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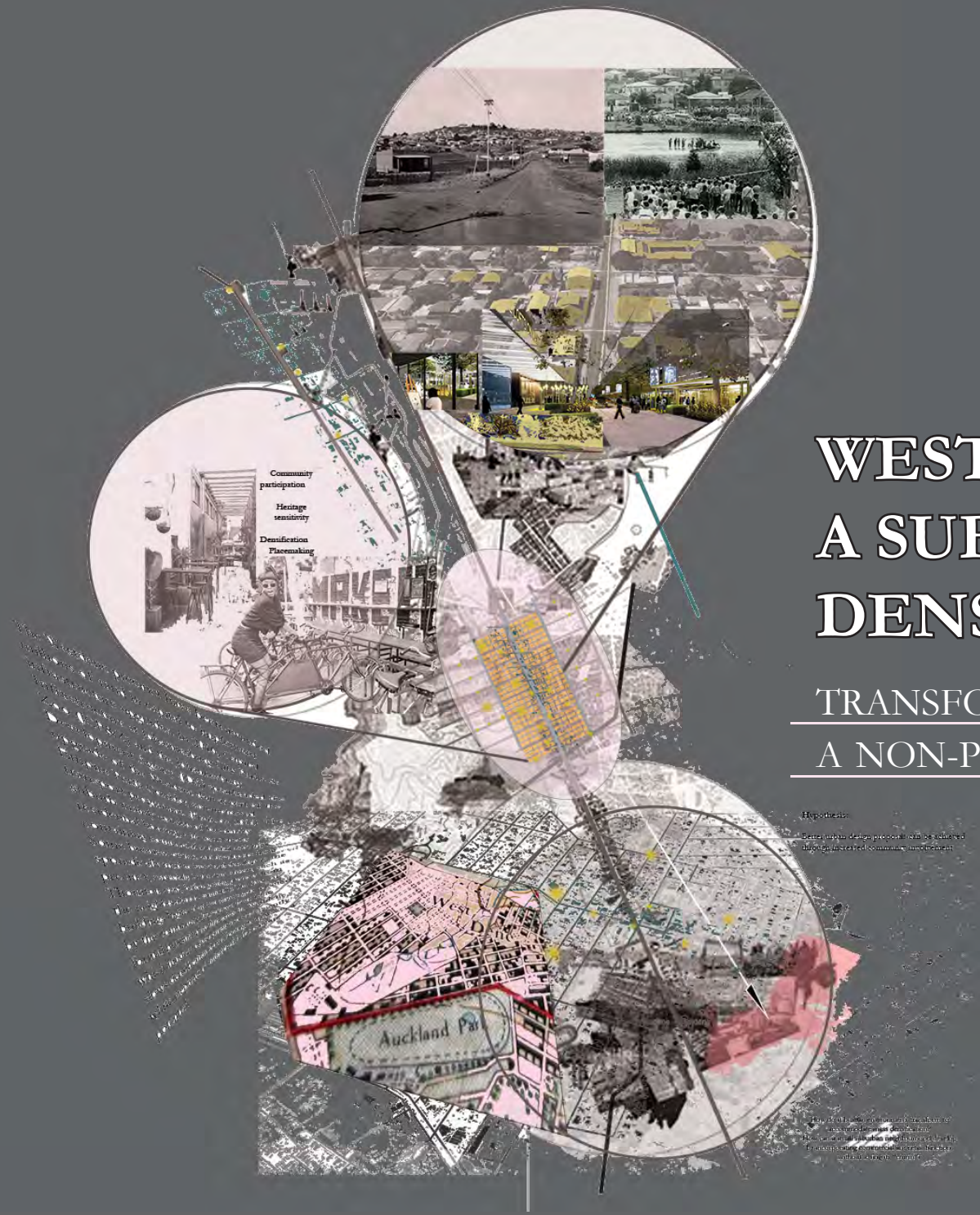

WESTDENE: A SUBURBAN DENSIFICATION

TRANSFORMING WESTDENE FROM A NON-PLACE TO A PLACE

M VAN DER MERWE

ARPL 7040 Research report

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University of Witwatersrand

Westdene: a suburban densification – Transforming Westdene from a non-place to a place

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PLAGIARISM DECLARATION

I declare that this research report is my own unaided work. It is being submitted to the degree of Master of Urban Design to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other university.

28 day of October 2021



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ABSTRACT

The research report, Westdene: A suburban densification, investigates how a residential precinct can appropriately develop over time from plot scale to precinct scale. Westdene has a contrasting set of characteristics: it is historic with a youthful influence, residential but on the precipice of densifying with permanent residents and a need for increased student and social housing. Despite the existing infrastructures, and upgrades thereof, Westdene has become dilapidated and seldomly used mainly due to low density, a lack of attractions and the haphazard densification of buildings. As a result Westdene has become a means by which you access another destination rather than a destination in itself. This begs the question as to how current research on 'best practice' densification can inform strategies for the localization of Westdene as a case of a historically significant first ring suburb. The investigation started by observing the irregularities of natural densification in the precinct and its effect as noted by the lack of architectural continuity and progressive loss of residential character. Natural densification occurs on a plot scale before multiplying into an eventual precinct plan. The research will employ an existing design methodology developed by Ian McHarg to the selected area by mapping existing, observable site informants and subsequently responding to these informants. The idea is to replicate the proper design codes onto a specific typology. Private developers and residents of the neighbourhood can then densify as needed within design parameters and good urban design principles. The idea is not to remove the autonomy of the inhabitants, but rather to guide them when they embark on future densification ventures by creating a space that is both functional, leaves potential for growth and garners interest in its visitors as an option for possible long term habitation.

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1

INTRODUCTION



INTRODUCTION & BACKGROUND:

Accepting the theoretical discourse that densification is central to urban sustainability, the research aims to pinpoint the type of densification needed to transform Westdene, Johannesburg into a local place that caters to the needs of the community, whilst adhering to good urban design principles. On the other end of the spectrum, the correlation between high density and community safety is a topical theme amidst the current global COVID-19 pandemic. Should we as designers find a middle ground between the ideal density and community safety and where does Westdene lie on that scale?

Westdene is an example of an old inner-ring suburb, on the historic edge of the city, which has been absorbed by the city during expansion over the past 100 years. The question lies in knowing how these suburbs can densify and grow with the city whilst retaining its suburban characteristics. The character of Westdene, historically, was that of a suburb on the city edge with an almost pastoral setting. Present-day Westdene is merely a 'sleepy suburb', lacking in activity and identity. The suburb transformed from a place to a non-place.

The Westdene precinct has been awarded millions of rand in capital to implement infrastructure upgrades. In 2016, Capital Infrastructure at Johannesburg City Parks & Zoo (JCP&Z) and the Johannesburg Development Agency (JDA) spearheaded the upgrade of the Westdene dam as part of the Empire Perth Corridor, non-motorized transport program (Frankson, 2016). The suburb mainly consists of low-density residential housing, with some streets containing commercial and retail activities. Some business owners and developers have sporadically tried to invest and develop in the precinct, especially in the main streets, such as Thornton road. These investments are curtailed by protests from the neighborhood community. Presently, there is no formal precinct plan that exists for Westdene, which hinders development and subsequently slows densification down.

Considering that Westdene will densify in the nearby future, it is pertinent to establish a vision for what the precinct can and might become. To do so, I will use a deductive methodology by analyzing Westdene's status quo and comparing it to the status quo of other suburban ring densification, case studies.

Density will be the main interrogation lens through which the following characteristics will be looked at;Macro & micro road networks, transport modes, Nodal points, Street typologies, land use, and integration value (space syntax).

Through a process of spatial exploration through design and cross-referencing to criteria, the research will develop a spatial development framework for Westdene as well as a high street typology that can be applied through natural densification. Both outcomes will facilitate the densification of the suburb by rezoning, whilst respecting the existing suburban character

PROBLEM STATEMENT

Existing infrastructures exist in and around Westdene as a result of the Empire-Perth corridor, yet four years after the implementation thereof as well as the upgrade of the Westdene dam, the area is once again dilapidated and very seldom used. This could be due to Westdene's low density and lack of attractions. When a place is not used, it becomes neglected, and as Richard Sennet said: " You move through a space and you dwell in a place."(Klaus, 2018)

Secondly, Westdene currently acts as a gateway into other suburbs, by being used as a detour route for vehicles avoiding other traffic-congested routes. No one goes to Westdene, to use it as a destination point for activities because it currently holds very few (if any) attractions. The concept of 'place' has been written about extensively within the environmental psychology circles. According to Bonnes et al, D Canter (1977) gave a concise explanation of a 'place' by stating: "an experiential unity referring to specific physical settings and having three main components: 'activities, evaluative conceptualizations and physical properties' (Canter, 1986, p. 9 in (Bonnes et al. , 1990))." Westdene not only lacks in attractions, but it also hosts no local commercial or retail centers. This results in local inhabitants having to venture out of the suburb to purchase daily supplies.

OBJECTIVES:

Methodologically: The research will employ an existing design methodology developed by Ian McHarg to the selected area by mapping existing, observable site informants. An appropriate urban invention for the area will be proposed by projectively responding to these informants. The aim is to test the relevance of the methodology applied to this site specifically.

Contextually: The research aims to understand how a low to medium-density residential suburb can be densified and activated so that it can better deal with thoroughfare while strengthening the area as a commercial and mixed-use destination.

Site specifically: The densification of Westdene needs to occur whilst respecting its historic and existing residential community character, through the introduction of strategically placed high street typology.

RESEARCH QUESTIONS:

1. How can current research on “best practice” densification inform strategies for the localization of Westdene as a case of a historically significant first ring suburb?

1. How can best practice densification be applied to:

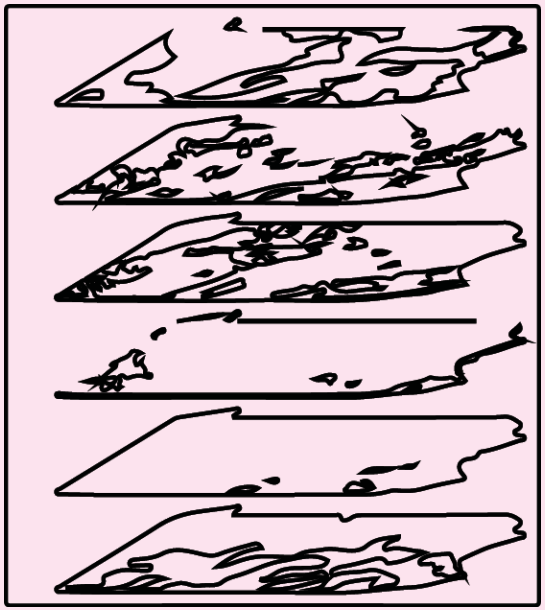
- Address the dominant through traffic function of Westdene that contributes to the character of the area as a non-place.
- Apply strategies of suburban localization to achieve sustainable place identity and place-making towards sustainable post-epidemic urbanism.
- Investigate code-based urban design principles of density and its relationships with street networks, urban form typologies, transportation modes, land uses, and place-making.

HYPOTHESIS:

Through focused research of best practice densification and the application of the appropriate principles, implemented in other case studies, a suburban densification strategy, can be crafted and applied to Westdene and similar suburbs.

The next chapter investigates theories by great urban design thinkers of the twenty-first century and how these theories can be applied to the study area. A literature review is an important tool to guide your thinking on your approach to existing problems identified. Due to the vast volumes of theory out there, it's important to focus your theoretical investigation through a certain lens, depending on your desired outcome. In this case the focus lens will be 'density'.

2
SITE ANALYSIS



APPROACH

The site analysis will start on a macro scale by looking at movement networks and connectivity, street typologies, accessibility, zoning, lost and underutilised space, density, edge conditions, and development trends. The analysis will then focus on a pot scale level by looking at existing building typologies, in preparation for future development on each erven. The analysis serves as a guiding tool, to establish how the existing macro variants – mentioned above – can be improved, independent of the plot scale adaptions, and vice versa – how densification on a plot scale will influence Westdene on a precinct level. Both will have an effect on each other, but for the purposes of this study, I am looking at densification from the inside out. In summary, the analysis will look at 'natural densification' occurring over time, erven-by erven, resulting in the eventual precinct modification.

ROAD NETWORKS AND CONNECTIVITY:



Figure 1.1 Macro road networks (Author: 2021)



Figure 1.2 Macro road networks (Author: 2021)

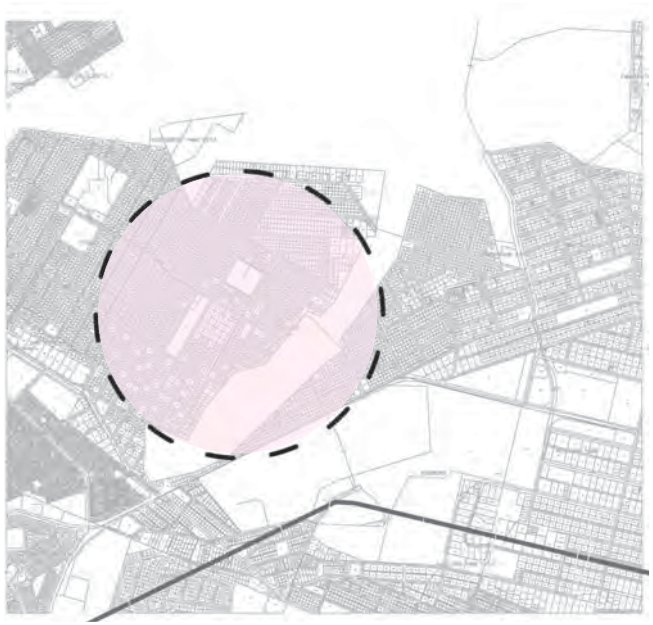


Figure 1.3 Macro road networks (Author: 2021)

The macro road network situated around Westdene consists of N1 to its West, the M1 to its east as well as the M2, and Albertina Sisulu to its South so the site seems topographically central and very well connected.

On a precinct scale, the site once again seems very well connected with Beyers Naude to the East, Empire/Perth to the South and Main road to its West.

The problem with Westdene's location is that it is not accessible due to its lack of connectivity. Alistair Morrison identified a property that typical road networks contain, called 'arteriality', which is a feature where "strategic routes connect up contiguously"(Marshall, 2005:61).

One of the main feeder routes of Westdene, Perth road, sits on the Southern boundary of the precinct, with only one direct road feeding from it into Westdene. A challenge with

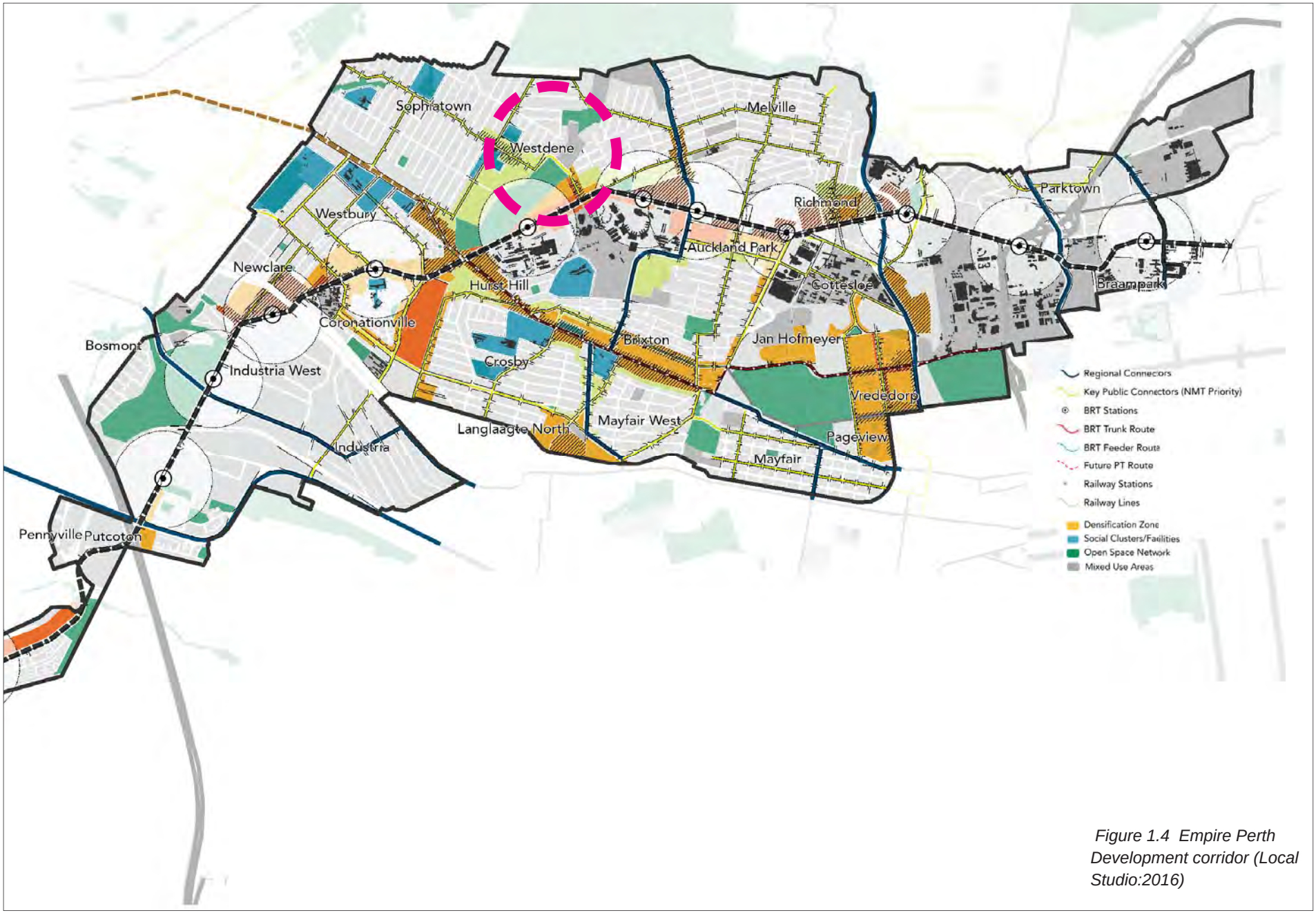


Figure 1.4 Empire Perth Development corridor (Local Studio:2016)

ROAD NETWORKS AND CONNECTIVITY:

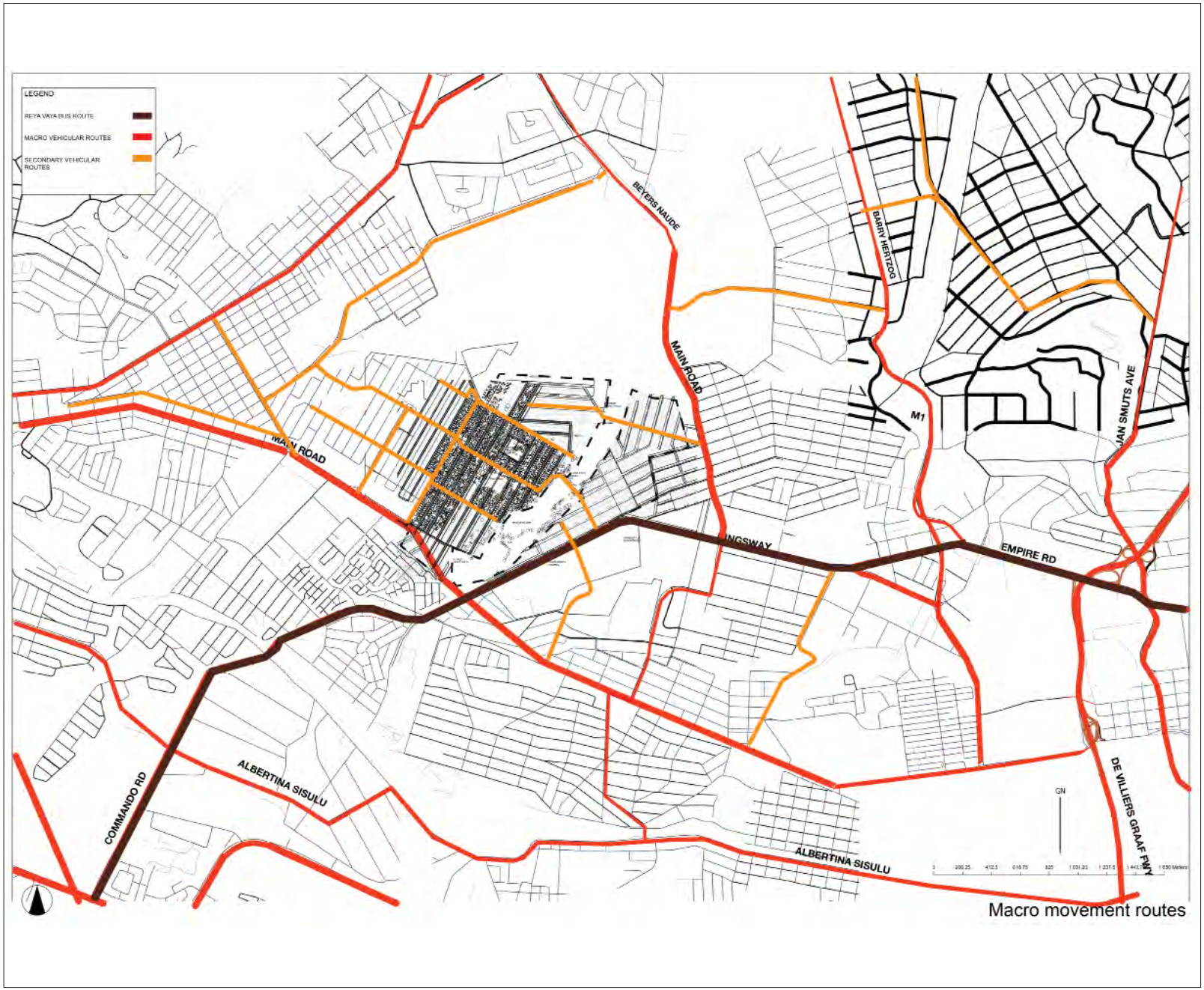


Figure 1.5 Macro Road networks (Author:2020)

the existing street layout is that the main connecter routes are not contiguous. The Space syntax analysis - figure 1.8 - illustrates the lack contiguity.

The existing 'activity street', Thornton road, is also used as a thoroughfare when vehicles or pedestrians would like to move in a North-Westerly direction. A NMT (non-motorised transport) was proposed and implemented in Westbury without it successfully integrating into Westdene (figure 1.6 & 1.7).

The space syntax analysis done on Westdene's existing vehicular roads, indicated what was expected: Perth road has the highest integration value. The second highest, are the roads lying in North/South-Eastern direction starting at 4th avenue (see figure 1.8).

What the space syntax analysis



Figure 1.6 Westburg NMT overlayed onto Rea Vaya route (Author:2020)

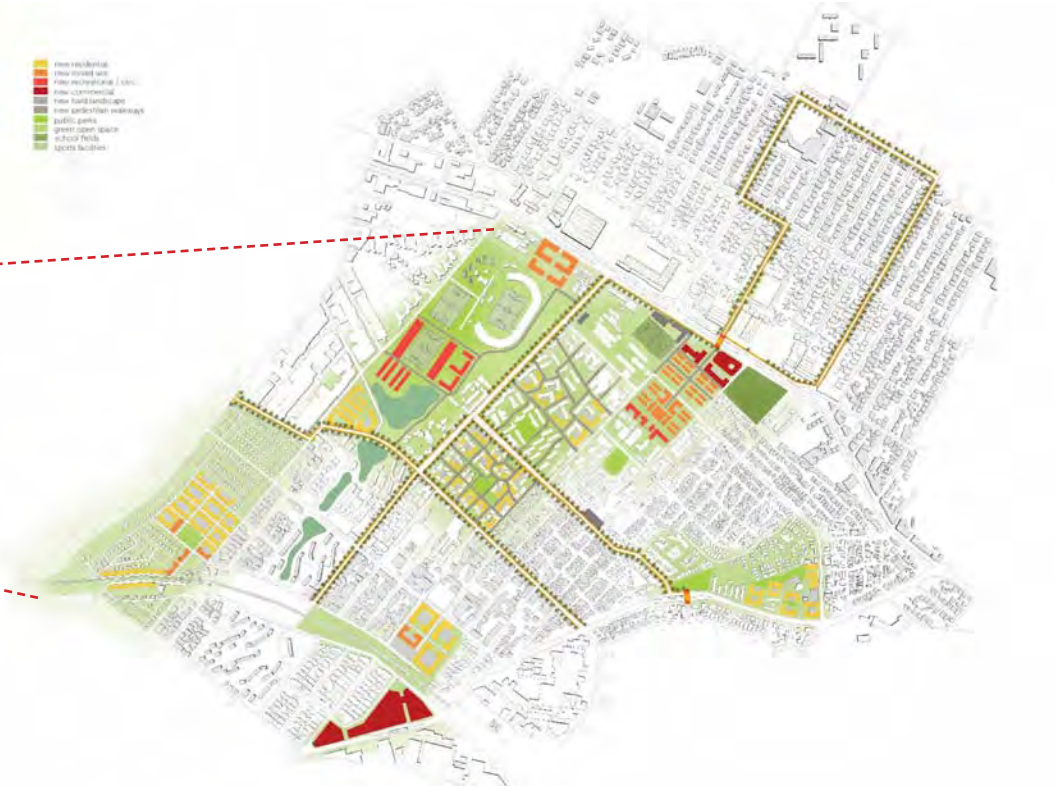


Figure 1.7 Westburg NMT (Local studio:2015)

indicates, is that the residential streets, closest to Westdene dam, are the least integrated. Moving in a North Westerly direction, the streets become more integrated. Interestingly enough, Leyds/Thornton streets are the least integrated of all the streets, yet currently is being used as the primary thoroughfare road. This is an indication that Thornton road, should first become more integrated before it can attempt to become a high street and it might also be indicative of why it keeps failing at being one.

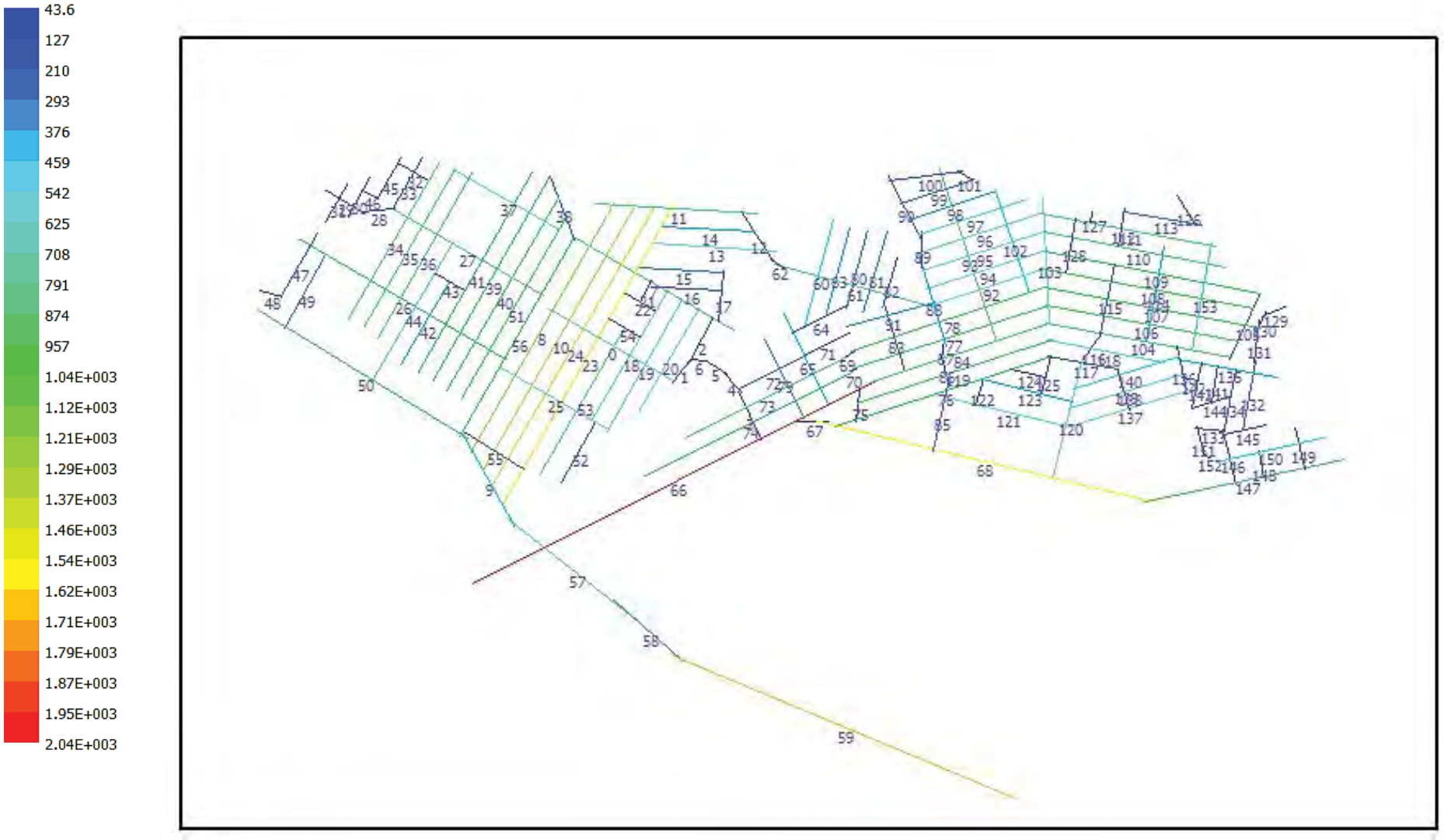


Figure 1.8 Space Syntax analysis, Westdene (Author, 2020)

MOTORISED MOVEMENT & ACCESS

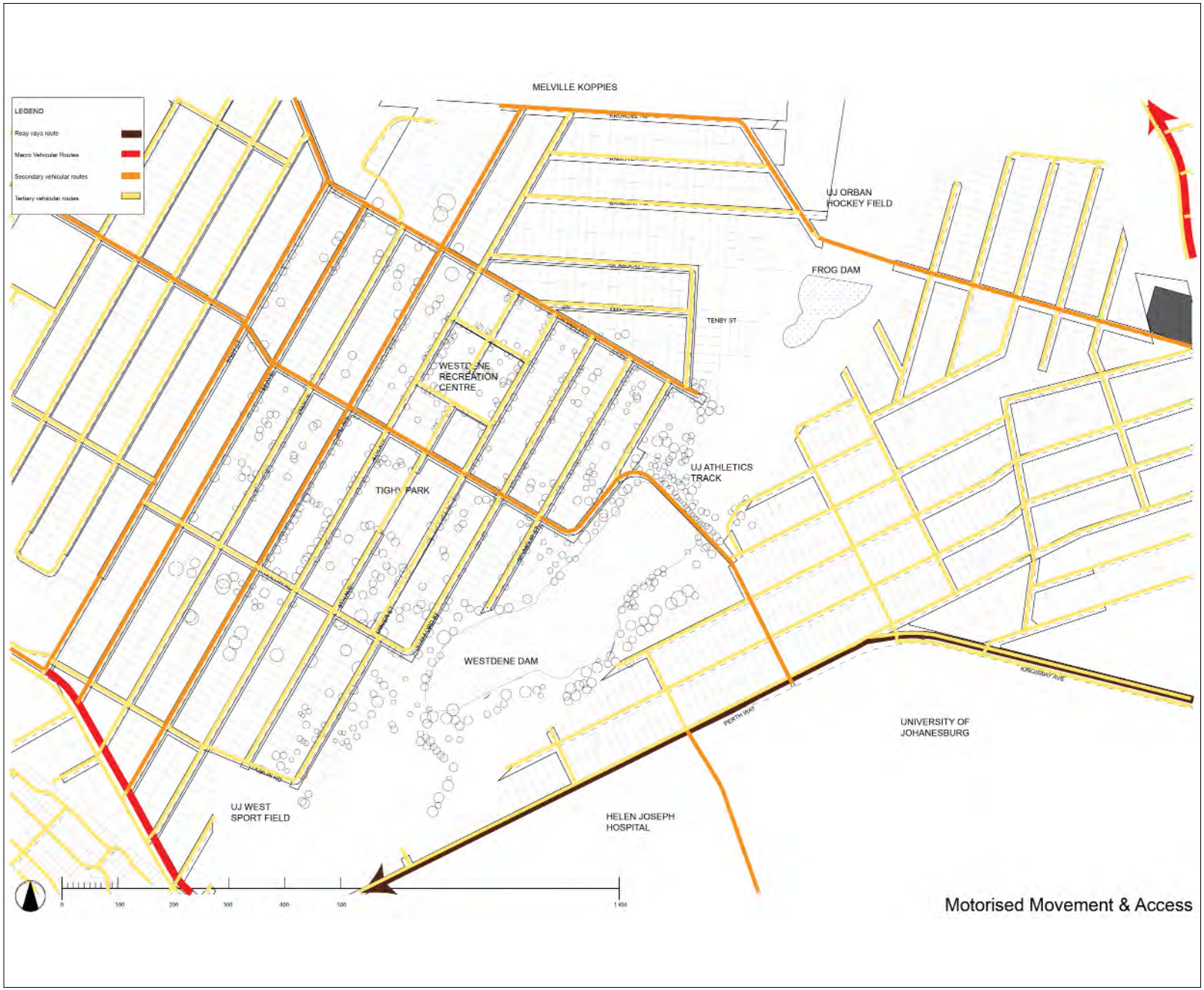


Figure 1.9 Vehicular road typologies (Author:2020)

As briefly mentioned in chapter two, there are three existing types of street typologies in Westdene. Perth and Main road can be classified as the BRT trunk route (primary distributors), whilst Thornton road can be classified as an activity street and the remaining streets as residential collector streets. Thornton road formed part of the Westbury/Sophiatown NMT(non-motorized transport), which included bicycle routes and pedestrian walkway upgrades. If any future proposals are made in terms of street upgrades, the implemented urban design guidelines should be taken into consideration. The existing street typology of Thornton road is a good foundation to start from, with wide sidewalks and on street parking. There are currently no urban design guidelines in place to create a

PEDESTRIAN MOVEMENT & ACCESS

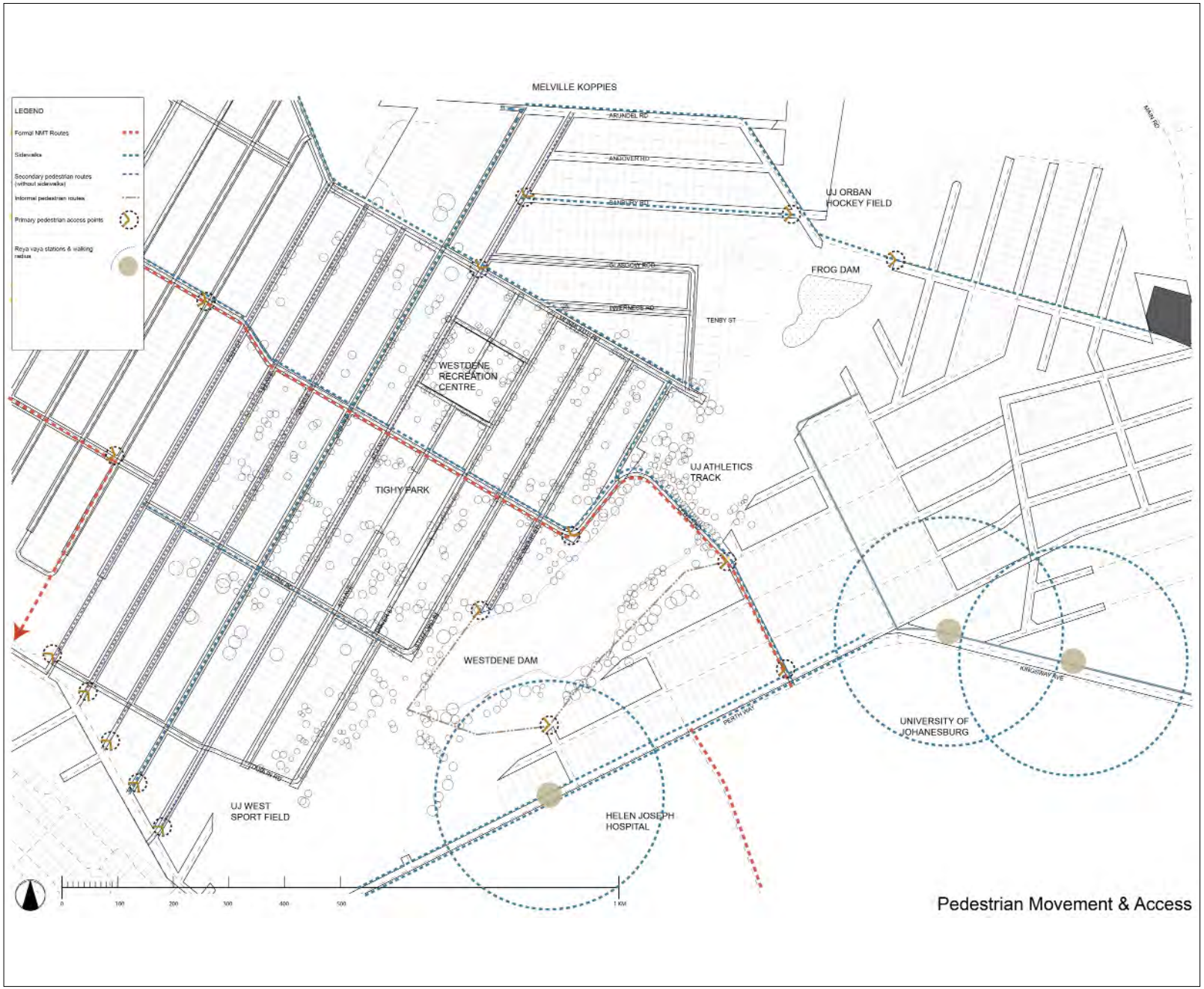


Figure 1.10 Pedestrian movement and access (Author:2020)

cohesive precinct. The residential streets contain tree-lined sidewalks, creating a pleasant pedestrian experience. If any future development would to occur, this is a characteristic we want to keep.

The existing infrastructure in some streets of Westdene, is accommodating by being generous enough to allow both walking and cycling. The sidewalks on well used streets, such as Lewes, Thornton, 4th avenue, 5th avenue, Ayr and Ludlow are in good condition. Lewes, and Thornton have recently been upgraded as part of the Sophiatown/ Westbury's NMT (non-motorised transport) implementation.

The Reaya Vaya bus tops are within close proximity of Westdene and are well positioned to assist pedestrians getting close to the precinct, but poor permeability in a North Westernly

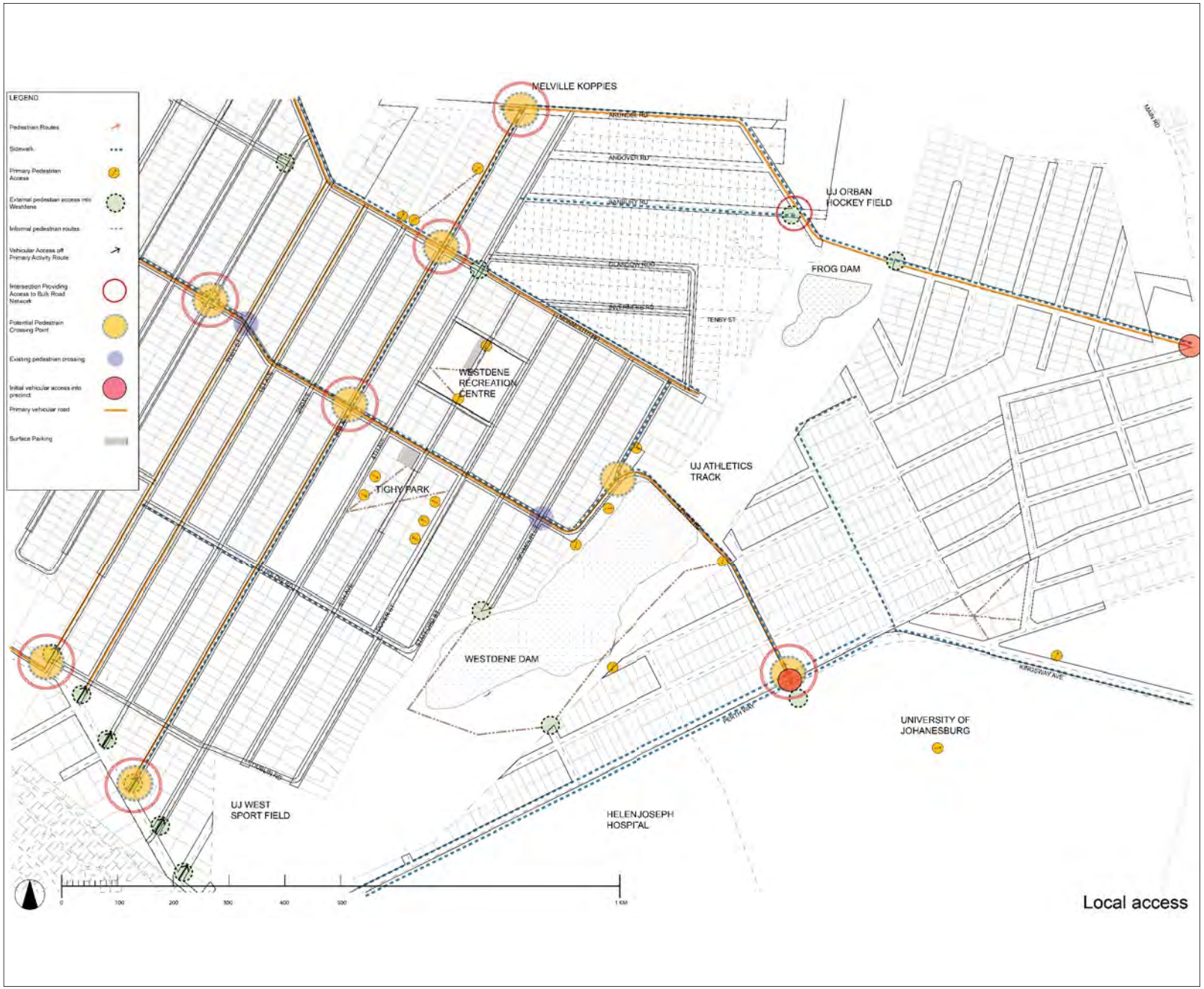


Figure 1.11 Local access (Author:2020)

direction hinders accessibility from the bus stops into the neighbourhood. Dis discontinuity of the road networks, in a north Westernly direction makes the quality of the sidewalks irrelevant.

The Westdene dam and it's surrounds creates a huge barrier for pedestrians due to the poor management of the public open space, resulting in the park often being locked up.

The steep topography makes cycling less desirable, and as the urban designers of the Westbury precinct's NMT admitted, "In hindsight, Local Studio believes that it may have been preferable to have combined the cycle lanes and pedestrian walkways, as cycle lanes are very obviously empty most of the time, while there is a significant amount of pedestrian movement."(Local Studio, 2015).

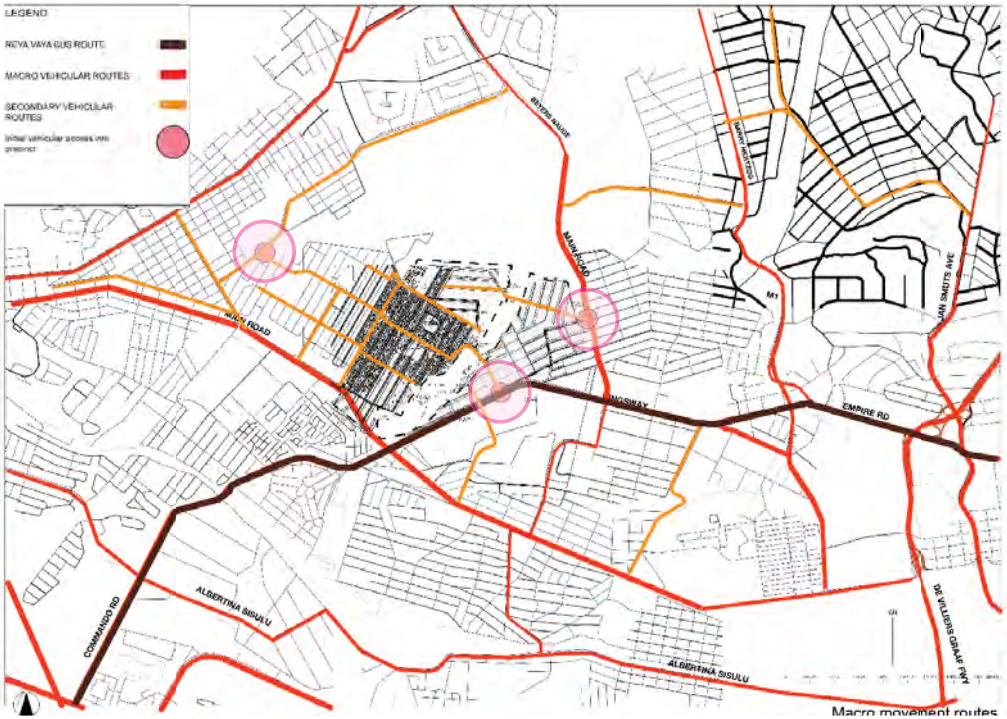


Figure 1.12 Macro vehicular movement showing primary entry points (Author:2020)

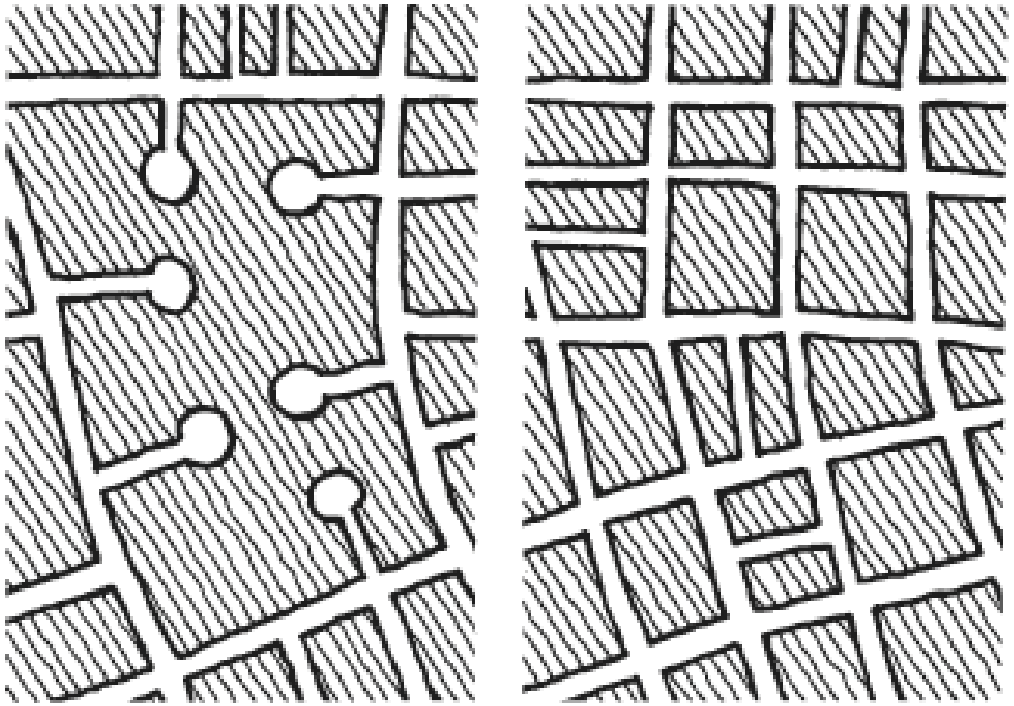


Figure 1.13 Permeability (Bentley et al., 1985:9)

An ongoing theme during the site analysis is the lack of permeability and legibility. It's difficult to direct yourself into Westdene when you are situated on the fringes of the neighborhood. In Bently et al., 1985:9, they describe permeability as the "the number of alternative ways through an environment", which explains why the permeability in Westdene is so poor because the entry points into the neighborhood are so limited. Figure 1.11: local access, indicate how limited the pedestrian and vehicular access is in an S-E/N-W direction. Driving down Perth ave, If you miss the turn-off in Lewes road, you need to drive another kilometer, at-least, before you get another opportunity to cross Westdene dam and enter the precinct. Melville koppies make up the Northern border of the precinct, with only Beyers Naude/Main road, providing access from the North-Eastern side, until you get to the next opportunity which is Johannes/Main road, which is 5km apart (See fig.1.11) Also mapped in the local access diagram, is the pedestrian access into Westdene from outside the precinct going in. These entry points are not formal gateways, but rather typical routes used by pedestrians because they are either the shortest route from A to B or the most accessible. Entrances into the Westdene dam public park along with 'informal routes', are also mapped as they are often used by pedestrians when the gates are unlocked, as an alternative – shorter route - to walking around the dam.

LOST/UNDERUTILIZED SPACES AND EDGES



Figure 1.14 Lost/underutilized spaces (Author, 2020)

There are various types of open spaces in any precinct. These are made-up of street verges, public open parks, the streets themselves, and the sidewalks. These spaces often form the edges of a space by either physically sitting on the perimeter of a defined land parcel - such as a building, or invertedly, the edges of buildings, form the spaces. Lynch (1959), defines an edge as the "linear elements not used or considered as paths by the observer." and edges can either be positive or negative. The edge of a precinct can also define it by announcing that you've crossed a border or threshold. In Westdene's case, a big edge and buffer is the green corridor containing the Westdene dam. This edge can function as a gateway in itself but fails to do so because of its,own, unwelcoming periphery. The

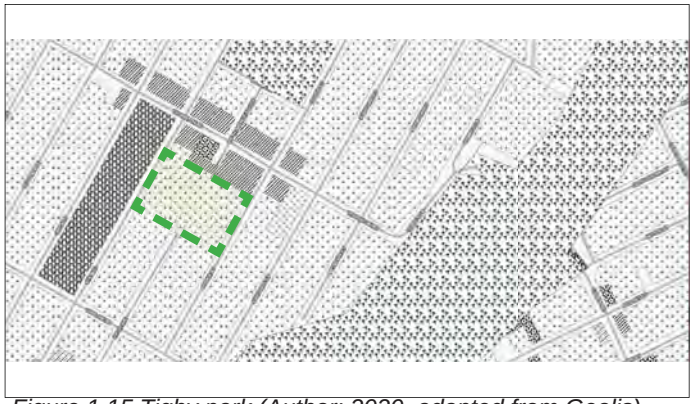


Figure 1.15 Tighy park (Author: 2020, adapted from Geolis)



Figure 1.16 Tighy park aerial (Local Studio: 2019)

park is not inviting, nor does it serve as a thoroughfare into the Northern section of Westdene. The public park surrounding the dam could be connected through formal pedestrian walkways in a SE/NW direction. There is currently no active nor passive surveillance in the park, making it unwelcoming and unsafe. Since Westdene dam's upgrade in 2015, it has been quite neglected and vandalised, as often happens with a public park when maintenance fails, and when the community doesn't take ownership. The open space adjacent to the frog dam is zoned residential, but it blocks access to the public open space lying beyond it. An opportunity to provide a continuous green corridor, functioning as a public park, is lost. The opportunity to create open, passive and active recreational spaces within the green buffer is there and although the JDA in conjunction with JHB city Parks, have invested in the Westdene dam, the lack of accessibility and permeability outweighs the

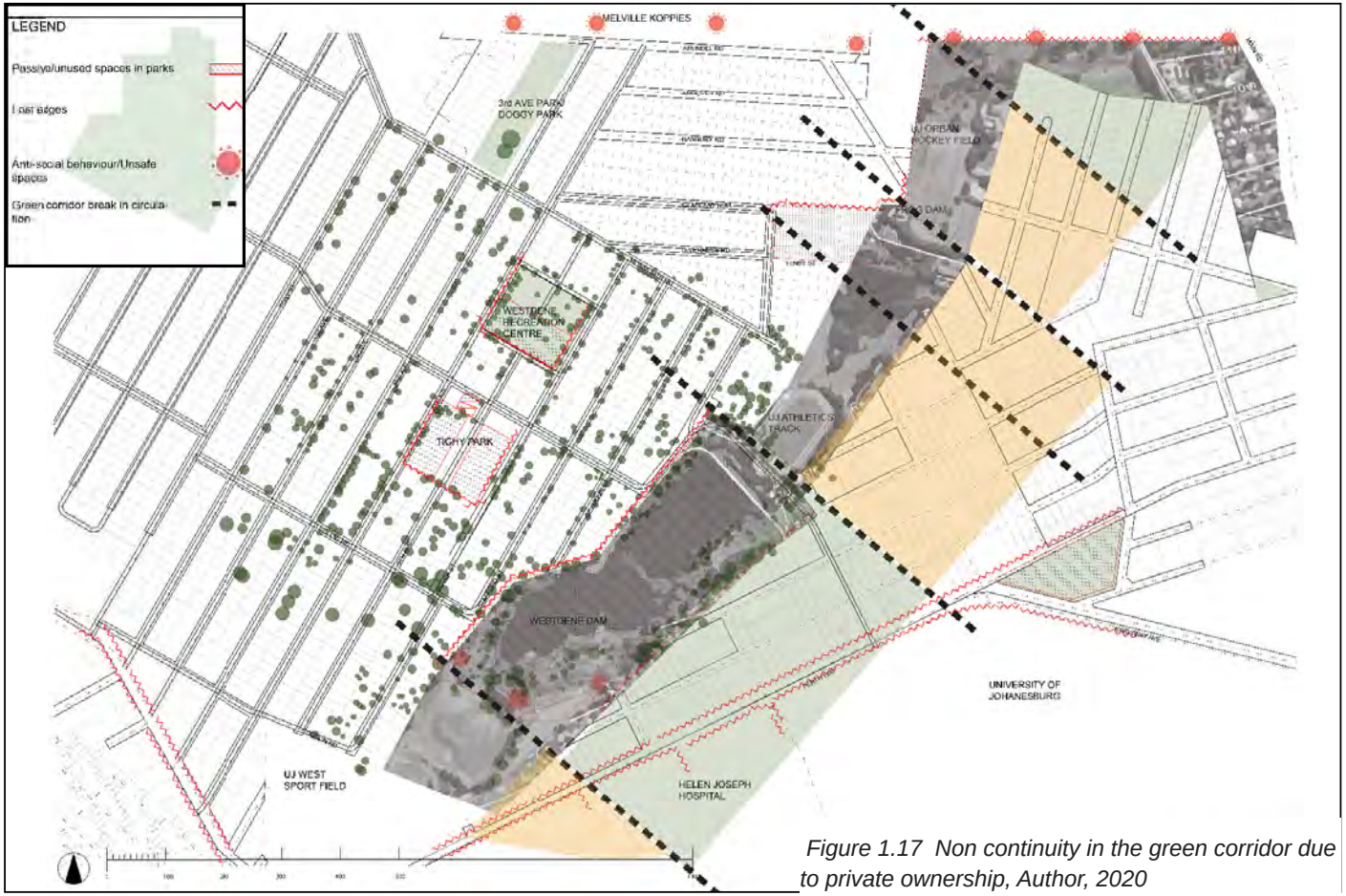


Figure 1.17 Non continuity in the green corridor due to private ownership, Author, 2020

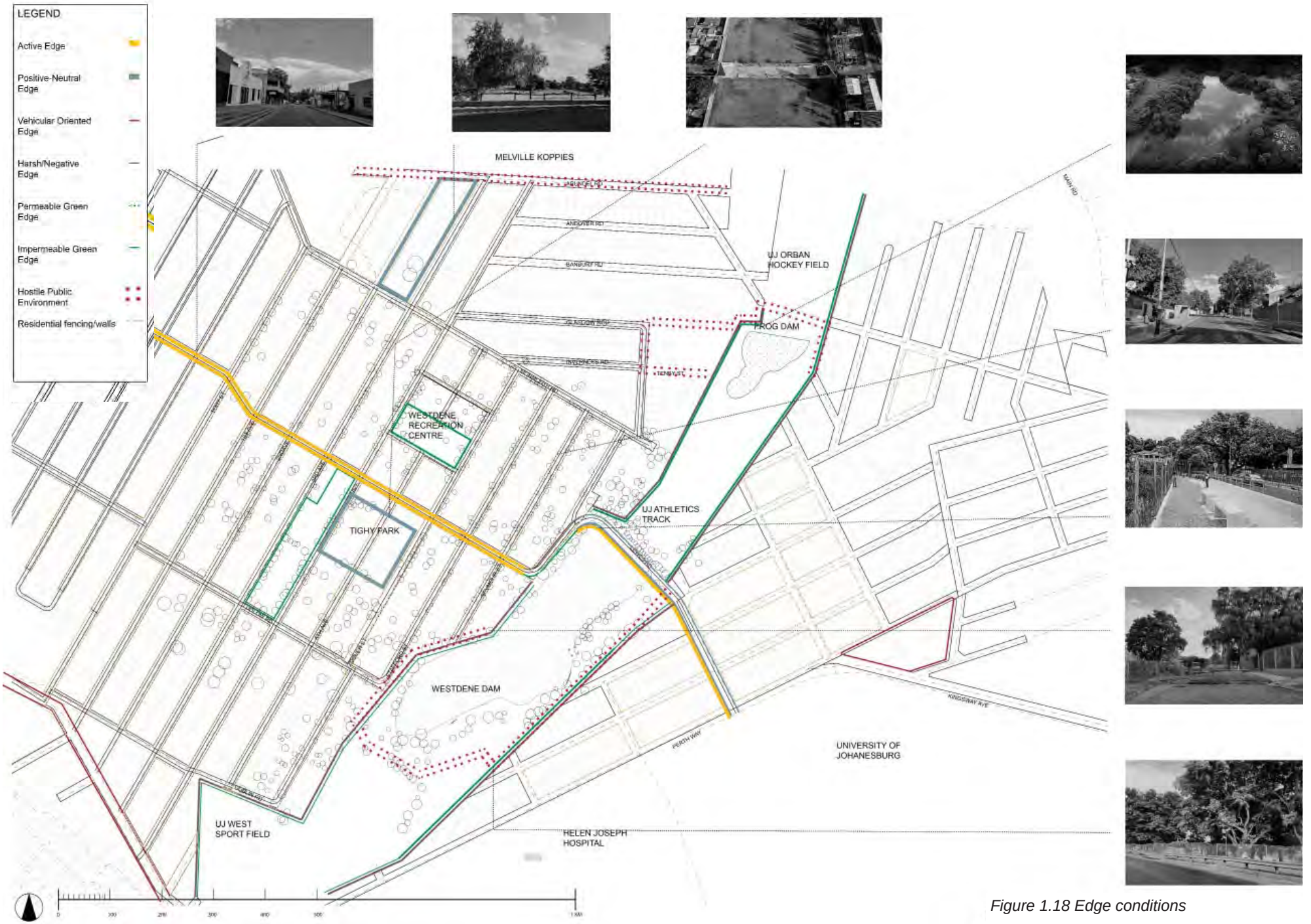


Figure 1.18 Edge conditions

positive impact of the implemented design. Tighy park, implemented by Local studio in 2018/2019, sits within a residentially zoned area. The design links Thornton and Ludlow together by acting as a pedestrian corridor between the two and essentially halving the block size. The foresight of this design will have a huge positive impact on the precinct once densification occurs in the future. Unfortunately, Tighy park is often fenced off with the residents not being able to access it. The implementation of fencing is always a point of great contention between Landscape Architects and the JHB city parks, with the latter always insisting on fencing although it often makes a space more dangerous and less used.

Third avenue park, know by the locals as the Westdene "doggy park" is very well used and highly successful, although zoned educational. The park is unfenced and welcoming with open views and no formal design input. It's essentially an open, grassed erf without street furniture or play equipment. The tertiary educational facilities's sports grounds such as the UJ athletics track, rugby fields and hockey fields are not accessible to the general public, and this breaks the continuity of the green corridor (figure 1.17).

The purpose of analysing and categorising the edge conditions is to assist me in making decisions about which aspects of the precinct need improvement,



Figure 1.19 Elements of a city, Kevin Lynch, Jagannath, T. (2019)

celebration or adaption. The edges of spaces essentially frame a scenario whilst guiding the passerby on the state of their surroundings. Edges are often the 'leftover' spaces of a developed area, and although an onlooker might not always be cognisant of the fact, an edge can provide a very clear indication of the state of affairs. As mentioned above, the edge conditions often form part of the lost and underutilised space, as is the case with sections of the Westdene dam and frog dam border and fencing. The edge conditions of each road typology differ, the main differences being the amount of movement activity and the typologies of the buildings adjacent to the roads. The edge conditions of the buildings are a variable that is addressed in the mapping of the various typologies and will be discussed in more detail during the detailed development of the design. On a broader, contextual, scale, it's important to identify which edges are positive, negative or neutral, in order to establish an appropriate urban design response. Some important edge conditions identified in figure 1.18, include; the active edge of Lewes and Thornton road, the impermeable (and often hostile) edge of the Westdene dam, the positive or neutral edges of the public open spaces, and the vehicular orientated high roads. In some instances, edges have a mixture of characteristics, such as Thronton road, by being both active and vehicular orientated, yet positive for pedestrians, or Lewes road by being both active, yet impenetrable and negative for pedestrians.

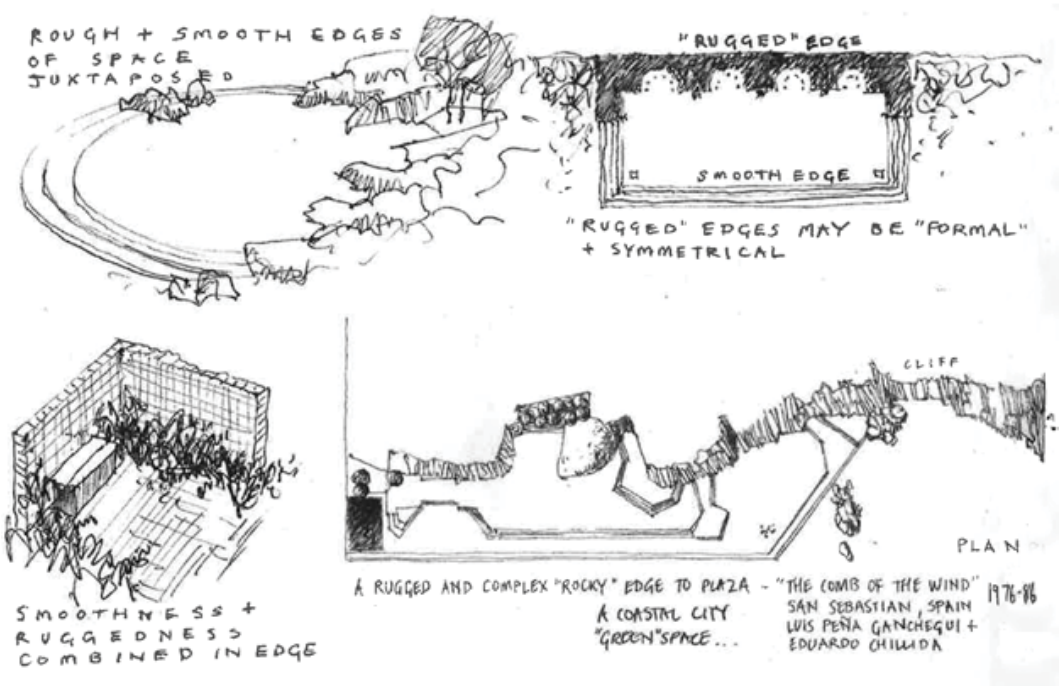


Figure 1.20 Edge conditions, Dee, 2001:84

DENSITY



Figure 1.21 Density, as zoned by COJ, image adapted from COJ (Author:2020)

The vision as outlined by the Johannesburg SDF (site development framework), is to create a compact polycentric city, with the aim of highlighting precincts in the inner city of Johannesburg as core nodes, and by improving them through effective public transport and an efficient density gradient radiating outwards. Westdene falls within this transformation zone meaning that investment will be prioritised for future urban intensification and thus densification. The framework plan, as set out by Iyer:2016, in the Empire-Perth corridor, indicates the consolidated framework plan to densify sections of Westdene. The majority of Westdene is currently zoned as low density (<100dph) with medium (100-160 dph) and high (160-250 dph)

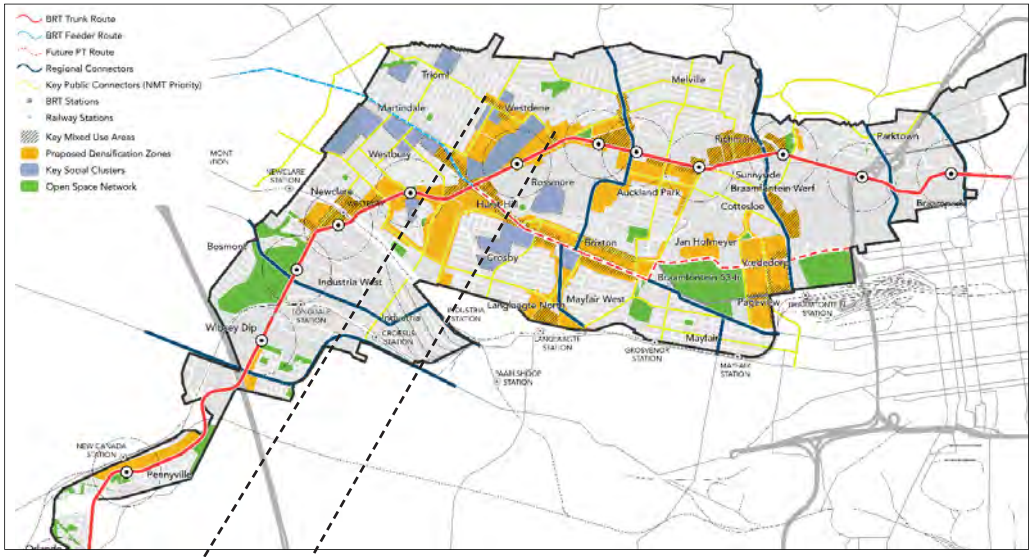


Figure 1.22 Study area, adapted from Google earth, (Author:2020)



Figure 1.23 Empire-Perth corridor Framework plan (Iyer:2016)

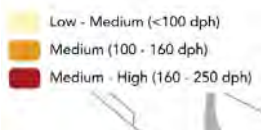
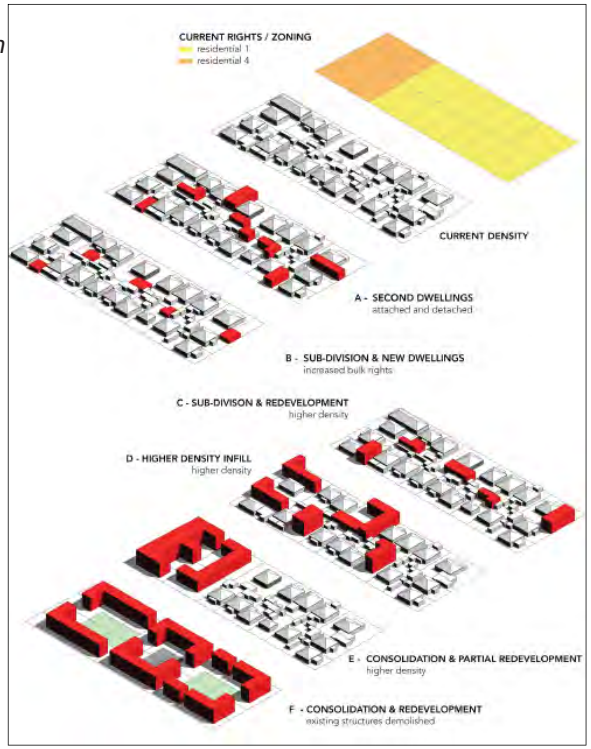




Figure 1.24 (Above) Detailed densification strategy (Iyer:2016)

Figure 1.25 (Right) Densification forms (Iyer:2016:57)



density appearing on the South-Western periphery of the Westdene dam, North of Perth Way. During the SAF (strategic area framework), Iyer suggested a more "detailed response" to the densification strategy by indicating where in the SAF, in conjunction with the corridors of freedom, densification will occur. In Westdene, they indicated medium-high densification along Perth road and the Southern section of Leyds road, without the densification extending into the precinct itself. Their response excludes the proposed densification within the North-Western section of the precinct, including; Thornton road, Seymour, Dover, Ludlow, and Park.

BUILDING HEIGHTS



Figure 1.26 Existing building heights (Author: 2020)

The building heights mapped in figure 1.26, shows the current, as-built heights. According the current development rights, as stated in COJ land use scheme 2018, any building erected in Height zone C, "shall not project above a line drawn at an angle of 59 degrees, to the horizontal from a point at street level on the street boundary opposite to the street boundary onto which the site fronts"(COJ, 2018). The majority of Westdene, which is zoned residential 1,falls into 'height zone: 3 storeys' with some exceptions – indicated in figure 1.26, where the height zone is indicated 0. Some of these erfs are situated in the following streets:Arundel, Banbury,Ludlow, Dublin, Lewes, Aberdeen and Ararat streets. As mentioned before, residential 1 have been rezoned to residential 3, meaning the height can extend up to 3 storeys. The aforementioned rezoning have been formalised in 2020.

ZONING

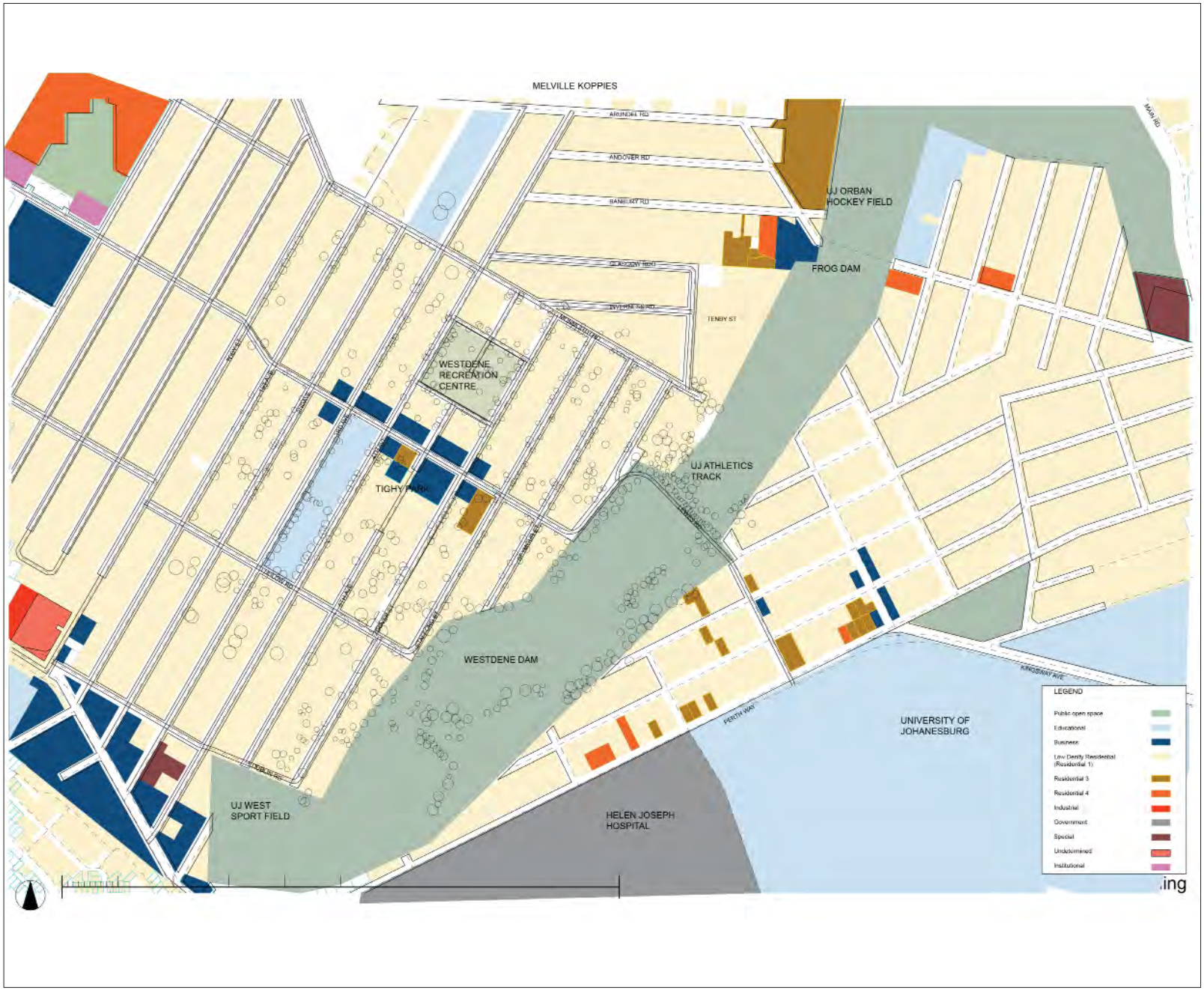


Figure 1.27 Land use zoning in Westdene, (Image adapted from COJ (Author:2020)

Westdene precinct currently includes the following zonings; public open space; educational, business, Residential 1, residential 3, residential 4, industrial, government, special, undetermined and institutional. The majority of the Westdene falls under residential 1, which happen to have been rezoned to residential 3, during the course of this research investigation. A broad overview is given in table 1, to provide a clear understanding of the primary functions and allowances of each land use, to determined the parameters given by COJ.

ZONING	PRIMARY LAND USE RIGHTS	SECONDARY LAND USE RIGHTS	COVERAGE DEVELOPMENT REQUIREMENTS	FAR	BUILDING LINES
public open space	public open space	-			Height Zones A and B: 3,0m Height Zone C:1.5m
educational	Institutions, place of instruction, social halls, religious purposes	Medical consulting rooms, dwelling units, residential buildings, sport and recreation clubs, public or private parking areas	-	2,1	Height Zones A and B: 3,0m Height Zone C:1.5m
business	Business purposes, shops, residential buildings, place of instruction, social halls, restaurant, car sales lot, motor showrooms, showrooms. offices, public or private parking area, institutions, religious purposes, dwelling units, warehouse	_		2, 1	Height Zones A and B: 3,0m Height Zone C:1.5m
residential 1	Dwelling house	Religious purposes, place of instruction, child care centre, social halls, institutions, residential buildings (excluding hotels) , special buildings, sport and recreation clubs, public or private parking areas, medical consulting rooms, tavern/shebeen, guest house	Residential 1: 60%	1,2	Erven of 500m2 or less:1m Erven larger than 500m:3m
residential 3	Dwelling units, residential buildings	Religious purposes, place of instruction, child care centre, social halls, institutions, residential buildings (excluding hotels) , special buildings, sport and recreation clubs, public or private parking areas, medical consulting rooms, tavern/shebeen, guest house	Residential 3: 80%	1.2	Erven of 500m2 or less:1m Erven larger than 500m:3m
residential 4	Dwelling units, residential buildings	Religious purposes, place of instruction, child care centre, social halls, institutions, residential buildings (excluding hotels) , special buildings, sport and recreation clubs, public or private parking areas, medical consulting rooms, tavern/shebeen, guest house		1.2	Erven of 500m2 or less:1m Erven larger than 500m:3m
industrial	Industrial purposes. Public garages, public or private parking areas. shop~, business purposes. commercial purposes, builders yard, building material storage.	-		2.1	Height Zones A and B: 3,0m Height Zone C:1.5m
government,	Government purposes	-		2.1	Height Zones A and B: 3,0m Height Zone C:1.5m
special	Only uses as stipulated in the applicable Schedule / Annexure	-		2.1	Height Zones A and B: 3,0m Height Zone C:1.5m
undetermined	Agricultural purposes, dwelling, house, urban agriculture	-			Less than 9ha: 9,0m 9ha and greater:30m
institutional	Institutions, place of instruction social halls, religious purposes	Medical consulting rooms, dwelling units residential buildings, sport and recreation clubs, public or private parking areas		2.1	Height Zones A and B: 3,0m Height Zone C:1.5m

Table 1: Land use zoning (COJ Land use scheme: 2018)

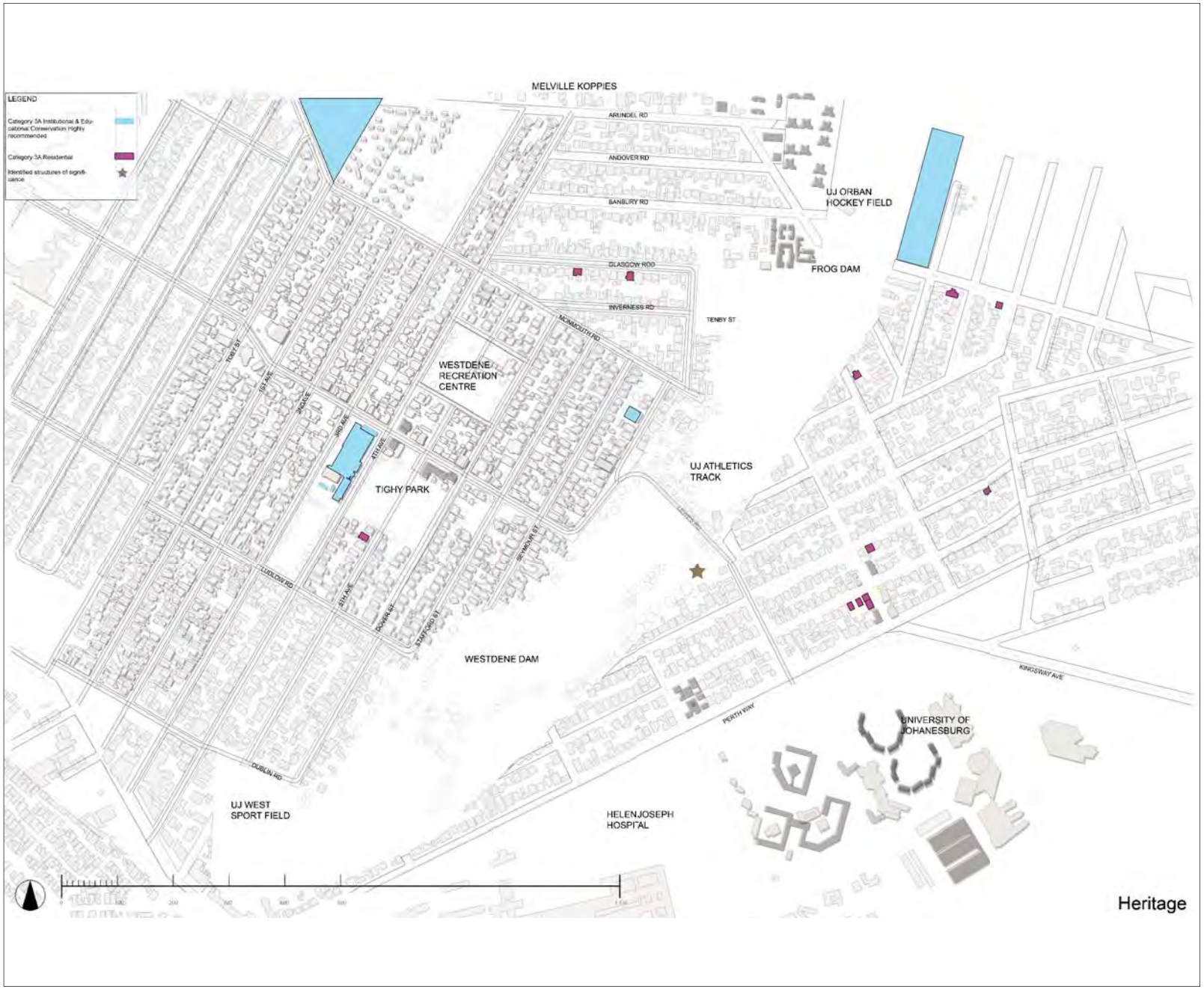


Figure 1.28 Heritage significant buildings (Author: 2020)

According to a heritage significance report conducted by (Tsica et al., 2016) in 2015, the sites in figure 1.28, were identified as having historical, architectural or social significance. The report highlights the fact that these sites have been well preserved throughout the decades and all of them have retained their integrity and character. All of these sites have been graded as category 3A, meaning that they " have a highly significant association with a historical person, social grouping, historical events, public memories, historical activities, and historical landmarks.." (Tsica et al., 2016: 165) and that this should be protected and conserved. The "religious buildings" category are significant due it being an "important indicator of the societal make up..". All the churches were



Figure 1.30 Nederduitsch Hervormde Kerk van Afrika
Figure 1.31 Generaal Christiaan De Wet Skool)
*Figure 1.32 Westdene bus memorial (*Tsica et al., 2016)





mapped as being significant, except in cases where the church buildings were used for a different purpose, in which case it will be graded as a category 3B or 3C.

"Residential buildings are buildings that are generally used for residential purposes or have been zoned for residential usage. It must be noted the majority of residences are over 60 years, it was therefore imperative for detailed visual study to be done where the most significant buildings were mapped out. Their significance could be as a result of them being associated to prominent figures, special events, design patterns of a certain period in history, rarity, or part of an important architectural school. Most of the sites identified in this category are of importance in their local contexts and are representative of the historical and cultural patterns that could be discerned from the built environment. "(Tsica et al., 2016:167)

Structures or objects of heritage significance were also identified which included; " bus shelters, street furniture, stairs, rails, culverts, bridges, embankments, poles and more."(Tsica et al., 2016:174)

In chapter 8 of the report it was concluded that although certain sections in Westdene are earmarked for densification, it should be noted that any buildings older than 60 years are still protected under the provisional statutory protection.



Figure 1.29 :26 Warwick Avenue, 12 Ayr Road (corner Avalanche Street), 16 Ayr Road
Tsica et al., 2016)

The mapped religious buildings included the Nederduitsch Hervormde Kerk van Afrika Westdene .
Institutional buildings included the West Rand Primary School (Generaal Christiaan De Wet Skool)
Residential buildings included 26 Warwick Avenue, 12 Ayr Road (corner Avalanche Street), 16 Ayr Road
Structures included the Westdene bus memorial.

BUILDING TYPOLOGIES IDENTIFIED

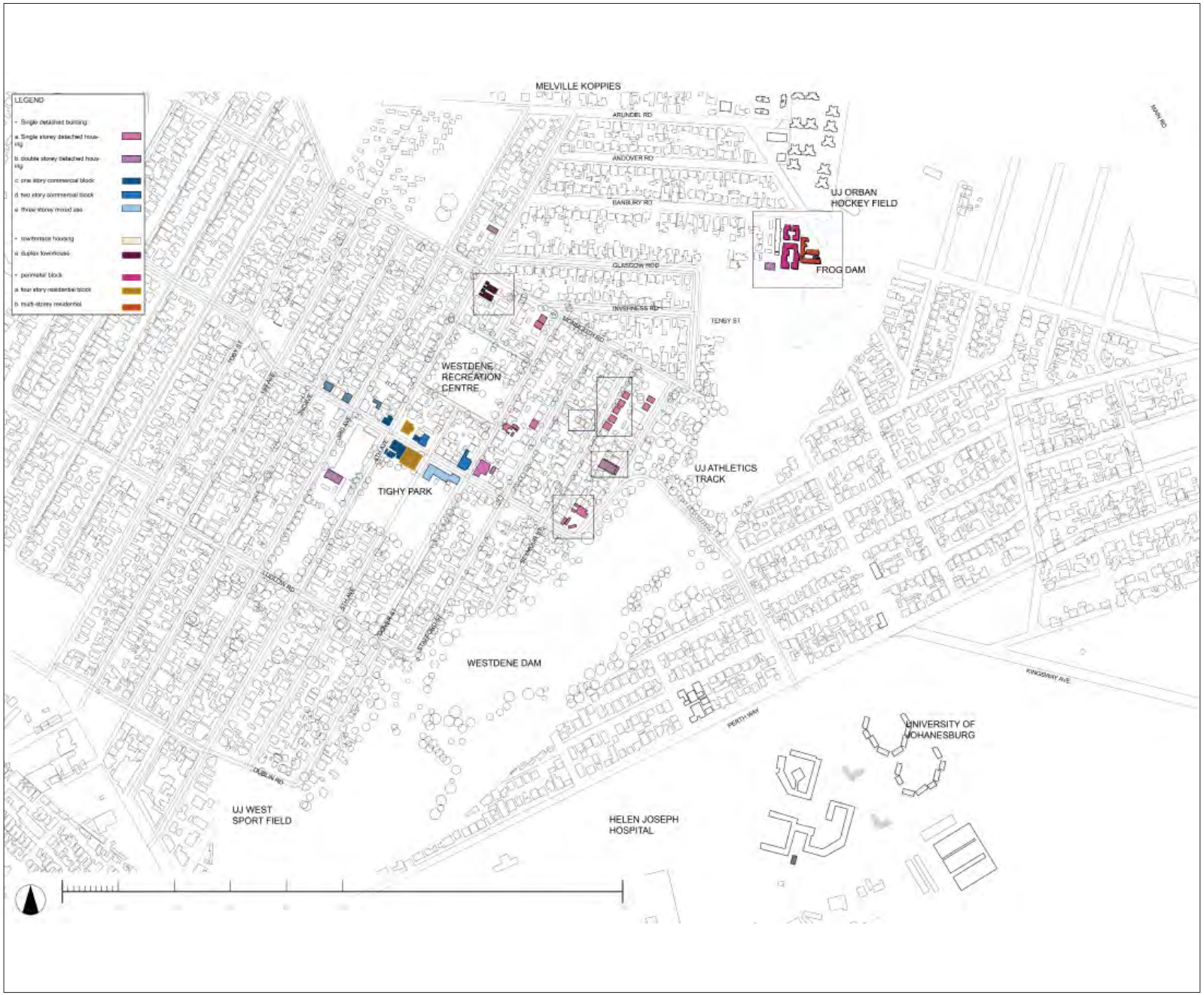


Figure 1.33 Building typologies identified to be investigated (Author:2020)

For the purposes of this study, I identified a range of typologies which will act as the main dwelling forms, and each of them will fall under the aforementioned generic building forms; single detached housing, Row/terrace housing, or perimeter block.

- ***Single detached building:***

a. Single storey detached housing

b. double storey detached housing

c. one story commercial block

d. two story commercial block

e. three-storey mixed use block

- ***row/terrace housing***

a. duplex townhouse

- ***perimeter block***

a. four story residential block

b. multi-storey residential

SITE DEVELOPMENT TRENDS

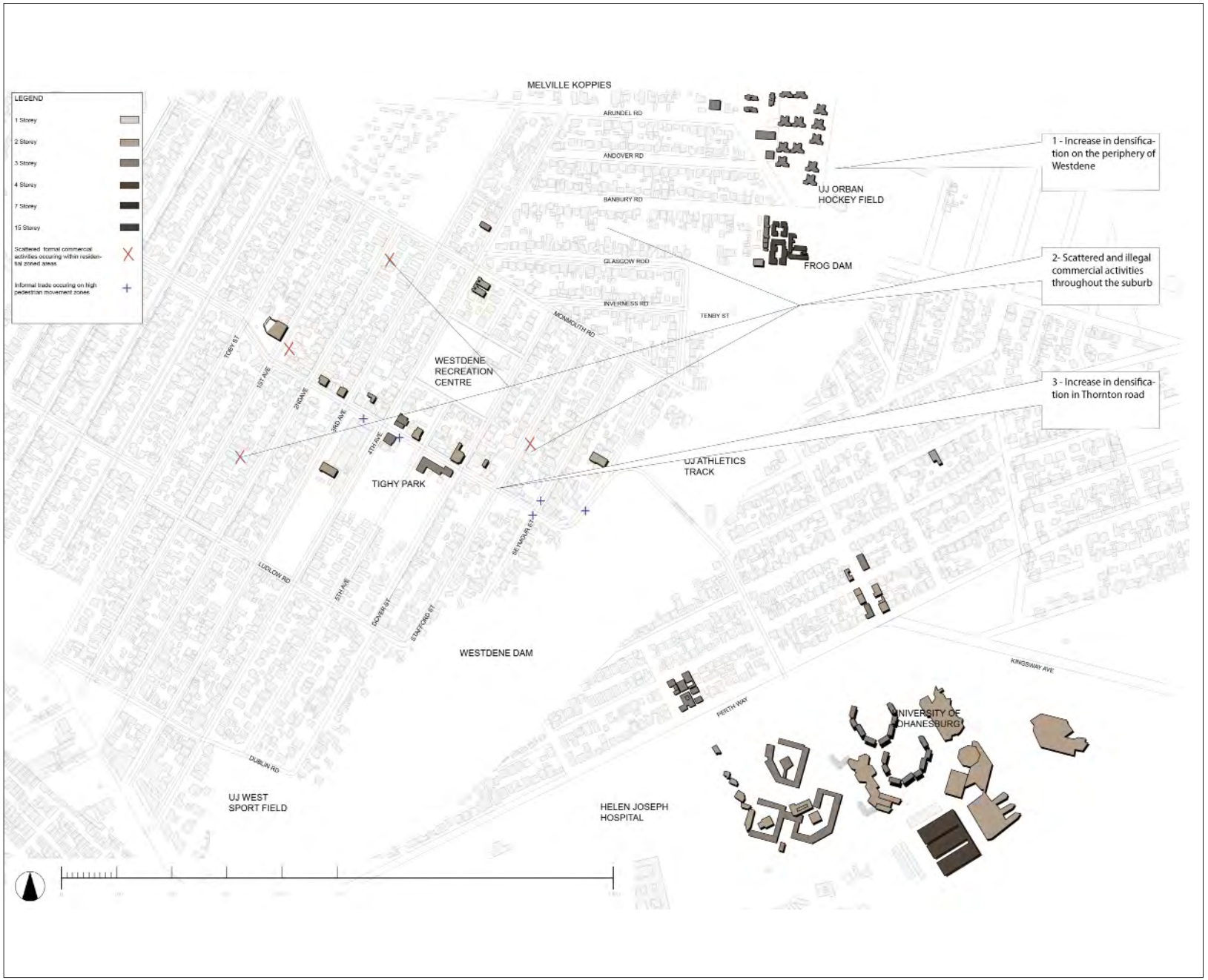


Figure 1.34 Site development trends observed (Author:2020)

During the analysis, a few observations were made regarding the current site development trends. The existing land use does not reflect the zoned land use. It will be difficult to say what percentage of the residential stands are being used as residential 3, or even business 1, without physically mapping each stand, but even from a broad overview, it is apparent that small scale businesses are everywhere in the precinct. There is an increase in densification in Thornton road, which is allowable according to the land use scheme, but the residents are pushing against it. It's apparent that the only two entry roads into Westdene are both prone to densification, proving how important accessibility and integration is for densification to be successful.

DRAFT OPPORTUNITIES

CONCEPT DEVELOPMENT



Figure 1.35 Draft opportunities, concept development (Author: 2020)

DRAFT CONSTRAINTS

CONCEPT DEVELOPMENT



Figure 1.36 Draft constraints as part of concept development (Author: 2020)

3
LITERATURE REVIEW



OVERVIEW

The literature will investigate the themes of movement networks, street typologies, land use and erf typologies through the lens of densification. There are many writings on the correlation between sustainability and densification, but less so on the 'meeting point' of a residential neighbourhood, a neighbourhood's character and the ideal density. The aim is to ascertain how the existing typologies can be adapted, in order to densify - when or if - a new development is proposed. Natural densification happens on a plot scale through individual developments which eventually result in a "revamped" urban fabric, which can either be an upgrade or downgrade from the original form. Secondly, the neighbourhood as a 'non- place' will be investigated by analysing what contributes to its current character, what used to contribute to it historically and how an increase in density will affect it in the future.

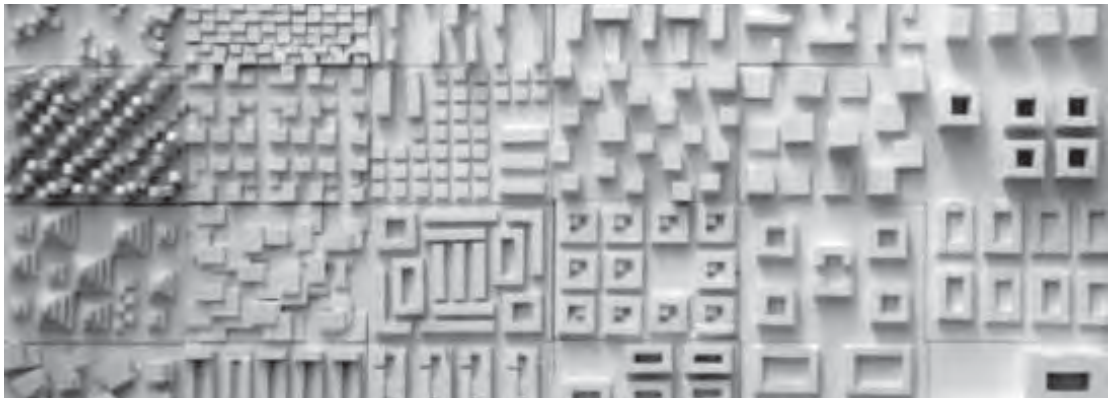


Figure 2.1:Rudy Uytenhaak Architectenbureau (Density Architecture:2013)

ROAD NETWORKS AND CONNECTIVITY:



Figure 2.2:Macro movement (Author:2020)

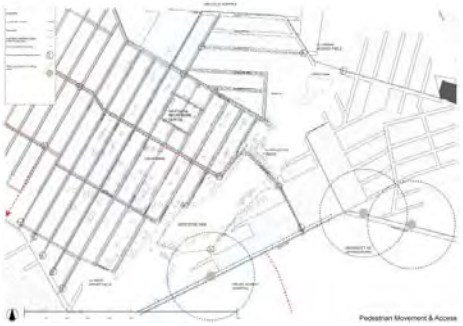


Figure 2.4:Pedestrian Circulation, (Author:2020)



Figure 2.5:Road hierarchy (Author:2020)

"Movement ushers in the fourth dimension of urban design, as objects in motion create linear paths in space through time. These tracks of movement trace out the basic organisational structure of urban topology. Whatever else streets are used for – as public places or social spaces – it is movement that demands the continuous thread that links one section of street to the next, stitching each part into a single whole."(Marshall, 2005:191)

Macro and micro road networks will be investigated in and around Westdene to establish an appropriate street hierarchy for projected future use. Another way of thinking about road networks, is that it's a "simplified schematic view of cities, which captures a large part of their structure and organization [2], and contains a large amount of information about underlying and universal mechanisms at play in their formation and evolution. "(Louf, Rémi ; Barthelemy, 2014:1). An increase or decrease in modes of traffic will be proposed based on the proposed land use, existing networks, the quantification of traffic flow and direction and the modal hierarchy.(Marshall, 2005) The modern development layout (routes and networks) of our cities revolve around the car, although it is used by various modes of movement, including pedestrians. Typical categorizing of these car orientated streets include; primary distributor, district distributor, local distributor and access road (Marshall, 2005:178). In South Africa, pedestrians use the entire range for walking and this needs to be accommodated. Space syntax analysis is a useful tool to calculate the places or intersections with the highest integration value. For urban design purposes, this can be used to analyse how well situated a precinct, a parcel of land or a building is and it can thus be deduced how successful it will be as an attraction point. It can be applied to macro and micro scale. The



Figure 2.3:A four-level 'hierarchy' of streets in Edinburgh's New Town. (a) Main street. (b) Transverse street. (c) Minor street. (d) Mews lane.(Marshall, 2005:54)

ROAD NETWORKS AND CONNECTIVITY:

Movement economy theory sits as the cornerstone theory of the space-syntax paradigm. It provides evidence as to how spatial accessibility correlates to economic and land-use value (Liebst, 2015:49). Understanding the movement economy theory in its most basic form is understanding human movement and the principles behind it. Hillier (1996:252), explains that it comes down to 'natural movement', which is the relationship between movement densities along a spine or a line and the urban grid structure. A well-integrated street is only part of the solution to activate an area. The typology of the street and of the building play an integral role on how well it will be used. This includes street character, appropriate road width, building typology and frontage function.



Figure 2.6:ABCD typology as transect. The four types are presented as if extending out from the core of a settlement (left) to the periphery (right) (Marshall, 2005)

STREET TYPOLOGIES:

One first need to understand what is meant by 'typologies' to grasp the contextual importance thereof. Van der Westhuizen, 2010: 235, simplified its definition to:" types of buildings, neighborhoods, place settings, or cities. It is about the study of typical spaces and structures that belong to recognizable types or classes". Humans have to interpret a lot of information that we observe in urban settings. In order to simplify and understand what we perceive, we categorise observations into groups. Routes or roads are classified according to their speed and the road width that can accommodate it, and the 'transit orientated hierarchy', based on the contiguity of the roads (Marshall, 2005:232). Both instances are based on the functionality of the movement. Architects, landscape architects and urban designers further categorise them, by adding design guidelines in the form of building facades, bollards, pedestrian interface, tree species or SUDS (sustainable urban drainage systems), which then creates a 'typology'. It's important to identify the existing street typologies to ensure that newly proposed streets, are contextually appropriate. The proposed street typology need to enhance the existing character of the neighbourhood whilst having an appropriate interface with current and proposed land use. All street typologies, whatever that might be, need to take into account; "improve[d] safety, accessibility and comfort for pedestrians, cyclists and motorists, creating a 'complete street'."(Development Planning Department, V, 2011) . The city of Johannesburg aligned its road classification with the RISFSA's (South Africa Road Classification System). RISFSA looked at more than mobility and accessibility, by also incorporating; "functionality, traffic volume,

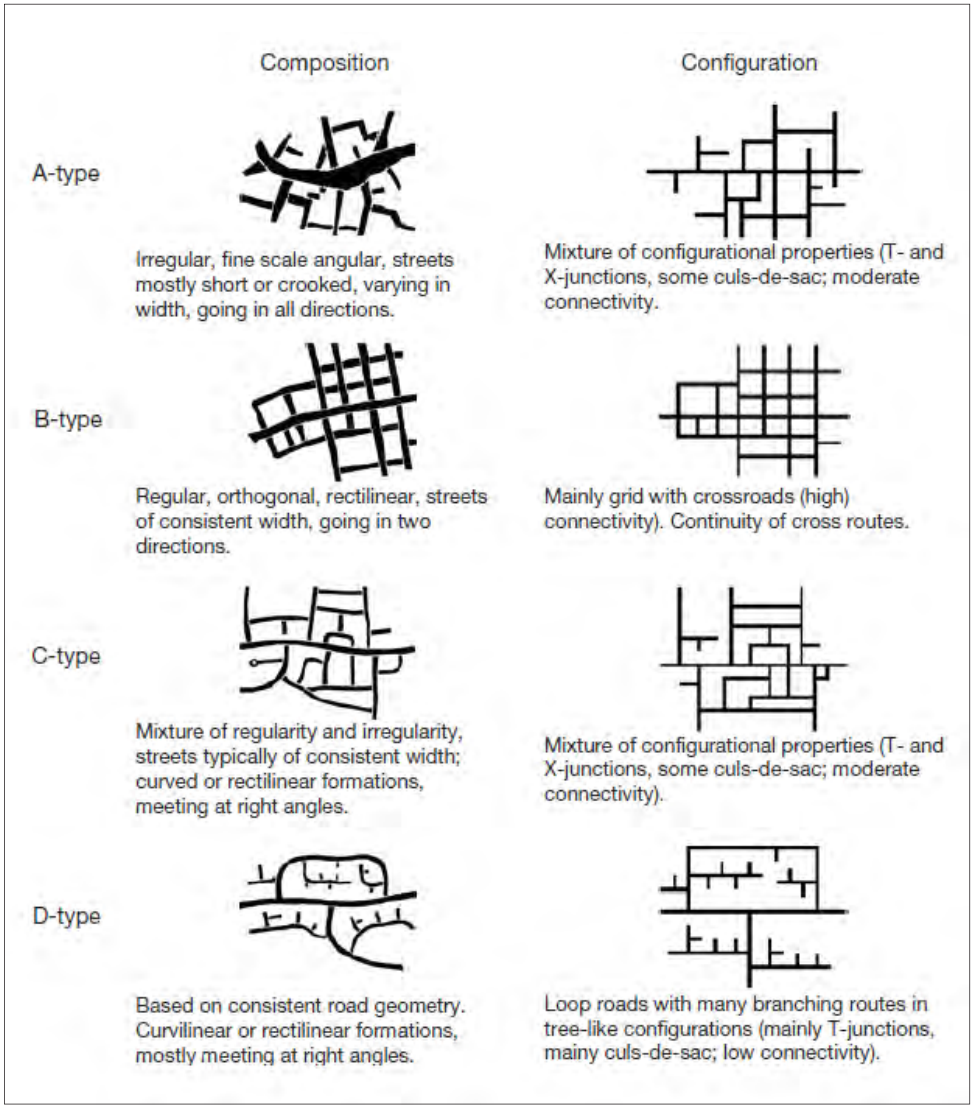
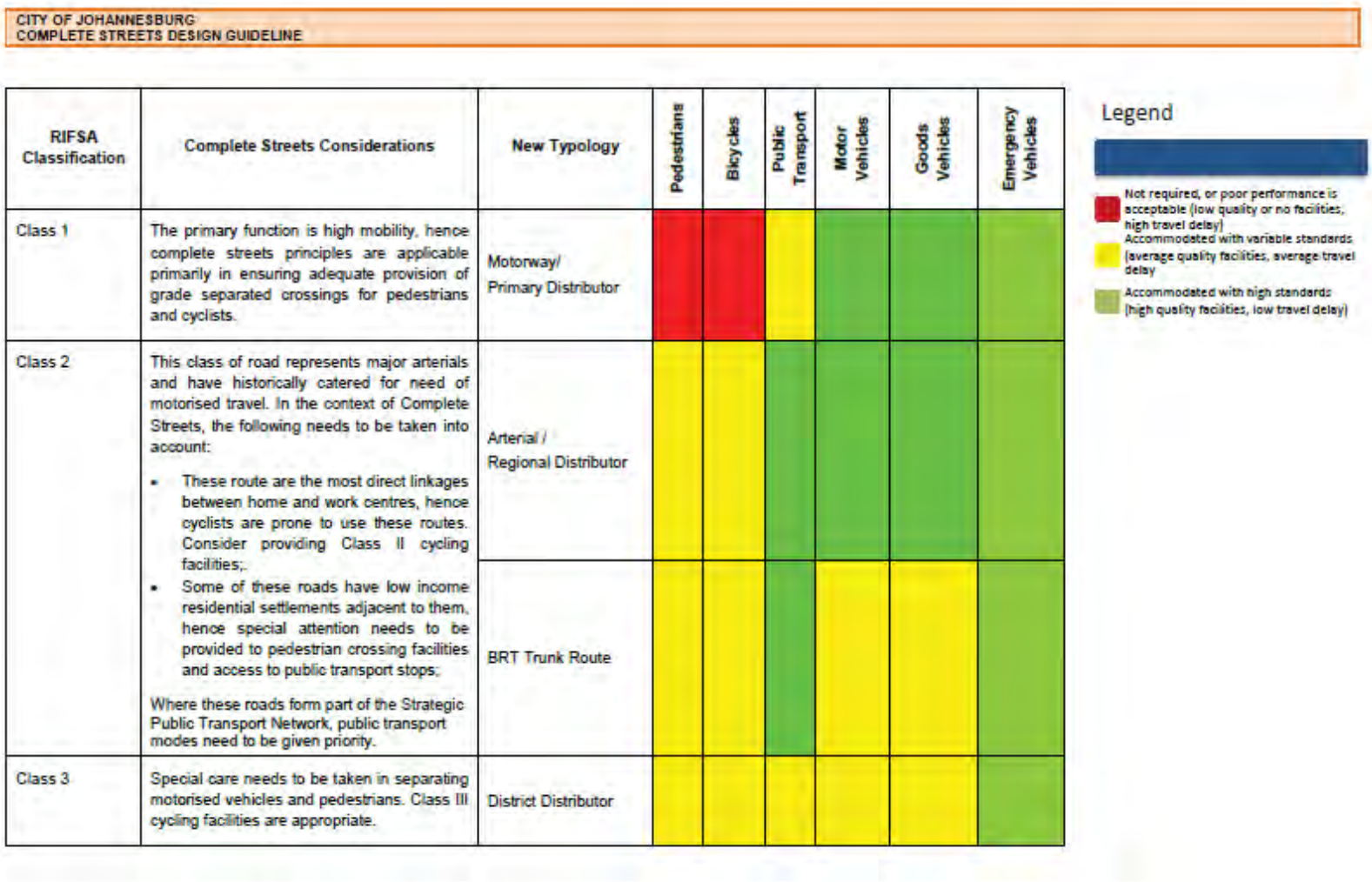


Figure 2.7:Compositional and configuration properties of ABCD types.(Marshall 2005:89)

public transport, geometry, access spacing, pedestrians, freight and traffic calming"(Garrett and Cusack, 2014:9). The complete streets manual takes it a step further with contextual classification by looking at non-motorized users, land use and context. The functional street class system is thus further defined or enriched by specific characteristics such as; tree implementation, median type, bicycle lands, parking type (on/ off-street), natural vegetation, amount of vehicular lanes, and street materiality. Westdene contains three types of street typologies; BRT trunk route (Perth road and Main road), activity streets/local distributor (Leyds and Thornton road) and residential collector/residential streets (remaining streets). The following tables illustrate the street typologies as defined by Garrett and Cusack (2014).



CITY OF JOHANNESBURG
COMPLETE STREETS DESIGN GUIDELINE

RIFSA Classification	Complete Streets Considerations	New Typology	Pedestrians	Bicycles	Public Transport	Motor Vehicles	Goods Vehicles	Emergency Vehicles
Class 1	The primary function is high mobility, hence complete streets principles are applicable primarily in ensuring adequate provision of grade separated crossings for pedestrians and cyclists.	Motorway/ Primary Distributor						
Class 2	This class of road represents major arterials and have historically catered for need of motorised travel. In the context of Complete Streets, the following needs to be taken into account: • These route are the most direct linkages between home and work centres, hence cyclists are prone to use these routes. Consider providing Class II cycling facilities;. • Some of these roads have low income residential settlements adjacent to them, hence special attention needs to be provided to pedestrian crossing facilities and access to public transport stops; Where these roads form part of the Strategic Public Transport Network, public transport modes need to be given priority.	Arterial / Regional Distributor						
		BRT Trunk Route						
Class 3	Special care needs to be taken in separating motorised vehicles and pedestrians. Class III cycling facilities are appropriate.	District Distributor						

Legend

Not required, or poor performance is acceptable (low quality or no facilities, high travel delay)
Accommodated with variable standards (average quality facilities, average travel delay
Accommodated with high standards (high quality facilities, low travel delay)

Figure 2.8:Road classifications as outlined by the Complete Streets Guideline (Garret and Cusack, 2014:9)

RIFSA Classification	Complete Streets Considerations	New Typology	Pedestrians	Bicycles	Public Transport	Motor Vehicles	Goods Vehicles	Emergency Vehicles
Class 1	The primary function is high mobility, hence complete streets principles are applicable primarily in ensuring adequate provision of grade separated crossings for pedestrians and cyclists.	Motorway/ Primary Distributor						
Class 2	This class of road represents major arterials and have historically catered for need of motorised travel. In the context of Complete Streets, the following needs to be taken into account: • These route are the most direct linkages between home and work centres, hence cyclists are prone to use these routes. Consider providing Class II cycling facilities;. • Some of these roads have low income residential settlements adjacent to them, hence special attention needs to be provided to pedestrian crossing facilities and access to public transport stops; Where these roads form part of the Strategic Public Transport Network, public transport modes need to be given priority.	Arterial / Regional Distributor						
		BRT Trunk Route						
Class 3	Special care needs to be taken in separating motorised vehicles and pedestrians. Class III cycling facilities are appropriate.	District Distributor						

Legend

- Not required, or poor performance is acceptable (low quality or no facilities, high travel delay)
- Accommodated with variable standards (average quality facilities, average travel delay
- Accommodated with high standards (high quality facilities, low travel delay)

Figure 2.9:Road classifications as outlined by the Complete Streets Guideline (Garret and Cusack, 2014:10)

HERITAGE AS A PLACEMAKING TOOL:

"Relph (1976: 8) argued that, while 'amorphous' and 'intangible', whenever we feel or know space, there is typically an associated sense or concept of 'place'."(Tiesdell, 2007)

The historic character of Westdene could possibly be attributed to its locality on the fringe of historic Johannesburg. The historic suburban genus loci of Westdene is a double edged sword by both contributing to the positive character of the suburb, but is also detrimental to the sustainability thereof. Tiesdel (2007), writes how an old environment can be seen as an opportunity for dramatic enhancement. A designer must be cogniscent of the fact that adaption should occur without losing existing character. There should be a merger between old and new. The old aspects of a place that people are often more connected to, are the intangible aspects such as a feeling towards a place or an associated memory. Tiesdel, further writes of the challenge of preserving the continuity of association and image after the inhabitants have been exposed to change. People associate a specific setting with specific a specific function and the behaviour that goes along with it and when a place changes "people no longer know how to behave."(Tiesdell, 2007:305). Westdene's existing inhabitants rebel against change for the fear of losing the residential feeling. Since the suburb's absorption by the city, however, the monofunctionallity of the residential land use negatively affects the Genus Loci of the suburb. In order to adapt a precinct whilst preserving its positive characteristics, one needs to understand the underlying theory thereof. A spatial mechanism which lies behind phenomena such as "urban buzz" or the genus loci of a place is described by Liebst (2015). She states that the theory of 'phenomenology of movement economies' hosts two notions of attraction, economic as well as phenomenological. If a street is rich with movement, it is often vibrant and exciting. In summary, the goal is to preserve the historic character whilst re-energising the precinct.



Figure 2.10:Historic Westdene, Westdene, Johannesburg, (Museum Africa,Wikiwand:2020).



Figure 2.11:Heritage significance Westdene (Author: 2020)



Figure 2.12: A map indicating Johannesburg in 1902, with the red arrow indicating where Westdene woud eventually be situated. (Unknown soure, Wikiwand:2020)



Figure 2.13: Westdene in 1934 (National Archives of South Africa ,Wikipedia: 2019)



Figure 2.14:Westdene in 1952 (Republic of South Africa National Archives, SGJ, 84, 4/3/4, Wikipedia:2019)

DENSITY

'[…patterns of land use and building densities….and give rise to the sense that everything is working together to create the special kinds of well-being and excitement that we associate with cities at their best" (Hillier,1996:109).

"Density describes the concentration of people in cities, neighborhoods, and blocks and refers to the number of people, residential households, or housing units in a given residential area."(Westhuizen, 2010:56). Designers need to understand density, as it forms part of our design vocabulary and it's integral in decision making on a high level. It affects applications for various and any type of development, made by architects, urban designers, municipal engineers and town planners. An architect needs to decide on the optimal and appropriate housing mix and building form. The urban planner needs to decide on the correct zoning modifications for council approval, and the engineer needs to understand how this will – for example – affect and influence the services, such as sewer lines.

(Alexander, Reed and Murphy, 1988a) writes about the "perceived, physical and measured densities" and how the urban designer's role as a shaper thereof is actually about manipulating each of those. Perceived density changes from person to person just as the idea of 'place' or 'placeness' changes from person to person. The idea of crowding, for example is closely linked to density but will differ from one social group or culture to another. Perceived density is made up of three major factors: social and cultural, physical and individual cognitive factors (Alexander, Reed and Murphy, 1988:4). The focus of this study was initially based on two types of information bands; received brackets informed by community participation and physical brackets of deductive analysis through physical variables on site. Hearsay, informal conversation with community members and observation indicated the communities negative attitude/aversion towards densification. Unfortunately the covid 19 pandemic made community participation particularly difficult due to lockdown, as well as other physical restrictions and constraints.



Figure 2.15:: The same density depicted in different building forms (Cape Town densification policy, 2012:4)

In the case of Westdene perceived density and the effect it will have on the character of Westdene is of utmost importance to the community and thus density and its relation to urban form will be investigated in detail. This study would have initially focused on community participation as an investigative tool to ascertain our speculation about the community's general feeling towards densification. It soon became clear that a only a tangible analysis will have to be applied on the study area, in order to achieve a deductive analysis. It should be noted that the results would have probably been more

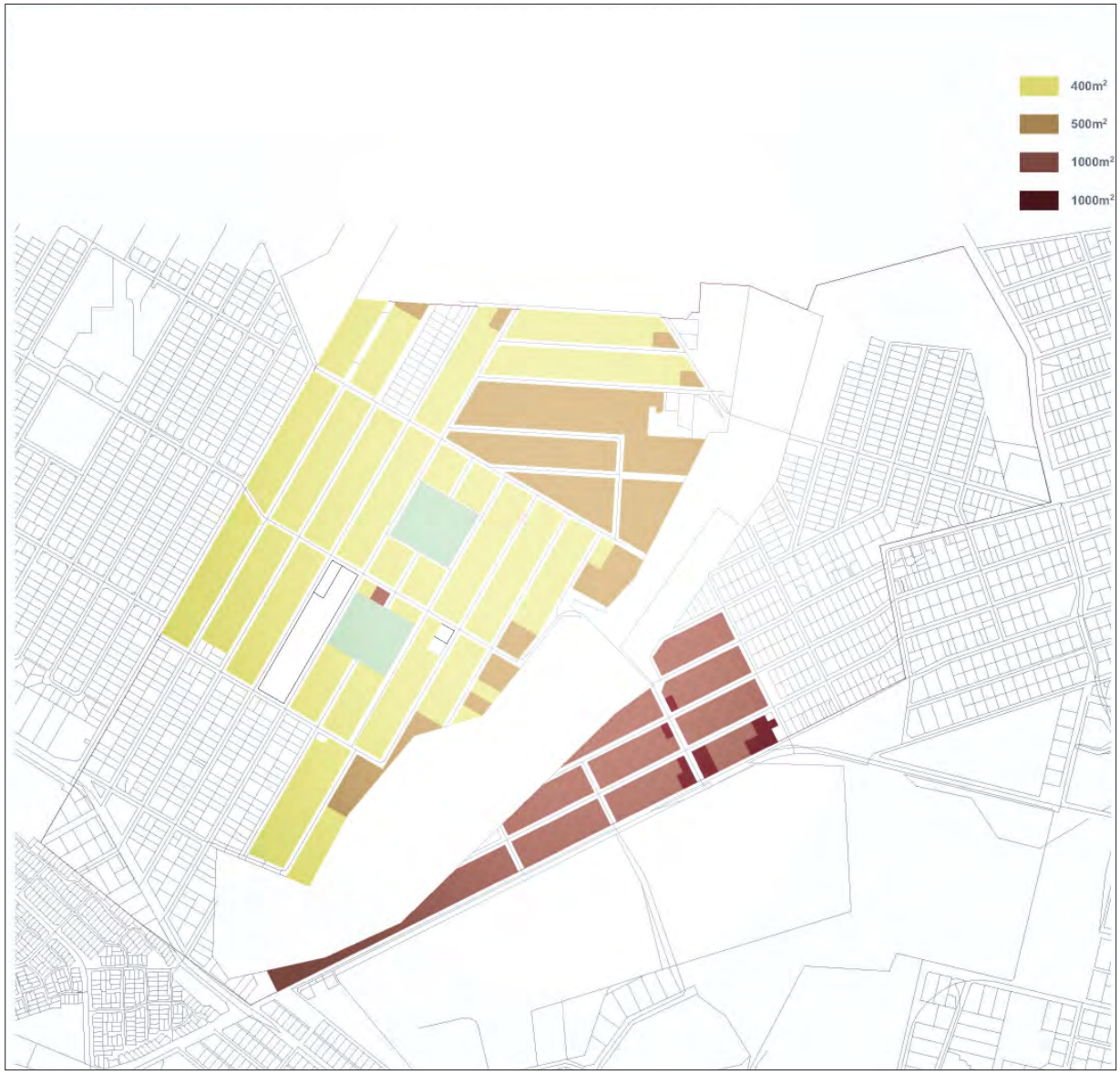


Figure 2.17: Existing land use density in Westdene (Adapted from Geolis, Author:2020)

well-rounded if community participation was possible, as this would have informed our perceived density assumptions.

How can we change or adapt the existing building typologies, to increase the density without changing the perceived density or losing the quality of the neighbourhood's suburban image?

The basic deductive analysis approach that was applied to the study area ,was informed by Alexander, Reed and Murphy, 1988a, who in turn adopted this analysis from others such as Martin and March, 1966 ;Keeble, 1969 and Daimond, 1976.

The aformentioned variables (movement networks, street typologies, land use and erf typologies) can be seen as the high level structure affecting density ,before delving into the qualitative - more detailed - influencers. (Alexander, Reed and Murphy, 1988a) define these as the qualitative part of physical density, and that includes attributes of a building or built environment such as the; height, relative spacing, massing, juxtaposition (opening and closure of site layout), diversity, details in elevations ,material choice, colour and landscaping.

The first and most important physical variable would be the dwelling form. The Cape Town education policy conducted in 2012, identified three generic building forms that can easily support densification. These include; a single

detached tower block building on an erf surrounded by open space, a traditional street layout with attached row/ terrace housing, and a perimeter block enclosing an open space or courtyard (DSPUD, 2012:7).

For the purposes of this study, I identified a range of typologies which will act as the main dwelling forms, and each of them will fall under the aforementioned generic building forms; single detached housing, Row/terrace housing, or perimeter block.

- ***Single detached building:***

a. Single storey detached housing

b. double storey detached housing

c. one story commercial block

d. two story commercial block

e. three-storey mixed use block

- ***row/terrace housing***

a. duplex townhouse

- ***perimeter block***

a. four story residential block

b. multi-storey residential

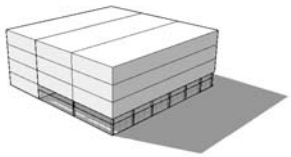


Figure 2.18:Typical single storey detached housing (Author:2020)

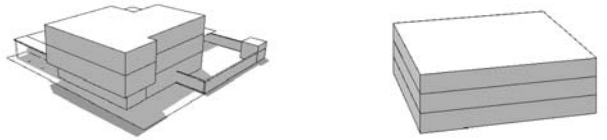


Figure 2.19:Typical double storey detached housing (Author:2020)

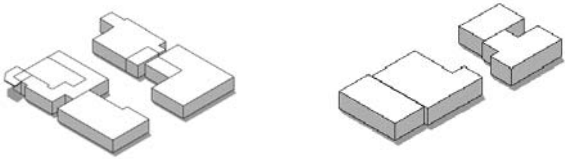


Figure 2.20:Typical one story commercial. (Author:2020)

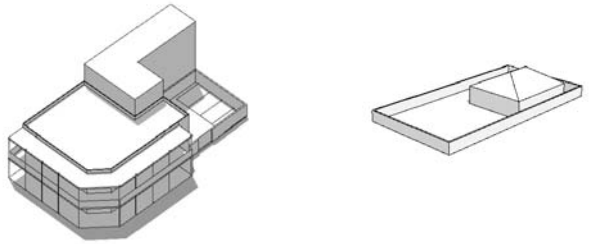


Figure 2.21:Typical two story commercial (Author:2020)

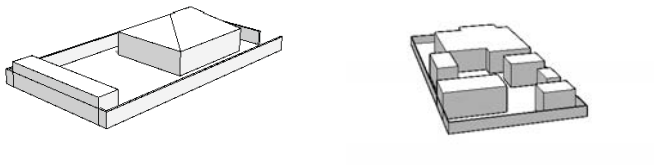


Figure 2.22:three-storey mixed use block (Author:2020)



Figure 2.23: Duplex townhouse (Author:2020)

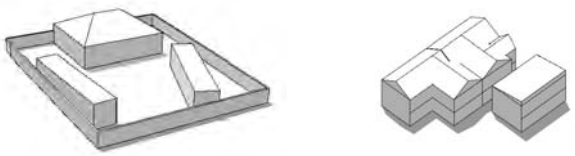


Figure 2.25:Four storey residential block (Author:2020)

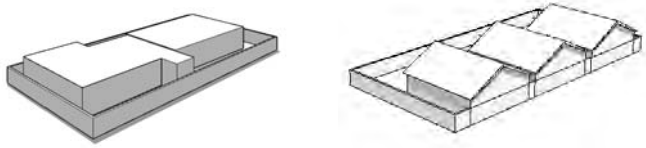


Figure 2.24: Multi-Storey residential (Author:2020)

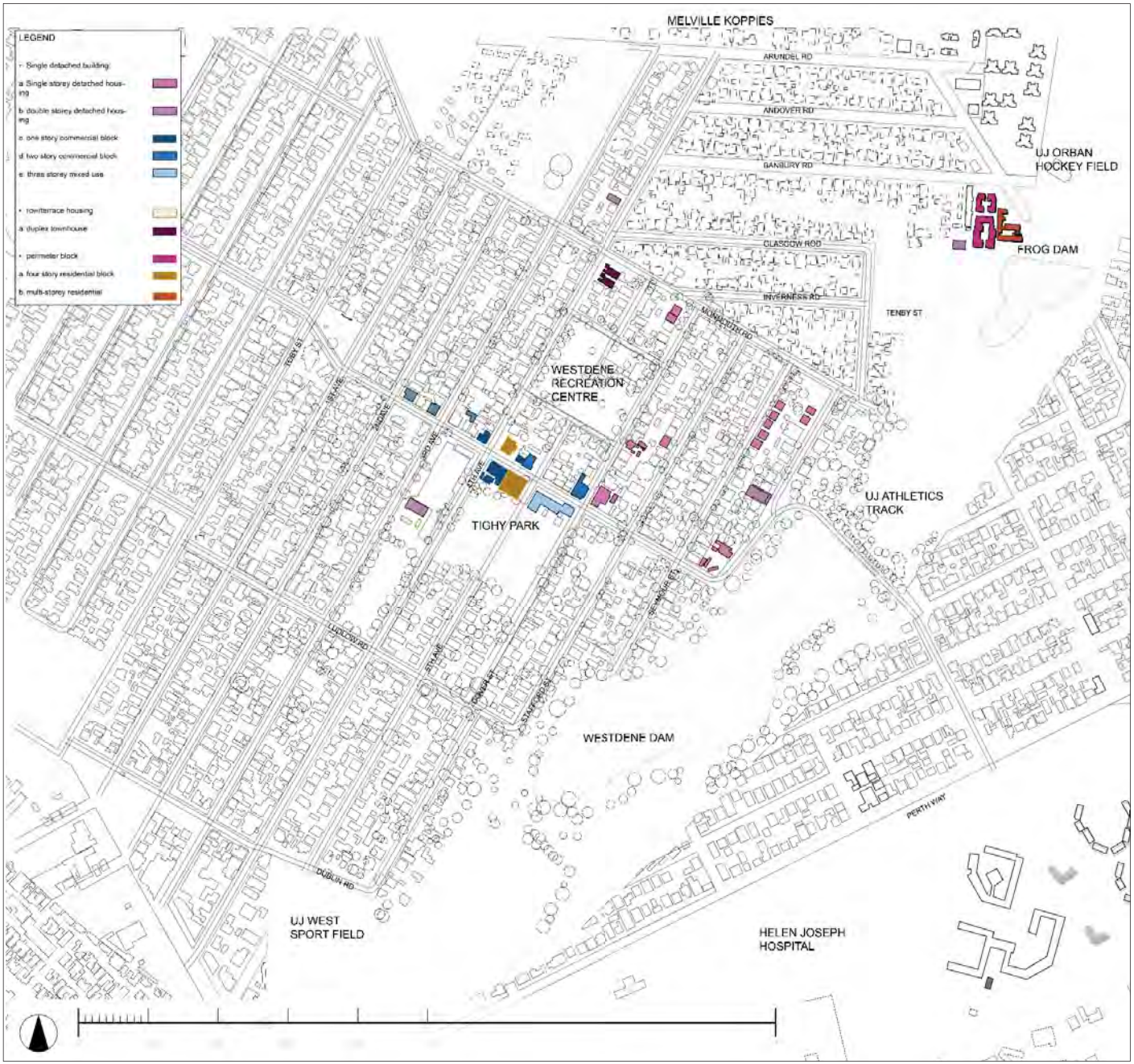


Figure 2.26: (Right) - Typologies are highlighted within the study area of Westdene (Author: 2020)

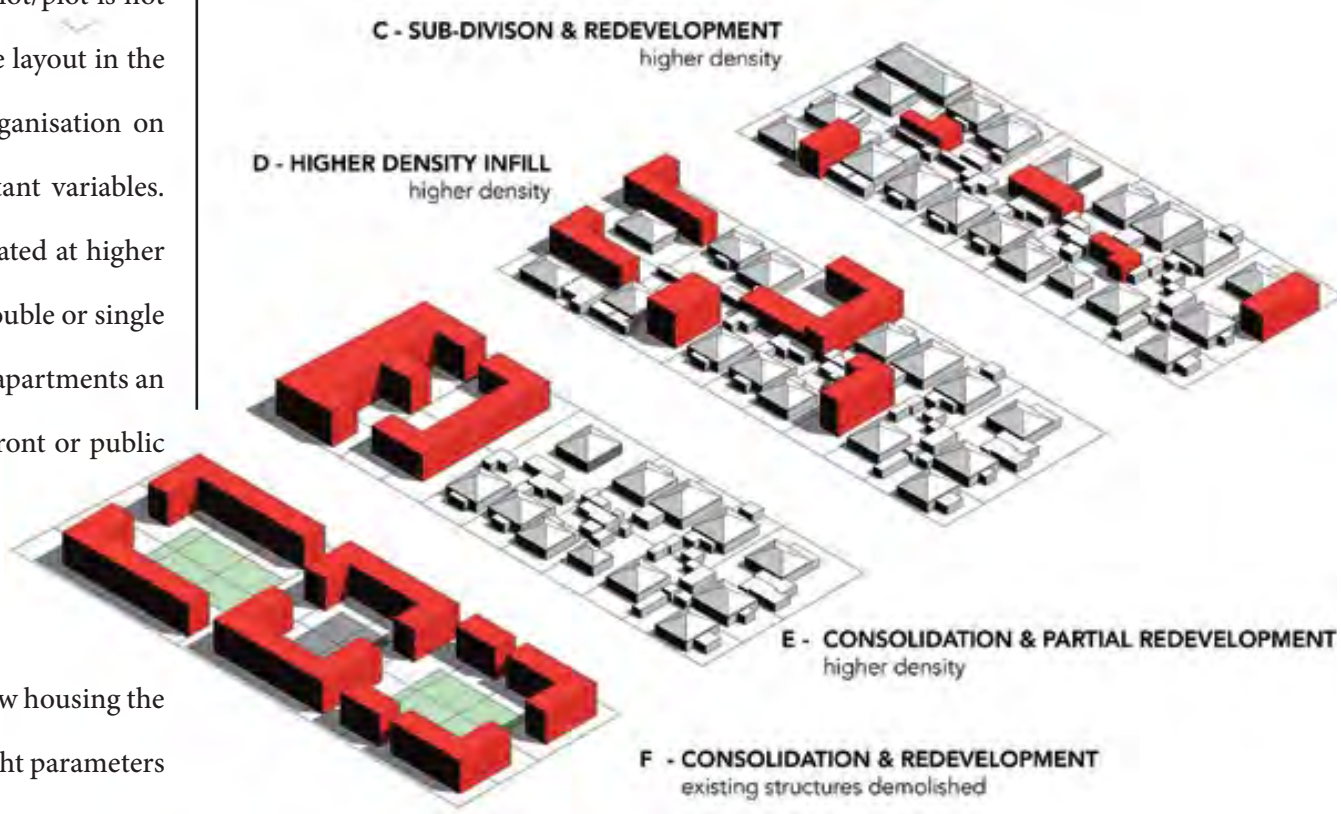
The diversity in plan layouts can vary considerably, therefore for the purposes of this study we won't look at the internal layout as part of the variables but instead we will look at the exterior physical variables such as; setback from the street, depth of sites/erven, coverage ratio, frontage function and permeability. These aforementioned variables only pertain to the building itself and excludes the context - which will have its own set of variables such as; street typology, space between buildings, adjacent land use, pedestrian circulation/sidewalk et cetera. (Alexander, Reed and Murphy, 1988b) argues that the lot/plot is not applicable as a variable because it essentially disappears from the layout in the case of garden apartments, and thus the dwelling type, the organisation on site and the relationship to parking, becomes the most important variables. The character of the urban form can be controlled and manipulated at higher densities for example, a three or four story building can have a double or single corridor, or a single or double core. In the case of lowrise garden apartments an internal courtyard can be created as well as an external urban front or public environment.

- row/terrace housing

a. duplex townhouse

(Alexander, Reed and Murphy, 1988b) states that in the case of row housing the density is dependent on the width of the site or plot, once the height parameters have been decided, that is. They further state that the denser the housing

Figure 2.27: Densification strategies as proposed in the Corridors of freedom SAF, Local Studio:2016).



development is, the more control the designer has. The statement is applicable for both the private spaces within the building block as well as the exterior or public zone consisting of the circulation parking and landscape.

- perimeter block including:

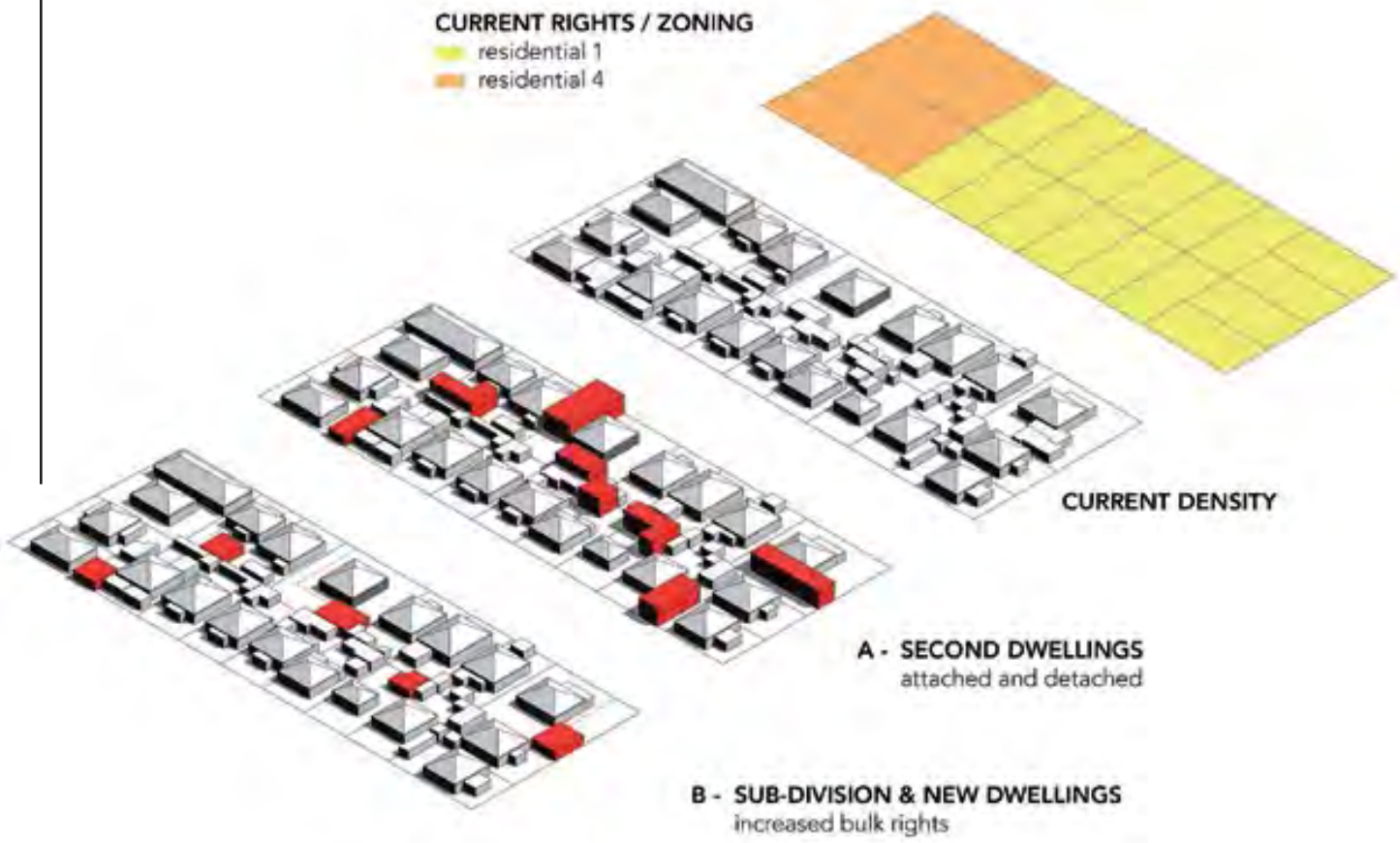
There exist opportunity for the development of a perimeter block where there is a continious and generous setback from the residential buildings and the rear erf boundary

a. four story residential block

b. multi-storey residential

One of the most significant challenges that come into play with multi-storey or high-rise buildings is the parking layout or availability of parking. As a point of departure we already decided as part of the precinct plan and philosophy of Westdene, we will include inclusionary housing as part of the scheme. Incorporating inclusionary housing into a development, while effects the parking requirements in that we can have less parking.

Figure 2.28: Densification strategies as proposed in the Corridors of freedom SAF, Local Studio:2016).



APPLICATION OF DENSITY

The Cape Town densification policy lists seven ways in which densification can be achieved. When densification theoretically occurs it will in all likelihood be by means of one of these methods (DSPUD, 2012:8).

1. The construction/addition of the second dwelling such as garages or cottages.
2. The extension of the building or adding on of floors in order to increase the number of units.
3. Block consolidation of erven.
4. Subdivision of land and subsequent redevelopment at higher densities.
5. Consolidation with redevelopment at higher densities (this differs from block consolidation in that only certain urban consolidates with in the block and not the entire block).
6. High density in full on vacant or open land.
7. Consolidation of sites with in a street block to create a single larger parcel for redevelopments (this differs from block consolidation, due to the fact that the in result is occupied by one consolidated building product).

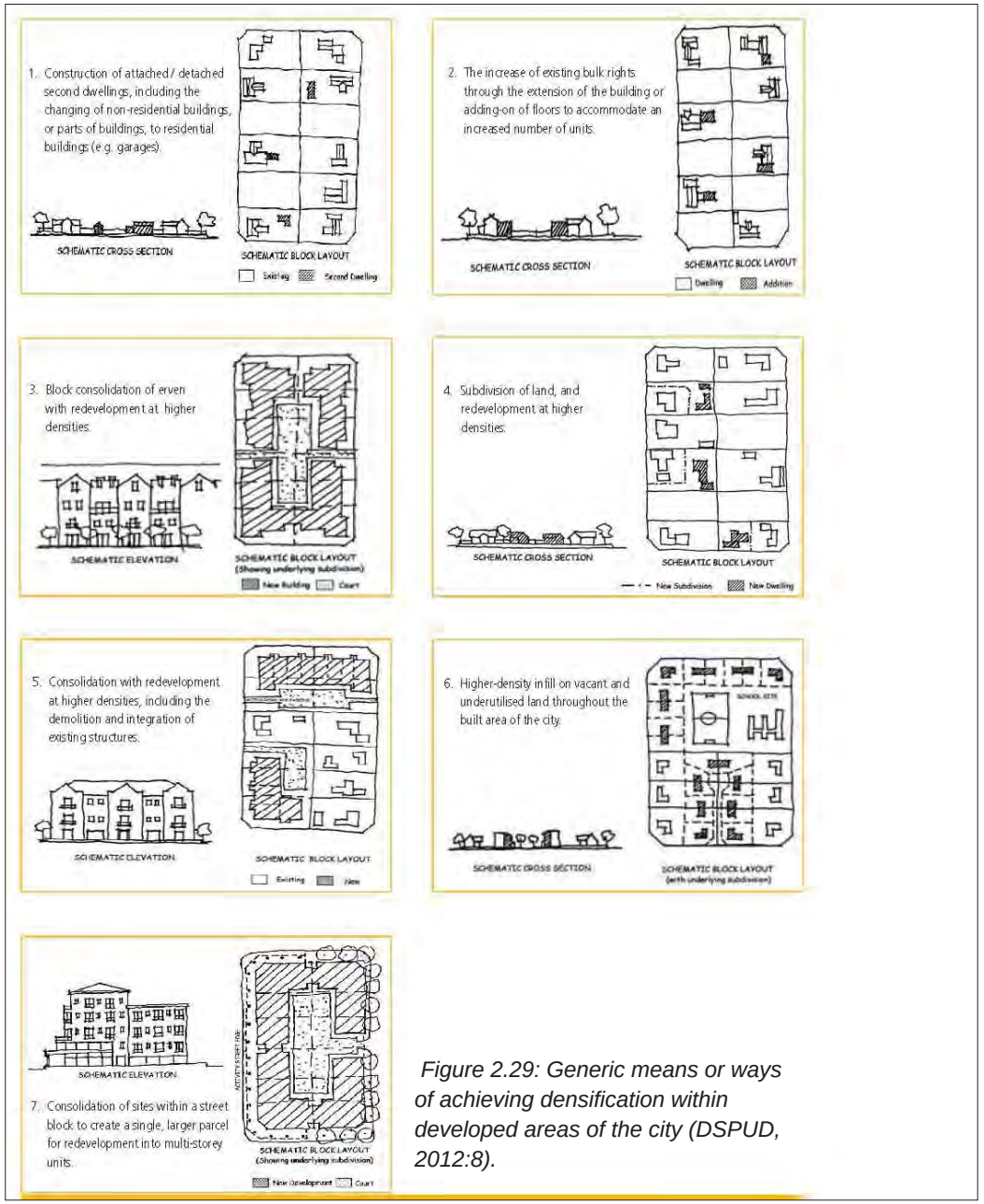


Figure 2.29: Generic means or ways of achieving densification within developed areas of the city (DSPUD, 2012:8).

EXISTING WESTENE POLICIES

There are various policies in place which influence the long and short-term development of Westdene. The overarching policy is set out by the Johannesburg Spatial Development Framework (SDF 2040), and this policy is backed by the Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA) (Development planning: spatial planning & city transformation, 2018:5). " SPLUMA indicates that no land use decision may be made that is not in line with the SDF, unless there are good site specific reasons." The spatial framework must be in line with the SDF and of SPLUMA. Before any external party can be considered to formulate a SFP (Spatial Framework Plan), the external party must prove how the SFP, slots into the overarching SDF (Site Development Framework

Westdene falls within the transformation Zone, as set out by die SDF. (Development planning: spatial planning & city transformation, 2018) but as (Tsica et al., 2016), states; there are a lot of limitations and contradictions towards the overarching SDF goal.

Westdene sits within region B of the SDF and the current

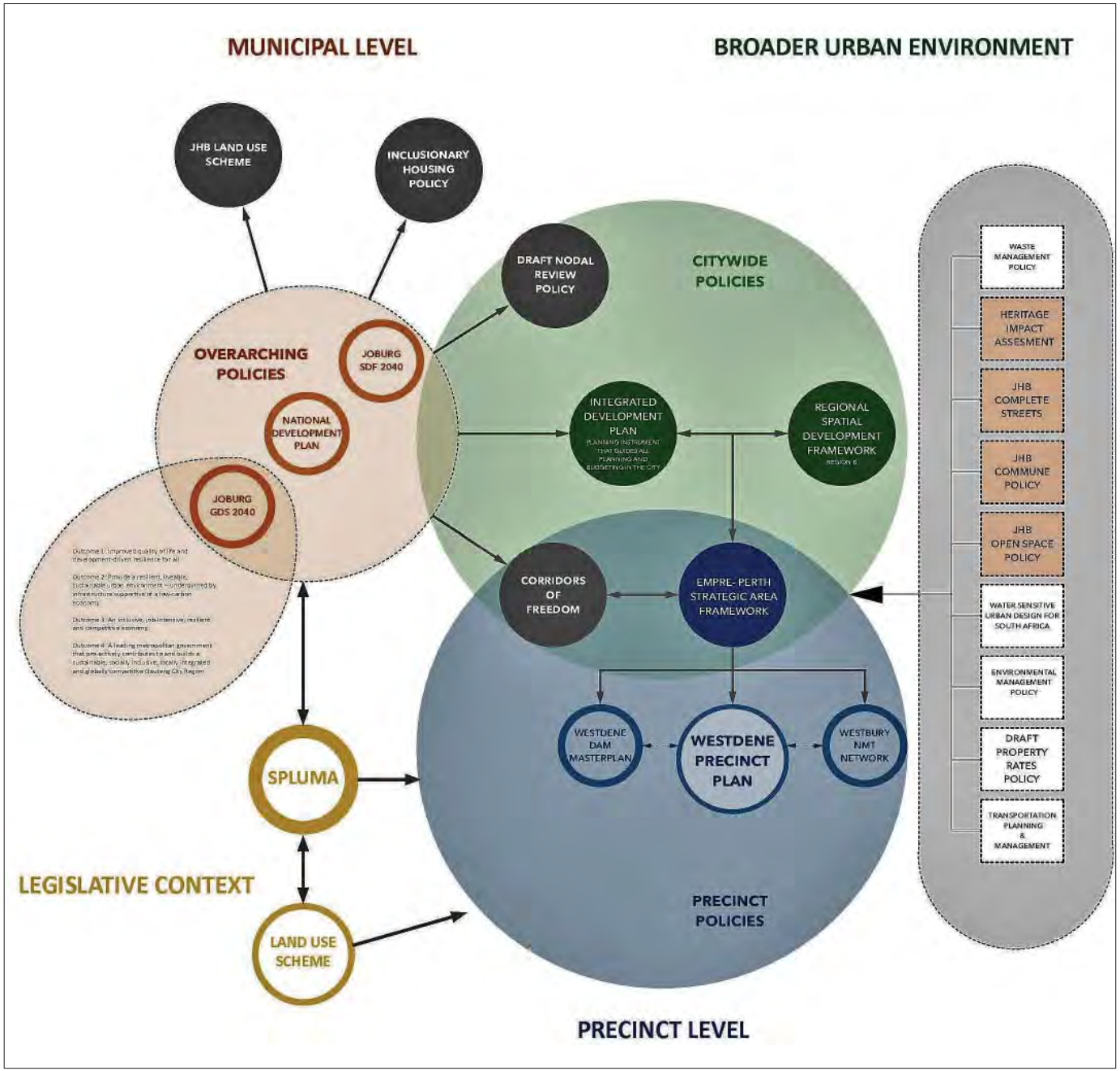
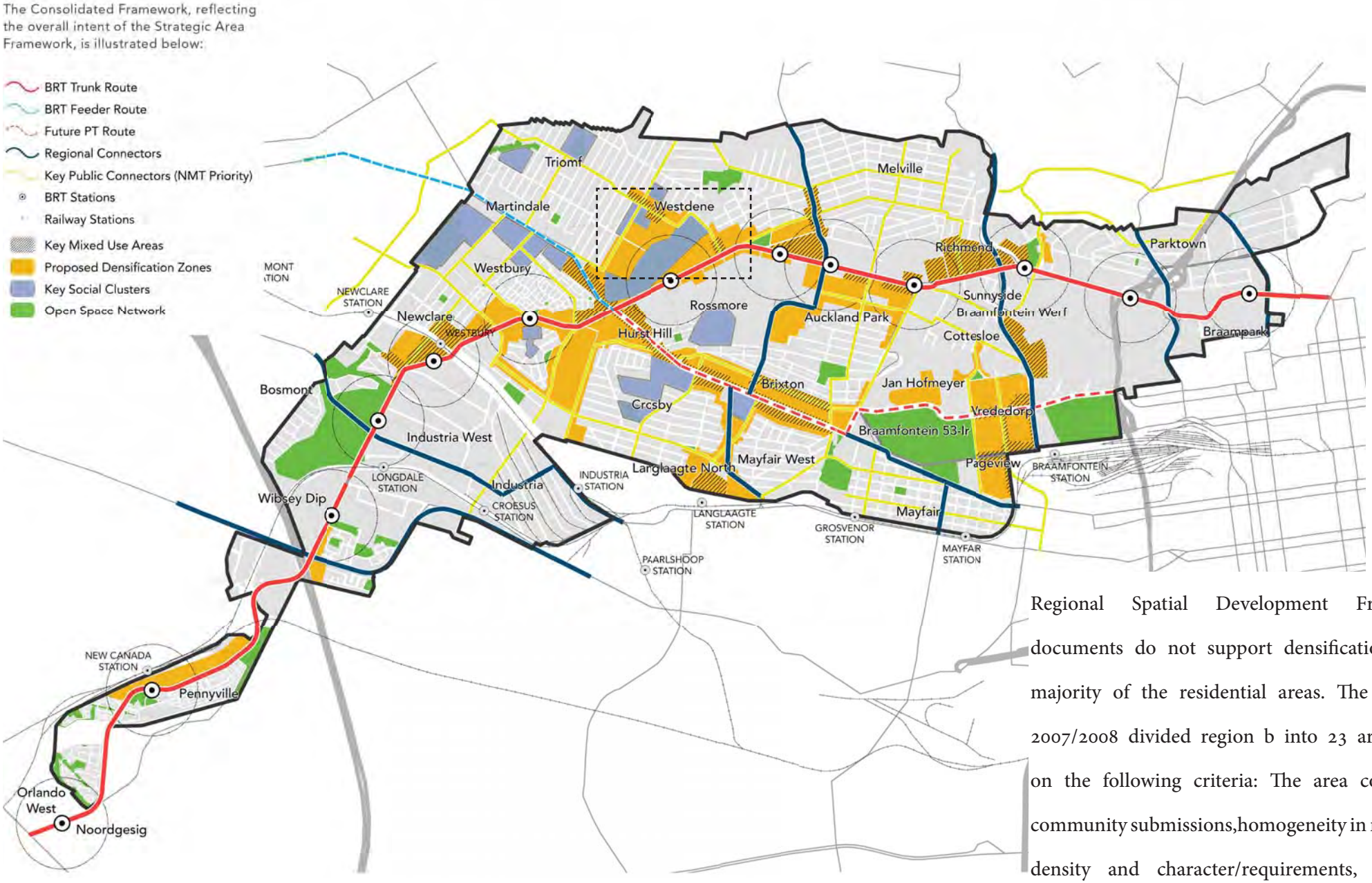


Figure 2.30:Mapping the current policy environment (Naik,2020)



Regional Spatial Development Framework, documents do not support densification in the majority of the residential areas. The RSDF of 2007/2008 divided region b into 23 areas based on the following criteria: The area covered by community submissions,homogeneity in residential density and character/requirements, land use homogeneity, natural/environmental features,

Figure 2.31: Spatial context framework plan (Local Studio:2016)

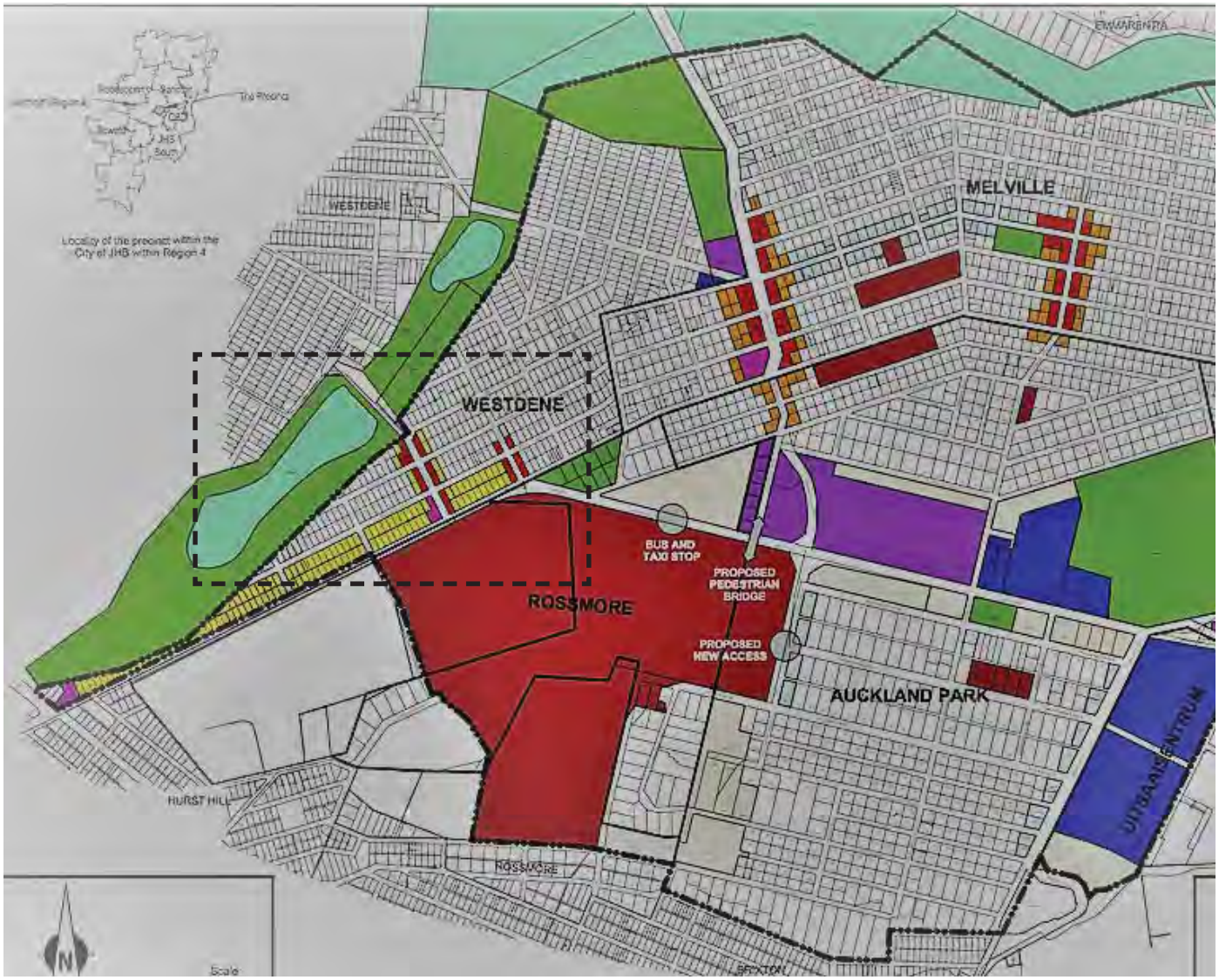


Figure 2.32: Development Framework (Urban terrain:2003)

economic investment, arterials and through roads., integration requirements. (Park, 2007) Subregion 5 and 6 within region b includes the following interventions:

Retain land use changes to non-residential

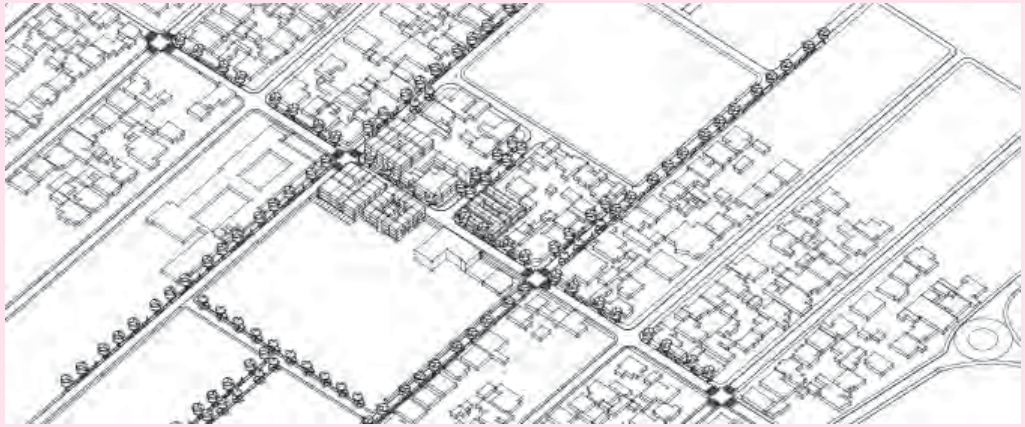
uses in Sophiatown and Westdene, to existing developed areas in Edward and Thornton Streets with specific reference to:

- Retaining residential character.
- Prohibiting intrusion of non-residential uses into residential areas.

Within region b, Westdene occupies, ward 69 and no major priorities or concerns were raised in the 2020/2021 integrated development plan review.

4

PRECINT PLAN



INTRODUCTION

The precinct plan serves as the binding component of the precinct by existing as the fabric and support on which the typologies will sit. In this study the precinct plan was developed after the housing typologies were analysed and adapted. It was decided that the precinct design of Westdene will be approached the same way as natural densification will occur – erf by erf, piece by piece. Phase one of spatial framework builds on the current urban growth and densification pattern and focusses on the core densification of Westdene. It addresses the incoherent building fabric, as a result of haphazard densification in the absence of urban design guidelines. These densification occurrences are mostly situated within the potential high street Thornton, and its immediate surrounds. In conjunction with the densification, is the appropriate High street characteristics that will be addressed. The third issue that will be addressed is the poor connectivity and permeability, by introducing new access roads. The movement economy theory illustrates how an increase in spatial accessibility, correlates to economic and land use value. (Liebst, 2015:49). Thus, an increase in permeability into the precinct, catalytic central retail activities and densification of the core, might lead to further densification on the periphery of Westdene and a probable increase in land value.

UPGRADE & DENSIFICATION STRATEGIES



Mixed use core densification



On street parking & sidewalk detailing



Raised pedestrian crossings



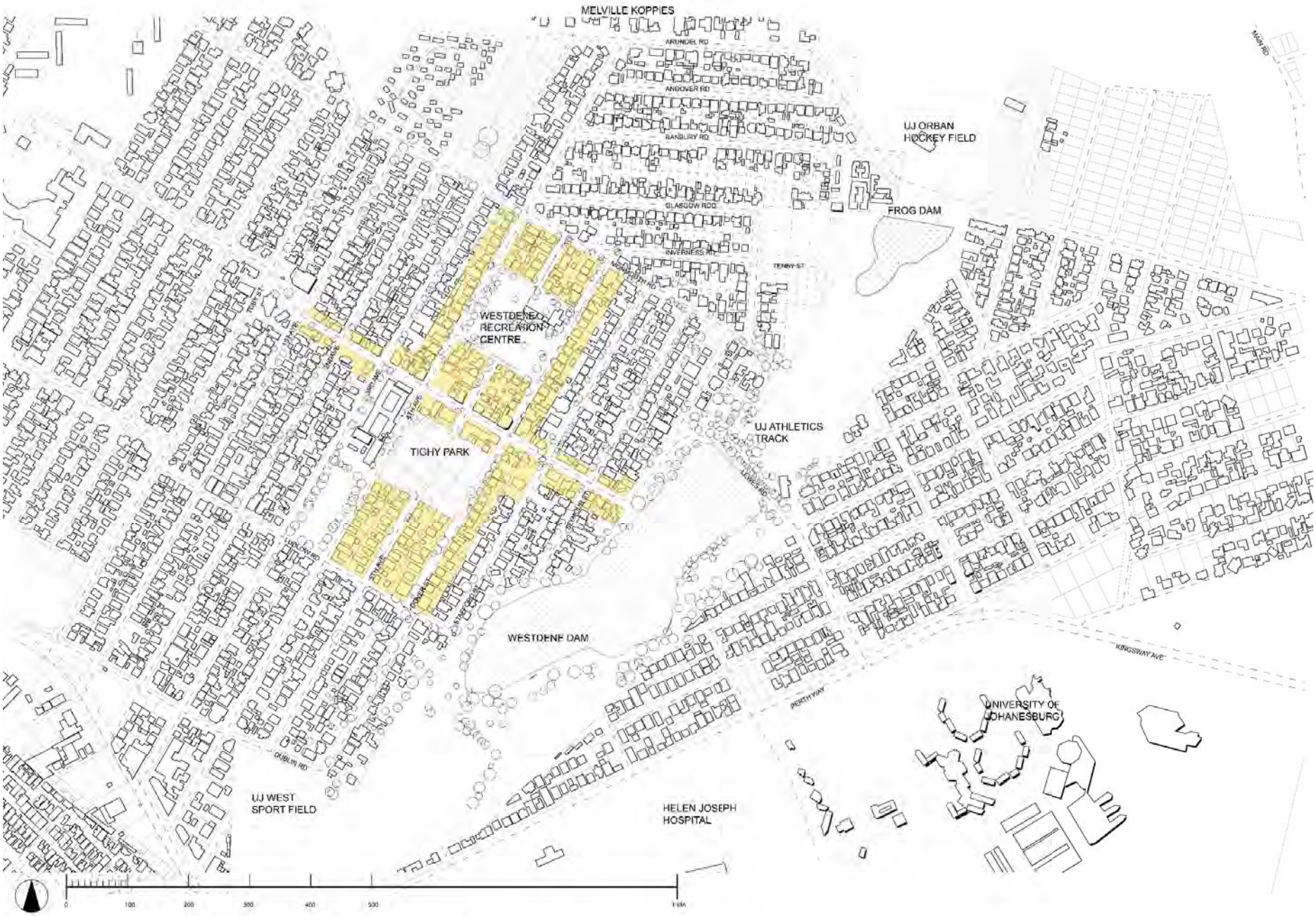
Imrpoved permeability & accessibility into precinct



Increased peripheral densification in precicnt

Figure 4.1:Strategies diagrams (Author:2020)

CORE DENSIFICATION

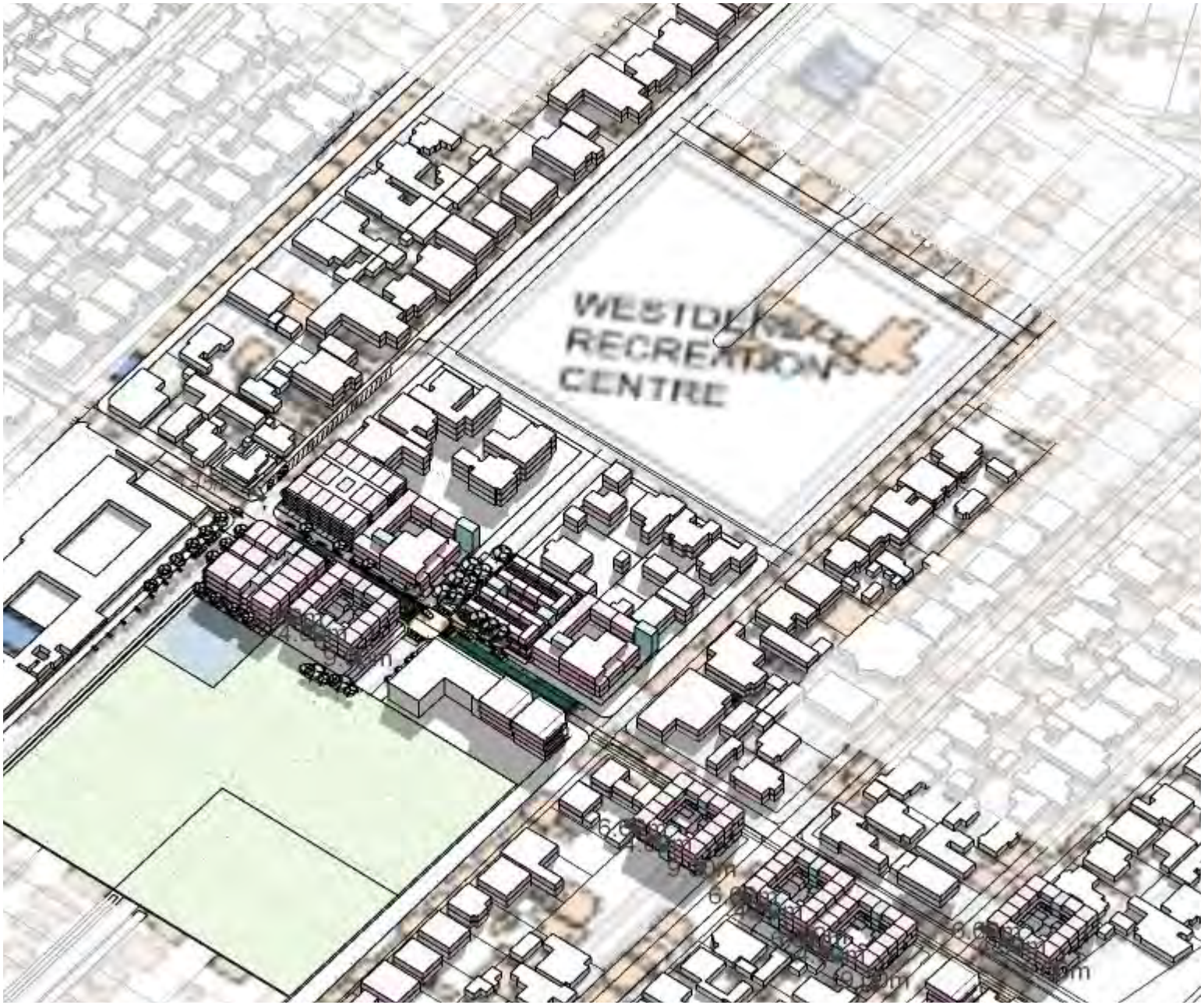


During the analysis, a few observations were made regarding the current site development trends.

There is an increase in densification in Thornton road, which is allowable according to the land use scheme, but the residents are pushing against it.

The hypothesis is that the core and some specific roads highlited in this precinct plan, will densify naturally over time.

This will enable a high street typology to activate the centre of Westdene acting as a catalyst for economic activity inside the suburb.



STREET UPGRADES: ON STREET PARKING



Removal of cycle lane to increase to road width and accommodate on-street parking in Thornton road, starting at the South Western corner, where it meets Westdene dam, and ending in Toby street

Figure 4.2:Phase 1: On street parking (Author 2020)

On street parking will be implemented in segments along Thornton street and is essential for small businesses whom depent on the fluidity of movement by a customer base. This is made possible by widening the street through the removal of the existing bicycle lane. The setback from the kerb edge to the erf boundary is generous allowing for a sidewalk, wide enough to accommodate both pedestrians and cyclists as well as a furnishing zone.

On street parking will be level with the existing road level, with the pedestrian and cycling boulevard situated on top of the curb level.

The on street parking will be segregated by the implementation of planters, acting multipurposely as seating, edge softening and tree containment

On street parking will be located in Thornton road, Dover road, 4th ave, 5th ave as well as North road, thereby services the entire mixed use core.

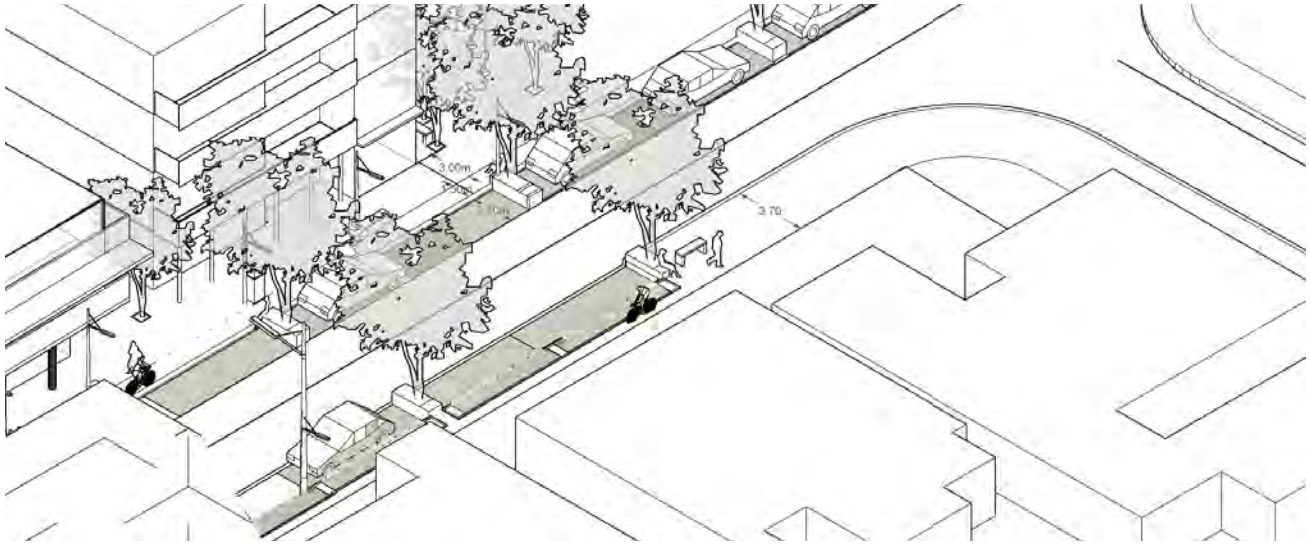


Figure 4.3:On street parking typical section overview (Author: 2020)

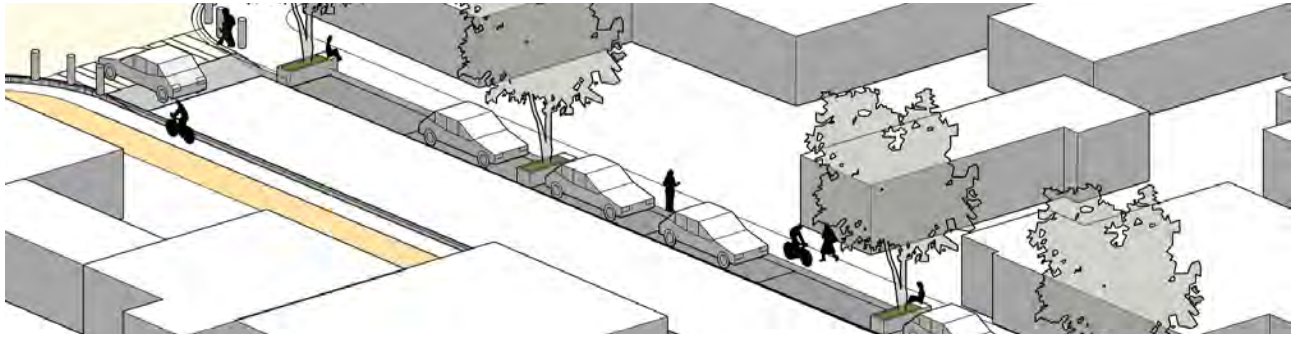


Figure 4.4:On street parking typical section overview (Author: 2020)

SIDEWALK DETAILING street lighting+ shared cycle & pedestrian + seating & planters + in road services



Existing street lighting should be kept and new pedestrian lighting will be added to the street lights

Pedestrian lighting will be added on the Southern edge of Thornton.

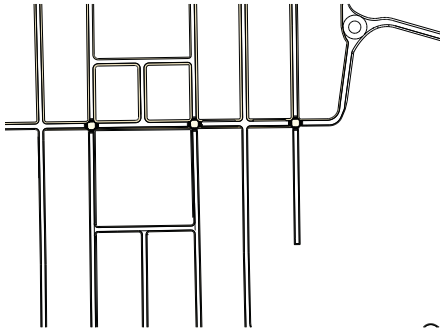


Figure 4.5: Phase 1: Multipurpose sidewalk (Author: 2020)
Figure 4.6:Typical sidewalk detailing graphic (Author: 2020)



Road verges act as a buffer between the roadway and walkway (JRA, 2010). Attention will be given to the careful design of the utility zone with street furniture and planters, the class III cycle land and the pedestrian zone. The section between the pedestrian zone and the building entrance will act as ground floor spill out space, accommodating the commercial and retail activities inside the building.

Street trees will be planted between parallel parking areas, or within the pedestrian walkway where space permits it (7m minimum between trees and 14m maximum between trees).

The trees can be planted in tree storm water pits, capturing some of the storm water runoff from the road.

Where the width of the walkways are 4m or wider, such as small public squares, sidewalk trees can be accommodated. It is however recommended that a cohesive street design is maintained throughout each individual street. Thornton road, which will act as a the High street of the precinct and the central spine, will have the same street design throughout, whilst the perpedicular smaller roads, have a bigger variety of street treatment.

Existing street lighting should be kept on the Norhtern border of Thornton and new , pedestrian ligting will be added on both sides.

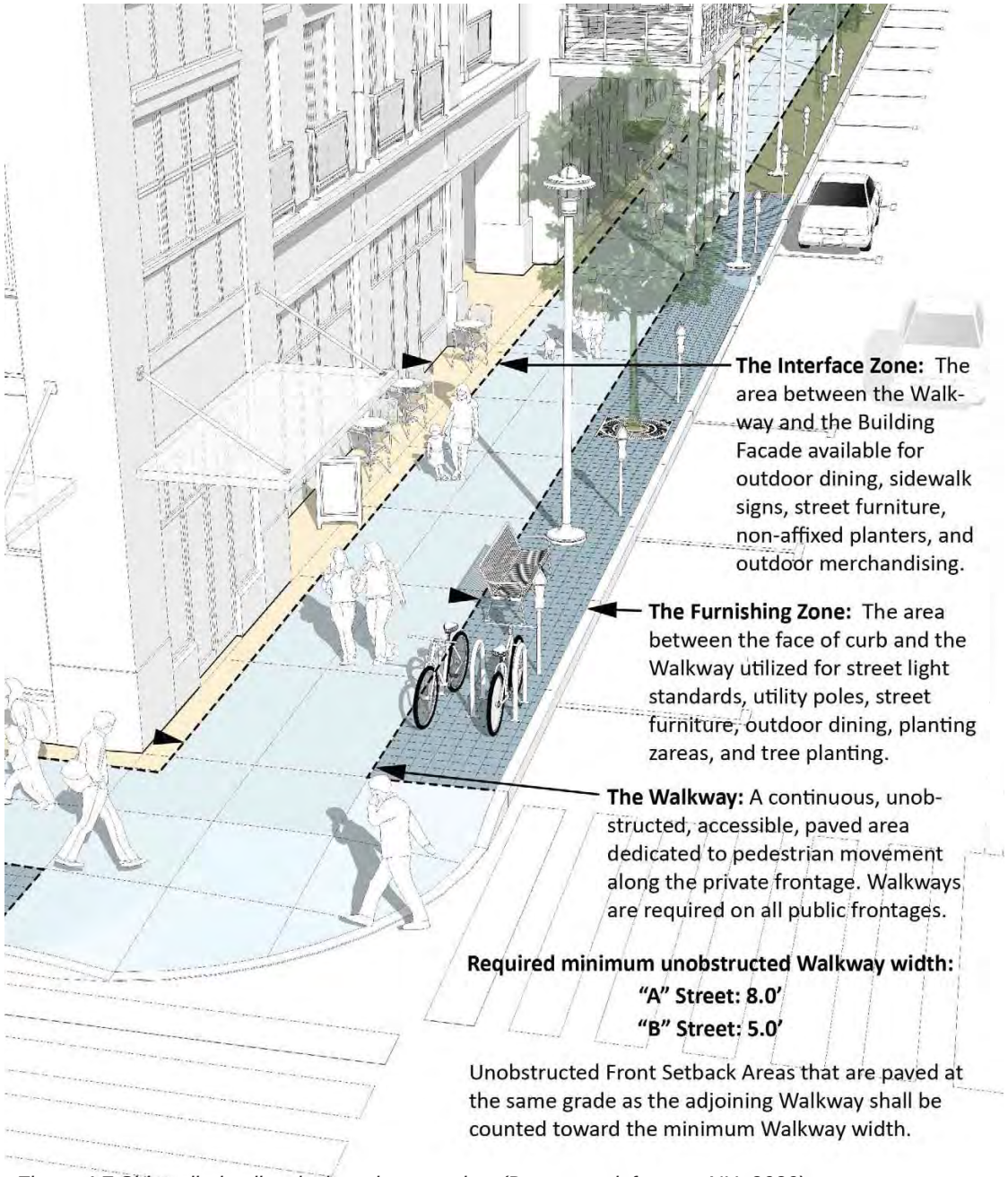


Figure 4.7:Sidewalk detail typical section overview (Downtown lafayette, NU: 2020)

PEDESTRIAN CROSSINGS

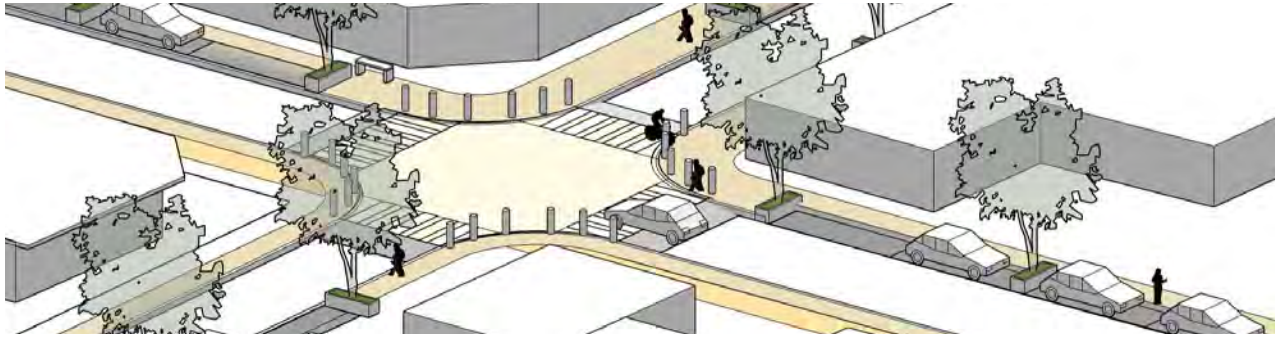




Figure 4.8:Raised pedestrian crossings (Author: 2020)

-Raised platforms for pedestrian crossings at specific intersections:, 4th/Thornton, 2dn/ Thornton, Toby/Thornton.

(Every second block)

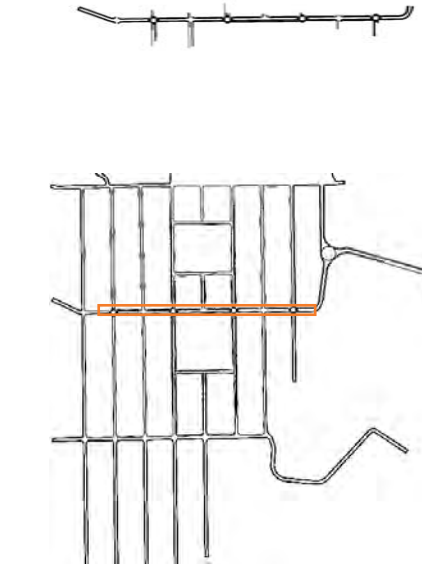




Figure 4.9: 3D diagram indicating raised platforms(Author: 2020)

Pedestrian crossings in the form of raised intersections, have been proposed at specific intersections along the high street namely: 4th/Thornton, 2nd/Thornton, Toby/Thornton (with Seymour street/Thornton having an intersection already). This was done as a traffic calming measure as well as creating a safe, inclusive pedestrian friendly environment. The distance between each of them is roughly 140m. There are several types of pedestrian intersection designs and the correct application and implementation have created "much confusion and controversy"(Combrinck, 2012). There are numerous aspects to consider, and the consultation with a professional traffic engineer is paramount and thus this proposed design serves as a guideline to aspects of raised pedestrian intersections that must be considered. Combrinck (2021), further stated that kerb to kerb raised pedestrian crossings are preferred to ramped crossings, as they are more wheelchair accessible.

Intersections should adhere to all SANS 10400 & SANS 784 legal requirements such as tactile paving and kerb ramps as well as universal design principles, such as; way finding and signage, safe segregation between pedestrians, cyclists, and vehicular traffic. (JRA, 2010)

Something very important to note when raising a pedestrian crossing from kerb to kerb, is that you interfere with the natural flow of storm water down the road, along the kerb line. This can be dealt with in two ways: inserting a new curb inlet close to the raised intersection, or inserting a drainage channel through the pedestrian crossing.

INCREASED PERMEABILITY & ACCESSIBILITY

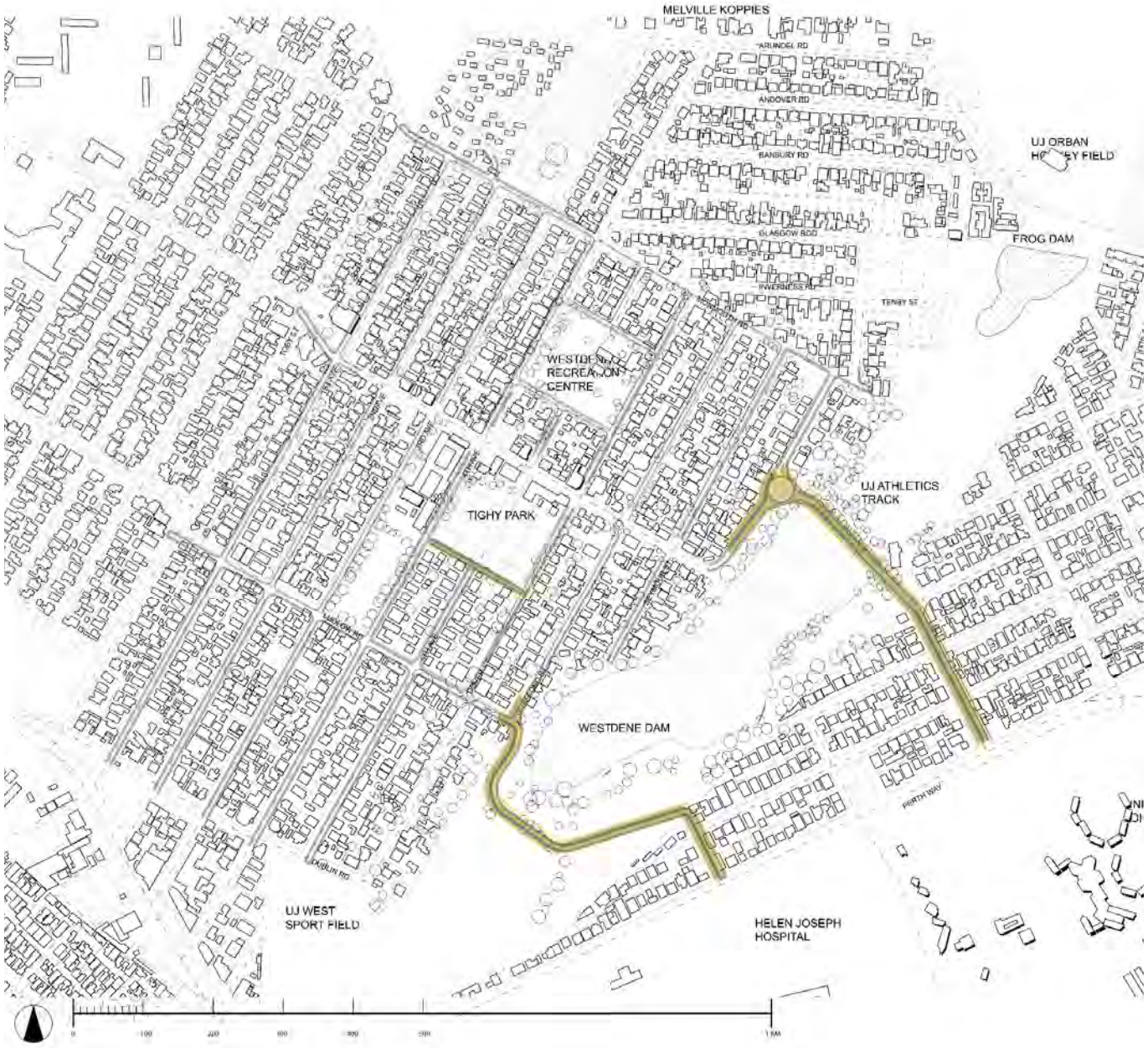
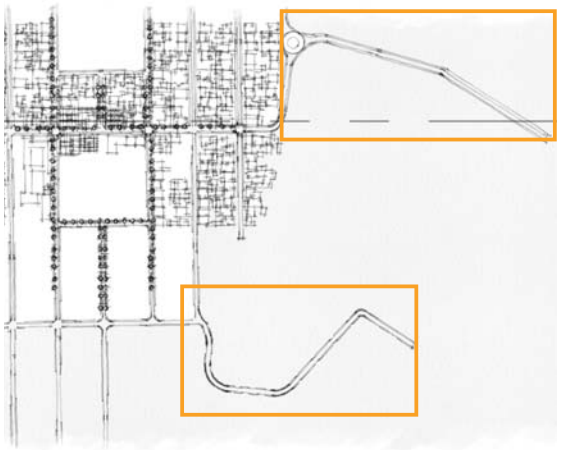


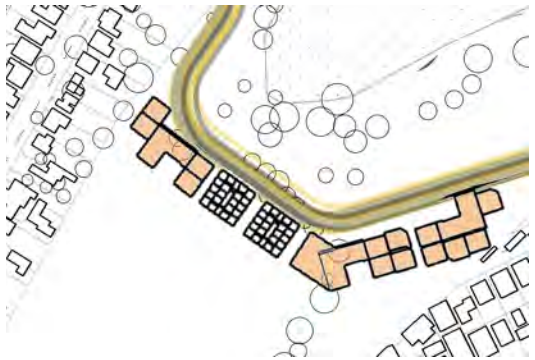
Figure 4.10: Phase 2: New access roads

-Implement a traffic circle on the intersection of Tenby Road and Lewes road

Access road in a South Westerly direction, from Ash to Stafford rd.

Proposed street between Dover and 4th street, situated behind Tighy park,





During the site analysis phase, I mention the issue of permeability when trying to access and orientate yourself into Westdene in an S-E/N-W direction. For Westdene's high street and core densification to be activated and more accessible, a new entrance road is proposed into the precinct, whilst an existing main entrance road Lewes, gets a new traffic circle, distributing the vehicles in an east-west direction, instead of just West, thereby alleviating traffic in Thornton road.

The new proposed road allows traffic to flow on the South Western border of the Westdene dam and essentially doubles the accessibility into the precinct from Perth avenue side. Accessibility will be improved by implementing this access road in a South Westerly direction, from Ash to Stafford rd.

Further to the accessibility increasing, a secondary "multiplier effect" will allow densification to occur on the South Western border of Westdene dam (currently University of Johannesburg property).

Closer to the core densification, another street is proposed between Dover and 4th street, situated behind Tighy park, allowing access from the adjacent properties onto the park.

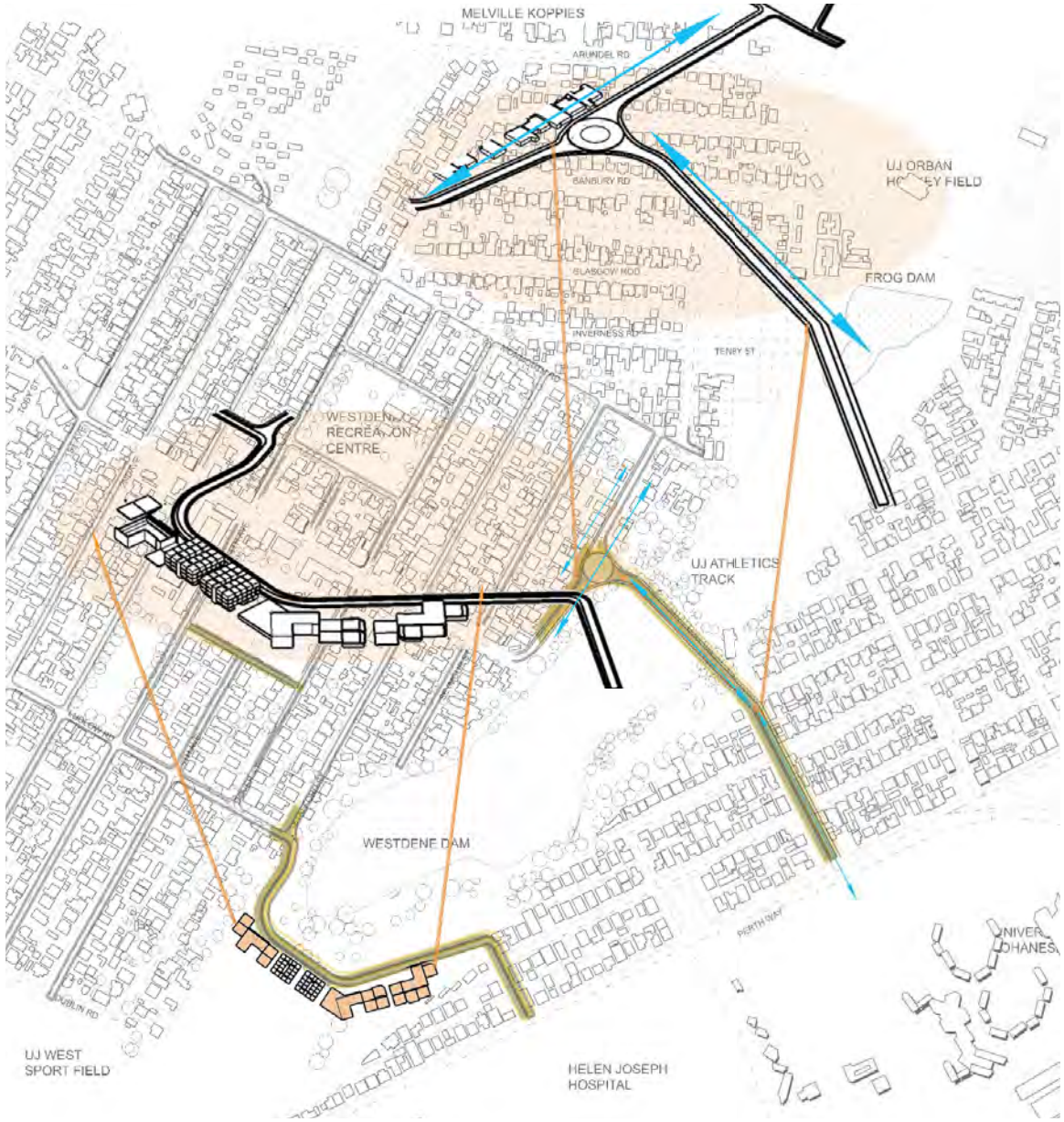


Figure 4.11: New access roads

CONCLUSION

The design of the precinct plan was an iterative approach and adapted along with the design typologies. It's envisioned that the precinct plan should occur as a phased approach with the core densification and street upgrades being part of the initial phase and the improved accessibility and peripheral densification being part of the second phase. Current development trends have shown that densification will occur regardless of a formal precinct plan being in place or not. The precinct plan aims to guide developers on decision-making when this happens. The street upgrades and traffic control measures will allow for a positive and unencumbered flow of movement when this happens.

5 BUILDING TYPOLOGIES

DESIGN CODING

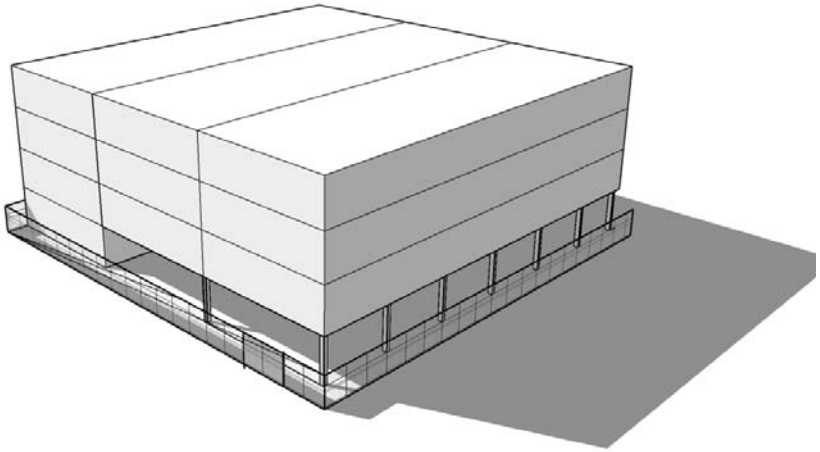


INTRODUCTION

During the site analysis various building typologies were identified in the precinct based on their function, visual characteristics, form and location. The two main categories are high street – usually commercial or retail - and residential. Typical built forms that allow for densification are a single detached tower block surrounded by open space, traditional street layout with row houses and a perimeter block that encloses an open space. The categories identified in this research, goes a step further by creating sub-categories within the aforementioned built forms. Within the high street category, four main typologies were identified and they are categorised into the following types; typology a (residential perimeter block), typology b (half perimeter residential block), typology c (one storey commercial block) and typology c2 (multi storey commercial corner café). Within the residential category, four typologies were identified namely; typology d (u-shape - single storey detached residential housing), typology e (half perimeter block - single storey detached residential housing), typology f (h shape - single storey detached residential housing) and typology g (block shape - double storey detached residential housing). Due to the almost infinite number of diverse design options, some parameters were put in place as a design tool and also as a lens to focus through. The interior layout of the built forms were disregarded and the following variables were looked at: setback from the street, depth of sites/erven, coverage ratio, frontage function and permeability and building height. The densification proposals situated within the high street (commercial) streets, were more aggressive than the densification proposals situated within the residential streets (secondary roads). This was done strategically so the chosen high street typologies can act as a catalyst for core densification and subsequent revitalisation.

As stated before, it was pertinent to preserve the residential character of Westdene and consequently the densification approaches required subtlety. .The majority of the residential buildings in Westdene are older than sixty years and therefore fall under the provincial statutory protection. In all the residential densification proposals, the facades remained untouched and all building modification for densification purposes occur at the back of the stand.

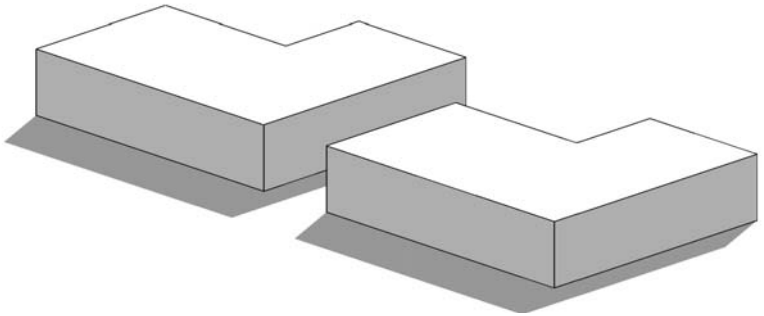
EXISTING HIGH STREET TYPOLOGIES INVESTIGATED:



Typology A:

Residential perimeter block

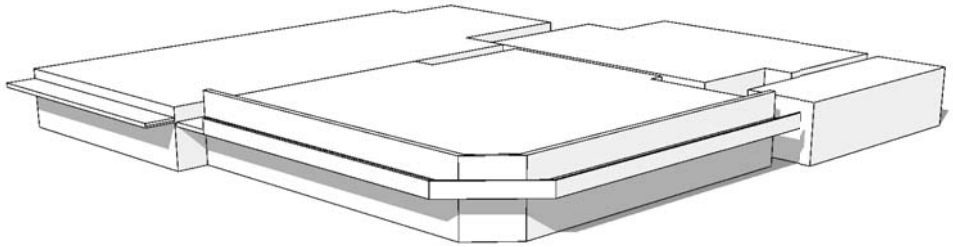
Figure 5.4:Typology A (Author: 2020)



Typology B:

Half perimeter residential block

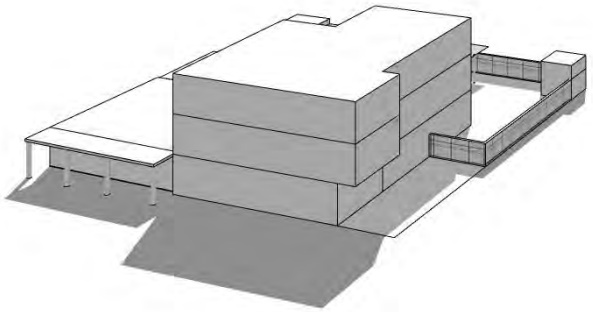
Figure 5.3: Typology B (Author: 2020)



Typology C:

One storey commercial block

Figure 5.2: Typology C1 (Author:2020)

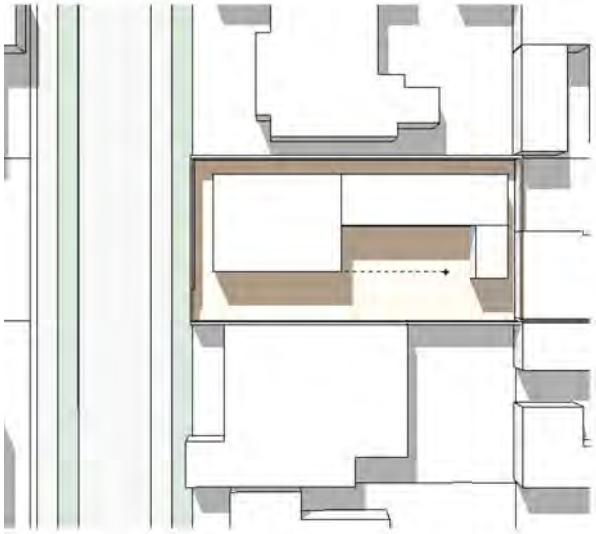


Typology C2:

Multi Storey commercial corner cafe

Figure 5.1: Typology C2 (Author: 2020)

EXISTING RESIDENTIAL TYPOLOGIES INVESTIGATED



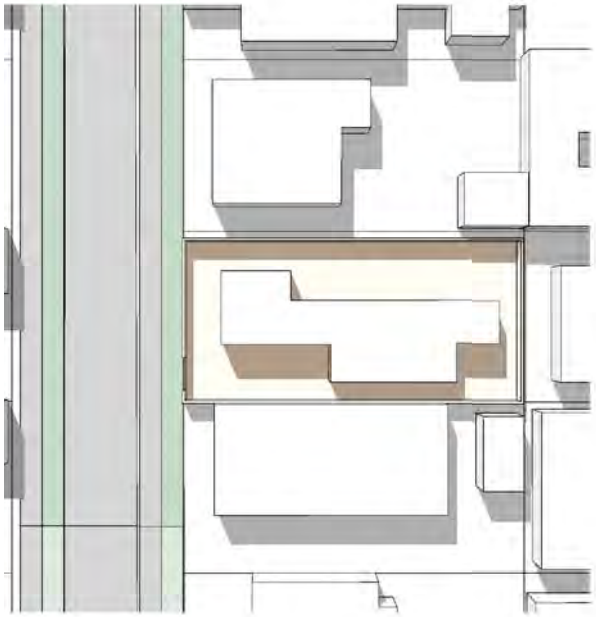
TYPOLOGY D:

U-SHAPE - Single storey detached residential housing
Densification through height increase on back of stand



TYPOLOGY E:

half perimeter block - Single storey detached residential housing
densification through building consolidation



TYPOLOGY F:

h Shape - Single storey detached residential housing
Densification through height increase at back of stand

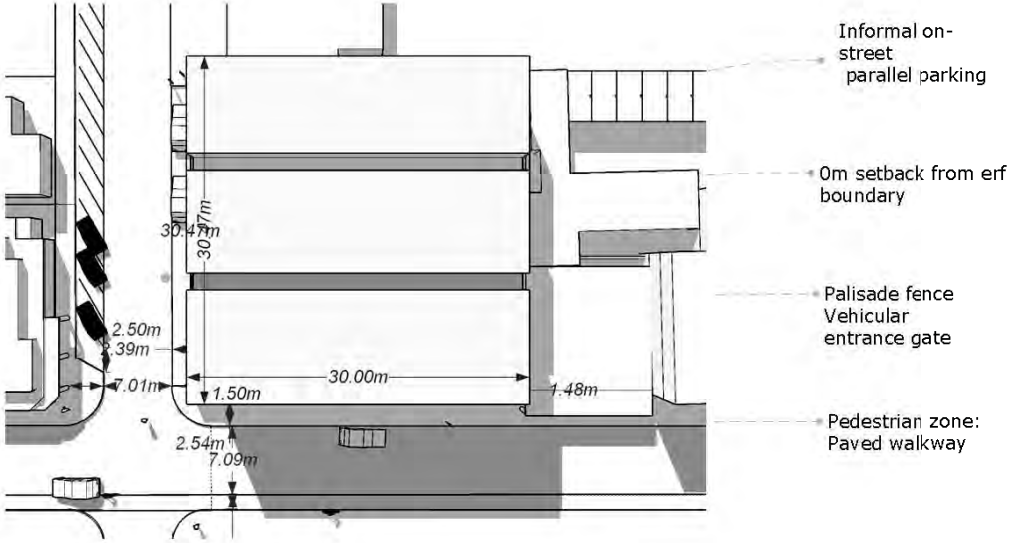


TYPOLOGY G:

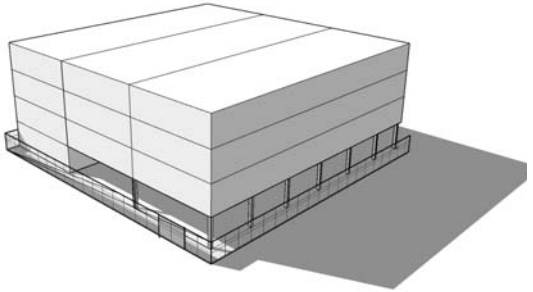
block shape - double storey detached residential housing
Densification through addition

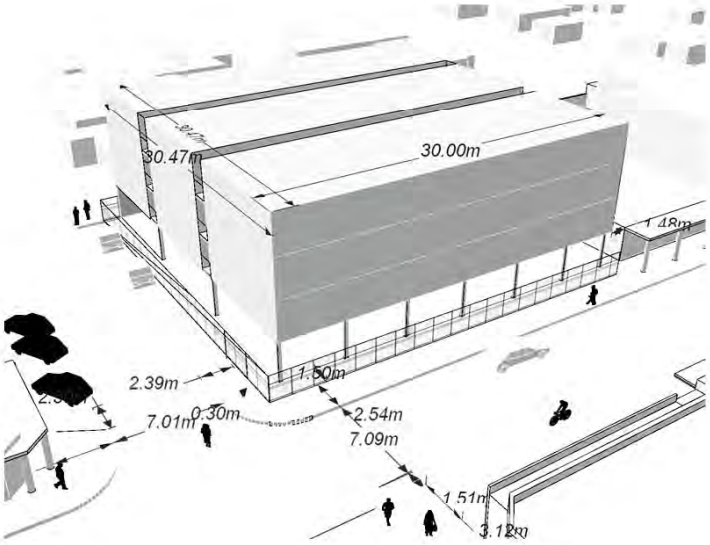
TYPOLOGY A:

EXISTING: RESIDENTIAL PERIMETER BLOCK



Existing:Plan

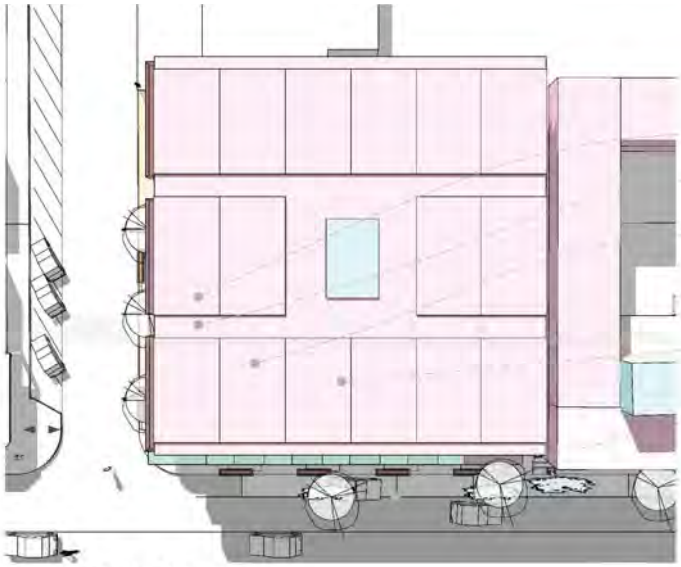




Existing:Isometric

Variables			
Setback from street	*2.1*	*Erf size*	*500m2*
Site/Erven depth	*30.1*	*Space between buildings*	*1.2m*
Coverage %	*80*	*Adjacent land use*	*commercial*
Frontage function	*none*	*Pedestrian circulation*	*high on Thorton road*
Permeability	*none*	*Street typology*	*High street*
Height	*3 storeys*	*Building activation*	*None*

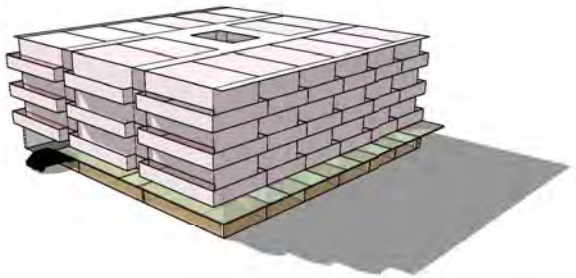
PROPOSED: GROUND FLOOR COMMERCIAL & RETAIL & 3 FLOORS RESIDENTIAL

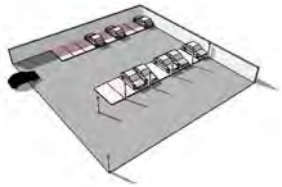


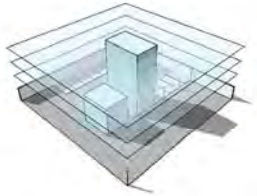
Proposed plan



Proposed isometric



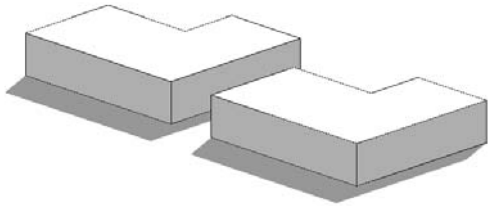


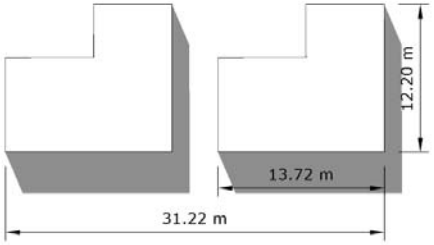


Variables	
Setback from street	*Sidewalk width increased to 4m*
Site/Erven depth	*30*
Coverage %	*80 (no increase)*
Frontage function	*Ground floor commercial, public interaction*
Permeability	*Ground floor public permeablity*
Height	*Maximum 3 storeys*
Erf size	*500m2*
Space between buildings	*1.2m (existing)*
FAR (Floor Area Ratio)	*2.1*
Adjacent land use	*commercial*
Pedestrian circulation	*Better permeability with streescape & furniture*
Street typology	*High Street, Densification core*
Building activation	*Ground floor activation*

TYPOLOGY B:

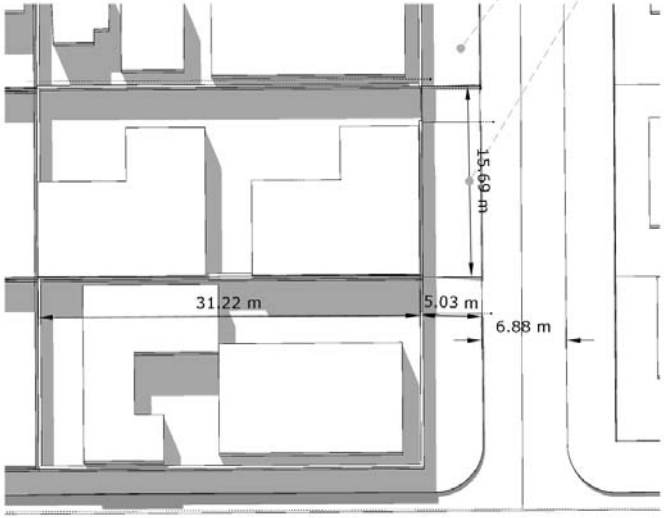
EXISTING: HALF PERIMETER RESIDENTIAL BLOCK



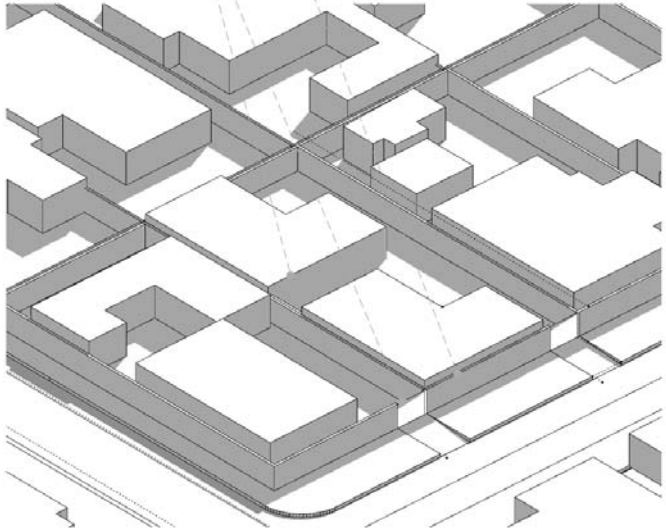


Existing:Plan





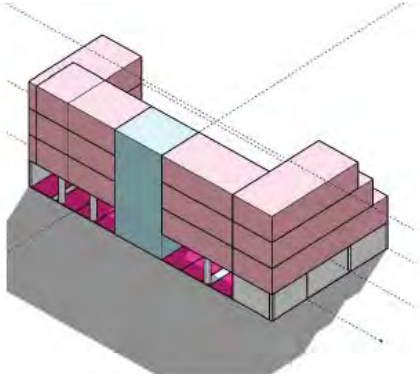
Existing plan in context



Existing Iso in context

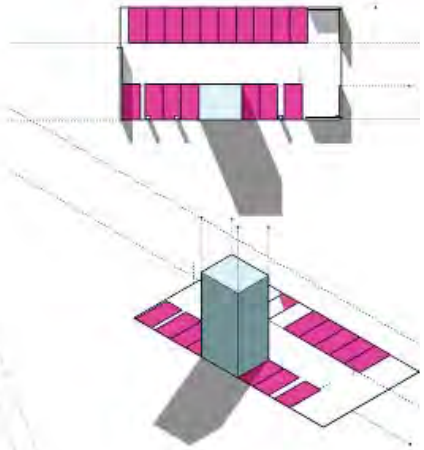
Variables	
Setback from street	*5m from residential street*
Site/Erven depth	*31m*
Coverage %	*50%*
Frontage function	*none*
Permeability	*None*
Height	*1 storey*
Erf size	*500m2*
Space between buildings	*3m*
Adjacent land use	*residential*
Pedestrian circulation	*Good, non interactive*
Street typology	*Residential*
Building activation	*None*

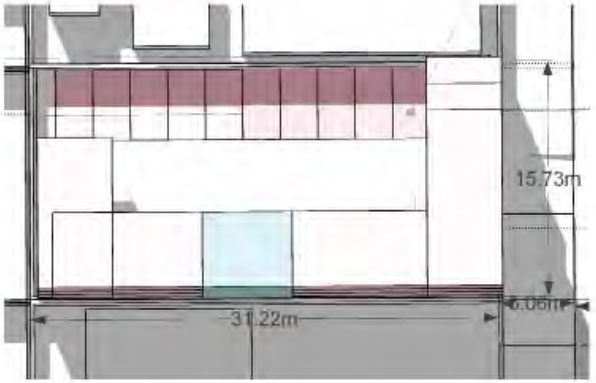
PROPOSED: RECONFIGURED HALF PERIMETER RESIDENTIAL BLOCK





Proposed:Plan





Proposed plan in context

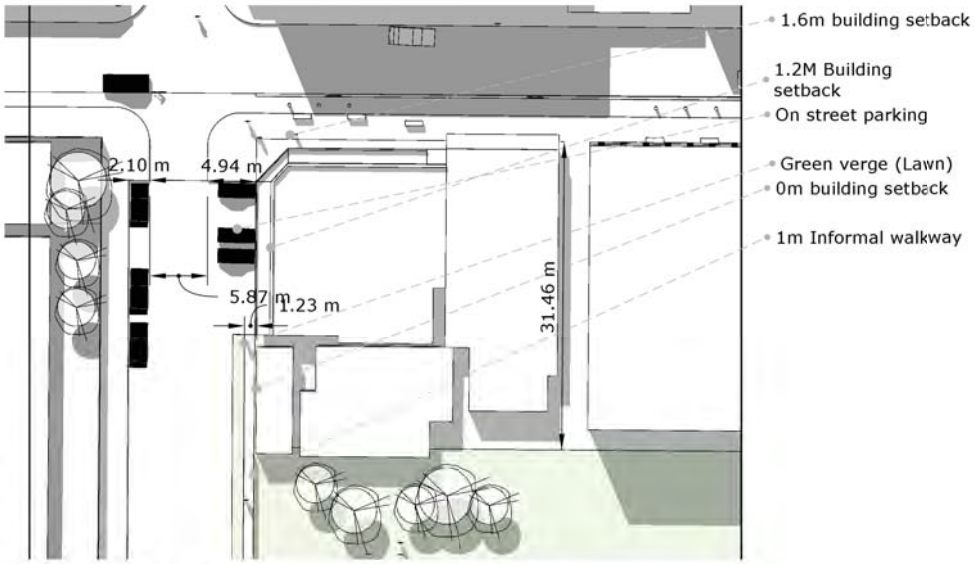


Proposed Iso in context

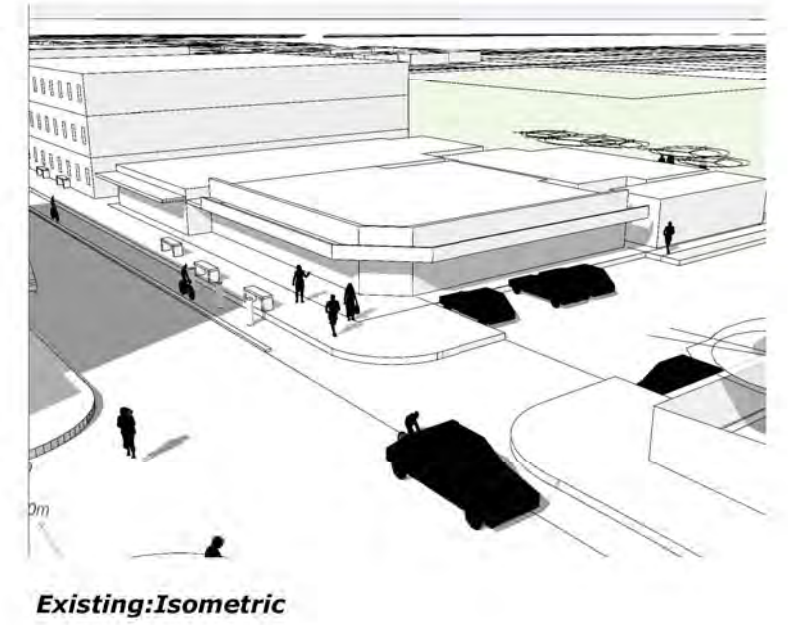
Variables	
Setback from street	*5m*
Site/Erven depth	*31m*
Coverage %	*50%*
Frontage function	*None, private and residential*
Permeability	*None*
Height	*3 storeys*
Erf size	*500m2*
Space between buildings	*3m*
Adjacent land use	*residential*
Pedestrian circulation	*none*
Street typology	*residential*
Building activation	*none*

TYPOLOGY C:

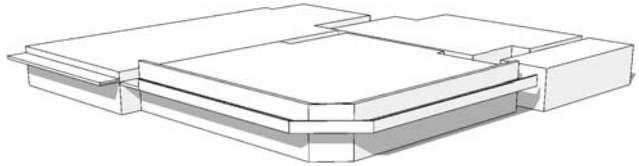
EXISTING: SINGLE DETACHED BUILDING: ONE STORY COMMERCIAL BLOCK



Existing:Plan



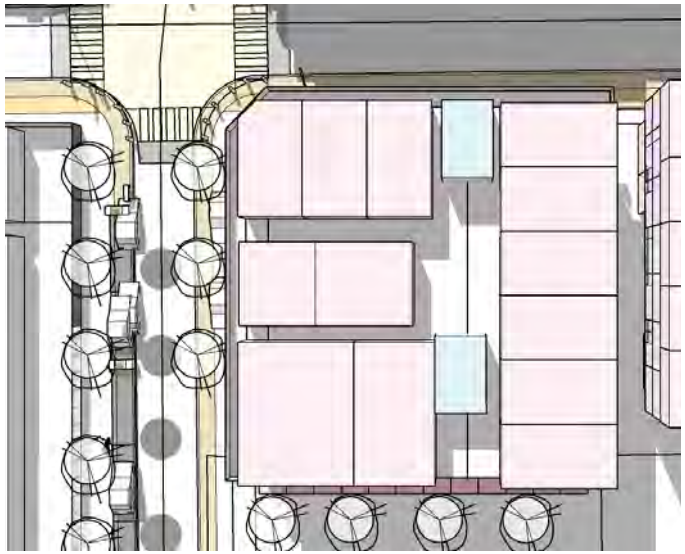
Existing:Isometric

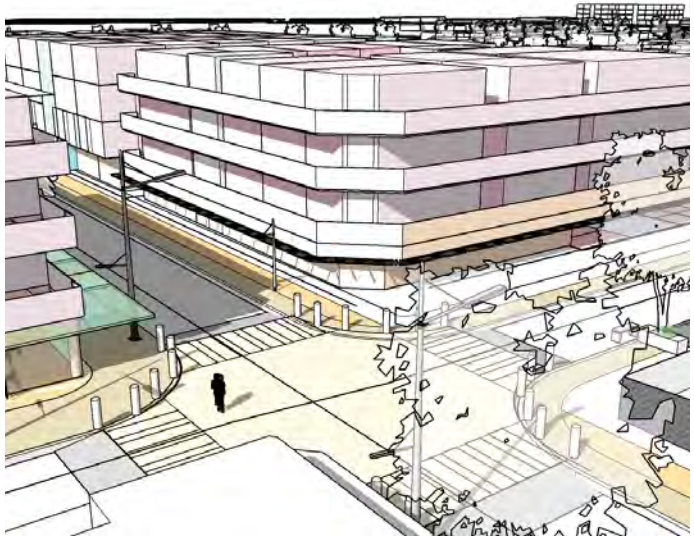


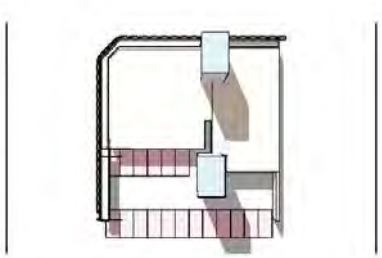
EXISTING

Variables	
Setback from street	*2.6m*
Site/Erven depth	*30m*
Coverage %	*90&*
Frontage function	*50% Commercial*
Permeability	*50% public permeability*
Height	*1 storey*
Erf size	*500m2*
Space between buildings	*3.1m*
Adjacent land use	*residential*
Pedestrian circulation	*High circulation on Thornton road*
Street typology	*High street and residential street*
Building activation	*Poor, corner cafe is active*

PROPOSED: SINGLE DETACHED BUILDING: GROUND FLOOR COMMERCIAL & RETAIL & 3 FLOORS OF RESIDENTIAL



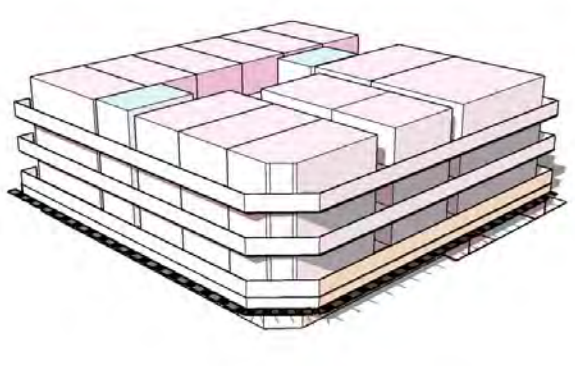




GF parking



Circulation core

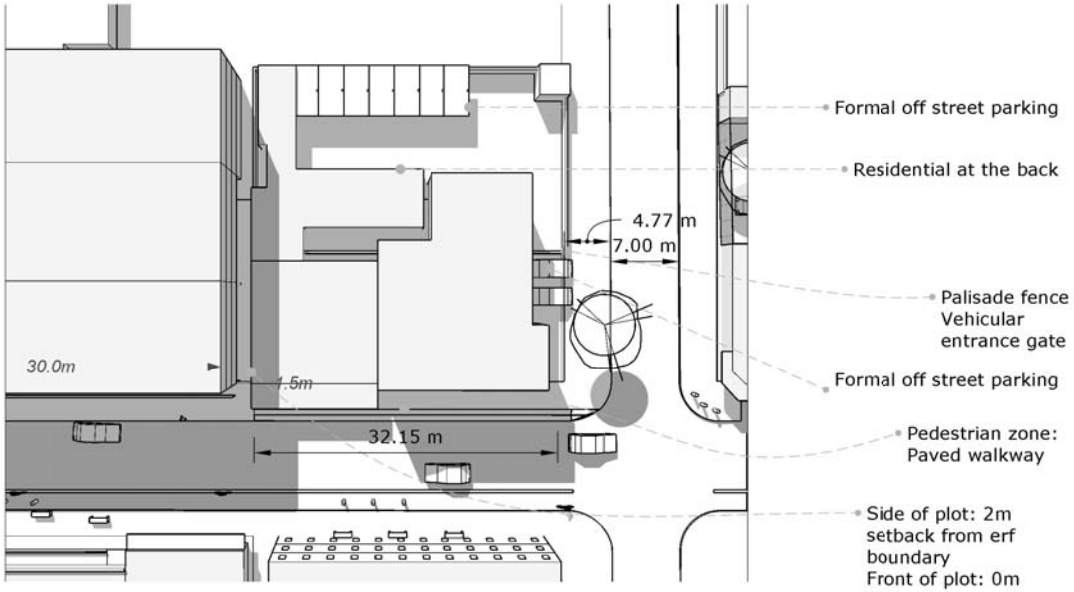


PROPOSED

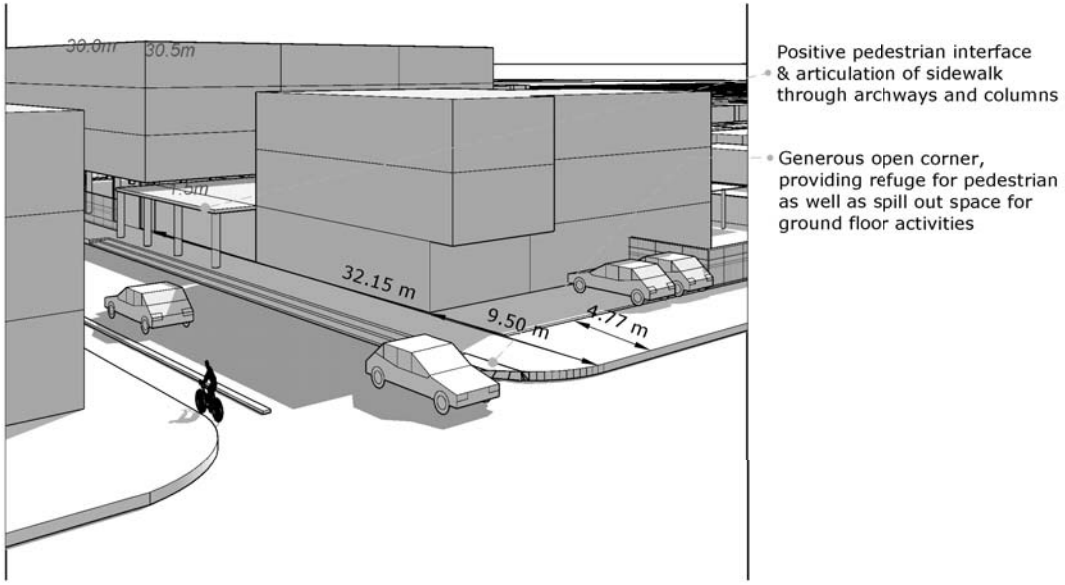
Variables	
Setback from street	*3m*
Site/Erven depth	*30m*
Coverage %	*90%*
Frontage function	*100% commercial*
Permeability	*100% permability with commercial gf*
Height	*4 storeys max*
Erf size	*500m2*
Space between buildings	*3.1m*
Adjacent land use	*commercial*
Pedestrian circulation	*Hight circulation on adjacent streets*
Street typology	*High steet and active commercial street*
Building activation	*100% ground floor activation*

TYPOLOGY C2:

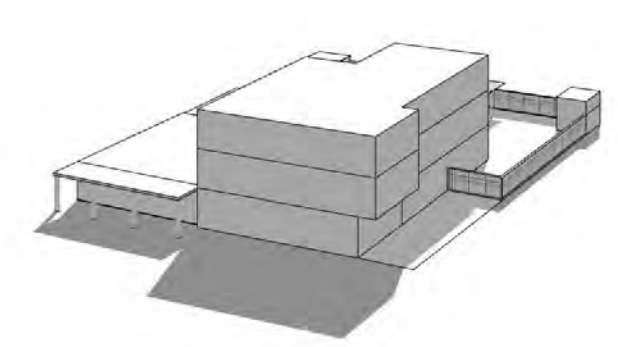
EXISTING: MULTI STOREY MIXED USE



Existing:Plan

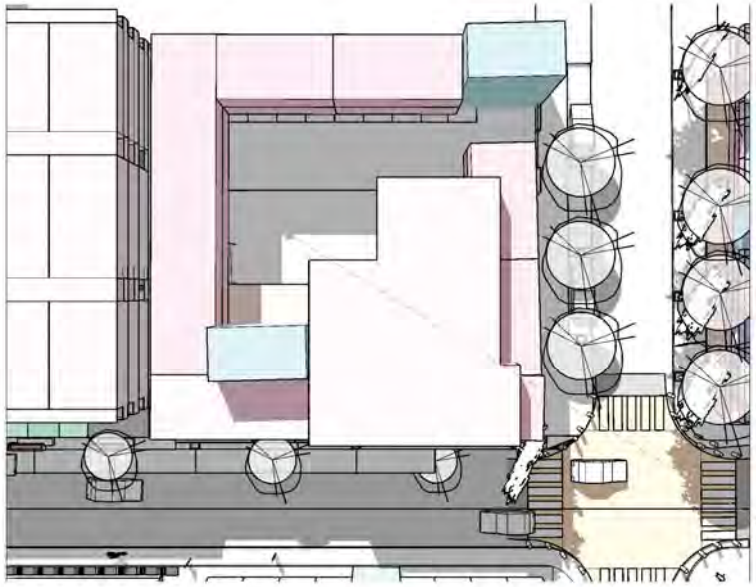


Existing:Isometric



Existing Variables	
Setback from street	*4.7*
Site/Erven depth	*32*
Coverage %	*60*
Frontage function	*Office space*
Permeability	*none*
Height	*2 storeys*
Erf size	*900m2*
Space between buildings	*2m*
Adjacent land use	*Residential*
Pedestrian circulation	*high on Thorton road*
Street typology	*High street*
Building activation	*None*

PROPOSED: GROUND FLOOR COMMERCIAL



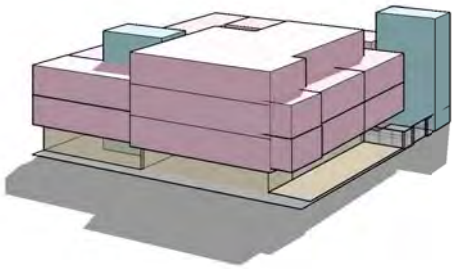
Proposed:Plan

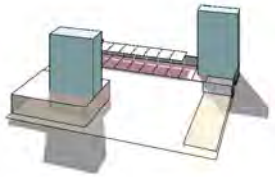


Proposed:Isometric



GF parking





Circulation core

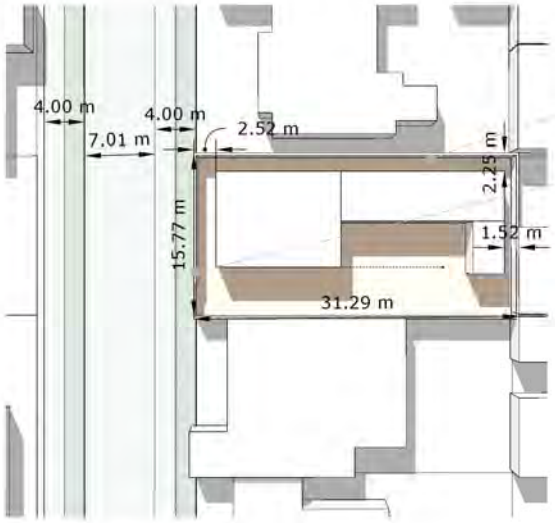
- Courtyard for private spill-out space
- Increase in building height, maximum 4 storeys
- Residential on floor 1-3
- No increase in building line to promote spill out space on street corner
- Ground floor activation through commercial/retail activities
- Raised pedestrian platform

Existing Variables	
Setback from street	*4.7 (unchanged)*
Site/Erven depth	*32*
Coverage %	*70*
Frontage function	*Ground floor commercial/retail*
Permeability	*Ground floor circulation*
Height	*4 storeys*
Erf size	*900m2*
Space between buildings	*2m (unchanged)*
Adjacent land use	*Mixed use : Commercial & Residential*
Pedestrian circulation	*high on Thorton road*
Street typology	*High street*
Building activation	*GF activation*

TYPOLOGY D:

U-SHAPE - SINGLE STOREY DETACHED RESIDENTIAL HOUSING

DENSIFICATION THROUGH HEIGHT INCREASE ON BACK OF STAND



Existing:Plan

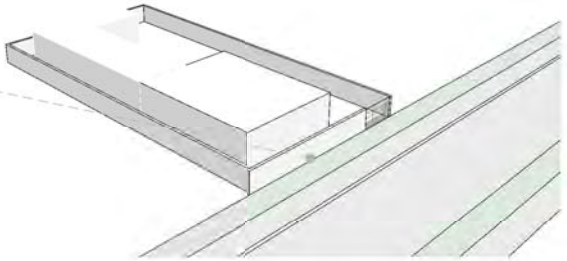
min 1m building line allowed on side and back of stand

Building line setback to remain unchanged or
Building line can be decreased to a min of 2m

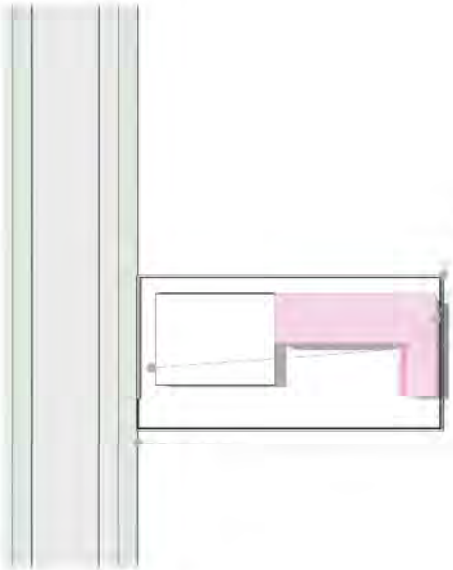
Low wall and/or fencing should not be increase in height

Maximum 2 storeys height

Front façade remains unchanged and all heritage qualities should be preserved where significance can be attributed to them, based on their design patterns or rare time specific architectural features



Existing:Isometric



Proposed:Plan

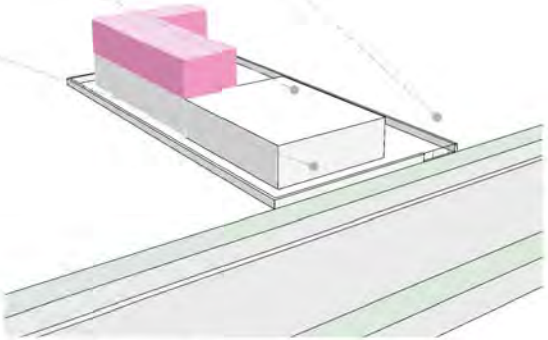
Densification at the back section of the building with the façade being preserved

Max coverage of 60% of total plot size

No relaxations allowed on existing street facing building lines , Front boundary wall may be removed , but height may not increase

Min of 1 parking bay (off street) per dwelling

Min of 2m Soft landscaped verges to remain and all existing trees should be preserved

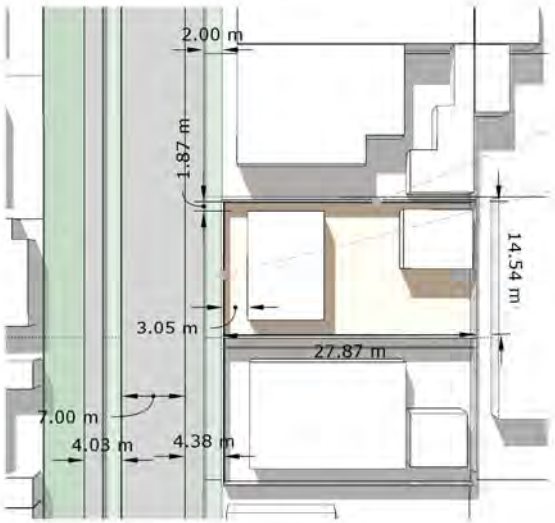


Proposed:Isometric

TYPOLOGY E:

HALF PERIMETER BLOCK - SINGLE STOREY DETACHED RESIDENTIAL HOUSING

DENSIFICATION THROUGH BUILDING CONSOLIDATION



Existing:Plan

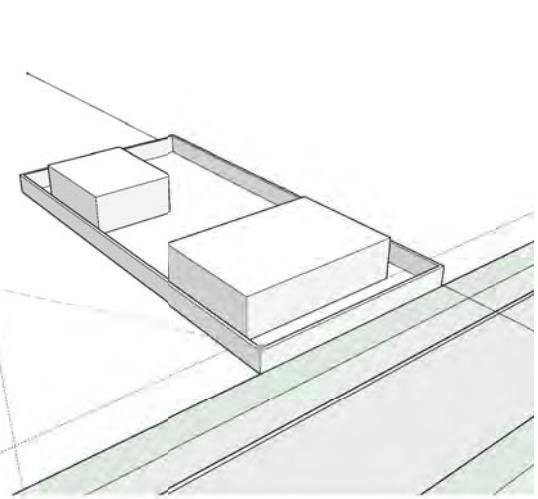
min 1m building line allowed on side and back of stand

Building line setback to remain unchanged or building line can be decreased to a min of 2m

Low wall and/or fencing should not be increase in height

Maximum 2 storeys height

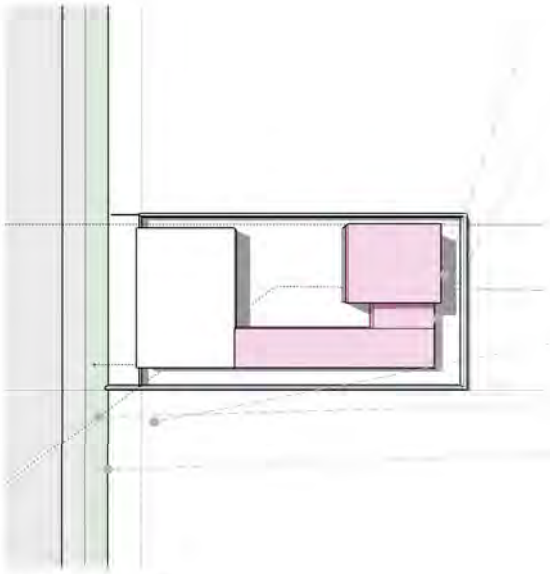
Front façade remains unchanged and all heritage qualities should be preserved where significance can be attributed to them based on their design patterns or rare time specific architectural features



Existing:Isometric

Densification at the back section of the building with the façade being preserved

Max coverage of 60%



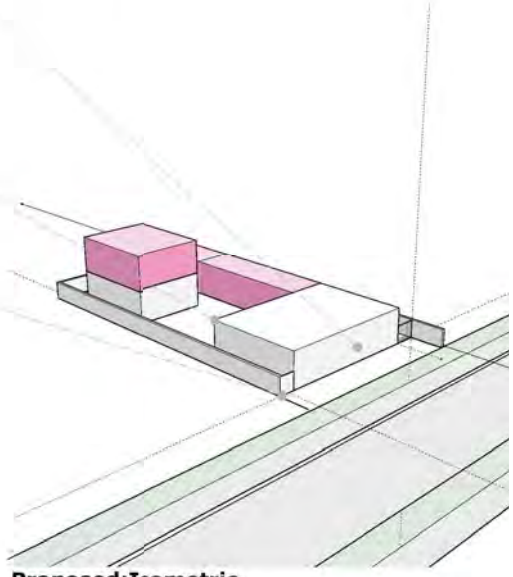
Proposed:Plan

No relaxations allowed on existing street facing building lines , Front boundary wall may be removed , but height may not increase

Min of 1 parking bay (off street) per dwelling

Min of 2m Soft landscaped verges to remain

Existing trees should be preserved

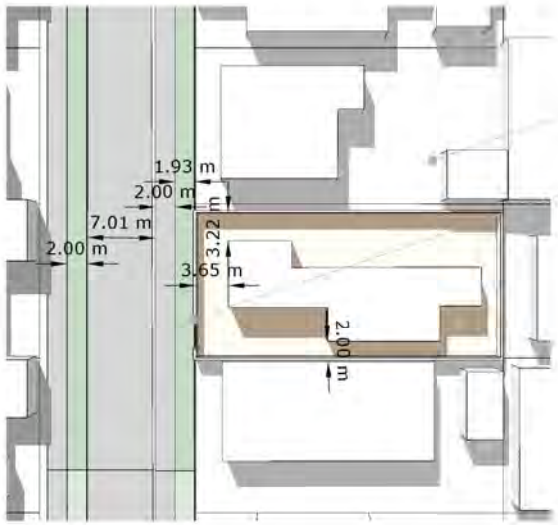


Proposed:Isometric

TYPOLOGY F:

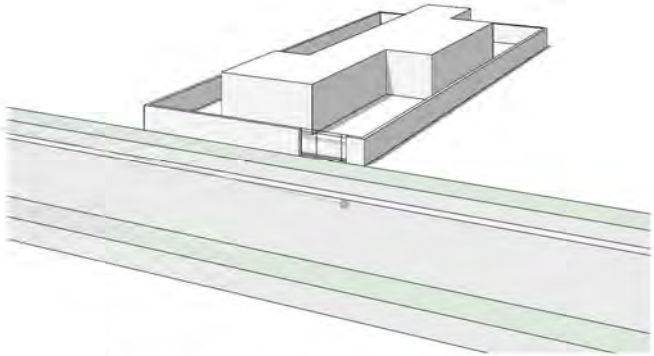
H SHAPE - SINGLE STOREY DETACHED RESIDENTIAL HOUSING

DENSIFICATION THROUGH HEIGHT INCREASE AT BACK OF STAND

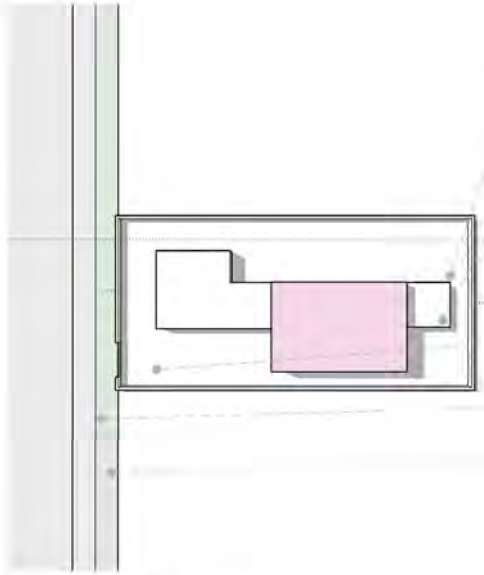


Existing:Plan

- min 1m building line allowed on side and back of stand
- Building line setback to remain unchanged Building line can be decreased to a min of 2m
- Low wall and/or fencing should not be increase in height
- Maximum 2 storeys height
- Front façade remains unchanged and all heritage qualities should be preserved where significance can be attributed to them based on their design patterns or rare time specific architectural features

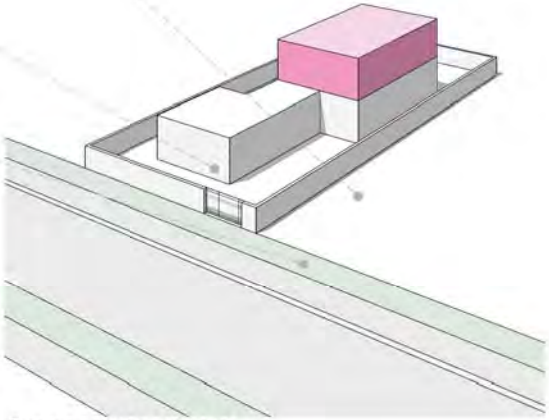


Existing:Isometric



Proposed:Plan

- Densification at the back section of the building with the façade being preserved
- Max coverage of 60%
- No relaxations allowed on existing street facing building lines , Front boundary wall may be removed , but height may not increase
- Min of 1 parking bay (off street) per dwelling
- Min of 2m Soft landscaped verges to remain
- Existing trees should be preserved

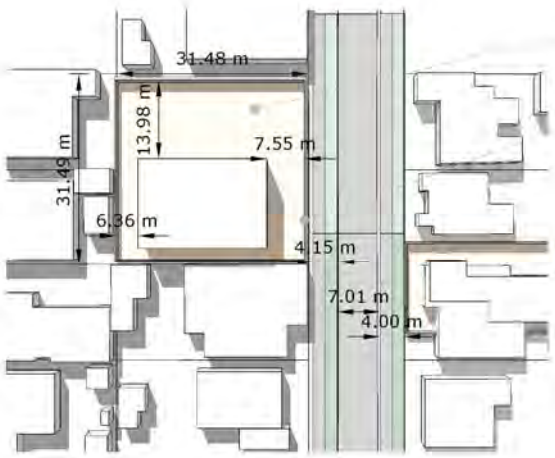


Proposed:Isometric

TYPOLOGY G:

BLOCK SHAPE - DOUBLE STOREY DETACHED RESIDENTIAL HOUSING

DENSIFICATION THROUGH ADDITION



Existing:Plan

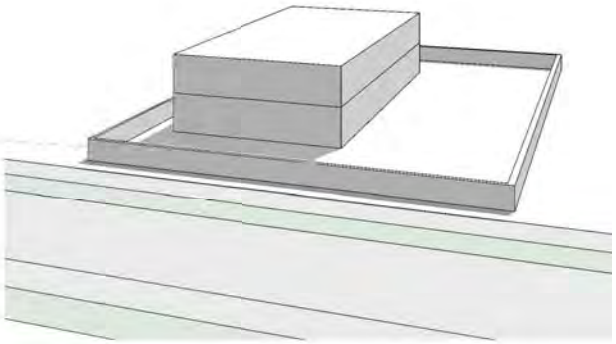
min 1m building line allowed on side and back of stand

Building line setback to remain unchanged Building line can be decreased to a min of 2m

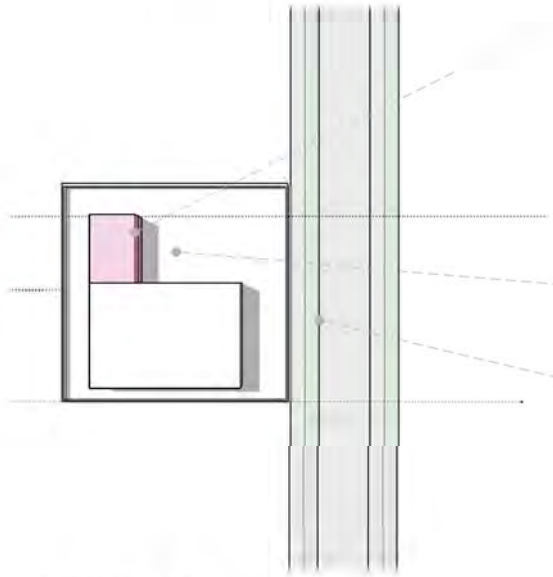
Low wall and/or fencing should not be increase in height

Maximum 2 storeys height

Front façade remains unchanged and all heritage qualities should be preserved where significance can be attributed to them based on their design patterns or rare time specific architectural features



Existing:Isometric



Proposed:Plan

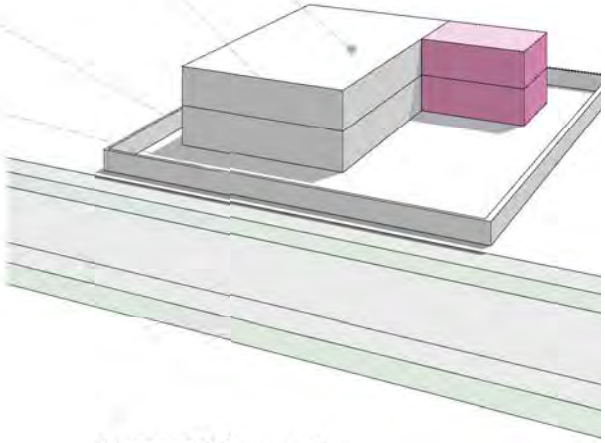
Densification at the back section of the building with the façade being preserved

Max coverage of 60%

No relaxations allowed on existing street facing building lines , Front boundary wall may be removed , but height may not increase

Min of 1 parking bay (off street) per dwelling

Min of 2m Soft landscaped verges to remain
Existing trees should be preserved



Proposed:Isometric

TYPICAL SECTION THROUGH RESIDENTIAL STREET WITHIN Ddensification CORE

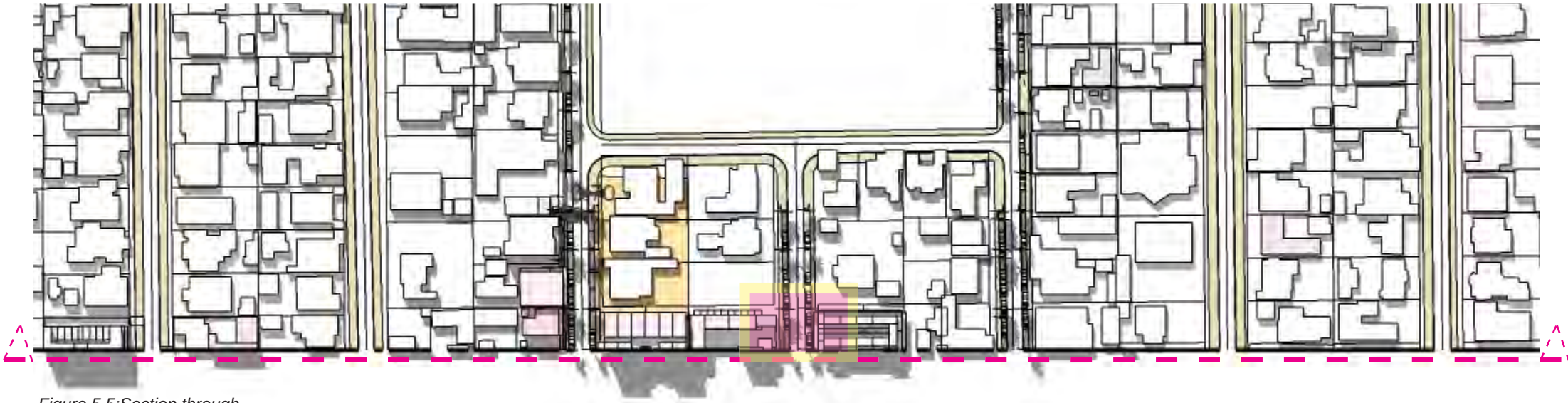
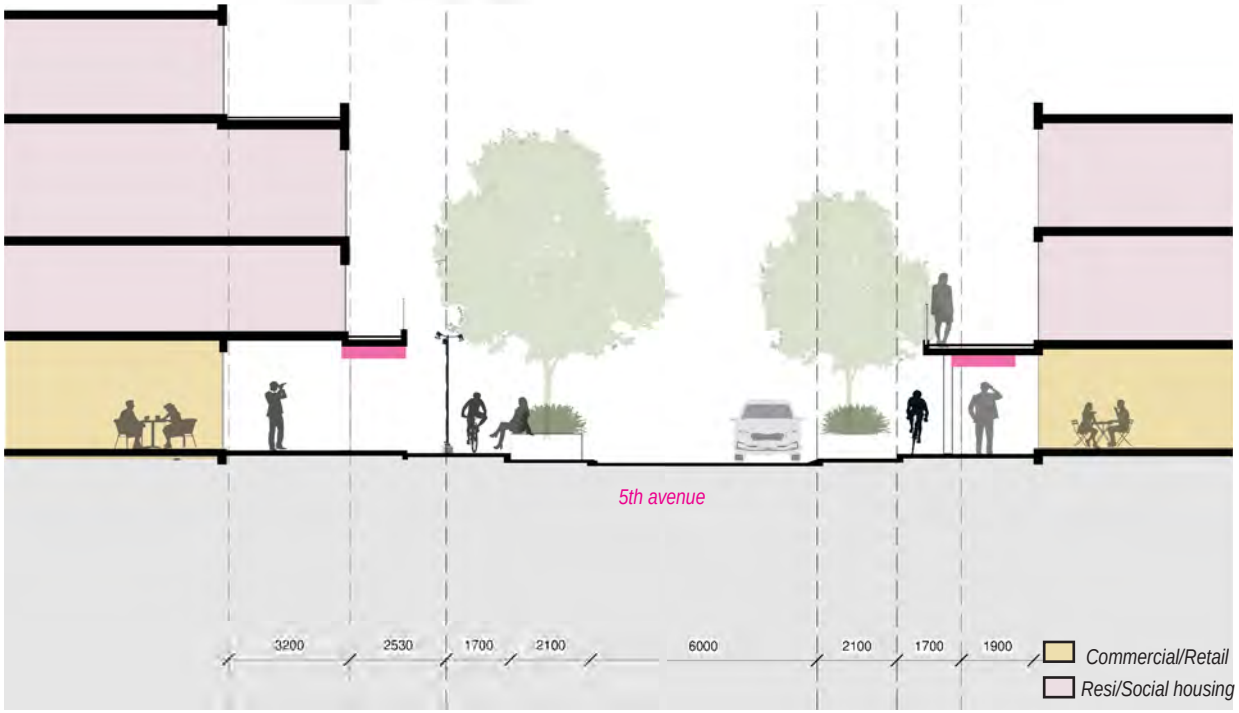


Figure 5.5:Section through 5th avenue facing the Westdene recreational center

The on street parking will be segregated by the implementation of planters, acting multipurposely as seating, edge softening and tree containment. Decidious trees with non aggressive roots are suggested

activate & remove fencing
<1.5m sidewalk
defined "°furnishing zone"± allowing placement of trees, bicycle parking, parking meters, street lights, and other streetscape elements.
sidewalks shaded with street trees where awnings and galleries are not present.



Building height: max 4 storeys in 5th avenue

The setback from the kerb edge to the erf boundary is generous allowing for a sidewalk, wide enough to accommodate both pedestrians and cyclists as well as a furnishing zone.

a sufficient amount of openings facing the street, such as windows and doors, create interest and enhance security.
sidewalks are shaded with awnings and galleries
shopfronts maximize transparency with clear windows.
main building entries face the sidewalk to increase activity on the street
2/3m
encourage outdoor dining so long as an adequate walkway width is maintained.

TYPICAL SECTION THROUGH THORNTON HIGH STREET, SITUATED WITHIN DENSIFICATION CORE

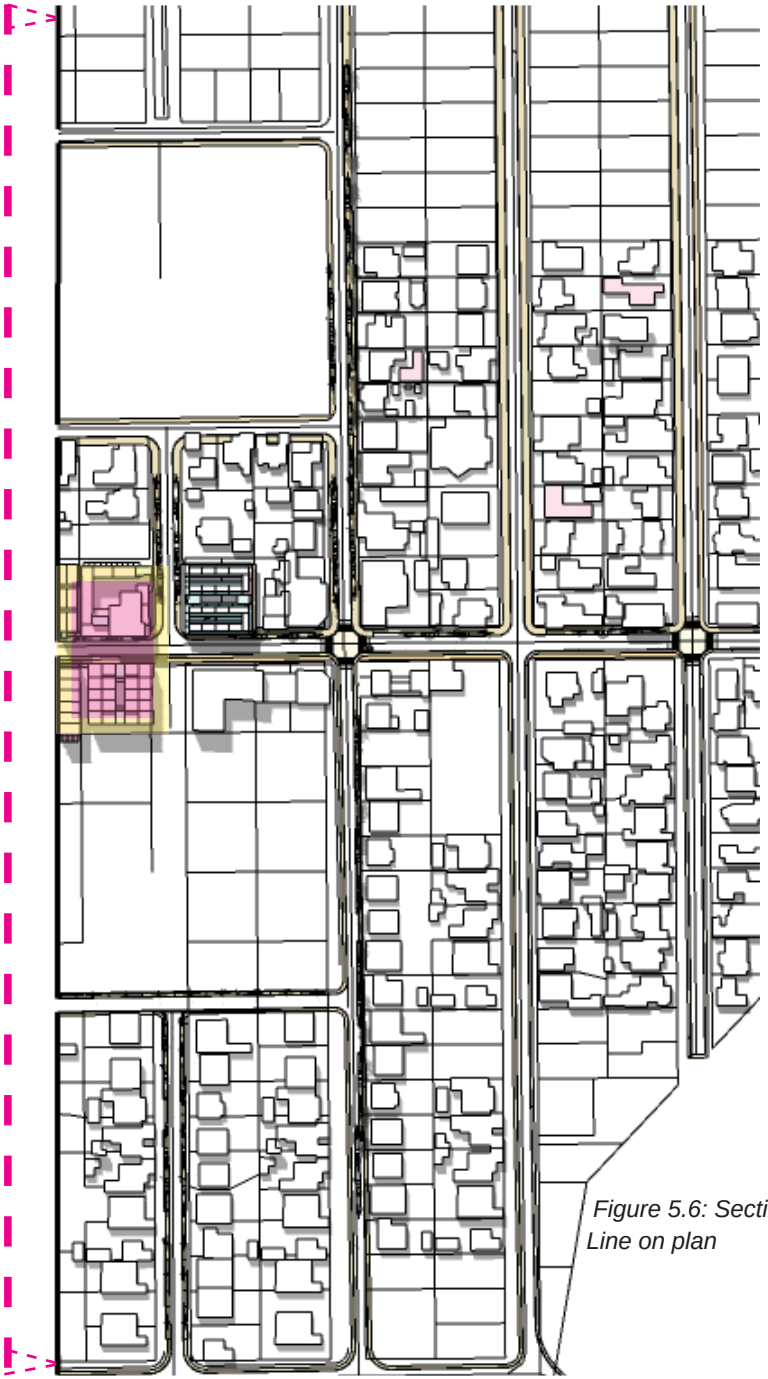


Figure 5.6: Section Line on plan

a sufficient amount of openings facing the street, such as windows and doors, create interest and enhance security.
sidewalks are shaded with awnings and galleries
shopfronts maximize transparency with clear windows.
main building entries face the sidewalk to increase activity on the street
2/3m
encourage outdoor dining so long as an adequate walkway width is maintained.

The setback from the kerb edge to the erf boundary is generous allowing for a sidewalk, wide enough to accommodate both pedestrians and cyclists as well as a furnishing zone.

The on street parking will be segregated by the implementation of planters, acting multipurposely as seating, edge softening and tree containment. Decidious trees with non aggressive roots are suggested

activate & remove fencing
<1.5m sidewalk
defined ""furnishing zone"± allowing placement of trees, bicycle parking, parking meters, street lights, and other streetscape elements.
sidewalks shaded with street trees where awnings and galleries are not present.

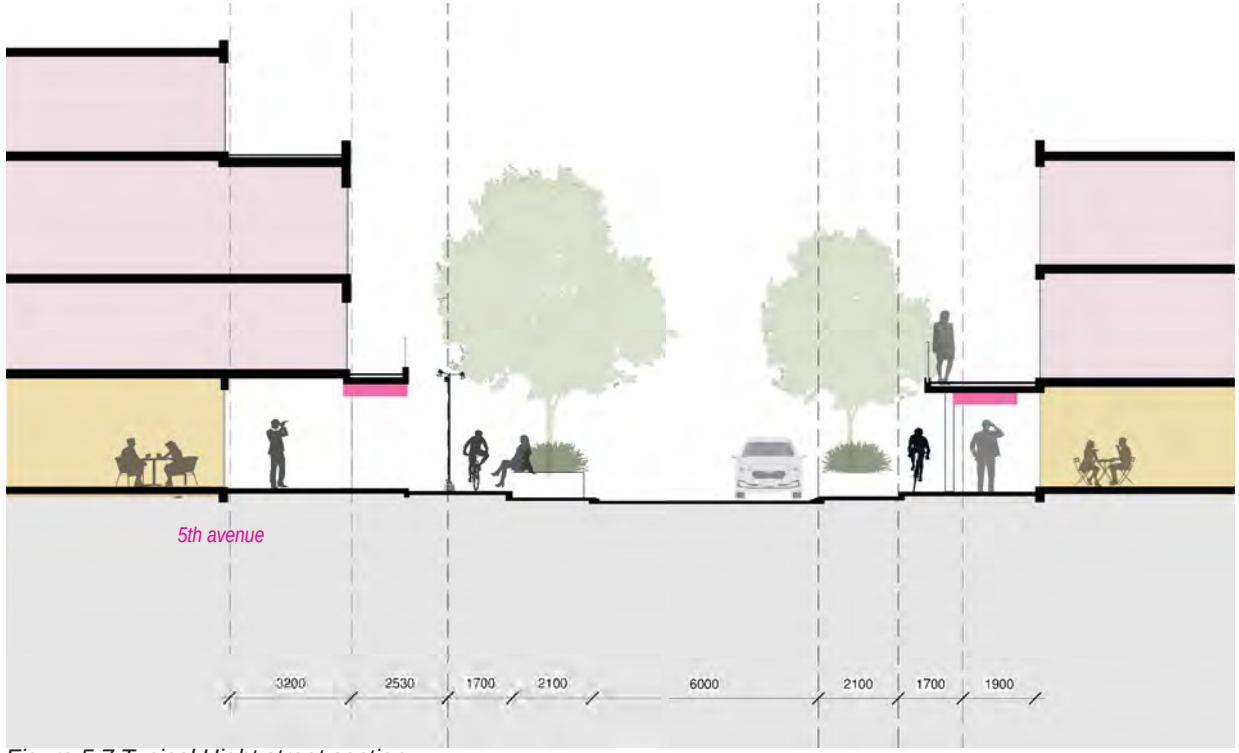


Figure 5.7:Typical Hight street section (Thronton road)

TYPICAL SECTION THROUGH RESIDENTIAL STREET WITHIN DENSIFICATION CORE



Pedestrian crossings in the form of raised intersections, have been proposed at specific intersections along the high street namely: 4th/ Thornton, 2nd/Thornton, Toby/Thornton (with Seymour street/Thornton having an intersection already). This was done as a traffic calming measure as well as creating a safe, inclusive pedestrian friendly environment.

Figure 5.8: Corner of Thornton and 4th Avenue at raised pedestrian intersection



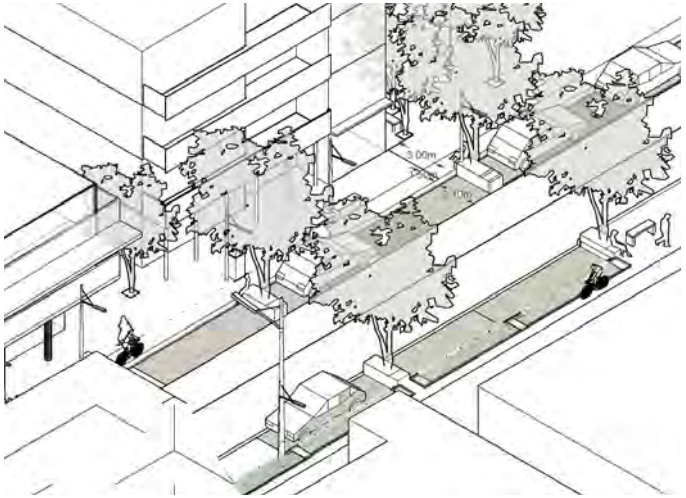


Figure 5.9: Overview of sidewalk detailing in Fourth Avenue indicating on street parking, planters and active ground floor treatment

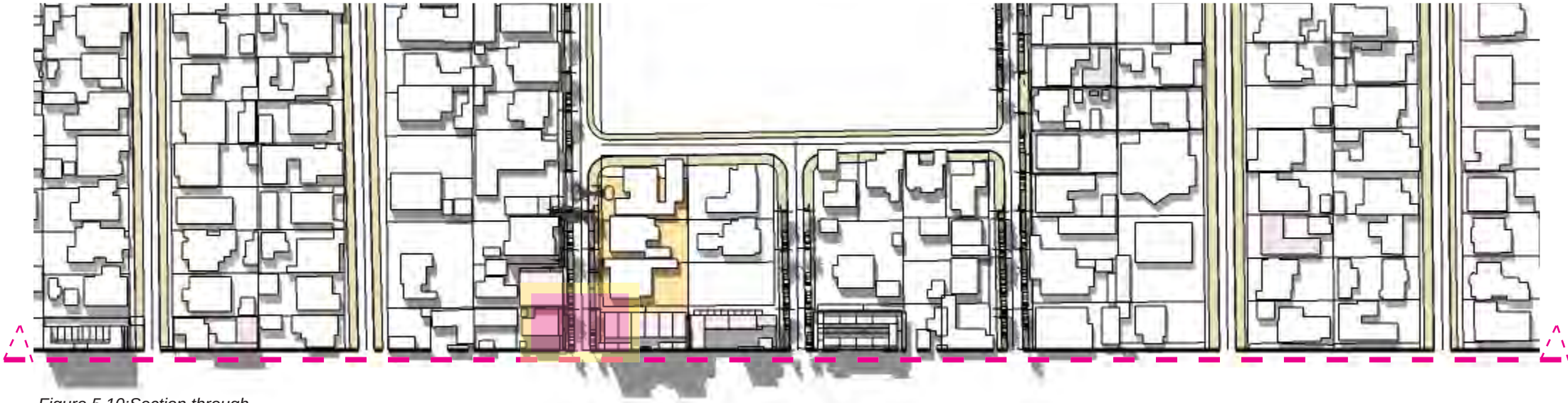


Figure 5.10:Section through 4th avenue facing the Westdene recreational center

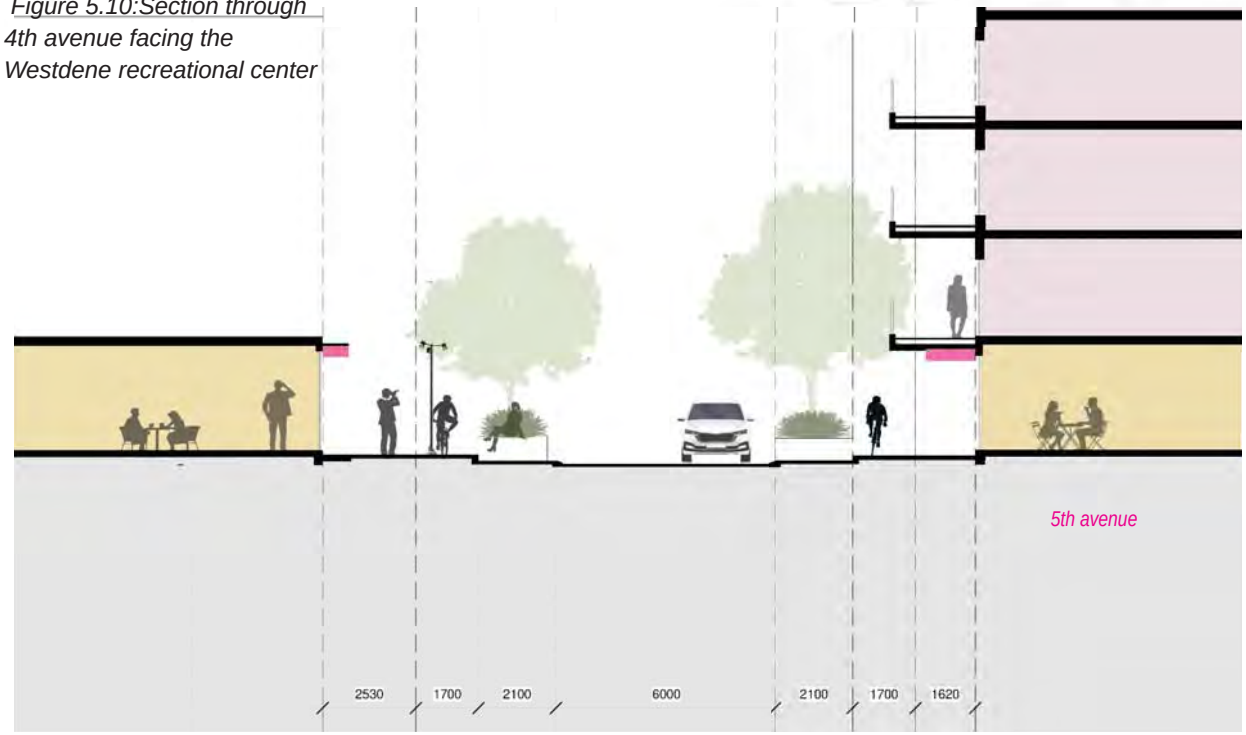


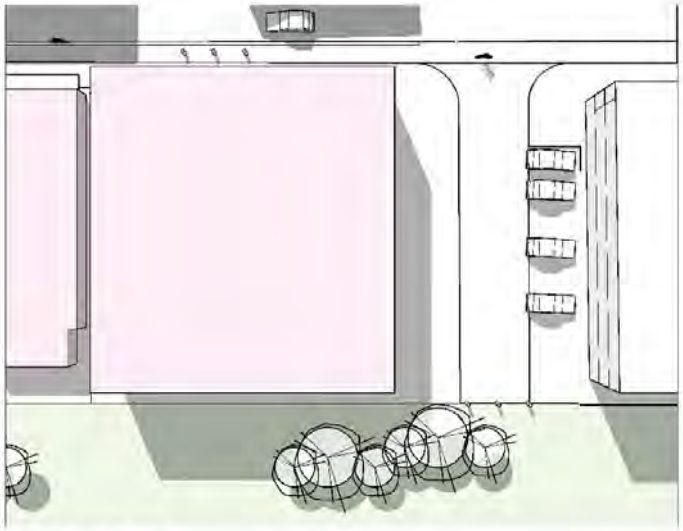




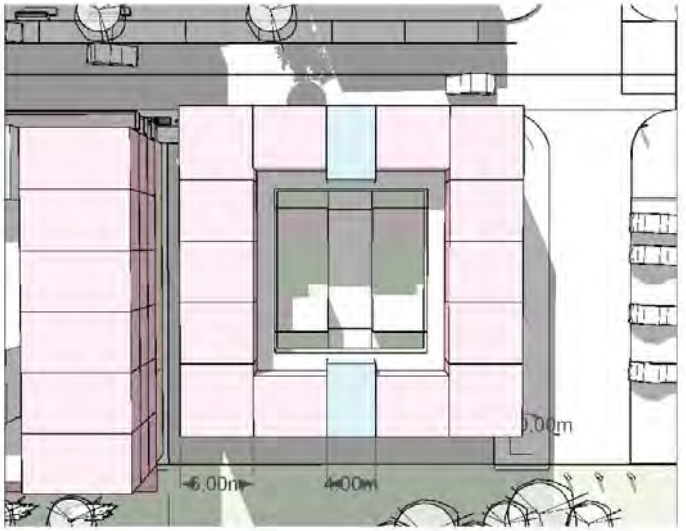


Figure 5.11: Corner view of proposed densification. Situated on corner of Thornton and Dover street

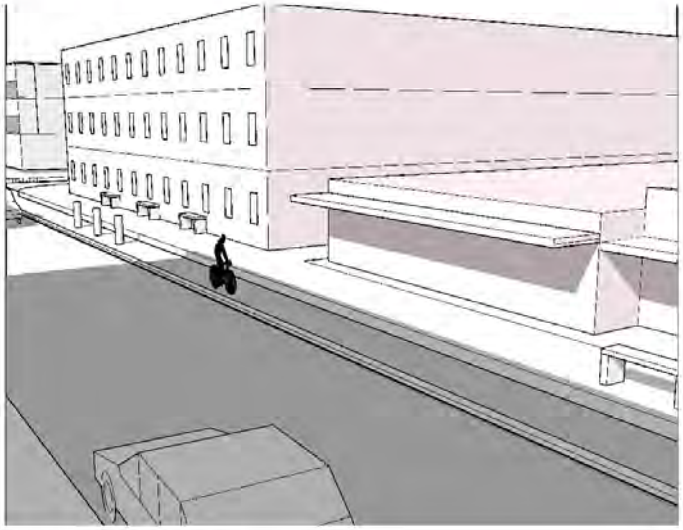
EXISTING RESIDENTIAL PERIMETER BLOCK



Existing:Plan



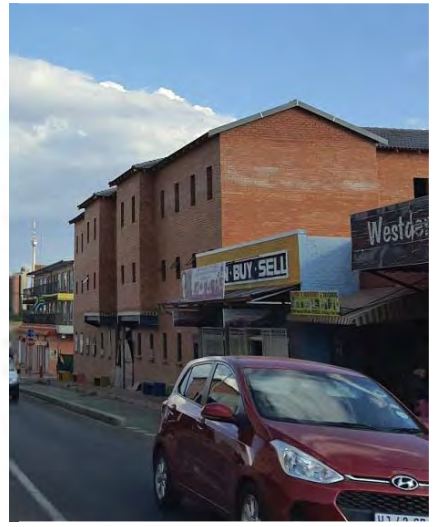
Proposed:Plan



Existing:Isometric

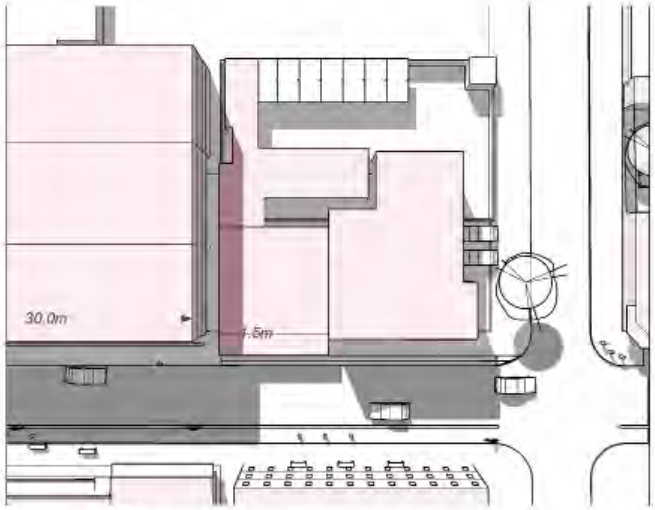


Proposed:Isometric

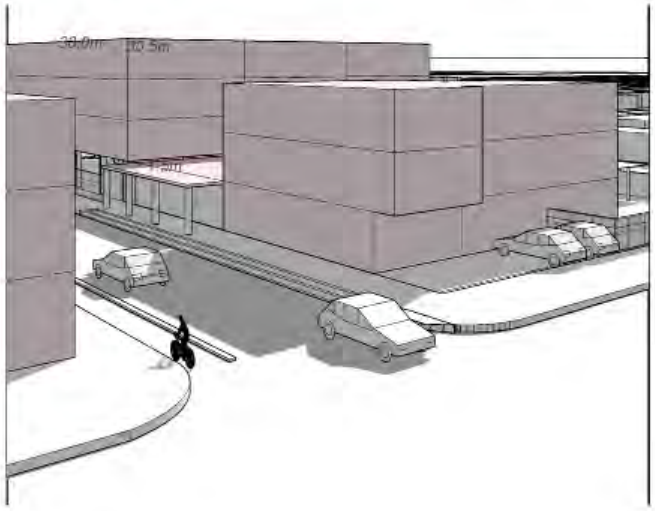


EXISTING

PROPOSED

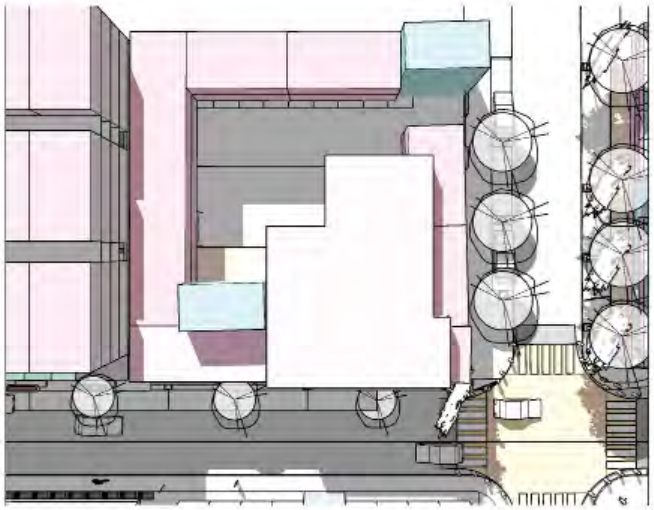


Existing:Plan



Existing:Isometric

EXISTING



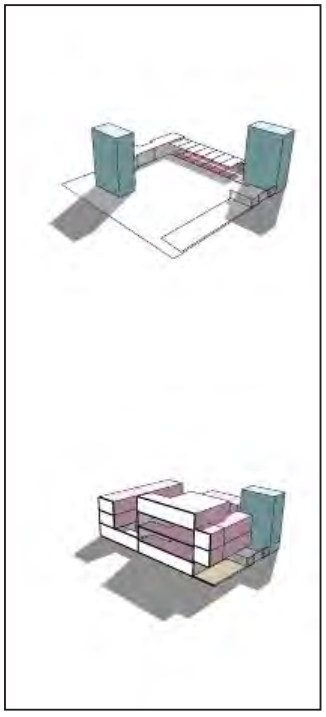
Proposed:Plan



Proposed:Isometric

PROPOSED





CONCLUSION

There were different approaches for the two street typologies. The high street typology which included: Thornton, 4th, Dover and 5th avenue acts as the main activity core WITH focus on higher densification, pedestrian-orientated ground floor activities. In the residential secondary streets, the densification approach allows for subtle changes in the built fabric through addition as a densification tool, and a maximum of two storeys height. The building setback from the street remains the same so that the street typology and character can remain intact. The facades of the buildings must be preserved if heritage characteristics are identifiable by a heritage specialist. This might include aspects of the architectural style such as; building materiality, window styles, gable styles, porch styles etc. It was important to not be too prescriptive with the densification proposals, and instead allow it to be used as a guiding tool for when natural densification occurs on a plot scale level.

6. CONCLUSION

CONCLUSION

It has been accepted that densification is integral to the sustainability and success of Westdene and based on the current development trends, densification is happening incrementally: plot by plot. Through a process of spatial exploration and cross-referencing criteria, this research attempted to find the balance between precinct and plot scale development proposals and the influence these two entities have on one another. The challenge lay in balancing a densification proposal with existing suburban characteristics. The resultant design outcome was achieved by inserting strategic densifcation zones in the form of high streets.
The hypothesis is that these activity streets will act as a catalyst for commercial and economic activity, while catering to the immediate needs of the precinct and the future needs of the students. In keeping with the heritage significance and suburban quality of Westdene, the residential streets surrounding the proposed densification core are envisioned to remain low in density
It was discovered that the high streets cannot retain the existing genus loci of Westdene and be densified. Therefore a decision was made to forego the ‘sleepy suburb’ for an activity street with a higher density. However, this was counteracted by allowing the adjacent residential streets to remain intact, resulting in a fine balance between the two categories of typologies.
and energy.
One of the problems initially identified in this study was how dilapidated the streets became soon after the implementation of the road upgrades, the westdene dam upgrade and the implementation of the cycle lanes.
Although this can be attributed to various causes, one hypothesis postulates that a lack of usage leads to this neglect. The hope is that density and outside attraction will increase by introducing activity to the precinct’s core and adding new roads to the surrounding area. Further, it is theorized that this will solve the second identified problem: Westdene acts as a gateway rather than a destination itself. Inserting a new road will increase the accessibility of the precinct and subsequently create increased interest.

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