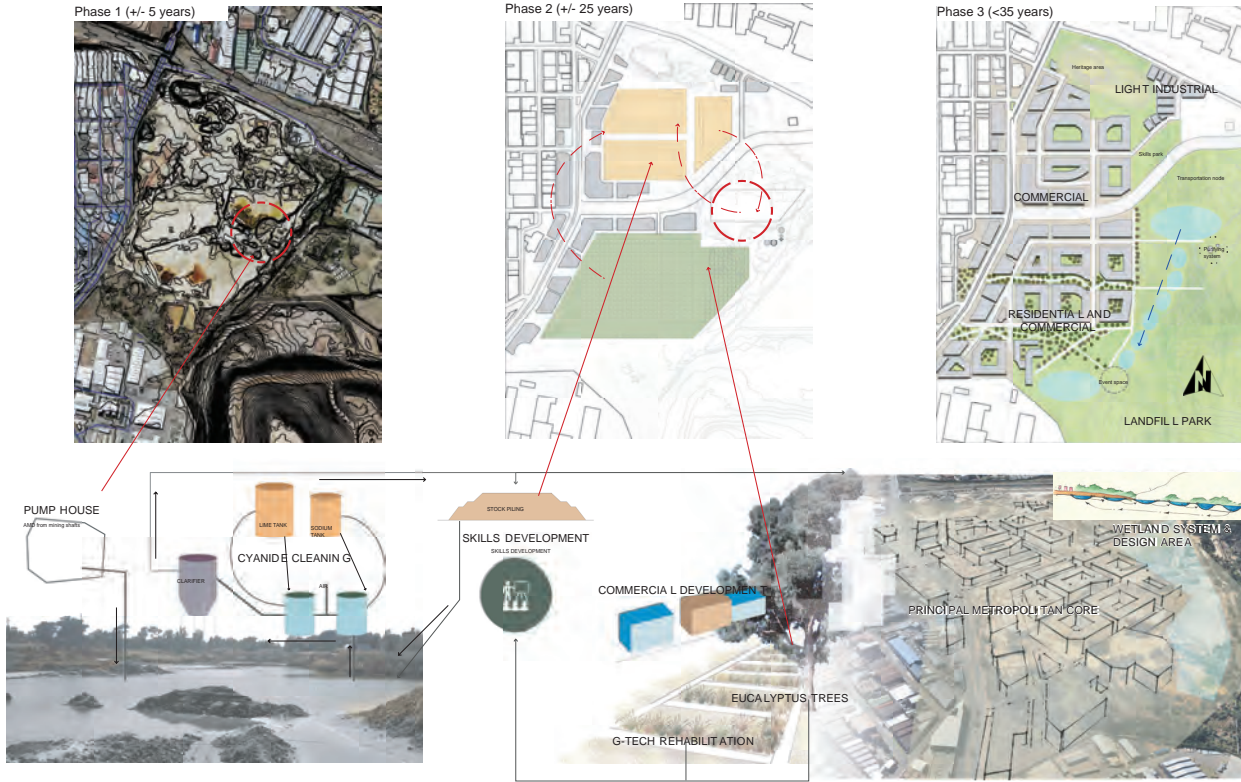


FIG 76 : Incremental process of site rehabilitation(Urban Group, 2017)

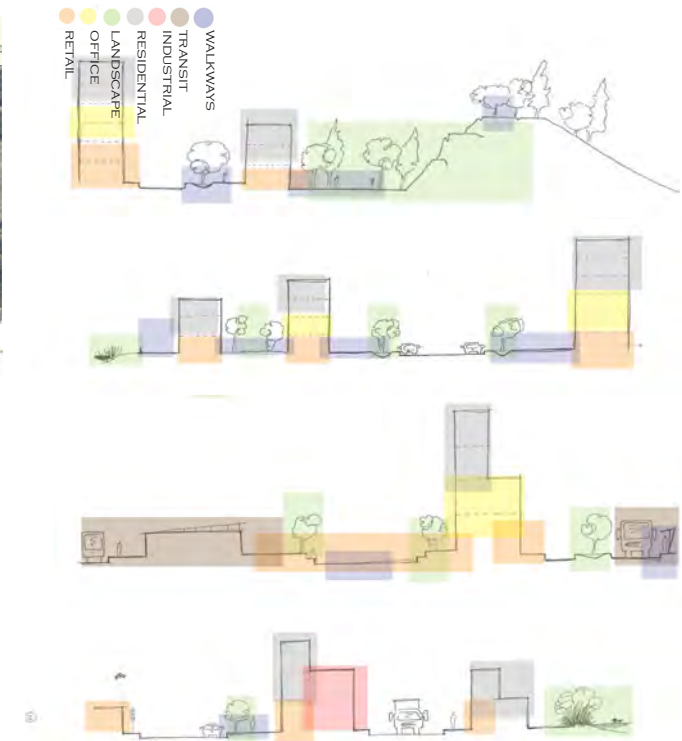
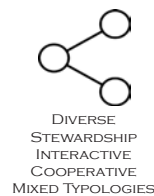


FIG 77 : Sections depicting building typologies (Urban Group, 2017)

The Urban Plan developed is an aim to synthesize the projects intention with existing Johannesburg Frameworks such as the 2040 SDF.

It focuses on creating an incremental development that will eventually bring new economic activity to the area and kickstart development along the mining belt reclaiming the landscape for the city.

The site itself has been imagined as a economic, ecological zone in order to provide a much needed green lung to the precinct and city.