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URBAN REGENERATION

GREEN SQUARE, SYDNEY

AN ASSESSMENT OF THE CONTRIBUTION OF THE PRINCIPLES OF NEW URBANISM AND COMPACT CITY TO A SUSTAINABLE URBAN TRANSITION

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Abstract

This research investigates the successful and challenging elements of the Green Square Urban Renewal project in Sydney, Australia, by analysing it through principles and indicators extracted from the New Urbanism and Compact City theories. The City of Sydney is facing challenges of urbanisation and new strategies are needed in order to accommodate population growth, ease housing stress and favour dense urban living in opposition to sprawl. Principles such as densification, transit-oriented development and mixed-use are considered of essence when striving for sustainable urban transition, but a lack of provision of infrastructure in order to support density is observed in the Green Square Town Centre. Strategic planning moreover shows that one of the further priorities should be public spaces. Because when planning for sustainability, it is important to plan for liveability as well. The research shows that in order for sustainable transition to be achieved in the Green Square regeneration, enforceable objectives must be set, misalignments between planning bodies must be limited, higher developer levies must be imposed, better control of land must be established and the wider public must be educated on the benefits of a dense urban fabric.

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1. Introduction

A. General Background

According to the United Nations (UN), in 1950, 30 per cent of the world's population resided in urban areas. In 2018 this number had reached a 55 per cent, and it is predicted that by 2050 it will reach a 68 per cent, with 6,7 billion people living in cities, so for the first time in history, majority of the population now resides in cities (Figure 1) (UN DESA, 2018). Many cities in developing countries in Africa and Asia are experiencing massive population and economic growth similar to what European cities experienced in the 20th century (OECD, 2010).

Cities may now only take up about 0.5 per cent of Earth's surface but urban populations have a massive impact on the functioning of our planet (Burdett, Rode, 2018). With more and more people moving into the cities, infrastructure needs to be enhanced in order to accommodate them and jobs need to be created to ensure a certain quality of life. Additionally, one of the challenges cities are facing with this increase in urban population is urban sprawl. Solutions need to be found in order for cities to grow without damaging the ecosystems and providing citizens with liveable spaces. Furthermore, with the increase of climate issues, cities need to adapt to climate change and take mitigation measures. Such a solution may be found in sustainable urban development.
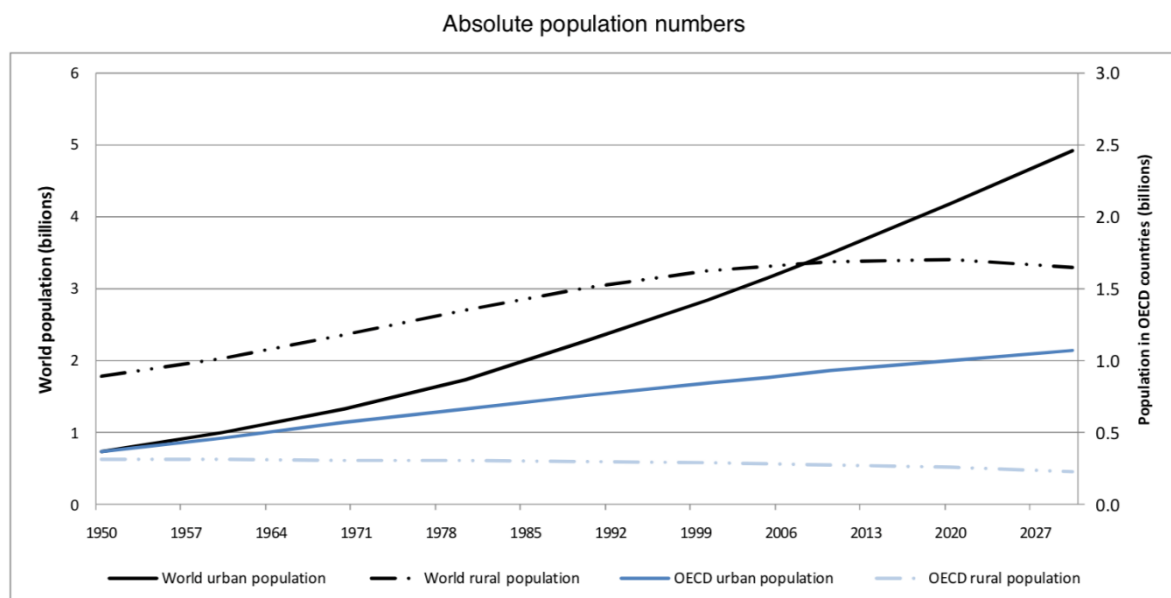
Figure 1: Urban and rural population in OECD and other countries (OECD, 2010)

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Challenges of urban sprawl

Urban sprawl is used to describe the phenomena in land development where places are single-use and disconnected, usually built on the edge of more dense urban areas and where there is a limited connection between where people live, work and spend free time. The term sprawl can be well understood when compared to its opposite, walkability. In such areas, people's only option for transportation is usually driving because distances are too large to walk or bike. Urban sprawl can be associated with health problems, as it limits walking and increases exposure to pollutants emitted from the use of cars. There is also a relationship between urban sprawl and obesity levels where there are more obese people in sprawling areas (Williams, 2016). Sprawl can be described as one extreme of the spectrum when it comes to urban forms, with smart growth and the Compact City being on the other side. Sprawl can be measured in different ways, such as measuring population density, distances between different land uses such as residential areas, shopping, working spaces and leisure and how well they are connected transit-wise. Furthermore, the presence of bike lanes and pedestrian paths can be considered (Boslaugh, 2008).

Soule (2006) states 5 of the most common arguments planners make on the consequences of sprawl. The first argument is fiscal - sprawl is expensive because road networks need to be created for citizens living in the outskirts to be able to reach their jobs and services. The second argument is aesthetic, where suburban architecture has usually limited character. Then there is public health, for the previously mentioned reasons, and traffic, because due to sprawl, each household owns two cars, while households in dense, mixed-use urban areas usually have one car per household. The fifth consequence is elitism, where people think they own their surrounding area and want foreigners, meaning people who don't live there, to stay out (Soule, 2006).

Artmann et al. (2019) outline the difference between expansion and sprawl. They describe urban expansion as "an overall physical process resulting from the reproduction of the urban material structure as a fundamental urban function" while sprawl as "particular expansion pattern largely described in the scientific literature as scattered development" (Artmann, et al., 2019).

Figure 2: Planning framework for eco-cities (Newton, 2013)

As apparent from Figure 2, there is a procedural shift in the current logic for urban policy towards 'Green Urbanism'. It emerged as a progression in urbanism studies as it portrays transformation towards more resilient and sustainable city forms (Newton, 2013). It supports a move towards more compact cities with the aim of limiting urban sprawl and adapting to climate change challenges. It also promotes urban regeneration as a smart, sustainable future logic for urban policy.

B. Problem Analysis

Brownfield regeneration: A response to urban sprawl

A solution to limit urban sprawl when facing this increase of housing demand with people moving to urban areas is sustainable brownfield regeneration. The popularity of redeveloping inner-city brownfield areas is becoming more and more popular in today's cities, where attention is given to densification and more sustainable development strategies. The trend is apparent in most cities with industrial past or old and poor building stock. Policymakers together with academia have been promoting the need for more compact urban forms and limiting sprawl for some time now (Artmann, et al., 2019). With sprawl already present in the cities and most houses being owned by citizens, it is difficult to regenerate areas by putting down individual houses in order to build buildings with multiple apartments that can accommodate more people. Therefore, brownfields, which can usually be found in inner cities, are the perfect occasion to use sustainable planning to create more compact cities.

According to Williams & Dair (2007), one of the definitions of a brownfield can be "a land that has been previously developed". Brownfields may also be defined as derelict or unused sites affected by former use in developed urban areas which may have contamination issues and require intervention in order to bring them back to life (Dixon, et al., 2007).

Examples of brownfields include:

- Former service stations
- Former factories
- Harbour areas and shipping docks
- Parking lots
- Lots where heavy machinery was stored or repaired
- Abandoned railroads and former railroad switching yards and strips
- Landfills
- Former warehouses
- Heavy industry areas
- Abandoned military bases
- Old abandoned houses and apartments

Regeneration, renewal, redevelopment, rebuilding, renovation, restoration and retrofit are terms all related to the topic of brownfields. They might seem similar but some of them portray a slightly different concept. While retrofitting is on a scope of individual buildings, redevelopment refers to a small cluster of buildings and regeneration means transformations on a precinct level (Newton, 2013). Urban renewal (synonym to regeneration) can be characterized as "the cumulative physical redevelopment of existing urban areas" (Roberts, 2005) or "the process of transforming under-utilised and sometimes degraded or neglected parts of the city into spaces and built environments that meet contemporary living, working or cultural needs" (SGS, 2014). Therefore regeneration (possibly renewal) seems like the most fitting term for our research.

The rise of sustainable agenda has a direct origin in interdisciplinary and transdisciplinary concepts. It explicitly connects issues of social, economic and environmental nature and tries to view the problems in a holistic way. Within the field of sustainability, experts are pushed to share knowledge and research with each other and form working groups with people from multiple backgrounds (Dixon et al. 2007).

According to Davison and Legacy (2014), there are six cornerstones of sustainable development:

- Environment-Economy integration
- Futurity
- Environmental Protection
- Equity
- Quality of life
- Participation

Cities ought to search for innovative solutions and processes in order to become truly sustainable, as current frameworks show a sign of failure (Newton, 2013). Especially during redevelopment processes, cities should aim for such solutions in order to favour infill development over greenfield.

Brownfield regeneration may seem inherently sustainable as it redevelops unused or problematic areas in inner cities and therefore creates better uses for space, however, many redevelopments are not sustainable in their construction techniques, during planning stages and in connection with the provision of transportation to the rest of the city. Some fail to reflect the main pillars of sustainability - social, environmental and economic aspects. It is argued that a blend of different types of development, quality and human-centric design and planning, can result into better balance in demand and provide favourable circumstances to sustainable communities (Williams, Dair, 2007).

Brownfields are usually located on the peripheries of urban centres and have a strong cultural meaning as they were usually the site of a major local industry (Williams, Dair, 2007). Regenerated inner city areas may create several benefits for the whole city and its citizens, and they are seen as one of the sustainable options to deal with problems that have troubled cities for decades (BenDor, Metcalf, Paich, 2011). Such problems include contamination, financial loss from otherwise lucrative land, traffic issues, social issues, dealing with squatters, low-income population in the city centres, not enough trade, etc. One of the major pushes for regenerating brownfields as previously mentioned is to limit urban sprawl. "Sprawling cities are one of the major threats to the future sustainability of our planet", "but it means going up against property developers who tend to prefer greenfield developments on the peripheries to the complexities of brownfield regeneration" (Swilling, 2016).

Brownfield regeneration should not be linked solemnly to upgrading dilapidated areas and dealing with contamination, it is also about the collaboration of various stakeholders and creating liveable cities from problem spaces. It may also support the idea of more compact urban settlements and may reduce the need for provision of extensive infrastructure. Brownfield regeneration as viewed by Raco and Henderson (2006) can solve environmental, technical, social and economic problems by introducing higher density development to otherwise underused crucial inner-city parts. Thus, it plays an important role in creating sustainable communities. Below, Figure 3 shows a representation of economic, social and environmental benefits of brownfield renewal.

Economic	Social	Environmental
Creation and retention of employment opportunities	Improved quality of life in neighbourhoods	Reduced urban sprawl pressures on greenfield sites
Increased competitiveness for cities	Removal of threats to human health and safety	Restoration of environmental quality
Increased export potential for clean-up technologies	Access to affordable housing	Improved air quality and reduced greenhouse gas emissions
Increased tax base		

Figure 3: The benefits of brownfield regeneration (Dixon, et al., 2007)

Sydney: A sprawling city

Sydney metropolitan area is among the top 10 fastest growing in the Western World (GSC, 2018a) with an increase of the total population of "9.8% in the 5 years since 2011, and 17.1% in the 10 years since 2006" (GSC, 2018a). Furthermore, the population growth is predicted for 90 000 new inhabitants each year until 2036 (Wulf, 2017). Therefore, there is a serious need for more housing which puts a pressure on land development, housing prices, the environment and infrastructure. Green Square area can be characterized as a classical example of an inner-city brownfield which has been in continuous reuse over the century (Rashid, Ara, 2015). The area could significantly contribute towards reaching sustainability, housing, and transport targets for the wider Sydney metropolitan area.

C. Problem Formulation

From the general background and problem analysis, several research questions arose:

How can the Compact City and New Urbanism principles contribute to creating sustainable urban transition?

- *To what extent is the Green Square Town Centre regeneration compliant to the principles of New Urbanism and Compact City?*
- *What are the challenges, barriers and success factors for sustainable inner-city regeneration towards a Compact City form in Green Square Town Centre?*
- *What are the main drivers to sustainable transition?*

D. Delimitations

As the Green Square Urban Renewal Area encompasses a large area and includes several new neighbourhoods in various stages of construction, the analysis was mainly conducted on the Green Square Town Centre area.

During the research of the case, we didn't look for financial data on whether the regeneration of the brownfields will lead to economic growth.

EPA (Environmental Protection Agency in the USA) identified three basic phases of brownfield redevelopment as 1) site assessment, 2) site investigation and 3) development of redevelopment plan, implementation and actual redevelopment (BenDor, Metcalf, Paich, 2011). From the three basic phases, our focus was solely on the third phase: development of redevelopment plan, implementation and actual redevelopment.

Plans were analysed in order to assess the regeneration of the Green Square development, but only strategic plans and plans directly related to the principles found in the theoretical framework and our narrowed study area were taken into account.

Furthermore, the gentrification effects a regeneration project of this extent may have, have not been studied in this research. Moreover, the environmental aspect of the redevelopment wasn't looked at from a technical perspective, therefore there was no focus on mitigation and adaptation techniques applied in the Green Square.

2. Contextualisation

The aim of this chapter is to offer a background in order to understand better the case that will be studied.

A. Australian Context

Australia is the 6th largest country in the world but one of the most sparsely populated with an average density of only 3,1 people per km^2 (ABS, 2017) (Figure 4), and has at the same time one of the highest levels of urbanization in the world. Australia was first inhabited by aboriginal tribes descending from Africa whose culture is considered to be the oldest surviving culture in the world (Australian Geographic, 2011). The modern history of the country as we know it today began to be shaped when the first Europeans landed on the continent in 1606, but it was not until 1788 when James Cook established the first penal colony in Sydney Cove and claimed the land for Great Britain, that the colonization started. In 1901, the Commonwealth of Australia was created, and the federation of states was established. Since 1945, Australia has seen a large influx of immigration resulting in a booming development, rise in suburban living and the creation of car-dominated cities in the 1950s onwards (Insider Guides, n.d.). Since the 1970s there is a steady migration from Asian countries and Australia formed a strong economic connection with China in the following years.
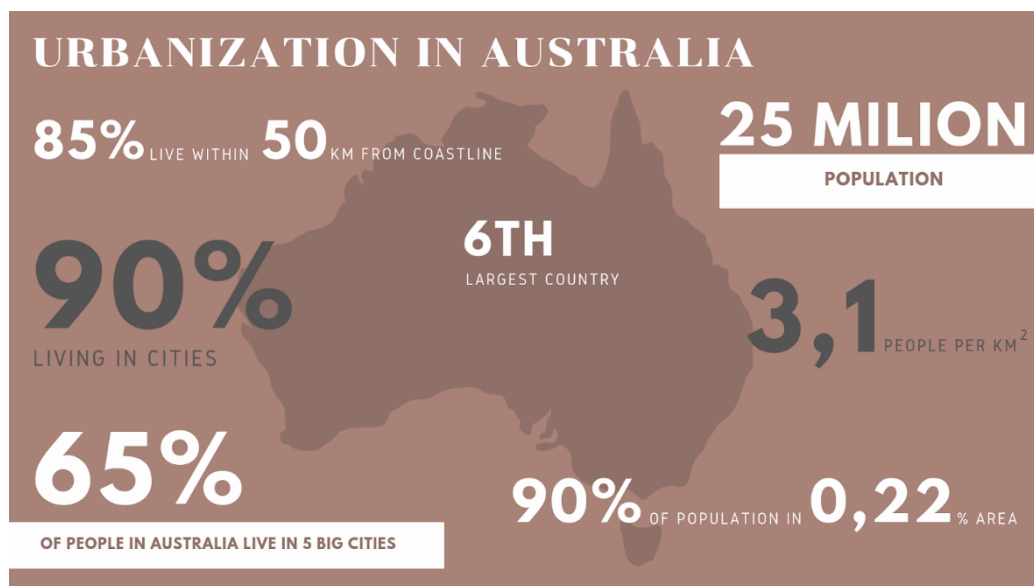
Figure 4: Urbanization in Australia (Own production - based on Newton, 2008; ABS, 2017; ABS, 2018; Wyeth, 2017)

Australia is experiencing centralized growth which appears mainly in its five largest cities (Sydney, Melbourne, Brisbane, Perth and Adelaide) and is struggling to bring more people to the rest of the continent. The fastest growing city is Melbourne with 2,5% increase between 2017 and 2018 (ABS, 2018) and is set to soon outnumber Sydney as the most populous city. Despite being one of the counties with the largest urban population, most Australian cities are low-dense in comparison with others in Europe and North America (Wyeth, 2017). There seems to be a consensus about the need for more compact development and redevelopment in Australian cities (Newton, 2013). This is supported in the Australian statutory framework as between 50% and 70% of net new housing should be from infill "in established inner and middle suburban areas" (Newton, 2013). With the increased growth, there comes a pressure for the urban environment to better reflect the needs of people and fight congestion, high prices of housing, inadequate infrastructure, services and social challenges. If the growth is not well managed, cities may become less productive and sustainable. Australian cities also have a very high ecological footprint - about three times the world average (Thomson, Newman, 2018).

B. Sydney Context

Sydney is located in the largest natural harbour in the world on the river mouth of the Parramatta River, between the Tasman sea and various natural parks where the Blue Mountains in the west form a natural barrier. The harbour has created a significant opportunity for Sydney to become a global city with a pristine natural environment. Sydney has a population of over 5,2 million in the metropolitan area (ABS, 2018) and provides a home to one-fifth of all Australians (Bunker, et al., 2017).

The Sydney region has been inhabited by aboriginal groups for at least 50 000 years. The first settlement was set up in 1788. At first, there was only a convict colony established, but later with the influx of free migrants, the colony was growing. The city was established in 1842 and when the gold rush came ten years later, Sydney was expanding quickly but mostly in an unorganized way. This is apparent even today as the streets do not form a grid pattern as it was usual with other colonial cities in the USA or elsewhere. Towards the end of the 19th century, Sydney became one of the largest cities in western society. The further rising economy made the rapidly growing city one of the global centres (The City of Sydney, 2019a).

Much of Sydney's urban fabric was created between 1920 and 1950. In the period between 1960 and 1980, the city had seen an explosion of apartment buildings as a result of the introduction of strata titles (allowing individual ownership of a part of the property) and

widespread rezoning. Additionally, more dwellings were allowed on one plot as a result of policies aiming to increase urban densities (Crommelin, et al., 2017). The rail and an extensive tram network were created and the latter one was eventually removed by 1961 to make room for buses and private cars (Graham, 2018). Melbourne as the second largest city in Australia took a different approach and now has the largest tram network in the world.

Sydney's metropolitan area is one of the largest in the world with an average density of 1237 people per square km when accounting for the built urban area (GSC, 2018a). In
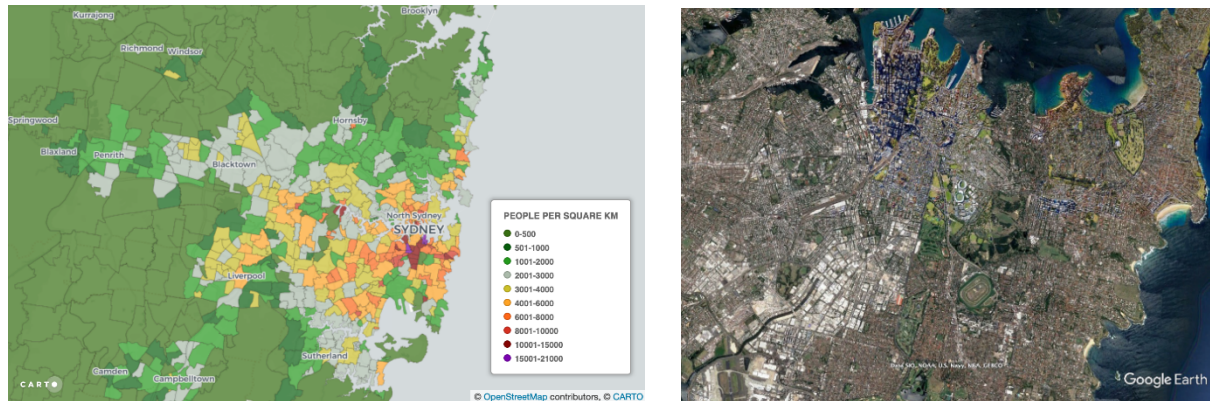
Figure 5 we can see that the city is dense mainly in the Central Business District (CBD) and inner suburbs. Sydney has a multi-centred sprawling growth, which forms a pressure on existing suburbs and transportation systems.
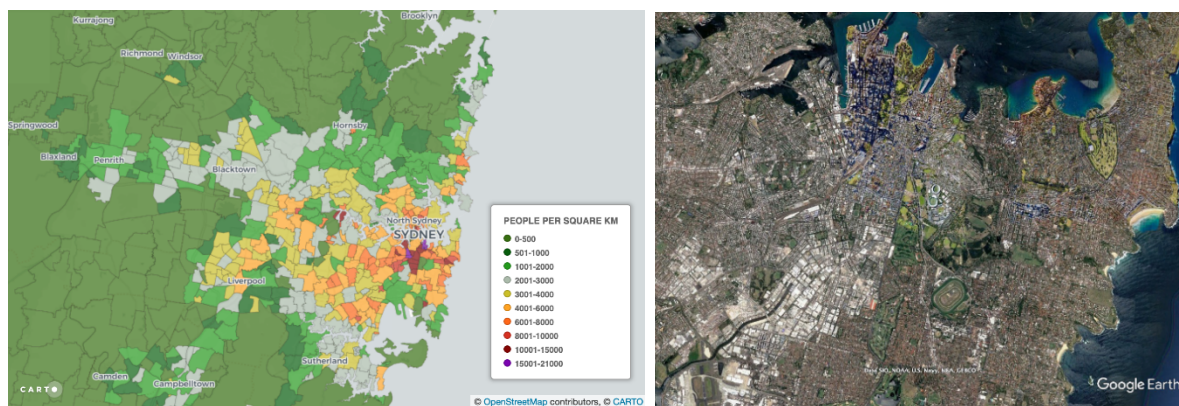
Figure 5: Population densities in Sydney (Gladstone, 2018) & built forms in the inner Sydney area (Google Earth, 2019)

C. History of Green Square

The Green Square Urban Renewal Area (GSURA) is located within the local government area of The City of Sydney and is not yet established as a standalone neighbourhood but lies within the neighbourhoods of Alexandria, Zetland, Beaconsfield, Rosebery and Waterloo. It is positioned 3,5km south from the CBD and 4km north-east from the airport (Figure 6) in an industrial area (visible on Figure 5b as a cluster of white buildings south of the CBD). The area

was once a sand dune wetland with swamps and dense vegetation and was inhabited by the Gadigal people of Eora nation. In the 1800s the vast supply of water resources attracted many industries to the area especially the milling industry. In the following decades, the area was transformed into a thriving industrial land with soap and candle factories, brickworks, breweries and wool washing firms. The area was dominated by the Drying Green - a large wool drying area. As more factories came to the area, residential housing for employees started to be built as well. The liquid waste from factories was being discharged into the local creek and the pollution levels were still high until recently. The neighbourhood of Rosebery was established promoting a model of residential and industrial living where "the factories were separated from housing by parklands and no two adjacent houses were of the same design" (The City of Sydney, n.d). During the great depression, the areas were unpleasant to live in. There was a large variety of manufacturing from chocolate factories to heavy steelworks and car manufacturing. The area was known as the "Birmingham of Australia" and developed into the largest industrial municipality in Australia with 22 000 workers in over 550 companies, and later moved to focus on the paper industry. However, in the 1950s manufacturing started to decline and most factories moved out to the outer areas, leaving the neighbourhoods mostly vacant. In the following decade, the area was used as a landfill and a huge incinerator was built which caused high levels of pollution. The incinerator was demolished to make a space for the new Town Centre development. Today, the area around the Town Centre still hosts manufacturing, but it mostly attracts showrooms, offices, high-tech industry and storages (The City of Sydney, n.d).

Green Square (GS) is located in a strategic location between the airport and the Sydney business district (CBD). It is the largest redevelopment area in Australia and is supposed to house over 60 000 residents until 2030 and become the most densely populated area in Australia. The wider redevelopment in the area has begun in the 1990s when the neighbourhoods of Victoria Park, Mary O'Brien and Crown Square started transforming from industrial to residential and mixed-use areas. The City identified this area as a major growth centre in the Sustainable City 2030 strategy and it is furthermore identified as a strategic centre, located on an urban renewal corridor (NSW Government, 2014).
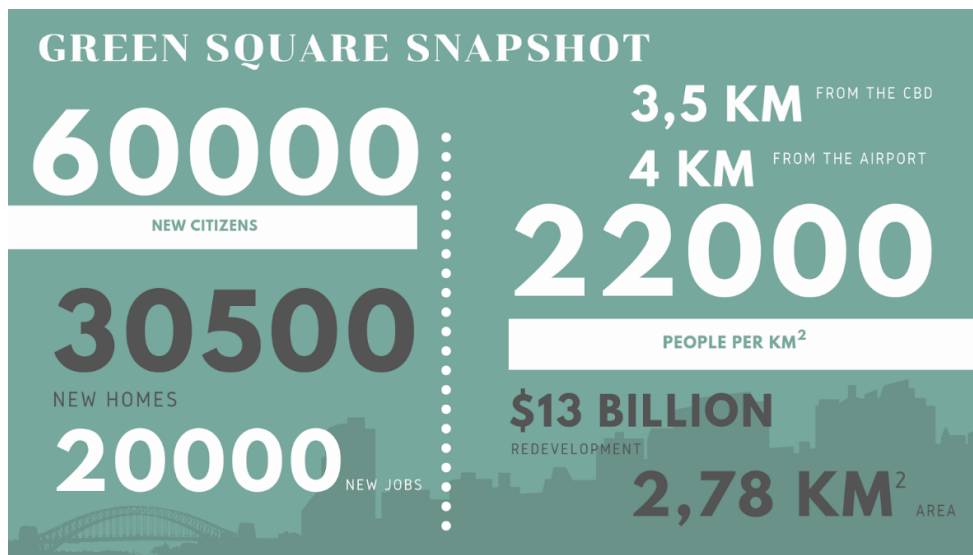
Figure 6: Green Square Snapshot (Own production based on Architectureau.com, 2018a)
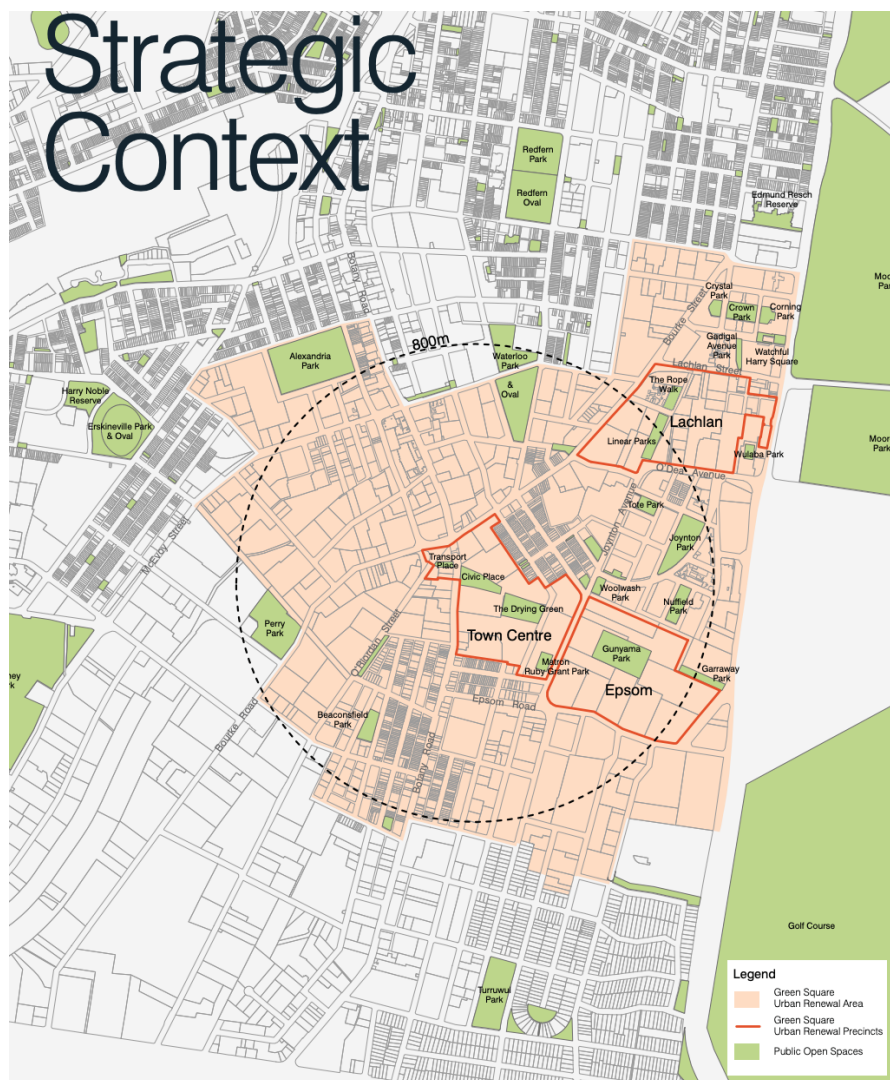
Figure 7: Strategic Context of Green Square Urban Renewal Area with highlighted areas currently under development (City of Sydney, 2014)

GSURA is identified as a brownfield private housing development and is now characterized by a mix of warehouses and high-density development. The works on the urban renewal in the area on large scale commenced in 2007 but until 2012, the project moved very slowly which formed a criticism from the wider public. Since then the area transformed significantly as more areas continue to be redeveloped (Pawson, 2015). Currently, major redevelopments in GSURA are mainly happening in, Lachlan, Epsom Park and Town Centre (Figure 7). Even though the analysis is considering the redevelopment of the area as a whole, we are focusing mainly on assessing the Green Square Town Centre (GSTC) if not stated otherwise.
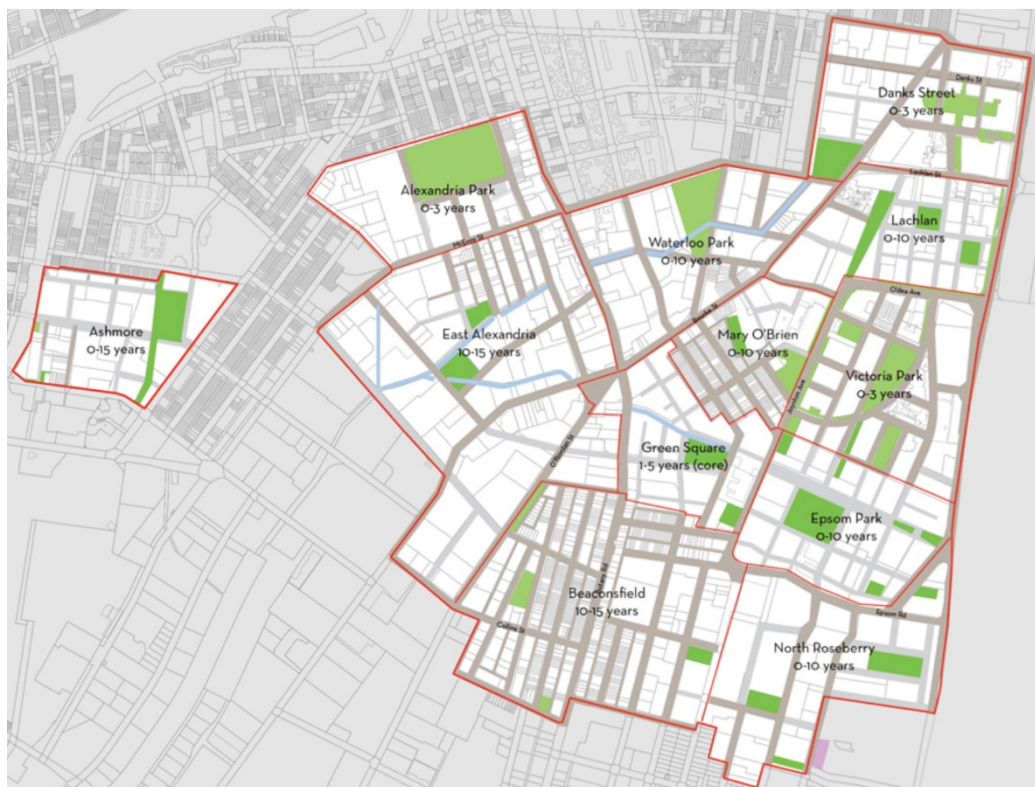
Figure 8: Timeline of development in GS starting from 2014 (Gallagherstudio.com, 2014)

D. Green Square Town Centre

The GSTC is located in the middle of Green Square Urban Renewal Area and is currently under development (Figure 8). It should serve as a mixed-use, retail and public space precinct near the train station and houses recently open library, plaza and community centre. The library features an award-winning design (it won an award for the best library design in the world) and has become very popular. It forms a centrepiece of the new Green Square plaza and serves also as a community space. The area also features a community park and civic centre and will also include a new park (The City of Sydney, 2019b).

Figure 9: Green Square Library (Realcommercial.com.au, 2018)

Figure 10: Community centre in Green Square and public space around it, together with affordable housing units (left)
(Architectureau.com, 2018b)

The governance over the area is split between the City of Sydney and New South Wales Government, where "the City of Sydney is primarily responsible for land use development and the provision of local infrastructures, such as community facilities, local roads, stormwater infrastructure, and parks, and the New South Wales government is responsible for providing major roads, public transport, and social education and health infrastructure" (Infrastructure Australia, 2018).

3. Methodology

The aim of this chapter is to report on the methodology used to carry out this research, along with a justification for the use of each method and a description of how it was carried out.

A. Research design

In order to answer the main research question: *How can the Compact City and New Urbanism principles contribute to creating sustainable urban transition?* a research design was developed in alignment with the problem formulation.

A deductive reasoning was used in order to test the hypothesis that the Green Square Town Centre is compliant to the theories of New Urbanism and Compact City, since one of the purposes of this research was to investigate the successful and challenging elements of the Green Square development project, by analysing it through principles and indicators extracted from these two theories.

Therefore, the theories of New Urbanism and Compact City were explored. These planning theories were selected in order to help define the way cities should develop in order to meet future needs and become more sustainable. We investigated their origin and meaning and identified their main principles. The theoretical concepts helped us understand the planning framework cities should strive towards in order to achieve a sustainable transition from sprawling suburbs to denser, more sustainable urban fabrics. Consequently, the main parameters found in both of the theories were linked and attributed to the indicators. The indicators were chosen so they would be easily assessed, reflect the nature of the parameters, would in the best way represent the indicator, and be objective. Following, we explored plans issued by the government and local Council and identified the main ideas and goals related to our indicators. With the interviews conducted and the results observed in person in the Green Square, we were able to assess to what extent this regeneration project was compliant to the principles of New Urbanism and Compact City.

I)   Deductive research

Deductive research implies "developing a hypothesis based on existing theory, and then designing a research strategy to test the hypothesis" (Wilson, 2010). During this research, the hypothesis was made that Compact City and New Urbanism principles can contribute to a sustainable transition. The strategy used to test this hypothesis was the development of a set of principles with indicators based on the two theories, which were then applied to the specific case of the Green Square Town Centre Urban Renewal area. The advantages of using this approach were that it made possible to explain the relationship between different theories, it facilitated quantitative measurement of concepts, and it made possible to generalize our findings to some extent. Some of the reasons we preferred to use this approach, was due to the fact that we could use abundant sources from our theories, since we only had a short time frame to conduct our research, and finally because we didn't want to take the risk of having the theories emerging, which could, for example, occur with the use of an inductive approach (Deductive Approach, 2019).

II) Case study

McLeod and Curtis (2018) argue that case approach and the use of multiple methods and theories are needed in order to understand a topic in a short span of time. According to Rizzo et al. (2016), "case studies can play an important role in knowledge transfer since they demonstrate and track the success of sustainable remediation implementation". As this research was conducted in four months, the use of a case study was essential in order to grasp how these theories can apply in real life development projects, and what were the barriers they met. This way we were able to understand the complexities of sustainability, planning frameworks and chosen theories when applied to a certain area in a more apprehensive and effective way than dealing with the concepts only from a theoretical perspective.

The reason we selected Green Square Town Centre as our case study was because Sydney is a city that needs to become denser in order to accommodate a new influx of inhabitants arriving every year. There is a lot of evidence about redevelopment strategies for sites in UK, USA and Germany but not that much was written about Australian major cities such as Melbourne or Sydney (Wu, Chen, 2012). The population of Australia increased by one third in the past 20 years (McCrindle, 2017) and Sydney is one of the fastest growing cities with projected growth of 1,7 million people by 2036 (GSC, 2018a). Green Square is one of the strategic locations where regeneration is underway with the aim of increasing density. It is therefore fitting to choose such area on the verge of transformation and assess to what extent it aligns with principles argued to reach a sustainable transition towards more liveable cities.

III) Cross-cutting research methods

Integrative approaches are needed in order to cope with negative environmental, social and economic effects of development (Artmann, et al., 2019). It is argued that separated disciplines and isolated expert knowledge are limiting the broader perspectives of a research. Therefore, there is a call for more holistic and integrated approaches. Boundaries and limits of individual disciplines may mitigate viewing the bigger picture of the problem and thus limit the potential generation of innovative knowledge. Therefore, there has been a shift towards multidisciplinary, transdisciplinary and interdisciplinary approaches (Dixon, et al., 2007). Within this report, we tried to look on the issues presented with a transdisciplinary mindset, in order to not be constrained by the boundaries of disciplines but rather see the bigger picture

and underlying patterns behind the issues. Therefore, we have combined various theories and attempted to connect them in a meaningful and interconnected way.
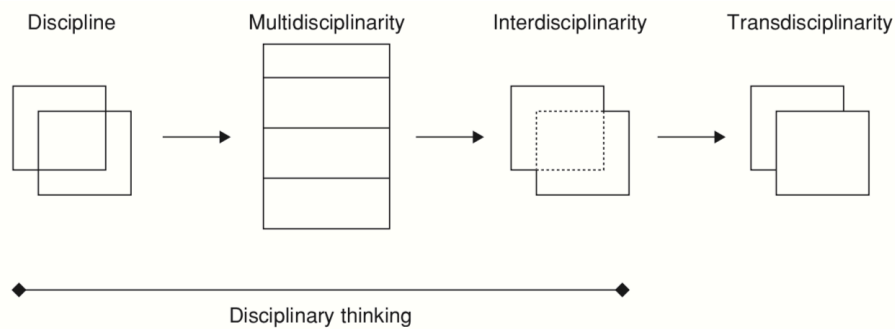
Figure 11: Types of cross-cutting research (Dixon, et al., 2007)

The aim of a multidisciplinary approach (Figure 11) is to place side by side theories from various complementary disciplines. In contrast, the interdisciplinary approach draws a common framework for the individual disciplines. This approach is founded in pluralism and inclusive ways of thinking and aims to blend disciplines together. However, such approach can cause divisions between the fields and disciplines and therefore create boundaries for further research. In consequence, a transdisciplinary concept (TR) was coined, which strives to escape disciplinary thinking and create new paradigms in problem solving. It aims to "avoid fragmentation and organizes knowledge around complex subjects, rather than around disciplines" (Petts et al. 2005).

This concept symbolizes a shift in research processes towards more inclusive and interconnected approaches. The authors of a Handbook of Transdisciplinary Research introduce the foundations of transdisciplinary research, its emergence throughout history and uses in selected case studies. According to them, TR tries to acknowledge the complexity and diversity of the problem and scientific perception of the world, link abstract and case specific knowledge and grow solutions which would foster "common good" (Hirsch Hadorn, 2008).

It is argued that "transdisciplinary research is necessary when knowledge about a societally relevant problem field is uncertain, when the concrete nature of problems is disputed, and when there is a great deal at stake for those concerned by the problems" (Hirsch Hadorn, 2008). Therefore, such methodology seemed to be fitting for the urban regeneration research area as the research is built on foundations of more disciplines but recognizes the complexity and interconnectedness. TR was used in order to gain a deeper understanding of the context, challenges and courses of action.

B. Qualitative methods

I) Document analysis

One of the three forms of qualitative research that were used in this research is document analysis. The purpose of this method is to interpret documents in a way that gives meaning to a specific topic that is assessed (Bowen, 2009). The documents analysed during this research were official public records, mainly consisting of governmental and municipal provisions and plans. Initially, a list of these documents to be analysed was drawn. This list included all documents that were directly or by affiliation related to the Green Square Town Centre regeneration project. When saying by affiliation, reference is made to documents which present plans for the entire city of Sydney but were still an essential part of the planning of the GTSC. One of the reasons we chose this study case was as well because Australia is an English-speaking country and no linguistic barriers would have to be considered for this method or for the interviews. Furthermore, when going through these documents, we had to acknowledge the possibility of the presence of biases between documents created by different organisations and directed to different audiences (whether directed to planners or public for example). Also, some plans which were relevant to Green Square area were not chosen for the analysis because they were not concerned about the topic of our research project. Of course, appropriate skills for research had to be developed in order to find access to these documents and go through them efficiently in an initial phase in order to assess whether they should be further analysed. To make this easier, it was important to know the data that we would be looking for. This was made possible by creating a set of indicators through which the documents were to be analysed in order to code the content of the documents into different themes. It is noted that indicators ought to be defined at the beginning of a remediation or redevelopment project in order for it to be conducted properly. In connection with this, there should be clear boundaries and objectives as well (Rizzo et al., 2016). Moreover, by using a table where the plans were set with the indicators in order to note the presence of elements of these indicators in each plan, the documents were treated as an interview of sorts, where the questions were predetermined, and the answers had to be found in the document. This way the information collected was directly relevant to our central questions. Finally, considering the number of documents to be analysed, we preferred quality over quantity, by picking a few documents that had a lot of relevant information to be used.

II)   Qualitative interviews

The reason qualitative interviews were selected as one of the methods, was to collect information from people that were either involved in the redevelopment project on the Green Square or have a vast knowledge of sustainable urban renewal from other projects. As we were not initially aware of all the challenges and barriers the project was facing, we created open questionnaires in order to allow the interviewee to lead the interview in a way towards the issues they considered important, while at the same time keeping them on topic. Table 1 below shows a list of the interviews conducted for this research:

Interviewee	Role	Organisation	Date
Gabriela Quintana Vigiola	Lecturer of planning	University of Technology, Sydney	10 April 2019
Annette Walter	Project leader	By & Havn, CPH City & Port Development	25 April 2019
Amanda Ziegler Dybbroe	Project Assistant		
Tamara Bruckshaw	Manager of Green Square (Strategic planning)	City of Sydney	16 May 2019

Table 1: List of interviewees (Own production)

The number of interviews was directly influenced by the response rate and willingness to participate in our research. There was a significant number of actors that were contacted however were not included in the analysis because they did not respond to our enquiry.

III)   Collection of visual material - Photographic material

Visual aids in report writing are now considered as one of the most important supporting materials. With time, our culture is becoming more visually oriented and the use of digital techniques during report writing is more common. The use of photography as a research method can be therefore distinguished as a method for visual research.

Even though plenty of visual material was collected from the planning documents and used throughout the analysis, photography taken by the researcher has been used as a research

method. Given the fact that especially strategic planning documents make use of visual material to convey the message more effectively, we have decided to use our own photographic material to support the process of assessing principles of New Urbanism and Compact City in the chosen context.

During the process of taking photographs, the researcher decides what is important to be pictured and later used to support the claims. Therefore, this method can be biased by personal views and other factors. So, the photographs become the researcher's "interpretation of reality" (Leavy, Holm, 2014). By the use of photography, details about the site can be noticed which would not be possible from only assessing planning documents and other sources. The researcher can also form an opinion on how the place will look in the future. Leavy and Holm (2014) argue that there is not a single best method for the researcher to collect photographic material, so the process is rather natural. The photos may also convey different messages depending for example on the weather, angle of the picture, quality of the camera, etc. These factors need to be separated during the analysis in order to form a non-biased opinion.

Rose (2007) points out that the selection of photos needs to be relevant to the research question and elements for assessment need to be developed prior to the analysis. The photographic material was therefore assessed from the point of content analysis where previously defined elements were being searched for (Ortega-Alcázar, 2012).

In order for the photographs to be used during the analysis, they have been sorted so only those directly portraying the principles used for assessment were present. Such photos were then used to support the claims and helped the researchers to form a more informed opinion during the process of answering the research question and drawing conclusions.

4. Theoretical framework

In this chapter, the theoretical background which will be used to analyse the case is described.

A city can be perceived as a microcosmos of our planet and a platform for constant change driven by external and internal factors. The field of urban planning has been shaped by many approaches and ideas which mirrored the needs of the time, visions of future and conditions in the society. With increasing urbanisation, climate challenges and sprawling cities, more than ever in history, there is a need for carefully orchestrated sustainable urban growth. What happens in cities has a profound effect on the environment around them. Decisions about the future of our cities we take now will have consequences in the near future and will influence urban growth significantly (Burdett, Rode, 2018). The car-centric urban design of the last eight decades has shaped most of the cities around the world and contributed to creating divided communities, decentralization, and urban sprawl. Fortunately, there is a widespread realization in today's planning policies about the benefits of compact urban growth, where most cities have initiatives for sustainable urban growth and limiting sprawl as an answer to today's urban challenges. However, the shift towards sustainable growth in our cities is a gradual one and needs strong governance initiatives.

In this section, a framework of theories connected to a transition to sustainability, Compact City planning, New Urbanism and densification in cities will be presented and an explanation will be given on how they will facilitate further analysis and guide the process of answering the research question.

A. Sustainable Transition

Sustainable development is by definition a broad concept that encompasses a large sum of ideas and notions. Rizzo et al. (2016) however comment that there is a general agreement of what sustainable development means across various stakeholder groups and countries. They furthermore define it as a "development that meet the needs of the present without compromising the ability of future generations to meet their own needs" (Rizzo et al., 2016). Cohen (2018a) in his book Sustainable City argues that "The goal of the sustainable city is to build human settlements that have the least possible impact on the environment". The new Urban Agenda from the United Nations (United Nations, 2016) sees the opportunity of accelerating rates of urban populations as a way for more sustainable agendas to take place. It

also calls for prioritization of infill development over sprawl and creating sustainable cities by many approaches on various levels of city governance.

Goal 11 of the Sustainable Development Goals from the United Nations is dedicated to Sustainable Cities and Communities with the objective of making cities inclusive, safe, resilient and sustainable. Goal 11 identifies 7 targets, from which 4 are the most relevant to this research. Target 1 aims to ensure by 2030 "access for all to adequate, safe and affordable housing and basic services", target 2 strives to "provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons", target 3 seeks to "enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries" and target 7 pursues the provision of "universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities" (United Nations, 2015).

Sustainability in urban planning has received much attention in the last decades and excessive research has been done on the topic of sustainable transitions and how to achieve them, their elements and challenges. The transition studies have moved to the forefront of social sciences mainly after the fall of communism in 1989 in Eastern Europe where many countries began to transfer to market-based economies. Later it was used to describe the move towards sustainable development (Falcone, 2014). In order for the cities to limit their negative impacts, accommodate more people, solve complex issues and prepare for the future challenges, it is argued that the transition of present systems towards more sustainable ones is inevitable. Such transitions are however slowed down by institutional lock-ins, public policies and political agendas; therefore, the change is more gradual rather than radical nowadays (Markard, Raven, Truffer, 2012). Having said that, with the present magnitude and speed of change in our cities, there is a growing need for more radical and effective solutions.

All sectors in a city consist of a complex web of actors and institutions and in this system, the transition towards sustainability has gained much attention. Markard, Raven & Truffer (2012) define sustainable transition as a "long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption". Sustainable transitions can be reached in

many ways. For example, by understanding the complexity of terms, by limiting negative consequences, or influencing trends, among others (Newton, 2008).

Sustainable transitions can occur on a short or long-term base. The latter ones are certainly harder to implement as they are constrained by the ever-changing political climate. Cohen (2018a) states that in order to reach a sustainable transition, there will need to be a system shift which will take a long time. The cities need to learn how to integrate all systems and structures in a holistic and efficient way in order to reach desired outcomes and consensus which is also crucial for implementing change. This integration must be embedded into routines across all disciplines and systems, not being only small parts of the framework (Cohen, 2018a). Effective collaboration across various actors may ease these issues, motivate to accept change and help accept sustainable transition with less opposition. Nevertheless, the key to achieving sustainable transition within urban development lies in the coexistence of technological, procedural and most importantly behavioural change (Newton, 2008). Now is the time when the momentum towards sustainable solutions is being generated however more urgency is needed for it to be effective. Only when a behavioural change will occur (which is an immensely complex and difficult process) will sustainable solutions generate positive change and reach their full potential.

Newton (2008) identified a horizon thinking model with three principal domains for sustainable transition in urban development, which have the potential to deliver positive change (Fig. 12). Horizon 1 portrays what is currently available but needs wider implementation. Horizon 2 are models that require further application and research in order to develop into wider applicable models. Horizon 3 scenarios are radical with significant barriers, and implementation is unlikely within a 20 years period (Newton, 2008).
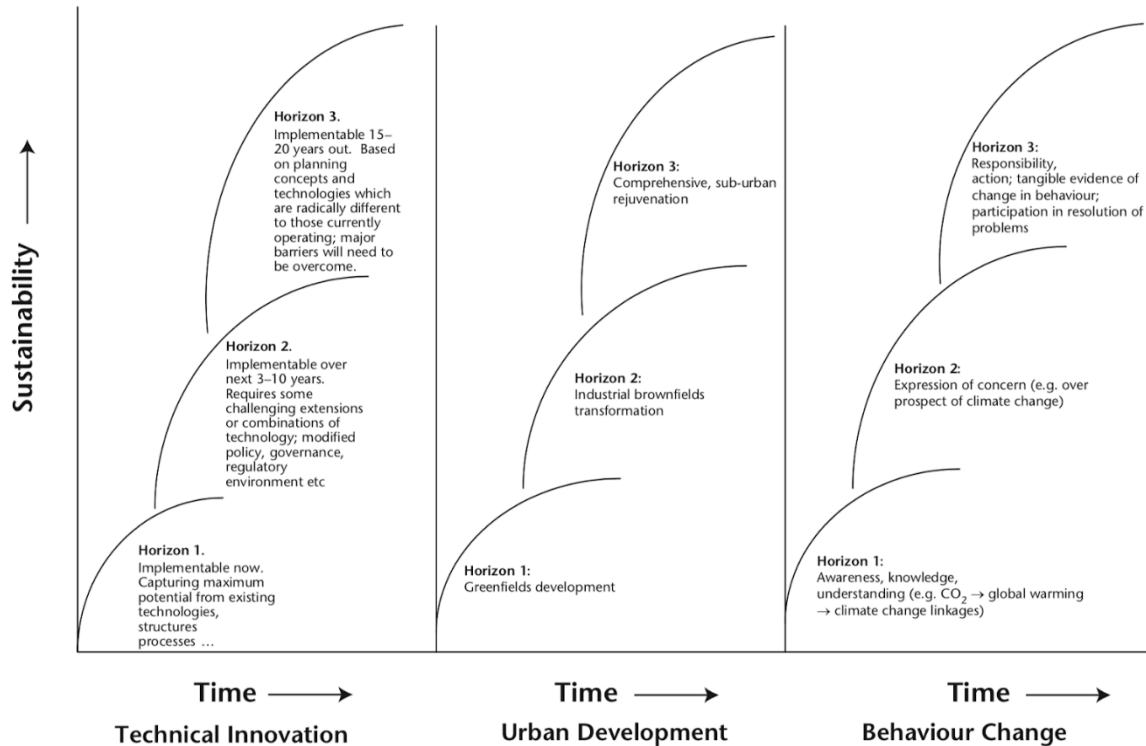
Figure 12: Horizon thinking model for sustainable transition in urban development (Newton, 2008)

The brownfield regeneration is stated in Horizon 2 due to its complexity. Ten years after Newton developed this model, it is likely that some horizons have shifted upwards but there still exist serious lock-ins within the field of brownfield renewal. He also states that "The rejuvenation and re-development of suburbs built during the 19th and 20th centuries, however, represents the greatest (Horizon 3) challenge to planners and designers attempting to create more sustainable 21st-century cities" (Newton, 2008).

Brownfield regeneration can be seen as one way to promote sustainable transition and urban change in cities. The renewal may serve as a catalyst of change for the neighbourhood or the whole city. Norrman et al's (2016) research concentrates on strategies for adopting a more holistic approach in the sustainable development of urban brownfields by drawing connections between the surface and subsurface sectors (Figure 13). They conclude that the communication between these two sectors may form an obstacle to sustainability in brownfield renewal strategies. While planners as a part of the surface sector usually deal with socioeconomic challenges, engineers on the opposite side, deal with technical issues. Urban planning decisions come usually first in order, prior to technical challenges, which then tend to be limited to approved plans (Norrman et al, 2016). Several agencies and consultancies have tried to develop a holistic sustainable regeneration framework for brownfields, however, introducing it would

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require legislative and policy changes mostly on a national level (Norrman et al., 2016). Given the fact that policy and legislative changes may take years to be implemented and that they usually require political shift at the right time and with the right people in charge, Norrman et at. (2016) argue that in order to achieve more holistic and sustainable approaches towards regeneration, the establishment of more effective communication and knowledge exchange between surface and subsurface professionals is proposed. Therefore, horizontal and vertical communication going both directions must be established together with the assurance that a triple bottom approach of sustainability is included in the renewal framework.
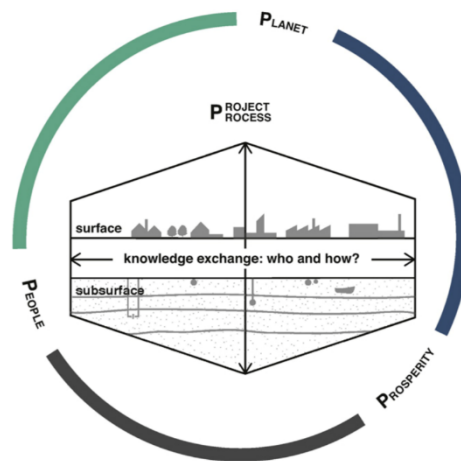
Figure 13: Communication exchange between sectors of development processes (Norrman et al., 2016)

The triple bottom approach of sustainable development connects elements of environmental, social and economic sustainability where all three aspects should be equally presented with the knowledge exchange of surface and subsurface actors of urban development (Figure 13). This requires careful planning of all stages of development and thinking about the whole life cycle of the project and its implications.

According to the Multi-Level Perspective approach, which forms one of the transition theories, every transition comes to light as an outcome of shock on varying levels of the system. Then a window of opportunity is open for new ideas, solutions and innovations (Falcone, 2014). Within this window, there is a tipping point in the process towards a sustainable transition. This point describes a process "in which a place will significantly shift in character" (Newton, 2008). This can be due to gentrification patterns, environmental improvement or policy change. So, the sustainable transition can be viewed as an incentive generating enough traction to reach a tipping point in a positive direction. However, it is hard to predict the exact path after the tipping point due to the complexity of urban planning. Additionally, a tipping point can be reached even by the smallest disturbance in any of the systems. One of the tipping points to

reach positive sustainable transition can be the process of urban renewal and mainly urban densification that it represents.

B. Urban Densification

There are several urban planning theories based on the idea of increasing densities such as smart growth, transit-oriented development, urban intensification, 30-minute city, Compact City approach and New Urbanism, and all have the common goal of creating a sustainable transition in specific areas. These theories are interconnected and share similar characteristics. As an overarching term, we can also mention Urban Ecology which can be defined as a "multidisciplinary approach to improving living conditions for the human population in cities, referring to ecological functions of urban habitats or ecosystems for people" (Endlicher, 2007). It supports the urge of urban societies to be sustainable and can be understood as an umbrella term for the theories used in this report.

Urban density in a city context can mean either population density or density of buildings so it is important to distinguish between these differences. There is no mutual understanding on how the density is exactly formulated in urban planning field (Taylor, 2008), but for the purpose of this research, we understand urban density as a number of inhabitants per certain area.

About a hundred years ago, cities were trying to decrease densities in order to fight increasing pollution, the spread of diseases and accommodate a growing number of cars. This view has completely shifted since then, and now cities, aiming for sustainable transition, are trying to achieve the opposite. Higher urban density is linked to benefits such as reduced car dependency, less consumption of land, increased social cohesion and safety, financial benefits, and other (Taylor, 2008). Therefore, higher urban densities are considered to be the most sustainable urban form. Additionally, denser cities harness innovation better and contribute positively to networking between companies and citizens (Lehmann, 2017). They also add health benefits to citizens as they promote walking over the use of cars.

It does not inherently mean that low-density development is harmful and unsustainable - both spectrums of urban densities can be done in the right and wrong way. Even high-density areas can be associated with poor walkability, easier spread of diseases, larger ecological impacts and other negative externalities if the quality of design and sustainability are not followed. From the point of today's planning theories, increasing urban densities is seen as one of the main solutions to limiting sprawl and therefore building sustainable cities of the future.

Limiting car use is commonly stated as one of the biggest advantages of dense urban forms. However, Melia et al. (2012) found out that even though the increase of density will limit car use per unit, it is only to a certain extent. Therefore, dense areas will still battle with congestion if local job opportunities are not created and efficient public transport is not in place.

"Not in my backyard" - Opposition to Densification

As all urban changes and transformations, also densification is usually met with strong community opposition. Densification processes in cities are almost always facing some form of community opposition and resistance. Citizens have conservative opinions on the densification processes due to a fact that they see the local character of their neighbourhood with "nostalgic idealism" (McLeod, Curtis, 2018). They might also oppose the development due to lack of information or participation processes and therefore cannot visualize how the changes will affect them in the future. It is argued that every change stirs opposition, it does not matter if good or bad. Brent Toderian - an urbanist working on densification strategies in many cities - has identified three prerequisites for densification limiting community opposition. The plan of implementation containing architectural elements and urban design, need to be of very high quality and implement smart design approaches and promote liveability and also be highly context aware. The second point is multimodality. The development should promote active transport options such as cycling, walking and the use of public transport. The third point is including amenities and housing diversity. He further explains that provision of amenities is rather expensive and planning bodies have rarely the power to push these through developers on a scale that would be sufficient. Toderian proposes the concept of density bonusing. The planning body sets a density which can be in certain conditions increased if the developer provides with amenities which would benefit the community (Roberts, 2019). The system of bonusing, for example, helped to shape Vancouver's densification processes into a best-case scenario. McLeod and Curtis (2018) did a research study on the community acceptance of activity corridor concept in Perth, Australia and came to the conclusion that the citizens were more likely to accept densification in areas with functioning public transport and especially when light rail was involved as a higher capacity transport option. This finding provides a proof that provision of functioning public transport infrastructure is at the forefront of successful densification process. Another important prerequisite for public acceptance would be the provision of public amenities in the redeveloped area (McLeod and Curtis, 2018). Additionally, the resistance can be limited by carefully orchestrated community engagement which produces more desired urban change (Vigiola, 2019).

C. New Urbanism

Urban densification is one of the pillars of New Urbanism - the emerging concept of city governance. New Urbanism was first conceived in the United States to address the increased issues cities are facing, and especially as a response to the problems created by the ways the suburbs are expanding (Villiers, 1997). One of the main themes reoccurring in New Urbanism is that "community planning and design must assert the importance of public over private values" (Bressi, Scully & Katz, 1994).

The roots of New Urbanism can be traced back to Jane Jacobs - an urban activist, that argued against radical urban renewal and helped establish community-based approaches to planning. According to Jacobs (1962) the planner's first goal to make the city liveable should be "to foster lively and interesting streets". Moreover, there has to be a significant number of people using the streets - which is achieved through mixed-use development. As a third principle she stated there had to be a clear line between private and public. To sum up her observations, she argued that four main principles are to be followed in order to achieve better cities (Figure 14).
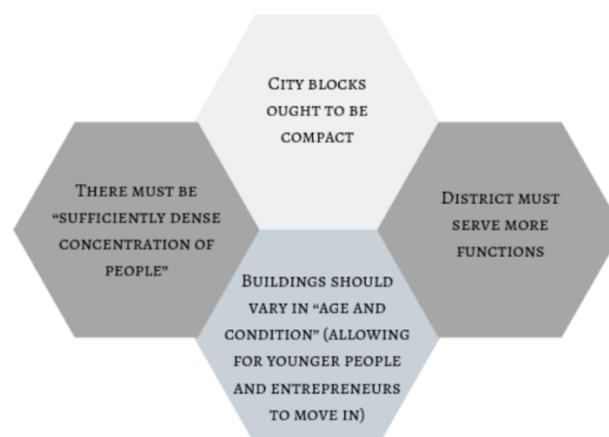
Figure 14: Crucial principles for better cities according to Jacobs (Jacobs, 1962, p.150)

Additionally, her follower, Rob Krier argued that "the city and its public spaces can only be built in the form of streets, squares, and quarters of familiar dimensions and character, based on the local tradition" (Krier, 1984). Krier influenced a lot of architects within the USA who began to rethink the modernist and rational model of city planning (Graham, 2016). They went on to produce six principles, very familiar to those of Jane Jacobs:

Figure 15: Principles of New Urbanism according to Krier (own production based on Graham, 2016)

Other architects followed in similar direction. Peter Calthorpe - one of the pioneers of New Urbanism in the USA - argues that "cities are about shared space" (Kunzig, 2019). In 1986, he wrote *Sustainable Cities* and argued for the concept of "pedestrian pockets - walkable neighbourhoods linked by public transit" (Graham, 2016). According to Calthorpe (2017), cities should be of high quality so it would push citizens out of their "bubbles" and into public spaces, streets and parks. A group of architects and urbanists with similar views then formed the Congress for New Urbanism (CNU) in the USA as to combat suburban sprawl and advocate for traditional neighbourhoods, following principles of Krier and Jacobs and detailing them, while adding the concept of Transit Oriented Development.

Jan Gehl (2011) followed on similar ideas with *Life Between Buildings* and other works where he puts emphasis on human centred design, walkability and place making. It is staggering that even after fifty years since Jane Jacobs drafted such principles, they are still sometimes being left out from the planning of our cities. Even though the community involvement has arguably improved since her time and we are seeing more human centric planning, there still are examples when the planners are facing significant barriers when following such principles.

The main goals of the New Urbanism movement are to achieve affordable housing, employment availability, density as a response to urban sprawl, improve transportation and have some principles to follow when planning new settlements and parameters to control the design of buildings in these settlements (Villiers, 1997). Some of the new urban approaches that have fused in the New Urbanism concept, since the establishment of the Congress for the New Urbanism in 1993, are the Transit-Oriented Development (TOD), transit villages, and pedestrian pockets (Grant, 2005). Though labelled differently, these approaches share similar

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principles, such as "fine-grained, mixed-use, mixed housing types, compact form, an attractive public realm, pedestrian-friendly streetscapes, defined centres and edges, and varying transportation options" (Grant, 2005).

This philosophy can be translated into planning parameters to be adopted. These parameters can be seen recurring throughout the principles (Figure 16). The first parameter is that every neighbourhood should share a **public space** that will define it and have commercial and civic facilities orienting towards the local community (Principles 19 and 25). This means that there should be open spaces destined for community gatherings such as a square or a plaza in order to connect citizens. Secondly, housing should be **mixed** in order to accommodate different age groups and economic classes, and land should have a range of uses (Principles 7 and 13) (Bressi, Scully & Katz, 1994). New Urbanism supports the building of "communities which embrace a range of people from different economic, racial and ethnic backgrounds" (Villiers, 1997). Thirdly, the focus should be given on facilitating **walking, biking and use of public transit over driving** (Principles 8, 11, 12, 15 and 23) (Bressi, Scully & Katz, 1994), particularly for everyday commuting. According to the New Urbanism philosophy, "increased integration of various land uses and a diminished role for private cars, are aims on which our environmental future depends" (Villiers, 1997). Finally, the **architecture** used should blend into its surroundings and respect local traditions and natural environment (Principles 6 and 24) (Bressi, Scully & Katz, 1994).

The Charter of New Urbanism, written between 1993 and 1996 by planners, architects, scholars and involved citizens, and ratified by the Congress for the New Urbanism, includes 27 planning, design and development principles that focus on the community and its liveability, broken down into 3 categories:

- The region: Metropolis, city, and town
- The neighbourhood, the district, and the corridor
- The block, the street, and the building (The Charter of the New Urbanism, 1999).

Below, an outline is given, indicating the principles of the Charter of the New Urbanism that are related to this report.

THE REGION: METROPOLIS, CITY, AND TOWN

4. Development patterns should not blur or eradicate the edges of the metropolis. Infill development within existing urban areas conserves environmental resources, economic investment, and social fabric, while reclaiming marginal and abandoned areas. Metropolitan regions should develop strategies to encourage such infill development over peripheral expansion.

6. The development and redevelopment of towns and cities should respect historical patterns, precedents, and boundaries.

7. Cities and towns should bring into proximity a broad spectrum of public and private uses to support a regional economy that benefits people of all incomes. Affordable housing should be distributed throughout the region to match job opportunities and to avoid concentrations of poverty.

8. The physical organization of the region should be supported by a framework of transportation alternatives. Transit, pedestrian, and bicycle systems should maximize access and mobility throughout the region while reducing dependence upon the automobile.

THE NEIGHBORHOOD, THE DISTRICT, AND THE CORRIDOR

11. Neighborhoods should be compact, pedestrian friendly, and mixed-use. Districts generally emphasize a special single use, and should follow the principles of neighborhood design when possible. Corridors are regional connectors of neighborhoods and districts; they range from boulevards and rail lines to rivers and parkways.

12. Many activities of daily living should occur within walking distance, allowing independence to those who do not drive, especially the elderly and the young. Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.

13. Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.

15. Appropriate building densities and land uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.

THE BLOCK, THE STREET, AND THE BUILDING

19. A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.

23. Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.

24. Architecture and landscape design should grow from local climate, topography, history, and building practice.

25. Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy. They deserve distinctive form, because their role is different from that of other buildings and places that constitute the fabric of the city.

Figure 16: Principles of the Charter of the New Urbanism related to this research (Own production)

But as most concepts, New Urbanism design practices and principles face some criticism. One of these criticisms is that by creating a very dense urban fabric, residents will experience a lack of privacy. Critics claim that the reason why some people prefer sprawl and detached homes is so they can have their own yard and some privacy and distance from their neighbours. Another criticism is that New Urbanist neighbourhoods only attract wealthy people as they usually become expensive places to live in and are connected to gentrification. (Briney, 2019) Moreover, Graham (2016) criticized New Urbanism for being too "code oriented" and that there is a danger of it becoming rigid and hindering creativity and diversity. It also draws on the idea that the planner is here to save the city by urban design. Even though New Urbanism dictates that buildings share a limited range of historic styles which may produce "fake" outcomes (Figure 17), we argue for a mix of building styles and varieties of architecture to promote creativity and diversity.

Figure 17: Jakriborg, Sweden - example of principles of New Urbanism with limited range of style (litefranovan.com)

There is an Australian Council for New Urbanism which have not been very active in producing guiding principles relating to Australian context but rather adopts the principles of the American version. They however distinguish it from the American context. It is stated that the state government has bigger say in planning and there is stronger role of government development agencies in redevelopments which may influence the planning outcomes (Morris, 2008).

D. Compact City Model

The Compact City approach can be seen as an intertwined theory to the concept of New Urbanism and is one of the most discussed approaches in urban planning. It shares similar values however is different in some respects and more focused on densification. The Compact City approach started to emerge during the first half of the 20th century with the Green Belt movement in the UK. In the 1960s, many European countries started to favour more sensitive urban redevelopment strategies which would actually pay attention to surrounding areas and local heritage rather than trying to replace old parts of a city with completely new ones. Compact City model mainly emerged as a policy tool for containment of agricultural land and natural heritage. But it was since the 1980s that the Compact City agenda became more rooted in local and state strategies and gained wider attention (Rode, 2018). Therefore, we can see that the process of implementing the Compact City model has been a gradual one for the past 80 years and it is now that the agenda is at its peak since 2010 and gaining even more attention with policies and plans targeted on urban densification and creation of compact cities.

The Compact City model is a contemporary urban planning and design model which is linked to the creation of a sustainable city as today's society is becoming more urbanized than it ever was in human history. Compactness can be seen as an optimal relationship between city block's surface and volume. The blocks of Barcelona, Copenhagen, Prague or Berlin can be seen as ideally compact with communal space in between, human scale, mix-use structure and quality-built form (Lehmann, 2017).

Rode (2018) points out that the Compact City model may be seen as "generic planning and policy principle underpinning a new focus on accessibility in cities" (Rode, 2018). OECD (2012) define the Compact City model as having dense development patterns, being linked by public transport systems and provides with accessibility to jobs and amenities. The approach, however, nowadays encompasses a wider variety of sustainability goals. The Compact City can also be defined as a "product of certain form, scale and mix of activities" (Thomas, Cousins, 1996) In the Compact City, growth is stimulated within existing boundaries. The inspiration behind compact cities can be a typical ideal European city centre which is walkable, full of quality public spaces, enhanced with parks and has functioning public transport and quality architectural form and scale. However, most global cities are far from this ideal as they usually are more spread out and have several urban cores.

Newton (2008) identified some of the benefits of more compact cities. In comparison with low-density development, compact cities could reduce energy use between 20-60% (however poor design of high-rise buildings can actually turn these numbers around). The transport energy savings could be up to 40%. Water consumption is between one third and one half lower in compact cities (particularly because of lower outdoor water use). Waste production is around 50% lower than in low-density areas (counting the area with the same economic status) and also Compact City development does not take up valuable agricultural land on the outskirts of the city, therefore, has less impact on the landscape. It also adds to more social sustainability and sense of community. Compact cities can therefore be seen as a sustainable urban form which has number of benefits relating to our research (Figure 18).

SUB-CHARACTERISTICS OF COMPACT CITY	CONTRIBUTIONS TO URBAN SUSTAINABILITY		
	ENVIRONMENTAL BENEFITS	SOCIAL BENEFITS	ECONOMIC BENEFITS
SHORTER TRAVEL DISTANCES	• FEWER EMISSIONS • LESS POLUTION	• GREATER ACCESSIBILITY DUE TO LOWER COST	• HIGHER PRODUCTIVITY
LESS CAR DEPENDENCY	• FEWER EMISSIONS • LESS POLUTION	• LOWER COST OF TRANSPORT • HIGHER MOBILITY • IMPROVED HEALTH	• DEVELOPMENT OF NEW TECHNOLOGIES
MORE ENERGY UTILIZATION	• LESS ENERGY CONSUMPTION PER CAPITA • BETTER WATER AND WASTE MANAGEMENT		• MORE ENERGY INDEPENDENCE • CREATION OF GREEN JOBS • SMALLER COST OF INFRASTRUCTURE
OPTIMAL USE OF LAND	• CONSERVATION OF FARMLANDS • FEWER EMISSIONS DUE TO LESS FOOD TRAVEL • LIMITED FOOTPRINT OF HOUSING DUE TO INCREASED DENSITY	• HIGHER QUALITY OF LIFE	• URBAN AGRICULTURE • RENEWABLE ENERGY • LARGER CONCENTRATION OF WORKFORCE
MORE EFFICIENT PUBLIC SERVICES		• BETTER LEVEL OF SERVICES BY IMPROVED EFFICIENCY	• LOWER INFRASTRUCTURE INVESTMENTS
BETTER ACCESS TO JOBS		• HIGHER OPPORTUNITIES	• GREATER PRODUCTIVITY • LIMITING HIDDEN COST OF TRAFFIC

Figure 18: Contribution of the Compact City to urban sustainability (Own creation based on OECD, 2012)

On the other hand, a study in London by Cheshire at al., (2012) found that Compact City policies may hinder development, increase house prices and equity, where Hilber and Vermeulen (2010) pointed that London's restrictions on vertical development and at the same time policies limiting greenfield, are one of the causes for the city's extraordinary high housing market prices.

The concept of Compact City is closely linked with accessibility mostly seen as the provision of effective public transport infrastructure. Rode (2018) differs between accessibility as connecting places on many levels (which is an ideal option) and from simple "getting from spot A to spot B" (Rode, 2018). The concept of placemaking is also rooted in the Compact City model, as the provision of place instead of space is desired not only by citizens themselves but also by the framework. The aim of a Compact City is to therefore create accessible city of short distances.

The OECD (2012) conducted a three-year study on the Compact City model and published a summary of their findings. They identify five main recommendations for Compact City strategies as:

- "Explicitly set goals (with metropolitan strategic documents),
- encourage dense and proximate development,
- retrofit existing areas,
- enhance diversity and quality of life, and
- suppress negative effects (combat congestion, provide affordable housing, promoting quality design, promoting a sense of place and greenery)" (OECD, 2012).

The Compact City model usually focuses on redevelopment strategies, brownfield redevelopment, promotion of infill and public transportation (accessibility), mixed-use development, walkability, and design quality. Compact urban forms can also contribute to more inclusive and healthier populations (Rode, 2018). However, all these strategies require extensive policies to be executed. As continuous urbanization affects the use of space in cities, the Compact City approach can be an option for a suitable policy (OECD, 2012).

Compact City and liveability

The research conducted by Mouratidis (2018) on the correlation between liveability and Compact City, proved that residents in compact cities *"are significantly more satisfied with their neighbourhood than those who live in sprawled areas"* and thus compactness has a positive correlation with liveability (Mouratidis, 2018) (note: We assume that liveability is measured by community satisfaction). He points out, however, that density must coincide with the provision of other important elements that tend to contribute to neighbourhood satisfaction such as safety, quietness, neighbour ties, attractiveness, and especially in high-density

neighbourhood's context - public transport, open space and accessibility to facilities (Mouratidis, 2018).

If the Compact City is only seen as an infill strategy with the sole goal of increasing urban densities, several negative consequences connected with high-density areas may arise. The Compact City model may, in this case, create division within the community, limit green spaces, there might be overcrowding issues, lower quality of living, noise, and increased traffic if necessary, solutions are not provided. These consequences that are connected with higher densities usually form a base for community opposition among the citizens if the Compact City model is applied without the appropriate care.

An important part of liveability is the concept of social sustainability which underlines the need of creating cohesive and just communities. Barron and Gauntlett (2002) define that "social sustainability occurs when the formal and informal processes, systems, structures and relationships actively support the capacity of current and future generations to create healthy and liveable communities". Easthope and McNamara (2013) establish a link between residential density and sustainability and state that it has received much attention in Compact City and New Urbanism literature. They follow to state that "compact and mixed-use urban forms are arguably more socially sustainable because they typically improve access to services, reduce levels of social segregation and inequity, increase vitality and social interaction, and improve safety due to higher levels of passive surveillance" (Easthope, McNamara, 2013). However, many of these supposed social benefits of higher-density and mixed-use living remain unproven in the literature.

Regenerative City

The concepts of New Urbanism and Compact City are some of the ways to reach a sustainable transition towards making our cities more future proof, resilient and liveable. Nowadays, most policies are focused on making the city systems and structures more *sustainable*. However, for our planet and cities to thrive under various stresses and shocks, a step further may be considered in the direction of a Regenerative City. Apart from seeing regenerative cities as the natural evolvement of sustainable cities, the concept of regenerative urban design can be also seen as a continuation of the urban ecology model (Girardet, 2015). A regenerative approach to city planning is about the restorative relationship between a city and nature. In order for cities to truly deal with the challenges that urbanization poses, they need to look further beyond

the concept of sustaining the present state, and rather strive for a restorative state which would actually benefit all aspects of environment and also human life.

Reed (2007) (Figure 19) explains the concept of regenerative design as human participation in the co-evolution of the earth systems with less energy required and high levels of understanding of the living systems and patterns on Earth.
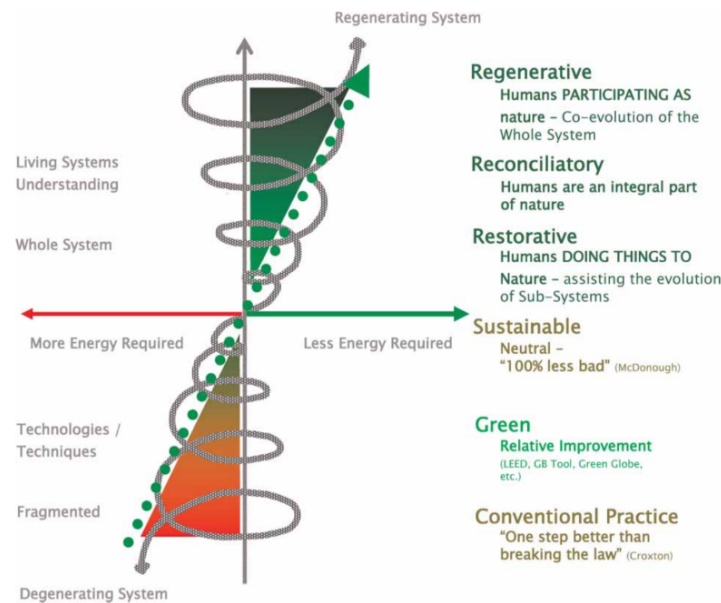
Figure 19: Regenerative System according to Reed (2007)

Sustainable urban development is presented as a middle point on the scale from conventional practices to a regenerative system. The restorative part aims to put the natural system in a healthy state, the reconciliatory stage recognizes that humans are dependent and integral to nature, and finally the regenerative design calls for co-evolution through feedback, reflection and dialogue (Reed, 2007).

Thomson and Newman (2018) in their article compare a city and its systems to a metabolism. They argue that by understanding the metabolisms, it helps the city to become more sustainable. In some instances, it is even possible for some elements to become regenerative, therefore contribute to the environment in a positive way. The Regenerative City "regenerates its ecological footprint, not just minimizes it*"* (Thomson, Newman, 2018). Thomson and Newman (2018) also identified key characteristics for a regenerative city:

- "An environmentally enhancing, restorative relationship between the cities and the natural systems they depend on;
- renewable energy systems; and

- new lifestyle choices and economic opportunities which will encourage people to participate in this transformation process."

By applying this concept, cities may offset the negative impacts generated over the years and strive to create a positive sustainable transition and "give back" to the environment. The regenerative city approach is therefore about creating a restorative relationship between cities and nature. Cities should, therefore, put in place regenerative processes instead of only striving to sustain the present state. This way they can contribute more towards future resilient cities which positively affect the environment instead of the opposite.

Schurig and Roumet (2014) summarised the takeout of the Future of Cities Forum 2014 and identified six solutions which could permit the transition towards a Regenerative City as:

- "Adopt local solutions that engage citizens
- Establish effective connections and involve diverse actors
- Adopt targets and indicators that reflect desired values and needs
- Set a clear long-term vision
- Reconcile policymaking and research
- Change behaviour through dialogue, education and awareness" (Schurig, Roumet, 2014).

Girardet (2015) argues that cities must undergo a paradigm shift in order for the process of Regenerative City to become viable. But even by creating isolated examples of regenerative developments, these can serve to become guiding examples and create a push in the system. While the concept of the regenerative city mainly focuses on the use of resources and limiting the influence on the city's hinterland, sustainable urban planning is also a part of the equation. One of the ideas that underpin the regenerative city approach is the need to limit sprawling footprint where urban regeneration comes to play. However, under this paradigm, regeneration has a wider implication.

Linking theories

Jacobs and Krier among others founded the basis for the principles of New Urbanism. Their theories continue to live through the principles of mixed-use development, affordable housing, facilitation of walking, biking and use of public transit over driving, and architecture that blends to its surroundings. Along with the main principles used in Compact City, such as mixed-use, quality built form, densification and accessibility, the main principles through

which we will assess the Green Square renewal can be seen in Figure 20, which represents a summary of our Theoretical framework, and in

Principle	Outcomes	Indicators
Densification	Provide with dense and compact areas without overcrowding	Density in relation to provision of services, public transport and employment
Transit Oriented Development	Strategically located density	Densest areas to be located directly near public transport
	Provision of multimodal transport	Provision of cycling infrastructure and other modes of transport
	Transportation provided before housing	Established public transport before and during housing construction
	Enough capacity for all residents without delays	Transport supports development and adapts to future needs and is aligned with growth
Mixed-use	Mixed-use within neighborhoods, blocks, within buildings	Mix of retail, offices, and housing on site
Accessibility	Activities of daily living occuring within walking distance, allowing independence to those who do not drive, especially elderly and the young.	Short walking distance to daily activites, such public infrastructure, retail, schools, hospitals, library, sport facilites and other services
	Connectivity	A pedestrian system that connects important destinations through the city
	Pedestrians protected both day and night	Clear structure of pedestrian system and small blocks, buffering, good lighting
Affordable housing	Bring people of diverse ages, races, and incomes into daily interaction	Increase of supply in affordable housing based on the city's targets and diversity
Public spaces	Increased availability of public spaces and greenery	Increased range of recreational opportunities
		Interactive, green, clean, walkable
		Space for cultural activities and communication
Built Environment	Create a sense of place	Recognizing character of place through aesthetics, appropriateness and blending architecture that respects local tradition, history and environment
	Promote fine-grain urban form	Housing is diverse in size, style and promotes compact city principles
	Streets are well designed and interesting	Interesting environment to walk in and human scale

Table 2 below, where indicators are attributed to each principle in order to facilitate our analysis. The principles are hierarchized according to their level of importance in achieving sustainable transition. The first three principles are densification, mixed-use and transit-oriented development. This is because both New Urbanism and Compact City theories state them as the most significantly relevant. Moreover, densification is the direct solution to urban

sprawl, but for it to be viable it is essential to have transportation that can serve all citizens, and mixed-use development to provide all necessary services. Then, there is accessibility and affordable housing. Accessibility is important in order to allow independence to those who do not drive, especially elderly and the young, and shorten distances to daily activities and services in order to minimise car use. Furthermore, a mix of retail, offices, and housing should be provided in order to support the densification. Finally, public spaces and quality-built environment should ideally support the beforehand stated principles, in planning for liveability.
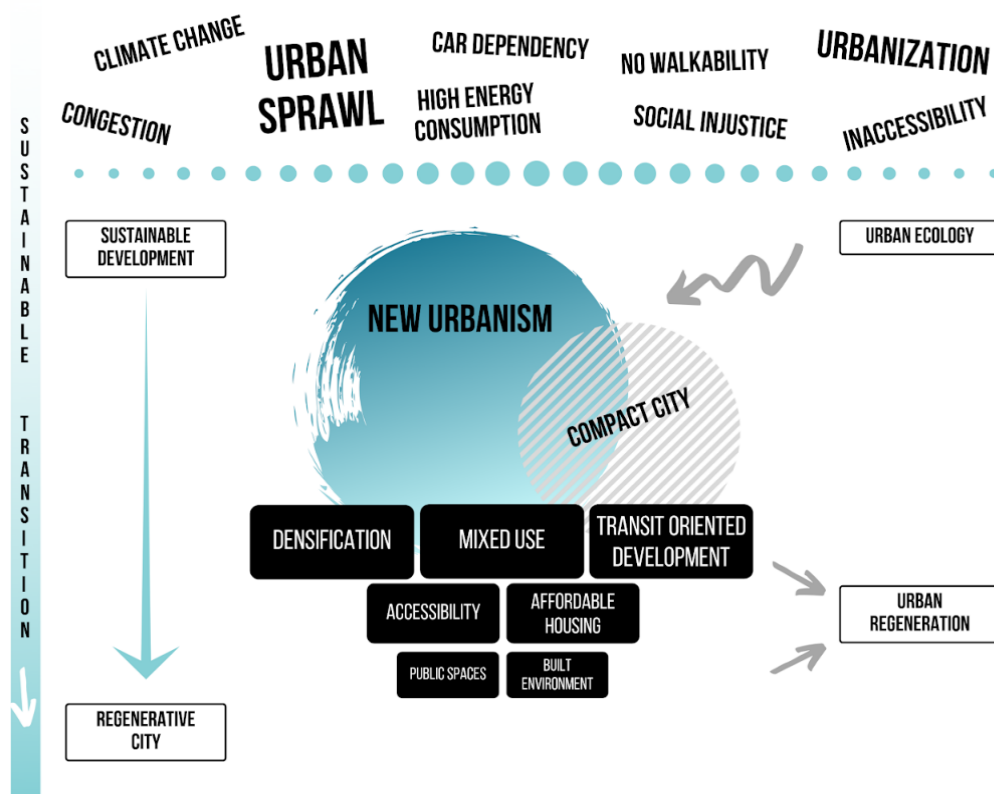
Figure 20: Theoretical framework diagram (Own Production)

The indicators were derived from those principles of New Urbanism and Compact City that overarch each other. They were also influenced by the principles of Jane Jacobs and Rob Krier. They were picked so they would reflect the needs of a growing city: limiting urban sprawl, promoting urban regeneration and producing quality everyday urban experiences for its citizens. The indicators were selected as to their relevance to our case study and their ability to be assessed within the availability of our collected data.

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	Streets are well designed and interesting	Interesting environment to walk in and human scale

Table 2: List of outcomes and indicators associated to each principle (Own production)

To conclude, while the policies aiming to limit sprawl and promote infill development are in the mainstream of current planning approaches, the scattered and decentralized development still prevails (Rode, 2018). Newman (in Bay, Lehmann, 2017) argues that planning for density is mostly about navigating urban change, limiting resistance and "grasping opportunities" and making sure that a sustainable framework is followed. The relationship between sustainability and the Compact City model has been discussed by Burton et al. (1996). They have raised the

concerns of what form of urban development is the most suiting in order to shift towards sustainable development and create a sustainable transition. They introduced two major historical flows which represented urban forms. Frank Lloyd Wright presented one end of an extreme as he saw an ideal urban form scattered across agricultural land. He wished to reintroduce people to the countryside, away from crowded cities as he wished to merge the city and country. On the other side of the spectrum, there was Le Corbusier with his centric planning view. He wanted to increase densities in cities by building taller structures surrounded by public space. He would advocate for radical solutions which would eventually spur waves of protest with urban activist Jane Jacobs in the frontline. Jacobs argued for a density which created diversity and vitality of neighbourhood but where existing structures would be accounted for (Burton, et al., 1996). In line with the views of Jane Jacobs, the theories used in this report - Densification, New Urbanism, sustainable development, Compact City and sustainable transition - are very much interrelated and strive towards a common goal of resilient cities of the future, with dense and liveable neighbourhoods, effective public transportation, thriving economies and in contact with natural environment, while stressing the need for social cohesion.

5. Analysis

In this chapter, planning documents relating to Green Square Town Centre were analysed against principles arising from the theoretical framework, assessing the existence of Compact City and New Urbanism principles. The analysis is supported by examination of photographic material taken on site, interviews conducted, and documents reviewed. The main drivers for the Compact City model and New Urbanism principles in Sydney context can be identified as planning and governance system, metropolitan strategic planning, and land development agencies (LDAs). So, a significant part of the analysis is focused on assessing these three areas of governance.

Due to the Sydney's geography, worsening traffic, immigration, climate shocks and stresses and push for more sustainable development, the city has started to implement policies of densification and smart growth, but these policies are facing barriers and challenges that are usually complex and difficult to overcome. The city has a history of inner-city redevelopment projects with the largest ones being Pyrmont/Ultimo and Darling Harbour where renewal was initiated by the Olympic games in 2000 (Bunker et al., 2017). Nevertheless, even now a significant urban growth occurs in land release areas in the city's west.

In Sydney, governmental and city policies are in recent years focusing on inner-city redevelopment mainly around transfer nods and stations, in which residential housing prices have increased significantly (Wulf, 2017). With the establishment of a new metropolitan planning body – The Greater Sydney Commission (GSC), the Compact City strategy has gained more attention. Since the turn of the century, planning strategies focusing on infill development and higher density living dominated metropolitan planning in Sydney, but they have proven to be difficult to implement (Crommelin, et al., 2017). Bunker et al. (2017) argue that in this new political planning system, development is to a significant extent controlled by land development agencies (mainly in strategic centres), that are influenced by the market forces. Compact City policies are rooted in the philosophy of neoliberalism which turns to market forces to deliver redevelopment with the help of the public sector. *"This creates tension, as it means renewal must be both financially viable and politically feasible. This tension remains under-examined in contemporary planning literature"* (Crommelin et al., 2017). Therefore, communities can feel like they are not having enough say during regeneration projects and that urban change (even sustainable transition) happens with the force of the market rather than by shared visions of the planning bodies or council and

citizens. Additionally, the local government can have trouble pushing quality development with the provision of infrastructure through the developers, which was confirmed during the interview with the manager for Green Square development from The City of Sydney Council Tamara Bruckshaw (Bruckshaw, 2019). According to Crommelin et al. (2017) Sydney's Compact City policies suffer from the lack of effective transport planning which would reinforce the strategies. There is a competition between rail and road priorities and even though metropolitan strategies are focused on creating more business centres, much attention is still given to providing easy access to the harbour CBD. Hence even though the Compact City policies have become the norm, for them to be successfully implemented, there needs to be a consensus with what the public expects and wants (Crommelin, et al., 2017) and of where priorities lay between various actors.

The principles of New Urbanism can be traced in the strategic and other plans of the city and state urban planning context and therefore significant part of the analysis is focused on assessing their presence in the case study of Green Square Town Centre urban regeneration together with objectives of the Compact City framework which are combined in our guiding principles.

A. Planning Framework in Sydney

In Australia, it is the state government that is responsible for the provision of urban planning and the role of national policies is limited, thus, each state has its own planning laws and different frameworks. The planning hierarchy in New South Wales is split into state, regional and local plans (Figure 21). Sustainable development principles in New South Wales are legally rooted in the government's Environmental Planning and Assessment Act from 1979 and they are a part of every government policy since 1992. Sustainability forms an important part of such documents and the implementation is left to the local government bodies due to the mainly poor definition on government and national level (Montoya, 2013). The sustainable development targets stated are however poorly defined and overshadowed by goals for economic prosperity (Thorpe, Hart, 2013). Sustainability should move towards being at the forefront of government policies with improved legal enforcement. Sustainable goals can, in fact, be the basis for planning theories in themselves and have the potential to provide a suitable framework. Sustainable development, therefore, needs to be more engraved and enforceable in NSW planning frameworks and not only form a part of a policy. Nevertheless, with the recent

plans, we can see that the trend is changing and sustainable principles form a larger part of such policies.
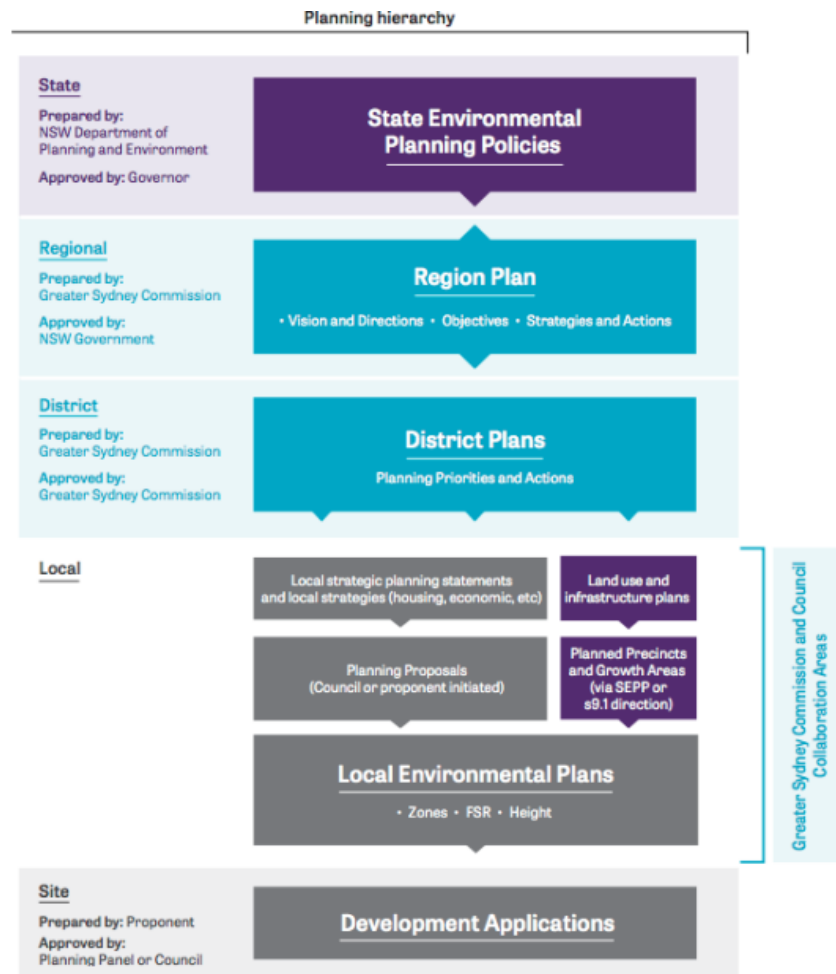
Figure 21: Hierarchy of planning in NSW (NSW Government, 2018)

The governance of the Green Square area is split between the City of Sydney and New South Wales Government, where "the City of Sydney is primarily responsible for land use development and the provision of local infrastructures, such as community facilities, local roads, stormwater infrastructure, and parks and the New South Wales Government is responsible for providing major roads, public transport, social education and health infrastructure" (Infrastructure Australia, 2018).

B. Strategic Planning

In 1991 the *Building Better Cities* programme was launched by Federal Government and for the first time supported the principles of New Urbanism, Compact City and sustainability (Bunker et al., 2017). However, it is not stated in any of the planning documents that the government or cities are following explicitly the concepts of New Urbanism and/or Compact City, but the overall aims are highly similar to those stated in the documents. In 2005 the *City of Cities Plan* was launched, which marked the acceptance of a Compact City model in the metropolitan planning framework in Sydney (Crommelin, et al., 2017). According to Crommelin et al. (2017), the plan was highly detailed and focused on establishing crucial growth regions and corridors. It was influenced by New Urbanism principles as it stated that 70% of all new development must come from infill development and support transport-oriented development. The *Metropolitan plan* from 2010 had similar targets, though the economic crisis hindered its full implementation. The *Plan for a Growing Sydney* from 2014 outlined different Compact City strategies where the focus is given on the land development agencies as the main redevelopment body. Great attention is given to the renewal in priority precincts and provision of infrastructure to these key areas. The infrastructure would be facilitated by the NSW government, housing mostly by private developers or land development agencies and the process would be aided by Urban Growth NSW (government's developer – now Landcom). The plan focuses more on the pragmatic side of planning and can be distinguished from its more visionary predecessors. With the overview of metropolitan strategies, we can see that metropolitan planning has shifted from visionary and partly non-viable goals towards a market-driven neoliberal perspective (Crommelin, et al., 2017). After the establishment of The Greater Sydney Commission by the NSW government in 2016 as the main metropolitan planning body, the *Greater Sydney Regional Plan* was created, and it is unclear to conclude at this stage how the planning framework will change with this new key player.

In this section, plans most related to Green Square Town Centre redevelopment (Figure 22) are critically assessed.
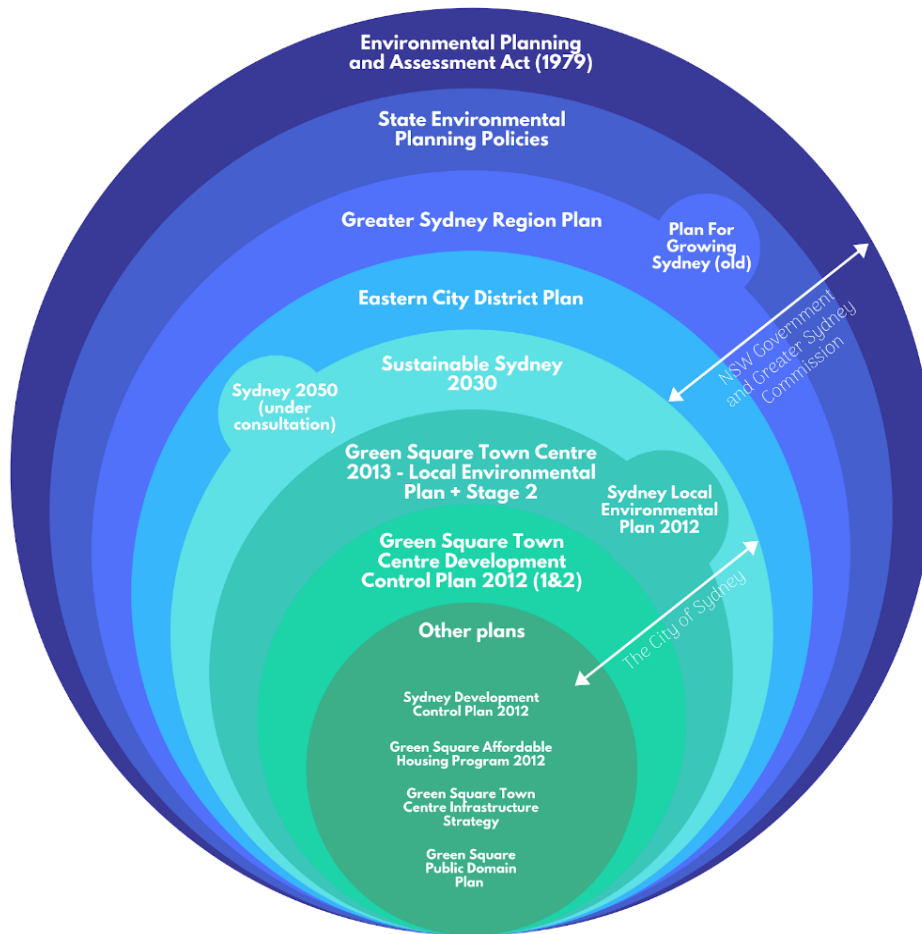
Figure 22: Planning Framework related to Green Square Development (Own Creation)

Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act of 1979 establishes a land development framework in New South Wales. It sets a legal framework for the planning system and all other policies are required to follow it. The aim is to guarantee environmental, social and economic welfare of the state. It is broad in focus to trace principles of NU or Compact City; however, it sets out mandatory procedures for affordable housing and community participation among others (New South Wales Government, 2019).

State Environmental Planning Policies (SEPP) (related to case study)

SEPP 70 Affordable Housing

The plan identifies that there is a need for affordable housing in the city, it states criteria for it and establishes the role of affordable housing in planning law. Affordable housing is defined as "housing for any household whose annual income is anywhere up to 120 per cent of the

median household income for the Greater Sydney (ie up to $109,200 according to 2016 census data)" (Gadiel, 2017). Also, it places affordable housing scheme provisions at Green Square to be mandatory (Gadiel, 2017), which is a laudable step to place it in government document which needs to be obeyed.

The SEPP 65 - Design Quality of Residential Apartment Development

This policy aims to:

- improve the quality of the built environment in New South Wales and achieve better aesthetics,
- satisfy the changing profiles of communities,
- "contribute to the provision of a variety of dwelling types to meet population growth",
- support affordability,
- provide visual privacy, solar access, and common spaces, and
- regulate amenity and space standards which contribute to the built quality of the buildings and public spaces (New South Wales Government, 2017)

Therefore, it directly aligns with principles of NU and Compact City in regard to build environment, affordability and quality public spaces. In connection with SEPP 65, the *Apartment Design Guide* was issued. It states the same principles in more detail and provides guidance during implementation. It places a special emphasis on scaling and how the building impacts the surrounding. According to the guide, communal open space is to be at least 25% of the size of the property or needs to demonstrate a good connection to open space or include an increased amount of private space. This can be seen as a step in the direction of sustainable transition where liveability is achieved by quality public spaces among other things. It goes on to include very detailed specifications of building design and construction and forms a basis for getting development approval (NSW Department of Planning and Environment, 2015).

SEPP Urban Renewal

There is also the State Environmental Policy from 2010 specifying Urban Renewal and aiming to promote it. However, it applies only to two areas within the metropolitan area - Waterloo - north of Green Square and Newcastle. From this it is apparent that when the plan was released in 2010, Green Square was not a top priority for the government induced urban renewal, but a year later the leading political party changed, which led to a shift of interests and the publication

of a new plan - Plan for Growing Sydney, which recognized Green Square as a urban renewal priority (Bunker, Troy, 2015).

A Plan for Growing Sydney

A Plan for Growing Sydney is a strategy presented by the Minister of Planning of NSW in 2014 to guide the use of land planning decisions for the next 20 years. This plan applies to the Sydney Metropolitan Area, including its 41 Local Government Areas. In this document, the vision is stated in order to make Sydney "a strong global city - a great place to live":

1. "a competitive economy with world-class services and transport;
2. a city of housing choice with homes that meet our needs and lifestyles;
3. a great place to live with communities that are strong, healthy and well connected;
4. a sustainable and resilient city that protects the natural environment and has a balanced approach to the use of land and resources" (NSW Government, 2014).

The goals 2 and 3 are the ones most related to this research and will be analysed in more detail.

Goal 2 expresses the plan's focus on delivering more dwellings, with options for different household needs and budgets, and located in well-serviced areas. Residents of these dwellings will be able to travel easily whether it is to go to work, school or social activities. Directions and actions are considered in the document to be followed, to reach this goal. Firstly, there should be an acceleration in housing supply across Sydney, and housing developed in designated infill areas highlighted by the Priority Precincts and Urban Growth programs of the NSW. Then, an acceleration of urban renewal projects across the city is planned in order to provide "homes closer to jobs". This will be realized by supporting urban infill projects and by prioritizing redevelopment in transport corridors and around strategic centres (Green Square is one of them). Thirdly, housing choices have to be improved to meet different needs, by drawing local strategies for housing planning, by subdividing existing lots and homes into medium density areas and of course by providing more affordable housing. Lastly, greenfield housing supplies are to be delivered in existing Growth Centres (NSW Government, 2014).

Goal 3, strives to create a city that is vibrant, has public and green spaces, facilities for sports, and areas that reflect its history and cultural heritage. To do this, the directions and actions given are firstly to revitalise the already existing suburbs by promoting urban renewal and social infrastructures. Then, the creation of "interlinked, multipurpose open and green spaces" should be encouraged by implementing the Sydney Green Grid. Thirdly, guidelines should be

set out for the creation of healthy built environments, and finally, the heritage of the city, along with arts and culture should be promoted by investing in growth opportunities (NSW Government, 2014).

Greater Sydney Regional Plan (Metropolis of Three Cities)

This plan sets a vision for the greater Sydney area until 2056 with the main targets being improved infrastructure, liveability, sustainability and productivity. The plan splits the city metropolitan area into three regions in support of building more strategic centres instead of having just one central CBD. The plan sets out to fight car-based sprawl but does not state the Compact City model or New Urbanism explicitly. A large part of new development is still set out for land release areas on the region's outskirts despite the fact that one of the priorities is infill development. It supports creating walkable local centres, diverse and affordable housing and a more accessible city (30-minute city). It identifies Growth Areas (one of them is Green Square) where the future housing should go, in which the infrastructure should sequence with the growth. However, it talks about urban renewal rather in a vague and not very specific way. It identifies the "missing middle" - referring to missing medium density housing as one of the key challenges. Other key priorities include quality of the public realm, finer grain urban form and human scale of development, access to open spaces and services and it sets the provision of affordable housing (which is given a strong emphasis) to be between 5-10%. With the principles of accessibility, connectivity and amenity, it is directly referring to New Urbanism. It furthermore promotes building resiliency and sustainability (NSW Government, 2018).

Eastern City District Plan

Whilst the Regional Plan states vision and objectives for the city metropolitan area, a district plan includes planning priorities, actions and more detailed goals (GSC, 2018b). The district plan follows the actions of sustainable goals of UN and align very well with it. Eastern City is one of the three regions coined in the Regional Plan. The vision for the Eastern City states that further "growth will bring urban renewal with increased infrastructure and services, open spaces and public places" (GSC, 2018b). It emphasizes the role of Eastern City in which during "the five-year period from July 2012 – June 2017, 36,889 dwellings were completed, which represents 27 per cent of all completions in Greater Sydney" (GSC, 2018b). The aim is to bring growth to renewal areas with sufficient infrastructure and open space with sympathetic infill development.
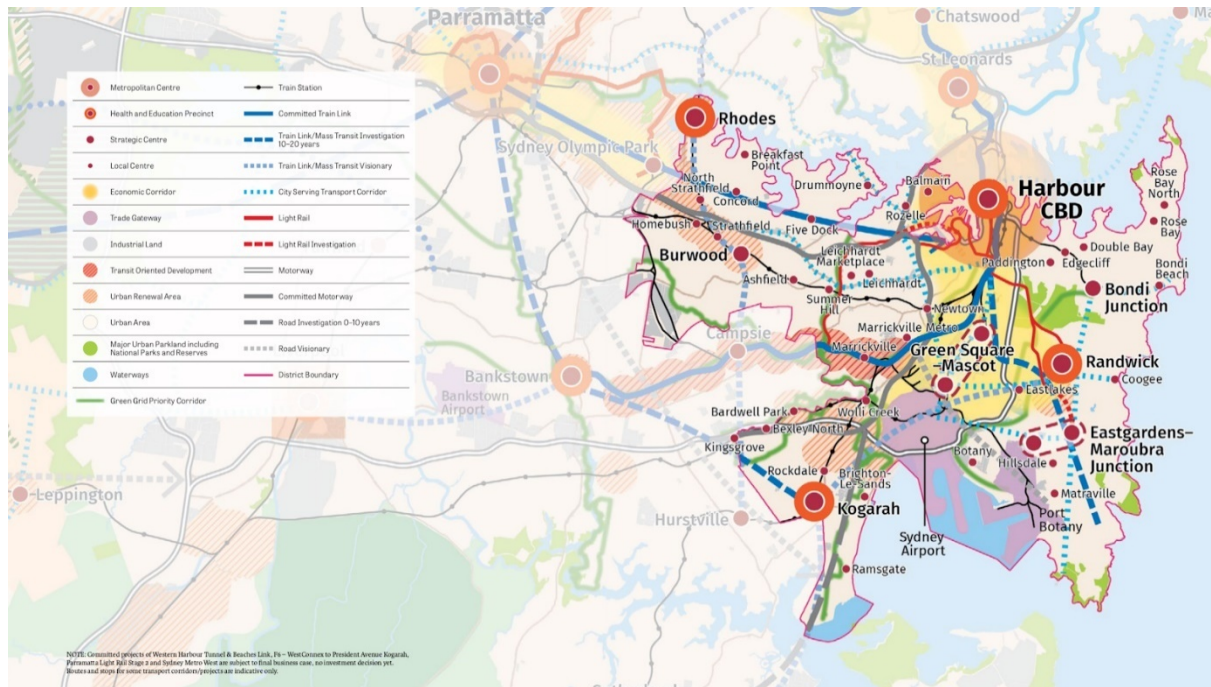
Figure 23: Eastern Harbour City map with Green Square identified as a strategic centre (GSC, 2018b)

It strives to develop a "more accessible and walkable city" and increase the number of jobs in strategic centres (GSC, 2018b) (Figure 23). So, we can see that the directions directly refer to the ones chosen for analysis and cover most of the principles of New Urbanism, and also align with the earlier Plan for Growing Sydney. Where we can see misalignment however is in the priorities of government and the City. From Figure 24 below, it is apparent that the government of NSW has different priorities for the location of the planned metro station when it places it in public housing area (Waterloo) and not in Green Square. Given the fact that the government is hesitant to provide the light rail and with traffic delays on the buses already, the train station remains the only reasonable higher speed transport option. The question is how this one station will cope with the more than 40 000 new inhabitants in the area in the next ten years.

Figure 24: Planned metro station bypasses Green Square development (GSC, 2018b)

Sustainable City 2030

This program, created in 2007 with the help of tens of thousands of citizens, expresses a vision for a city that is green, global and connected. It focuses on 10 strategic directions: "a globally competitive and innovative city, a leading environmental performer, integrated transport for a connected city, a city for pedestrians and cyclists, a lively, engaging city centre, vibrant local communities and economies, a cultural and creative city, housing for a diverse population, sustainable development, renewal and design, and implementation through effective partnerships" (The City of Sydney, 2017). The plan published in 2017 is the highest plan in the hierarchy through which the city prepares and aims to prioritize future development for Sydney and it aligns with the state priorities for growth which is beneficial. It was preceded by vast public consultation and based to address climate change. It argues for more affordable housing, prioritization of public transport and cycling infrastructure, climate adaptation, 50% energy provision from renewable sources, and that every citizen will be within 250 metres of green link among other goals (The City of Sydney, 2017). With this plan, the City of Sydney is trying to formulate priorities towards achieving sustainable transition until 2030. The goals are well manufactured and align with most principles of sustainable development, NU and Compact City. It states Green Square as a case study (Figure 25) which underpins its importance as a

new centre for Sydney City. The City states that the transformation process of GS is complex and heavily relies on the financing and provisions by the government (The City of Sydney, 2017). It also states that the public spaces and significant buildings are to be developed by open competitions to ensure high quality and independence.

Figure 25: Vision for GSTC from Sustainable Sydney 2030 (The City of Sydney, 2017)

"Urban renewal projects like Green Square result in higher density communities. When they're done well, they can create a more sustainable and liveable city and a place where people want to live"

- Lord Mayor Clover Moore

(The City of Sydney, 2017)

Sydney Local Environmental Plan (LEP) 2012

The plan makes provisions for the whole legislative area of the City of Sydney. The aim is to encourage growth, densification, provide a range of services and infrastructure, and promote mixed use as well as quality public spaces. When looking at the aim, it is in line with not only the principles of sustainable development but also other strategic plans for the city which form a basis for the creation of this LEP. The principles of New Urbanism are present, even though not developed in great detail. It specifically states density provisions for the Green Square area. It also restricts large retail development in close proximity of Green Square Town Centre to strengthen its position (The City of Sydney, 2012c).

Green Square Town Centre Local Environmental Plan 2013

This Local Environmental Plan (LEP) specifies permitted and prohibited development in the GSTC area, development standards and various local provisions. It emphasizes mix of uses to be included in the area, encourages the provision of services, and aims to generate employment

in the area. It states a very general framework for the development goals which is further specified in the Development Control Plan (DCP). Stage 1 applies to the now almost finished development of the library and its surrounding buildings controlled by Landcom (governmental land developer), and stage 2, released in 2013, applies to the rest of the town centre area. The rationale behind having two LEPs for the area is unclear but perhaps it has to do with different planning schemes for voluntary developer provisions, in other words, it differentiates a land towards which developers need to contribute more. Also, it differs between the stages of development (The City of Sydney, 2013b).

Some sites in Town Centre area are deferred from stage 2 document and older planning rules currently apply to these. Deferral means postponement of action so in this case, certain requirements need to be met for the land to be released for development with new planning controls. Therefore for these properties, the ban on development will be lifted only when sufficient infrastructure is provided, sufficient public domain has been realized and "council is reasonably satisfied that the owner has, or will, participate in the costs of the provision of the infrastructure in an equitable way" (The City of Sydney, 2006). This planning strategy allows the city of Sydney to make sure that infrastructure and public spaces will be in place before the development commences and gives the council the upper hand (Bruckshaw, 2019). A site located near the new library was in 2017 asked to be un-deferred and the city requested for a monetary contribution towards the provision of infrastructure, new pedestrian and bike lanes on developer's account and provision of sustainable features in coordination with the city's strategy (Central Sydney Planning Committee, 2017). Voluntary Planning Agreements between the council and landowners are in this case the mechanisms to achieve wanted outcomes (The City of Sydney, 2012a).

Green Square Town Centre DCP 2012

The Development Control Plan (DCP) for Green Square Town Centre was written in accordance with the Environmental Planning and Assessment Act 1979 and is complementary to the Local Environment Plans of Sydney and Green Square Town Centre.
The DCP provides detailed provisions in order to:
- "recognise and reinforce the distinctive characteristics of the Town Centre as the major centre for the surrounding neighbourhoods; and
- protect and enhance the public domain" (The City of Sydney, 2012a).

Some of the objectives of the DCP are to make sure that:

- Green Square Town Centre will become a model for sustainable urban renewal
- the precinct will develop to be "diverse, attractive and inviting" for people to live, recreate and work,
- it will feature high quality public spaces for the community,
- new buildings will "achieve design excellence and maximise the amenity of occupants and the overall performance of the Town Centre", and that they will fit in their context as to minimise the impact on the "urban character of the surrounding area",
- that emphasis is given on walking and biking and that access to public transport is provided, and finally
- that climate adaptation and mitigation is ensured through new developments (The City of Sydney, 2012a).

The DCP then lists detailed provisions and requirements further detailing the objectives.

Green Square Affordable Housing Program 2012

The aim of this program is to retain diverse population in the area as it undergoes gentrification. It uses "contributions collected through individual developers" to allow for affordable housing (The City of Sydney, 2012b). Such voluntary contributions can be either on-site provisions of affordable housing by developers or a monetary provision. In the latter case, affordable housing would be provided on another site in GSTC or in other areas surrounding it. This means that the developers have the option to offset the affordable housing out of the site. This may cause clustering of affordable housing in one area out of the major development and away from primary public transport. As of 2012, it was stated that 330 affordable units ought to be allocated in Green Square. According to LEP Sydney 2012, the provision of affordable units is to be 3% (The City of Sydney, 2012c). It states that affordable housing should be provided within the area and available for households with various incomes (low income, which is 50% or more of the median income of the city, and moderate income, which is between 80% and 120%) (The City of Sydney, 2012b).

Green Square Town Centre Infrastructure Strategy

Overall, this document identifies the infrastructure that is required, describes the relation between the infrastructure and the redevelopment of the GSTC, gives a cost analysis for the infrastructure, and provides with guidance on how landowners and developers can meet these

provisions. It is one of the only plans that recognize higher densities close to transport nods as a priority and therefore directly supports principles of Transit Oriented Development. The document highlights that *"the Green Square Town Centre will only reach its true potential if the supporting infrastructure (including the public domain) is realised"*. While the plan recognizes the infrastructure needs for the GSTC, it does not state how exactly would the traffic issues be dealt with given the increased population in the area (The City of Sydney, 2006). It also includes an overview of landowners in the area (Figure 26). There are 11 landowners in GSTC which makes the redevelopment rather complex given the fact that more stakeholders' needs need to be taken into consideration.
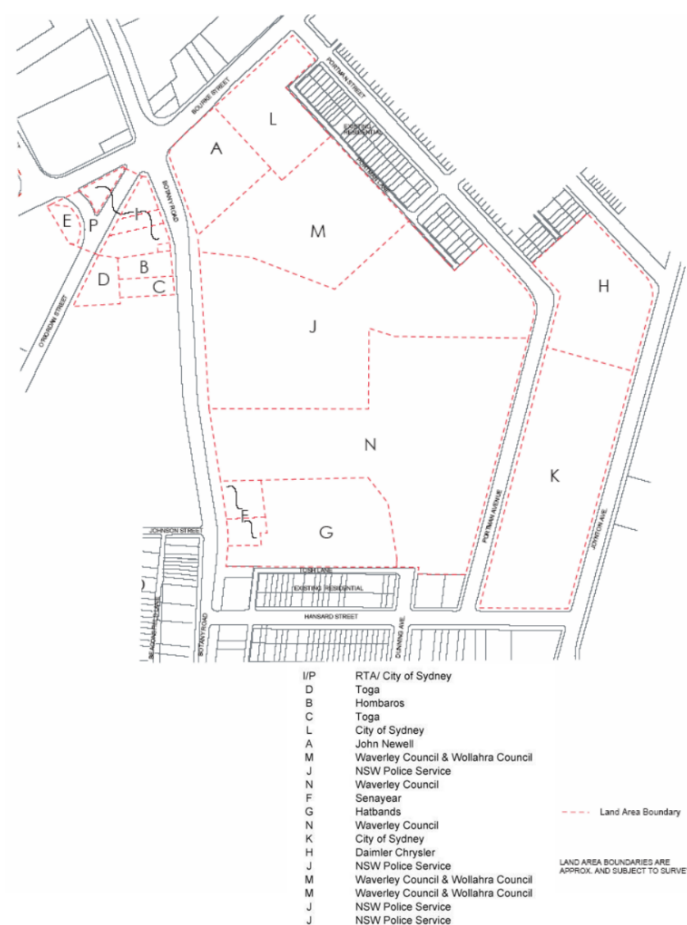
Figure 26: Distribution of GSTC land between 11 landowners (The City of Sydney, 2006)

Green Square Public Domain Strategy

The domain strategy establishes the design, material and technical links for successful development needed to integrate goals within the 2030 strategy, the DCP and other plans. It directly aligns with principles of this research for accessibility, public space and built environment, therefore follows the principles of New Urbanism in this scope. It states that the

residential population will be around 6,700 people and the workforce of 7,600 people which is unlikely given the limited provision of commercial space within the area. It establishes public space around the library as the centrepiece of action in the area and focuses on giving priority to pedestrians and green infrastructure (The City of Sydney, 2013a).

Figure 27:The cover of GS Public Domain Strategy portrays the preferred outcome for the central public square with a light rail (The City of Sydney, 2013a)

Strategic planning takeout

In order to have an overview of the presence of principles of New Urbanism and Compact City in the plans issued by the government and local council, a table was created. From the analysis of the main plans, we can see that the metropolitan planning system has shifted from visionary plans to market-driven pragmatism (Bunker, Troy, 2015). However, significant amount of principles can be found in various plans even though they do not directly state them as objectives for New Urbanism or Compact City model (Table 3).

Principle	Indicators	Plan for Growing Sydney	Greater Sydney Regional Plan	Eastern City District Plan	Sustainable City 2030	Sydney LEP 2012	GSTC LEP 2013	GSTC DCP 2012	GS Affordable Housing 2012	GSTC Infrastructure Strategy	GS Public Domain Plan	SEEP 65
Densification	Density in relation to provision of services, public transport and employment	X	X	X	X	X				X		
Transit Oriented Development	Densest areas to be located directly near public transport		X	X						X		
	Provision of cycling infrastructure and other modes of transport			X	X	X	X	X			X	
	Established public transport before and during housing construction		X	X								
	Transport supports development and adapts to future needs and is aligned with growth		X	X	X	X		X		X		
Mixed-use	Mix of retail, offices, and housing on site	X	X	X		X	X	X		X		
Accessibility	Short walking distance to daily activites, such public infrastructure, retail, schools, hospitals, library, sport facilites and other services	X	X	X		X				X	X	X
	A pedestrian system that connects important destinations through the city	X	X	X	X			X			X	
	Clear structure of pedestrian system and small blocks, buffering, good lighting			X	X			X		X	X	X
Affordable housing	Increase of supply in affordable housing based on the city's targets and diversity	X	X	X	7, 5% by 2030	3% of total floor area	3% of total floor area	3% of total floor area	X			
Public spaces	Increased range of recreational opportunities	X	X	X	X	X		X		X	X	
	Interactive, green, clean, walkable	X	X	X	X	X		X			X	X
	Space for cultural activities and communication	X	X	X	X	X		X		X	X	X
Built Environment	Recognizing character of place through aesthetics, appropriateness and blending architecture that respects local tradition, history and environment	X	X	X	X	X		X			X	X
	Housing is diverse in size, style and promotes compact city principles			X		X		X				X
	Interesting environment to walk in and human scale			X	X						X	X

Table 3: Assessment of presence of indicators in different plans (Own production)

In the following section, the findings from the analysis of the plans are combined with insights from personal visit and interviews with actors, forming an assessment of the presence of principles and indicators drafted in the theoretical framework in the regeneration of the site, and their possible contribution to a sustainable urban transition.

C. Principles

I. Densification

Density in relation to the provision of services, public transport and employment

Australian cities have a history of low-density suburban growth mainly due to the fact that they experienced rapid growth during the era of car-oriented planning (Bunker et al., 2017). Sydney has evolved rather organically and as a result, does not have a grid street pattern like Melbourne or Adelaide. The city's complicated topography with deep valleys, natural harbour, river body and mountains also present a barrier in terms of denser planning and especially with the provision of transport infrastructure and rail network. Australian planning has been since the colonial era dominated by the ideal of free-standing houses in cities and with plenty of space for development. As a result, only over a third of people in inner Sydney live in apartments and the density is around 2100 people per km^2 within the inner city and goes down to 500 people per km^2 in the outer suburbs (in comparison, London has density of 7500 people per km^2) (Lehmann, 2017). This situation is still apparent today even though the NSW government has been pushing for infill strategies. As a result, one of the biggest challenges for the future growth of Sydney is the need to accommodate new populations without increasing urban sprawl. Lehmann (2017) argues that massive transformation with better approaches would be needed to shift low-density suburbs into high-density alternatives. However, the Green Square regeneration can potentially be seen as a catalyst in such change.

There are two main approaches which the Australian government pushed for when dealing with densification in cities. First is building house extensions on existing plots (that might increase the urban heat effect and increase the number of cars if not served well by public transportation), and the second option is building apartment towers. As Lehmann (2017) comments, "in Australia, the two modes of housing supplied to the market tend to be large single houses in the suburbs or apartment towers in central urban areas". Instead of only focusing on these two options, there needs to be more focus on townhouses and apartment blocks which would reflect the shifting demographics of the city and provided with suitable options for all communities and types of dwellers and have a human scale. Increasing density in Sydney is also according to Haaland (2015) connected with limiting the number of green spaces which can be seen as a challenge when implementing the Compact City model.

High densities around Australian cities have a bad reputation mainly because as Gibbs (2019) mentions, "we've not been particularly good at it" (Gibbs, 2019). He adds that even though Australia has been steady in incorporating the favourable results of higher densities, the fundamental obstacle seems to be the belief that high-density housing is not fit for upbringing children. More and more developers start to realize that creating a community through higher densities is the key to creating local identity, activation and liveable places. Also, residents are becoming more aware of the benefits of higher density housing such as shorter commuting time, access to amenities and walkability. Gibbs (2019) points out that "build environment can be a constructive force for social change and the property industry is uniquely placed to invoke a sense of community that will maximise social value". This progress is slowed down by the fact that the government is incredibly bad about speaking about positive effects of density to people which also adds to massive opposition to densification in Sydney, which is mainly rooted in cultural norms (Vigiola, 2019).

The density in Green Square should go up to 22000 people per km^2 which is higher than Hong Kong or parts of New York. Therefore, significant attention needs to be paid to overshadowing issues, traffic management and provision of services in the area (Spencer et al., 2015). 2016 has been the first year when there was more construction of higher density dwellings than detached ones in the City of Sydney (Troy, et al., 2017). This is for sure a success factor of Compact City policies and densification, however as Troy (2017) argues it may not be a success for everybody. He states the two main problems are gentrification and infrastructure. Given the fact that development on Green Square is market driven, it is a common pattern that development in brownfield areas generates gentrification with the allocation of apartments for generally higher incomes which also happens in the area. There is not a significantly large current population in the area, however they will be influenced by the development with different social dynamics. This development will drive lower and medium income workers outside of areas with good public transport if a significant amount of affordable housing is not provided.

Green Square is undergoing a rapid change from an industrial to a residential neighbourhood and increasing density and population growth will surely have implications. With so much development still to come within the area, it is difficult to predict the future and say how exactly the neighbourhood will turn out (Sharpe, Moore, Paddon, 2013).

From the research by the Institute of Sustainable Futures, the Green square area has a higher proportion of single households and houses more educated citizens than other parts. Since a lot of young professionals' work in the CBD area, they are less dependent on cars (Sharpe, Moore, Paddon, 2013), which can, in fact, lower the vehicular traffic in the area.

There are several implications of increasing higher densities in urban renewal areas. Investors are usually more involved in the residential market as they handle the development after purchasing it from landowners and continue to sell it on a Strata Title basis than dealing with other things. When planning for infill development or brownfield renewal, there needs to be a consideration of implications and consequences. With infill development, there will be an increase in the densities within the urban area. This increase will usually happen over a more or less short period of time and will affect infrastructure, services and other spheres of human life. However, building high densities just as an opposition to sprawl is not the best solution. Research by Jan Gehl found that the most comfortable city environment for a citizen to walk around is one where buildings are between 3–6 storey high (Snyder, 2014). Therefore, following these principles of human-centric design, instead of increasing densities where possible and as high as possible, the key is to create sustainable and people-centric cities with human centric design. In Australia, the growth targets and deliveries are usually dictated by the state government without much consultation with the local councils (Infrastructure Australia, 2018) so even in the case of densification, there are significant misalignments and planning controls for densification are likely to be influenced by the government or the current housing market.

Green Square area is developed as a high-density precinct. This approach is well argued for and justified by its size, location and opportunity of renewal. However, when we look at how the renewal area blends with the neighbouring parts, we can see that it looks like an island in a mostly low-density environment. The urban fabric usually contains dense pockets amid low-density setting and the middle part is scarce. This can be seen as a wider issue of the "missing middle" housing in Sydney.

Randolph (2006) outlines some implications of an increase in higher density housing in Australian cities. The housing market will be more controlled by investors and developers as most of higher density development will emerge from redevelopment projects. Strata Title housing will form the majority of new higher density apartments, and with this increased pressure there will be a need to make this housing option problem free. He also states that

planners need to be careful about placing higher density living in urban areas as it might create division between social groups. While families tend to reside in lower density areas, young professionals and singles tend to live closer to urban cores. So planners need to promote a better mix of social groups when planning renewals.

Other implications may include the provision of open space which might become contested and more children-friendly facilities which would draw families to higher density areas. Another important implication is community provision. Nowadays most residents of higher density are drawn outside of their precinct for recreation and social life. This relates to the fact that homeowners are more likely to form social connections than renters. But this not seem to be the case in GSTC where amenities for communities are already partly provided.

Another interesting research found out that there is not a significant connection between the rise of small family units and their preferences for units in shared apartment buildings. This said, the higher density housing in Sydney still currently serves as a transition to suburban living or detached houses that the family will eventually choose after some time (Randolph, 2006).

To sum up, there needs to be a strong independent planning vision from local and government authorities and developers will need to be pushed to provide more liveable solutions. In order for Australians to be comfortable in the rental environment and for high density to be appealing like it is in Germany or the Netherlands, the government would have to improve tenancy laws and push developers to build quality and mainly more affordable housing with quality public spaces and transport options (Bunker, Troy, 2015) and also put more emphasis on speaking about the positive consequences of apartment living. However, with influx of young professionals and migrants who are more likely to prefer inner city living, the case for quality higher densities is promising.

II.   Transit Oriented Development

Densest areas to be located directly near public transport

Transport has been the Achilles heel of Compact City policy (Bunker, Troy, 2015). Nevertheless, from the planning documents, it is apparent that the GSTC is indeed planned as a transit-oriented development and the highest densities will be located near the train station or public plaza. The government established a Priority Precincts Policy which can override the LEPs and aims to increase densification close to transport nodes (Pawson, 2015). This can,

however, be seen as an opportunity for the developer to gain planning approval for an increased number of dwellings without the need to "give back". To conclude, GSTC will create density, which is rare in Sydney context, so the provision of dense areas does not seem to be the issue. On the other hand, it will be interesting to see how this density will be supported by other services.

Provision of cycling infrastructure and other modes of transport

The cycling culture in Sydney is not very established and is mostly on a recreational level. Cycling to work is not currently established as a viable way to commute in most city areas mainly because of difficult topography and missing infrastructure. The City of Sydney has recently opened the first separate cycling path through the CBD which was at first met with strong opposition but over time created a push for other areas to include cycling infrastructure as well, but wider connections are still missing. The provision of cycling and public transport has become a priority in most planning documents across the hierarchy. Even in GSTC, cycling paths are already built and are to be connected with the rest of the city in the upcoming years. Cycling is still seen as an unwanted mode of transport on roads and does not have much dedicated infrastructure (Herreck, 2016). The government is furthermore not making the situation better with the introduction of fees up to 350$ for not wearing a helmet or for not having a bell. Tour de France winner Cadel Evans said that even he would not ride a bike in Sydney, because of the poor infrastructure and aggression on the streets. With the introduction of cycling infrastructure and bike parking in GSTC (Figure 28), the situation could change at least for citizens of Green Square for better when they will be able to reach CBD in 20 minutes on a bike.

Figure 28: Proposed Zetland Avenue with cycling path (CityArtSydney, 2015)

On the other hand, the infrastructure strategy states that buses "will remain the most appropriate public transport mode for most of Sydney over the next two decades" (The City of Sydney, 2006). With the struggle that the introduction of light rail faced, and the limited presence of heavy rail lines, buses will indeed keep being a popular option for a significant amount of the population in the city and in Green Square respectably. Things will however change with the introduction of metro lines which are under construction and also the construction of the planned light rail. But with the pace of the development, it will take a long time before that happens.

Established public transport before and during housing construction

Establishing public transport before and during the redevelopment of an area is essential to ensure that the new residents will have access to means of transportation in order to easily reach their job, school, recreational activities and so on without having to rely to the use of cars. Since building transport infrastructure may take a long time, it is preferable to have it sorted out before starting the construction of houses. This is of course profitable as well for landowners, since well served neighbourhoods have an increased value. Moreover, having public transport made available beforehand increases the density you can generate in an area, since the more residents there are while there isn't enough public transport to serve them, the more cars will be used, which is first of all against the idea of a sustainable transition, and secondly, it will create other problems to be dealt with, such as congestion and parking availability.

There is an apparent lack of dedication to this element of transit-oriented development since from the strategic plans of the city, only two mention the necessity of establishing transport before having people moving in. This is unfortunately not sufficient. More details on the lack of sufficient public transport to serve all the new residents that will be moving in the area are given in the following indicator.

Transport supports the development and adapts to future needs and is aligned with growth

Bunker and Troy (2015) conclude that "in previous plans, areas planned for higher density have not adequately considered the public transport service levels and accessibility required to support them". The inclusion of transport planning in redevelopment projects has been the vulnerable point of redevelopment strategies in Sydney (Crommelin et al., 2017). Furthermore, the GS redevelopment project is facing critique for its poor traffic management in the area.

The precinct is still under construction and the train station located in the heart of Green Square is already experiencing overflowing issues. The situation is only set to worsen once all the apartments in the area are finished. Green Square is located between Sydney's CBD and the international airport. Therefore, with increased volumes of passenger traffic in the area, the station will in the close future become a traffic choking point. Even now, passengers travelling with large bags from the airport to the city during peak hours have a hard time getting off the stations as the lines are overcrowded (O'Sullivan, 2017). The transport corridor between Green Square and Sydney CBD was identified as a high priority initiative with a timeframe of 5-10 years (Infrastructure Australia, 2018). However, both major stakeholders have varying opinions on the issue. The City has reserved parcels for tram connection, whereas the government is pushing for a metro station nearby and has not identified the possible station as high priority in the short term (Infrastructure Australia, 2018). So, in the next decade, it is unclear how traffic congestion will be dealt with within the Green Square. In the meantime, the government has increased the number of busses and is planning to add services to the train. According to traffic experts from The University of Technology, buses are not a sufficient and real option for the increased traffic. Light Rail would therefore seem as a suitable option as it would provide with larger capacity and increased speed. The City of Sydney has bought land in the suggested light rail corridor from the direction of the CBS, but no plan has been established for the beginning of works on the rail network so far. The government of New South Wales is responsible for delivering transport solutions as well as a major part of funding. Therefore, it seems that the City of Sydney does not have enough governing and financial resources to get the project going alone. Meanwhile, the city is trying to establish short-term solutions such as incentives for cycling but struggles to provide with long term options. There is apparently a lack of funding from the state government to support the building of a light rail to Green Square (Bruckshaw, 2019) as the City is experiencing a lot of massive infrastructure projects such as a new metro line, Westconnex, and preparation works for a new airport and light rail through CBD to the Eastern Suburbs (O'Sullivan, 2017).

The Development Control Plan establishes the opportunity for car sharing and stresses the need for limiting car use within the area which is a step in the direction towards sustainable transport. It also states the provision of cycleways (Figure 29) and flow of traffic in the area.
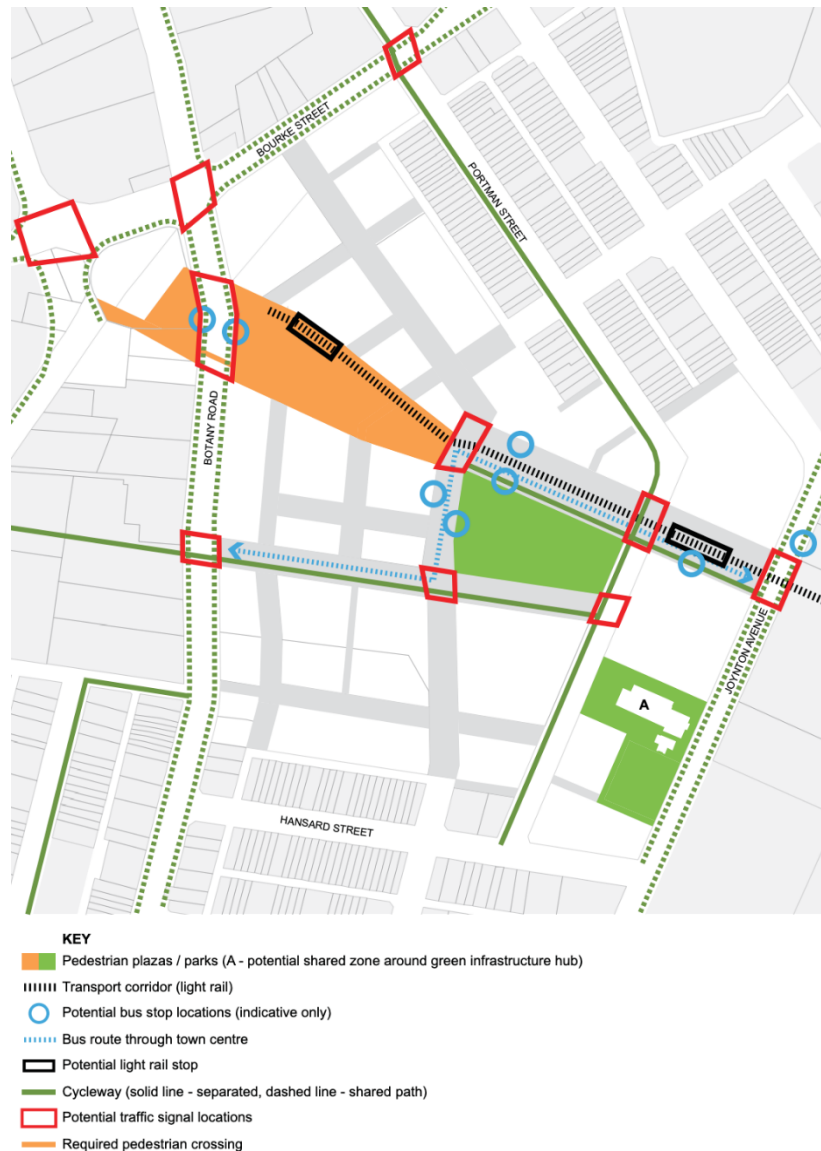
Figure 29: Transport structure plan (The City of Sydney, 2012a)

The Zetland avenue is designed to be a major avenue connecting east to west. Since the present connection that would be able to satisfy the traffic volumes is missing, there is an opportunity to create it. As the Zetland avenue points directly to the public plaza (Figure 29), traffic will funnel through surrounding streets, therefore there is a missed opportunity to connect streets better to the CBD direction and westwards. Nevertheless, local streets in GSTC will function and provide a walkable city centre, but the wider traffic issue which is already apparent in the area will remain.

The Green Square Transport Management and Accessibility Plan identifies "measures to improve the accessibility of Green Square by sustainable modes such as walking, cycling and public transport" The key findings of the TMAP are that "business as usual scenario for growth in the area would be incompatible with the vision for Green Square", and "that the vision for

Green Square is best achieved by adopting a scenario of no net increase in car traffic for the renewal area". This scenario includes limiting car parking, developing transit corridors and prioritizing cycling and walking (City of Sydney, 2012d). It is however questionable if only by limiting parking and car use within the area, the car dependency will decrease, given the fact that almost all residential buildings include a parking garage. It also states that most of the travel demand will be generated by growth from residential areas outside of GSTC (The City of Sydney, 2012d) but this statement is misleading as other areas are naturally connected to GSTC. The Town Centre is on the junction of three major roads through southern Sydney which provide a link between CBD, the airport and Port Botany. The capacity of such roads is close to being reached. There is a hope that the city will use developer contributions to push for an increased capacity in the area and create better connections together with provision of more viable public transport options.

To conclude, the issue of transport infrastructure in GSTC demonstrates that priorities differ between state and local government and this is made more complicated by funding issues and different responsibilities. This misalignment leads to insufficient deliveries and missed opportunities (Infrastructure Australia, 2018).

III) Mixed-use

A mix of retail, offices, and housing on site

The total area developed in the GSTC is approximately 410,000 m^2 of gross floor area comprised of:

- 286,700 m^2 of a residential area
- 16,500 m^2 of retail area, and
- 106,800 m^2 of commercial/other areas (The City of Sydney, 2006)

Also, the whole GSTC is zoned as B4 - mixed-use area (Figure 30). So, on the first sight, it seems that the provision of mixed-use should not be an issue, however, the reality is much more sceptical.

Figure 30: Land zoning in GS (Urbis, 2016)

Given the fact that GSTC is located close to CBD and other retail areas, it is according to Urbis (2016) unlikely that it would generate a significant amount of retail opportunities but will include dining facilities as the centre grows. "At this stage, the economic opportunity beyond residential construction is not clear. Property experts agree that it will be difficult to attract commercial tenants to Green Square until the town centre has amenity for workers" (Urbis, 2016). In any case, the DCP (The City of Sydney, 2012a) aims to introduce mixed land use in most of the area. Most of the employment opportunities within the area are currently in the wholesale industry but in the future, it is expected that it will attract technological and knowledge sector which would benefit from the location of universities in short distance from the site. From the land use map (Figure 31) we can see that the majority of buildings around the library plaza and around the main streets will host retail in the ground floor and some in the second floor, however limited.

Figure 31: Land use in Green Square Town Centre (ground floor (left), first floor (middle) and above (right)) (City of Sydney, 2012)

This will create walkable streets with plenty of shopping and dining opportunities. Secondly, four buildings around the train station are to be built as entirely commercial which is a smart move with regards to the proximity to a major transportation hub. However, these four buildings are surely not going to be able to generate significant employment opportunities for the whole GS area. It is unclear whether the rest of the land (west of GSTC) will be rezoned to commercial or residential, however, according to Bruckshaw (2019), it is unlikely that the area will become a mixed-use precinct given the fact that it is significantly more profitable for developers to sell housing units than retail or commercial thanks to a booming housing market. Additionally, there is a limited amenity in the Town Centre e.g. retail, parks, plazas, as the area is under construction. Commercial tenants want to see the vision unfolding so they would be confident in the place. Another case hindering mixed-use is also the unattractive industrial landscape. The area is currently unattractive for commercial tenants who are interested to provide a quality environment for their workers. Green Square has also a significant competition with other already established business precincts around Sydney which makes it a riskier choice as public transport connections and presence of other companies is stronger elsewhere. Furthermore, with limited parking in GSTC, they would be forced to compete for on-street parking spaces with the rest of the residents of the area. Also, flooding issues are a worrying factor but stormwater management in the area was put in place recently so the flooding in the area should be avoided (Urbis, 2016).

While mixed-use provision (mainly retail) will not be such a problem in the town centre, thanks to the proximity of train station, with the statement that buses will remain the major form of

transportation and light rail will not be introduced in the next 20 years, the situation is different in the land around the town centre. The land zoning favours significantly residential development and it will be problematic to reintroduce mixed-use areas. Griffiths (2011) states that once the area housed a large number of employment opportunities, which have been lost to private housing development. With only a handful of cafes and supermarkets, the wider area has become a large housing estate lacking vitality (Griffiths, 2011).

IV)   Accessibility

Short walking distance to daily activities, such as public infrastructure, retail, schools, hospitals, library, sport facilities and other services

There is a new library and community and art centre build directly at GSTC together with a supermarket and a cafe. More retail will follow once the buildings are finished, given the fact that most buildings in GSTC have the ground floor reserved for this purpose. There are plenty of parks already built in the area, however larger open space with sport facilities is located in Centennial parklands about a 40-minute walk from GSTC. There is also a shopping district in Newtown and in Alexandria as well as in the CBD which is 9 minutes by train. We can conclude that GSTC is well serviced by retail and public infrastructure, however the provision will need to be higher in the future. On the other hand, the provision of schools and hospital in the area is currently lacking. The walking distance to reach GSTC for people from around the Town Centre in most cases does not exceed 800 meters (10 minutes radius), however direct pedestrian routes are currently scarce as well as cycling routes (which are under construction).

A pedestrian system that connects important destinations through the city

There is a hierarchical order of streets in the GSTC that connects to the wider areas of the urban renewal site. The main square is designed for pedestrians even though some traffic is still allowed. The speed limit is reduced to 40 km/h in the whole GSTC and 10 km/h in the area around the central plaza which will reinforce the role of pedestrians. Inner laneways are designed in the area for better permeability. Most footpaths are of quality apparel and they look "friendly" to walk onto and provide safety from traffic. They also provide shading by the trees and awnings. It is apparent that the pedestrian routes through the area are well designed however when reaching the town centre from outside, visually appealing pedestrian access is lacking (Figure 32 and Figure 33).
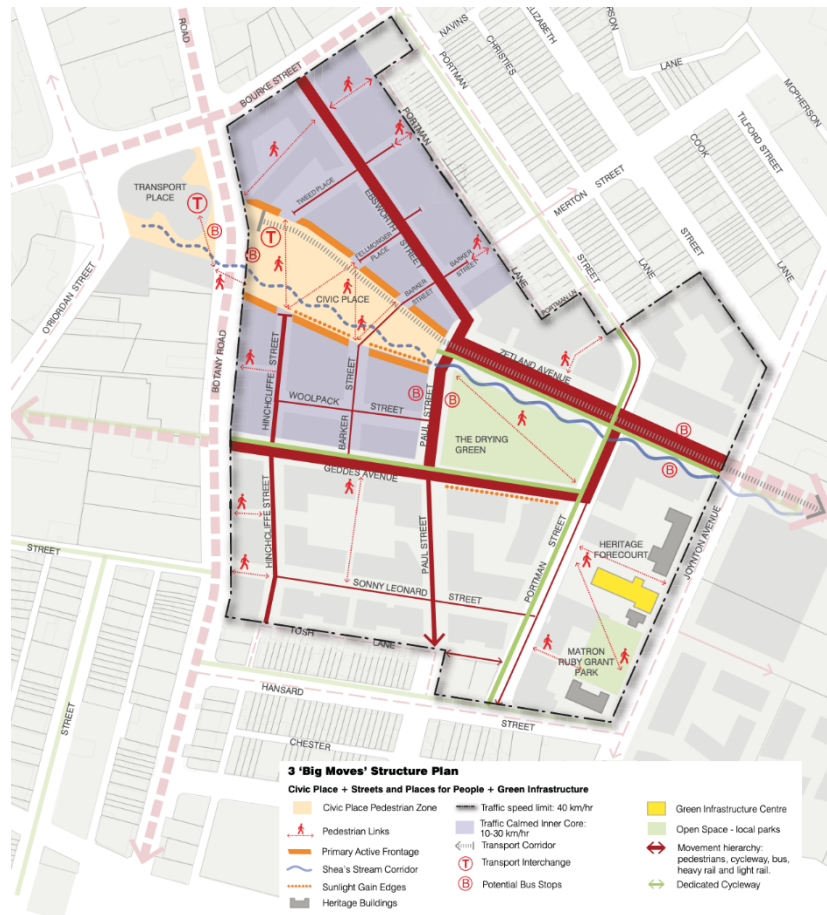
Figure 32: Structure plan for civic place, streets and places for people, and green infrastructure in GSTC (The City of Sydney, 2013a)

Figure 33: Unappealing access to GSTC from the south (Own production)

The clear structure of a pedestrian system and small blocks, buffering, good lighting

From the proposed services and amenities that are to be included within the walking distance of the new town centre, such as the library, new aquatic centre, community centre and gallery, two new parks and a planned retail precinct close to the station, we could conclude that the area will have a good accessibility to services. However, it is stated, that there is a lack of educational and hospital facilities within the area to account for the increased population density. Also, the train station will hardly be capable of handling all the passengers in peak hour, which will impede the accessibility for citizens. The lightning standards are discussed in the Public Domain Strategy together with the provision of buffering by plantings and trees and higher. The town centre is split into various blocks that promote fine grain structure and promote the interesting walking environment.

V) Affordable housing

In this report, the focus will be placed on affordable housing and not social housing. For social housing in Sydney, residents need to be eligible by fulfilling several criteria including having a very low income. Whereas affordable housing is also for households on moderate income and should not "absorb more than 30% of income" (The City of Sydney, 2015). As a result of a steady wave of migration, Sydney is currently experiencing a housing crisis with an "undersupply of dwelling stock" (Wulf, 2017).

Increase of supply in affordable housing based on the city's targets and diversity

Sydney is experiencing a housing affordability crisis and has one of the most unaffordable housing markets in the world, where a typical house costs around 12 years' wages. The issue is nationwide with Australia being ranked as the 3rd least affordable housing market in the world after Hong Kong and New Zealand (Devine, 2017). In the last decade, the city has experienced a 70% growth in rents and a 65% growth in sales prices. Furthermore, 84% of households are in housing stress, and the number of homeless people has increased by 25% since 2006. The median rental price in the city was $720 per week, this means that a household needs to earn a gross income of $120,000 per year in order to not spend more than 30% of the income in rent (The City of Sydney, 2015). Therefore, there is an affordability gap (Figure 34) for people who want to rent or buy a property. It is projected that NSW may need annually up to 10,000 additional housing units to keep up with the population increase (Lim, 2018). As apparent from the figure below, it is almost impossible for low and moderate-income

households to buy a property in the inner Sydney neighbourhoods so they are pushed out to suburbs that may not offer services and employment opportunities for such communities.
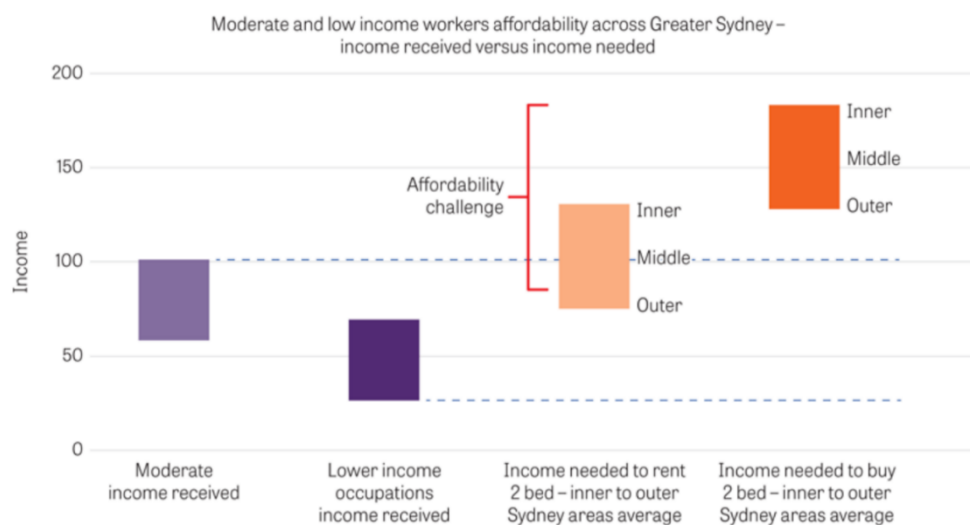
Figure 34: Housing affordability for moderate- and low-income workers - income for household in AUD (GSC, 2018)

The GSTC area is undergoing gentrification, however only 3% of affordable housing is planned to be provided (Pawson, 2015). As the further redevelopment of the area will push the land prices up together with rents, it is expected that the provision of affordable housing will need to be higher if the community would be to become truly diverse. Recent research shows that "about half of young Greater Sydney residents are considering leaving Greater Sydney within the next five years" (GSC, 2018a) mainly due to housing unaffordability.

Green Square has due to the scale and size of redevelopment and location of the site, the potential to incorporate a significant portion of affordable housing targets set for the city, however according to Bruckshaw (2019) a limited number of affordable housing in the area has been a large problem.

The City West Housing (affordable housing developer) recently opened 104 units of affordable housing in Green Square Town Centre near the community centre (Figure 35) and there should be 330 affordable rental units provided by the City of Sydney in GSTC in total (City West Housing, 2016). Landcom states that there will be a total of 4,000 residential dwellings in the GSTC which would mean only 120 units would legally be provided if the 3% minimum scenario was followed. So with 330 units proposed, the City will provide three times more than minimum. But this will still not be enough since the City West states that "eventually more than 7,500 people will move to Green Square Town Centre" (City West Housing, 2016).

The city can secure new units in development areas, by using voluntary planning agreements, developer levies or by selling their land (The City of Sydney, 2015). The council rarely uses mandatory inclusions and even if they do, with the case of the Town Centre for example, we can see that they are very low - currently set on 3% of floor space. They state that "state planning laws affect the ways that local governments can supply housing" (The City of Sydney, 2015). So, in this case, the city blames the government for having very low targets. Developer levies can be used as a key mechanism towards including more affordable housing. The levies are currently allowed in only three areas city-wide and should instead of 3%, opt for a 15-30% in order for city targets to be reached (Morris, 2018). Morris (2018) further states that "a major barrier to affordable housing supply in the inner city has been the state government's reluctance to agree that affordable housing should be a sizeable proportion of the housing to be built on state-owned or controlled land that is being renewed" and concludes that the federal and state government need to play a bigger role in preserving land for affordable housing.

As previously mentioned, the Green Square area is identified as a strategic centre and will be the largest redevelopment in Australia to date with significant population density. This would ideally create an opportunity to include affordable housing on a large scale and help to level up the demand in the city. However, this opportunity is missed when looking at the provision of affordable housing units in the area. Even though the nearly located Waterloo houses a large amount of social and affordable housing units and is being upscaled to create even more, it is still not enough for the city's demand.

The development of affordable units was partly financed from the offset requirement towards affordable housing by Green Square area developers and built on council property - the former site of a hospital, therefore the affordable housing was channelled to two buildings which are right next to each other. The buildings include a public area which is of high quality and residents pay 30% of their salary as rent (City West Housing, 2016) (Figure 35). But affordable housing has ended up being clustered together instead of being dispersed through the neighbourhood which would create a more liveable outcome.

As the city had to sell land to an affordable housing provider (Visentin, 2018), it can be observed that the monetary or other incentives to provide affordable housing by developers are not effective, as the target is set too low. The policy constraints can be recognized as a major barrier to including more affordable housing and reaching the target of 7,5% set in the 2030 plan.

Figure 35: Affordable housing in GSTC (Own creation)

VI)   Public spaces

The city of Sydney faces limitations when it comes to the amount of open space it can provide to its citizens, even though it is famed for an outdoor lifestyle and plenty of natural environment around. With this taken into account, new parks and public spaces are designed to meet the needs of the increasing population of the areas. Some of the key recommendations given by Gallagherstudio (2014) were to "redesign leftover streets, lanes and service corridors as supplementary open spaces" and design "flexible park spaces that accommodate a range of activities that foster relationships between residents".

Increased range of recreational opportunities

During the site visit, it was observed that the GSTC provides its inhabitants with active and passive recreational space (Figure 36). The interconnected streets create a sense of walkability and together with a series of public spaces boost the community feeling in the area.
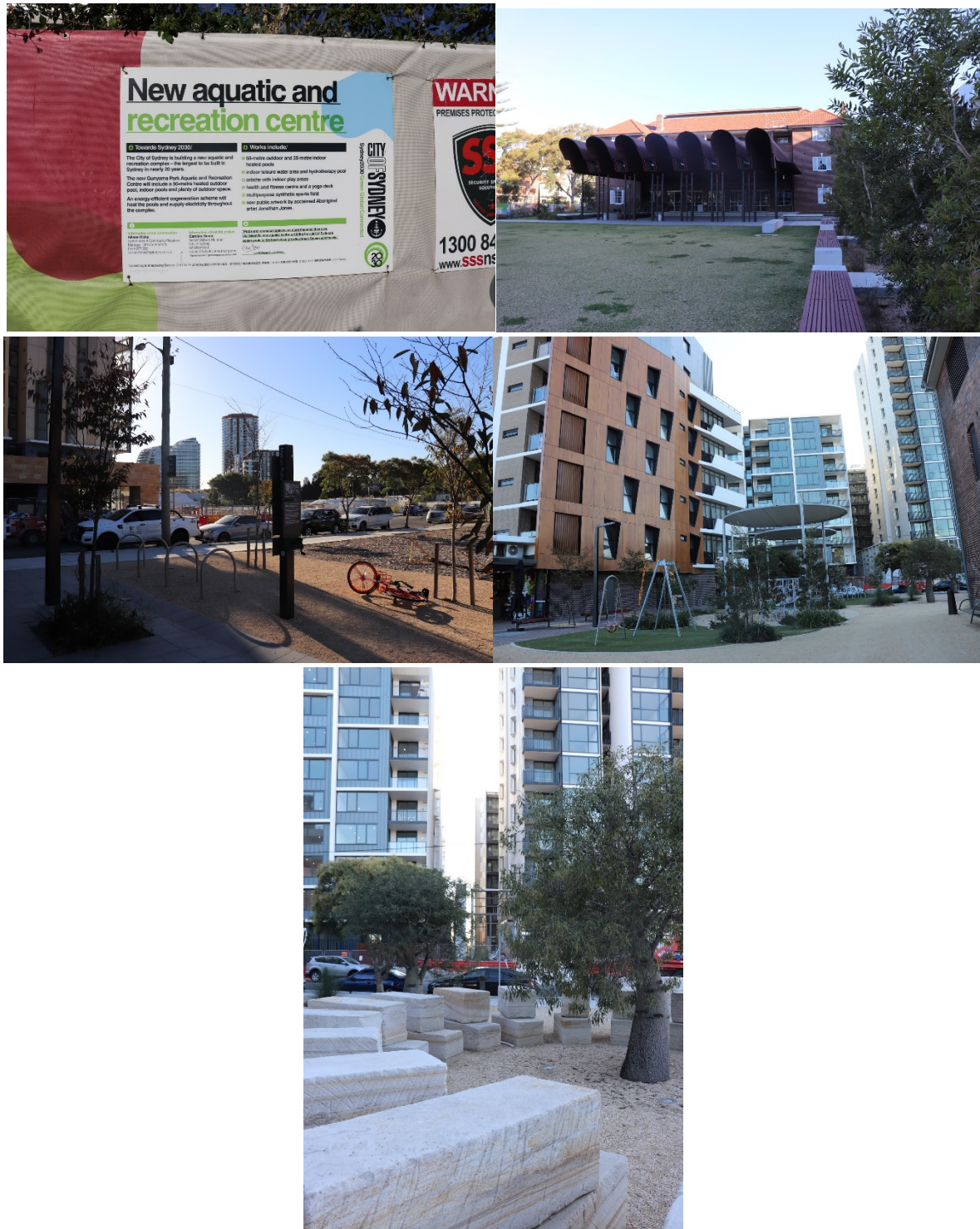
Figure 36: Active and passive recreational spaces in GSTC (Own production)

The Green Square area will feature a significant number of parks and public spaces, but a larger open space will not be provided directly in the GSTC. However, the site is closely located to Centennial parklands which provides large open spaces (Figure 37). Therefore, better connection is needed between the site and the open space to accommodate for the future needs of the residents. The Moore Park, located closest to the Green Square, is unfortunately not capable of providing the open space for new citizens as it serves as a golf course. This golf course is the oldest public one in Australia and has one of the best views of the city skyline. From the recent masterplan by Centennial Parklands, the golf course is to remain and be modernized. This is nevertheless a questionable move given the fact that the City faces critique for having inner-city golf courses instead of open space which could have been enjoyed by all citizens.
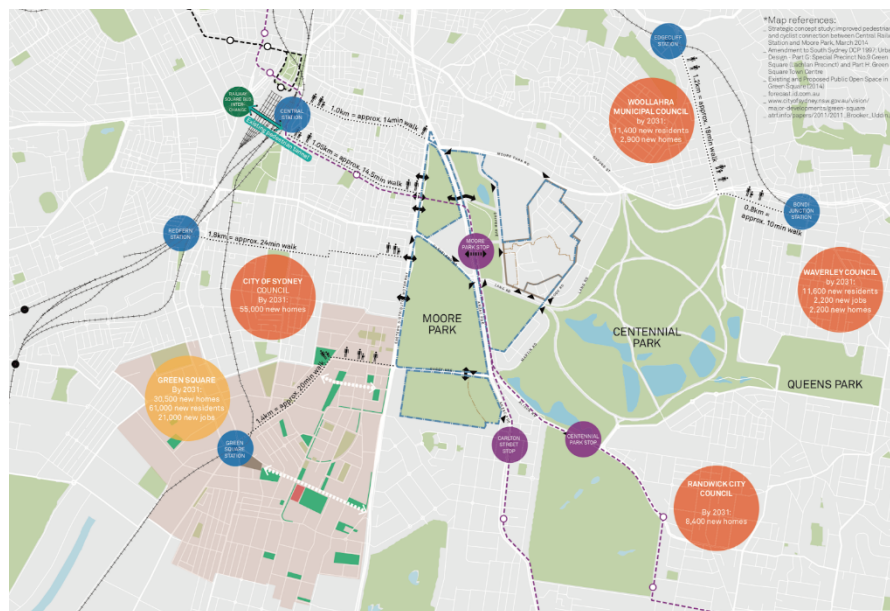
Figure 37: Connection to significant open space in Green Square Urban Renewal Area (Hassell, 2016)

Interactive, green, clean, walkable public spaces

There are instances of green urbanism in GSTC as most of the courtyards are filled with greenery of some sort and park spaces (Figure 38). Species of trees native to the area were used which are a dominant element of a streetscape in Sydney. Furthermore, most buildings have balconies providing contact with the outside (Figure 38) (Rashid, Ara, 2015). Therefore, it can be seen from the master plans and the site visit that the provision of greenery has been one of the important pillars of this renewal. The planning in the area integrated an environmental strategy with a place-based approach opposed to the typical approach of designing the road layouts and built masses first (Rashid, Ara, 2015). From this approach, the development was

considered by Rashid and Ara (2015) as a "successful model of transformation of a neglected inner-city precinct".

Figure 38: Public spaces in the area (Own production)

Space for cultural activities and communication

Easthope and McManara (2013) state that "positive social interactions and social cohesion are central to the success of all large-scale residential redevelopments" (p.1). From the number of events and workshops in the area, it seems that the community in Green Square is actually vital and there is a lot of community groups organized in the area. There are groups focusing on growing local food and cycling, along with Chinese and Indonesian cultural groups (The City

of Sydney, 2019a). Moreover, the Town Centre has a library and a community centre that already attracts visitors, which is good marketing for the area. Furthermore, a study published by The University of New South Wales (Paine, Mitchell, Thompson, 2016) said that the neighbourhood performed very well in supporting healthy living, walkability, application of sustainable systems and materials, and stormwater management. The residents were generally satisfied with the level of social interaction.

The Town Centre has been in May 2019 awarded 6 stars in Green Star - Communities rating. The Green Building Council of Australia recognizes Green Square as a leading example in high-density planning, creating public spaces, building on local heritage with the community precinct, recycled stormwater use, and water management. Green Star Communities award assesses the design, construction and planning of large development projects within five categories which include governance, liveability, economic prosperity, environment and innovation (The City of Sydney News, 2019). This award is a proof of quality public spaces and facilities.

Figure 39: The Community centre of GSTC (Own Production)

Figure 40: The Library in GSTC (Own Production)

Recognizing the character of a place through aesthetics, appropriateness and blending architecture that respects local tradition, history and environment

The GSTC is set in a former industrial area with many historical warehouses still present. However, most areas directly near GSTC feel obsolete and abandoned which is not appealing at this stage (Figure 41). Until people start to see changes to the surrounding areas, "the realisation of Green Square will seem a long way off. The concern, therefore, is that progress is too slow" (Urbis, 2016). The case is different with the former South Sydney Hospital which has been carefully restored and turned into a community centre and art recognizing the history of the place. However, the other buildings at GSTC does not seem to directly refer to local heritage through their aesthetics (Figure 42) apart from the colour palette of the buildings which seem to somewhat respect the local industrial heritage.

Figure 41: Industrial warehouses south of GSTC (Own Production)

Figure 42: Buildings at GSTC (Left, own production; and right, CrownGroup.com, 2019)

Apart from the library and the Crown building (Figure 42) which have distinct architectural features, other buildings feel "common" and not very attached to the site. Costigan, (2015) in his personal review of the architecture in the Green Square area noted that "in short, there are a few fine aspects of urban design. But the overall effect is the dominance of the bland box architecture and the lack of variation in the urban fabric". This can be indeed observed in most of the buildings in the GSTC (Figure 43). Additionally, when looking at the plans for the housing by private developers Bridgehill, Mirvac and Crown, they advertise a vision which is aimed at affluent population. This fact is mirrored by the apparel of the buildings which will be expensive to rent however they can hardly be recognized from each other (Bridgehill, 2019).

Figure 43: Series of building blocks found in GS (Own Production)

Housing is diverse in size, style and promotes Compact City principles

There is a wider issue of "The Missing Middle" housing in Sydney which was mentioned in the Densification indicator. "The Missing Middle" consists of duplexes, fourplexes, bungalow courts and manor houses not bigger than a large house. They provide with diverse housing choices, human scale and are able to support public transport demand.

Figure 44: The real Missing Middle (Chandler, 2018)

Chandler (2018) identifies the missing middle as mainly from 30 to 55 dwellings/ha (Figure 44). This could be one of the ways to tackle the affordability and density crisis with opposition to high rise in Sydney. These types of dwelling have a lower perceived density (they do not look that dense), create walkable streets, integrate public spaces within the buildings, and offer smaller environmental footprint. They can create a natural transition between high-density centres and low-density neighbourhoods, and while this type of buildings is common in older parts of Sydney, it is significantly missing in new developments where the growth either focused to high rise apartments or single dwellings. Nevertheless, from the planning documents reviewed, it is apparent that there is a vision for including more of Missing Middle housing, especially in the inner-city areas.

A frequent principle that is occurring in the planning documents is the concept of fine grain urban form. Urban forms can come in many different shapes and sizes. Fine grain urbanism stresses the importance of small block with many storefronts, and slower traffic (Artibise, 2010). This makes the urban form walkable, interesting and easily navigable and resilient. According to the GSTC Development Control Plan of 2012 (The City of Sydney, 2012a), there is a maximum height that buildings are allowed to reach, as can be seen in Figure 45. The buildings are highest around the corridor from the transport plaza towards new Zetland avenue. Saying this there is a concern that they will overshadow the public spaces below and the central plaza. Furthermore, if a building is 16 storeys high or more - a compulsory design competition

is required (The City of Sydney, 2012a). Moreover, according to the DCP, buildings close, next or opposite to each other are not to be of similar design. This is true in some instances but in most of GS not really. It is also stated that if the building is longer than 25 meters it has to be structurally divided. This promotes the principles of fine grain urbanism where rhythm and scale are respected. The plan states the Sluseholmen area in Copenhagen as an inspiration.

The building style is repetitive and even though the public spaces and greenery are abundant, it does not feel like we are just 4km from the CBD around a new major Sydney centre. The site currently feels as a housing development on the outskirts of the city. This will hopefully change as more buildings are constructed.

Figure 45: Building height in storeys (City of Sydney, 2012)

To ensure diversity in housing, whenever more than 20 dwellings are developed, the following proportions should be followed:

- Studio dwellings are to represent 5 to 10% of the total amount of dwellings,
- 1-bedroom apartments, 10 to 30%
- 2-bedrooms apartments, 40 to 75%, and
- 3-bedrooms apartments or larger, 10 to 30% of the total (The City of Sydney, 2012a)

Interesting environment to walk in and human scale

The SEPP 65 (Design Quality of Residential Flat Development) outlines objectives for quality building design and defines principles to support sustainability. This is an important regulation for the quality of the building environment which was recently adopted (ASBEC, 2019) (Figure 46). High-quality design is especially important when increasing densities or redeveloping an area. Creating Places for People is a framework developed by the Australian Sustainable Built Environment Council which outlines the best practice urban design principles. They outline twelve principles for the urban design protocol:

Figure 46: Design protocol of Australian Sustainable Built Environment Council, (ASBEC, 2019)

From the analysis, it can be concluded that the design of the built environment is being considered sufficiently, since there are a lot of guiding documents and recommendations, even though it was difficult to find legally binding documents apart from the SEPP 65 that would provide with more indicators. On the other hand, during the site visit, discordance between the heights of the buildings was observed which was not very pleasant to the eye (Figure 47). As mentioned earlier, there is a "Missing Middle" housing, that would create a better visual effect and increase the human scale of the area.

Figure 47: Diversity in building typology (Own Production)

D. Constraints for development

"There is definitely not a single best way to develop urban regeneration project."

(SGS, 2014).

During the research process, several driving forces of urban regeneration processes arose from the interviews and document analysis (Fig. 48). These were split into categories as below where the political drivers are in between as they were recognized as the main forces driving the redevelopment strategies. Political misalignments between various stakeholders seem to form a barrier towards the redevelopment in the area. Also, land development agencies have a large stake at the redevelopment processes and as they are increasingly influenced by the market, they might form another clash of priorities. Economic forces and mainly the issue of financing arises as well and contributes significantly to the outcomes. Legal drivers, legislations and planning framework in this case create the opportunity for redevelopment and set a scene, however may also form barriers when for example the council must use overcomplicated policies to reach their outcomes instead of having the support of the planning framework to do

so. Cultural norms pose a great deal of challenges especially with the issue of densification in Sydney. Ideological values and priorities of stakeholders involved are connected with all spheres of the drivers and influence the functioning of the whole system.

Figure 48: Driving forces of GSTC redevelopment (own production, framework from Doak, Karadimitriou, 2007)

Below, three main constraints for the development are stated. These were identified as the "behind the curtain" issues for the successful redevelopment of Green Square Town Centre. Further challenges are then stated in the Discussion chapter.

I)   Land Ownership

The land ownership may be seen as one of the challenges in brownfield regenerations and they usually require large amalgamations of lots in order to foster desired outcomes. The subdivision in the area is highly diverse and irregular. The train station is located directly near a large government owned site which will become the town centre (White, 2014). The development rights scheme which states that the land will be rezoned in favour of the developer if they manage to provide what is asked from them, commits developers to provide contributions to public space and infrastructure.

II)   Complex planning framework

The process of implementing policy objectives into sustainable brownfield development is rather difficult (Williams, Dair, 2007). There has been a study in the US which identified that the biggest barrier to brownfield renewal is a lack of funding, need for environmental assessment and liability issues (BenDor, Metcalf, Paich, 2011). These challenges are also

present in GSTC however environmental assessment does not seem to be an issue given the fact that the city together with the developers has agreed that all new buildings must gain at least 5 star Green Star rating in sustainability and the whole precinct is being redeveloped with sustainable systems and indicators in mind. It is believed that the partnership between public and private spheres is needed in order to achieve the sustainable outcomes for today's cities (Cohen, 2018b).

There is a high level of legislative complexity in Sydney where there are three local environmental plans (LEP Sydney 2012, LEP Green Square Town Centre I and Stage 2). The complexity is further exaggerated with various planning controls such as Voluntary Planning Agreements, Developer Levies and other planning documents. This complexity creates a "messy" planning environment which is harder to navigate than if there was only one LEP for the area. Bruckshaw (2019) raised an opinion that the framework is indeed complicated, but on the other hand there are reasons behind it. "We had to use the planning system to make sure that developers make an appropriate contribution to infrastructure and we can't do that in the normal planning framework" (Bruckshaw, 2019). Since the political schemes in Sydney change, planners need to come up with new, edited plans and strategies to navigate this changing environment so the planning visions would be followed through.

Bunker et al. (2017) identified the four pushes that shape the planning in Sydney as:
- "An ongoing struggle for who has what say in development control,
- growing executive power of the state government,
- increased government engagement with powerful lobby groups, and
- more inequality in the city".

So, from his statements and our analysis, it can be concluded that there are power issues in between various actors (specifically the City and Government of NSW). Also, the Government has more power over the development in the city and with the rise of the land development agencies that they control, it is even more apparent since they are responsible for usually large redevelopment strategies.

Vigiola (2019) mentioned that it is a "political suicide to push forward brownfield redevelopment in Sydney" as she concluded on the barriers towards urban renewal. This view mirrors the situation in the political world and reflects the wider opposition not only from the community, but also from politicians and from the way how the planning system is currently working. Until the planning framework will favour the implementation of the principles of NU

and Compact City, the situation will hardly change as "the process of change first begins with a change in the direction of policy" (Cohen, 2018, p. 94).

III)   Land development agencies

The neo-liberal movement towards administrative efficiency and economic freedom has formed a series of reforms aiming to limit government intervention in planning (Davison and Legacy, 2014). The strive towards more independent planning and deviation from statutory planning can be seen in the establishment of Land Development Agencies (LDAs). The LDAs in Australia are state (in this case New South Wales) owned and their role is to gain areas of land with a development potential and produce new properties with public benefits. The idea behind this is for them to also become financially sufficient after time. This move towards positive planning has shed a better light on planning processes in comparison with statutory planning which often has negative perception (Davison and Legacy, 2014).

The article by Davison and Legacy, (2014) examines the potential of positive planning in a political context through the redirection of brownfield regeneration towards state-owned and profit-making land development agencies. LDAs are usually involved in projects where the government wants to limit involvement, however, wants to have a significant voice in the outcomes. The involvement of LDAs can "boost confidence for developers, help address site constraints and infrastructure deficits, simplify governance frameworks and add planning certainty" (Davison, Legacy, 2014). The article concludes that development by LDAs can be very useful for dealing with brownfields however does not guarantee that the outcomes will be sustainable. The establishment of land development agencies can make the urban transition more bearable from the financial and also planning perspectives. This can be seen as a pursuit of the state government to fortify their power in interaction with the private industry.

On one hand they can be seen as beneficial because they have the resources to redevelop even sites with complicated issues where private developers would be hesitant to step in. On the other hand, they are increasingly controlled by the market forces and profit therefore some of the "good things" which they were supposed to deliver might be lost due to their orientation on investment return. Bunker and Troy (2015) state that development agencies were given large freedom to implement the plans, and compulsory purchase powers (usually only limited to acquire land for hospitals, roads, schools and such) were allowed for these actors to gain land, which would otherwise be sold to private developers. For example, Landcom soon became

profit oriented as the government saw their existence as an opportunity of earning revenue for state budgets (Bunker, Troy, 2015).

This way, the provision of mixed-use in the area or even affordable housing may be limited by the market values of such spaces where luxurious apartments have the largest revenue.

Farrelly (2017) states that "governments should govern, planners should plan". She draws a line between the responsibilities of planners, governments and developers where government and planners should work in coalition to provide with open spaces, streets, public housing and other services and only then developers should be invited to participate. She concludes that "they (developers) might get a tad less pleasure, but we (planners) get a lot less pain" (Farrelly, 2017). This way the GSTC is strongly controlled by the market even though it is marketed as a regeneration by the government agency and the City, and we might see that some of the principles of New Urbanism and Compact City, which were stated in the plans before the commencement of the development, were simplified due to dynamics of the market.

6. Discussion

In the Introduction Chapter of this report, some of the issues Sydney is facing today were mentioned. Issues such as urban sprawl, car dependency, congestion, lack of walkability, inaccessibility, and urbanization were identified. Therefore, it is essential for the city to rethink the way it is growing and to create a sustainable transition of the urban fabric in order to increase its density while ensuring the provision of necessary infrastructure and increasing the quality of life for its citizens.

"Real cities are an immense laboratory of trial and error, failure and success"

(Jacobs, 1962)

During this research, a set of principles were extracted from the theories of New Urbanism and Compact City model and translated into indicators in order to assess the extent to which the Green Square Town Centre is being redeveloped in a sustainable way. In this chapter, the main findings of this report will be discussed in order to answer the questions posed.

The theoretical framework has been chosen to reflect the most relevant indicators in order to create a sustainable transition. The framework served well when assessing the case and proved to be valuable guidance when drafting the conclusion about the presence of indicators during the implementation of the project. Results of the study show that the indicators were present in most strategic and other plans however some aspects were missing.

Principles of the theoretical framework and their confirmation within the analysis

Densification

Sydney is growing fast and in order to accommodate the booming population it needs to be thinking how to make density a more liveable option. The aim of building for increased density in Sydney is to limit sprawling growth, but also to increase benefits associated with higher density and compact living. From the document analysis, we can see that most of the plans were promoting increasing densities. We have found out that there is a cultural resistance towards higher density in Sydney and in general in Australia, which is not being eased by the types of development currently being built in Sydney. Most of the development is either of high-density apartment towers or single dwellings in the outskirts of the city. Development is usually concentrated around strategic centres where the highest densities are promoted. One of such areas is also the GSTC. The concerns are usually about the pressure for infrastructure whose provision is lacking behind the pace of development. Citizens are also concerned about overcrowding; however, this is rarely confirmed. This boils down to a statement that officials need to be able to communicate benefits of density better to people. GSTC will become one of the densest populated areas in Australia which is beneficial given the population influx. However, services and public transport needs to be provided in order for the area to be functioning. Sydney is currently developing pockets of dense strategic centres amid low dense neighbourhoods. If the growth was more evenly distributed and the "Missing Middle" housing was more incorporated into the existing urban fabric, the opposition towards density would be arguably lower and more sustainable results would be seen.

Transit Oriented Development

The principles of transit-oriented development were found to be present mainly with indicators concerning the promotion of cycling and other modes of transport and transport being aligned with growth. GSTC is in itself centred around a transit hub so most indicators are met, however, the TOD underscores with the establishment of public infrastructure before and during the construction period and is not aligned with the growth of the area as a whole. This is indeed an

issue in GSTC and also this indicator is missing in most of the planning documents. Moreover, it is rarely stated that the densest areas should be located near the transport hubs, however, in the case of GSTC, the proposed highest densities are indeed located nearest the train station. Even though the area is serviced by a train, it is even now experiencing overcrowding issues together with congested local roads which are not built for such capacity. The City is pushing for a light rail to Green Square and this vision is marketed in every planning document, however, its provision is unrealistic in the next 20 years due to misalignment of priorities with the state government and the lack of funding. Even so, the light rail seems in a longer prospect as one of the best solutions to avoid traffic congestions and improve public transport services. Upfront public infrastructure and transport would provide more safety to the developer and also increase the citizens' attractiveness when the area is still in development stages. In pursuit of economic growth, the "luxury" development in transit-oriented development is prioritized over perceiving it as an opportunity to solve broader housing and mobility issues in Sydney.

Mixed-use

The mixed-use principle seems to be mostly followed in the documents and also it is apparent from the analysis, that GSTC will include retail and commercial spaces. These spaces will be limited to the first or maximum second level of some buildings facing the main pedestrian corridors. It can be pointed out that the situation is different in the land surrounding GSTC which is mostly residential. According to Ms Bruckshaw (2019), GSTC will have a problem with the provision of jobs as well as retail and commercial space due to a higher market value of apartments in contrast to other land uses and that there is not enough executive power over developers to push them to include more. Most services are accessible by walk in the area or within a short drive, but the hospital and school facilities are currently missing which is due to funding issues from the government's side. There is a lost opportunity of generating a significant amount of jobs and together with more mixed-use areas, Green Square could have become an extension of the urban core of Sydney instead of being compared to a housing development surrounding a railway station somewhere on the outskirts of the city.

Accessibility

The accessibility indicators were to a big extent included during the assessment. Most attention is given to connectivity of a pedestrian network which seems to be established however is lacking connections with the wider area. The GSTC is compact enough to be walkable and provides a quite pleasant pedestrian experience.

Affordable housing

The provision of affordable housing can be seen in almost all strategic plans, with a target of 3% of the floor space made available for this use. This target is met and will even be surpassed in the case of GSTC, but it is still not enough considering the number of new inhabitants that the area will receive over the next years. Furthermore, affordable housing should ideally be provided by most developers, and not be something that the local government has to strive for by having to reserve land specifically for this reason. This would result in housing units spread throughout the area, instead of being clustered in two buildings as they currently are. The City of Sydney is aiming for an increase to 7,5% of this target until 2030. This would correspond better to the needs of the citizens and would provide for a more diverse community. Policy changes are needed for improving the provision of affordable housing and developer levies need to be higher than just 3% and they need to be applied city-wide in order to ease the rental gap and improve tenancy options. It is argued that "up zoning to promote renewal ensures that both potential and completed renewal areas command high prices" (Bunker, Troy, 2015). This is confirmed in GSTC redevelopment as most of the new units are priced as quite expensive, which further widens the rental gap. The City of Sydney is using several planning mechanisms to increase the number of affordable housing units - developer levies, Voluntary Planning Agreements and selling of land. As discussed, developer levies are mandatory, however, should be higher than 3% in order to effectively target higher provision of affordable housing. Currently, they can be viewed as a missed opportunity. Voluntary Planning Agreements can contribute to increased sustainability outcomes if the developer is willing to participate in return for bonuses in floor space ratio or increased height of buildings.

Public Spaces

Since the development will include significant densities when completed, ensuring quality public places (and other indicators) is vital. The public spaces in the area are currently of high quality, feature a lot of greenery and provide shading during the heat. The library and community centre received awards for their design and environmental performance, and they are embracing the heritage of the area. They have been built in the early stages of the development however most public spaces are far from completion. From the analysis of planning materials, quality public spaces are receiving much attention which is beneficial towards creating sustainable outcomes, promoting liveability and creating a sense of community. There are going to be plenty of parks in the area, however, the connection to a larger open space is lacking.

Built Environment

The built environment of a regenerated area is important in order to have a beautiful neighbourhood that will create a sense of belonging to its residents. In the case of the GSTC, the built environment is highly considered in planning, when talking about architecture that respects its environment and preserves local identity. But it's lacking in implementation, where there are only a few buildings such as the hospital (now a community centre), that have remained from the old industrial buildings. Moreover, there is a lack of diversity in housing, with the "Missing Middle" being one of the elements that should have been considered during planning. This has resulted in 28-storey buildings located right next to 2-storey buildings. Finally, even though not much attention is given to this during planning, an emphasis can be observed on site from the provision of an environment that is interesting to walk in.

Further barriers, challenges and opportunities

From the assessment of each principle, indicators and their presence within the case, some barriers and challenges arose that affected the implementation of several of the indicators. But furthermore, opportunities became clear as to what can be done in order to ensure a sustainable urban transition. These challenges and opportunities are presented below.

Land ownership

Results of the present study show that one of the main barriers to redevelopment is individual ownership of land which hinders the regeneration process. The redevelopments are usually driven by market demand which can result in a different outcome than what other stakeholders would have hoped for. There is a tension between political feasibility and financial viability of the regeneration project when a land development agency is involved as a responsible body. This tension is reflected well in the GSTC redevelopment as Landcom - even though being a governmental agency - is together with other developers developing mostly luxurious apartments which reflect the housing market in Sydney and not paying much attention to creating housing options for more diverse population.

Misalignment of governance priorities

One of the greatest challenges in the redevelopment of GSTC is the misalignment of government and local council priorities and tasks, and Green Square illustrates well the challenges of aligning priorities in urban regeneration projects. School and health are undersupplied from government's side together with infrastructure. This is partly because "the State government often don't have the resources to put in hospital or train station or a school

there until the growth is present" (Bruckshaw, 2019). On the other hand, the City of Sydney is pushing for the opposite.

Diversity

There is not going to be much age diversity (most people under 35) as well as income diversity (mostly higher middle class). This is due to for whom the new apartments are targeted, lack of affordable housing and not enough incentives for families with children to move into this area.

Cultural Norms

People in Sydney are still very much used to living in a house with a backyard even in the inner-city parts. Also, most families with children will still opt for living in the suburban parts because of significantly cheaper house prices and limited options of family facilities in the inner parts. Therefore, due to such cultural norms and biases, it is hard to push through the benefits of a more sustainable living. It is argued that once the market and potential residents will see signs of progress, there should be a greater deal of acceptance of such urban living (Urbis, 2016).

Planning system

Urban planning needs to be innovative but realistic at the same time. The city of Sydney has shown that they are pushing for sustainable transition, however, some of the goals are dependent on more complicated factors such as the market, cultural norms and system lock-ins. There is a very complex statutory planning framework in place, which is causing uncertainty for developers among other actors involved. As Bunker and Troy (2015) point out, "the planning landscape of metropolitan Sydney has shifted considerably over the past decade, from the brittle certainty of Labour's 2005 Plan to the market-driven pragmatism of the Coalition's 2014 Plan". In this shift, we can see a wider issue of a shift of governance principles towards more neoliberal principles. Furthermore, the Greater Sydney Commission is a new player in metropolitan planning and can be more successful in pushing and sustaining policies so it will be interesting to foresee how the situation will evolve. The urban policies as they are now are more focused on dealing with the issues as they arise instead of proactively preventing them.

It can also be argued that for the most beneficial outcome of redevelopment, the public should have a major say in the process and be involved. Nevertheless, we could not find any major information on public participation processes other than community meetings where citizens would state their opinion on the construction. Given the fact that the area was a brownfield

before and housed a large hospital and incinerator, the population in place was not that significant. But when we look at the map of GSTC, there are some established housing streets where citizens should have a say in the development around them and also could be helpful in generating the best solutions. This way, more community centred development could help citizens to accept more dense forms of living.

The following opportunities exist in order for Green Square Town Centre to push for sustainable transition and incorporate principles of New Urbanism and Compact City better:

- Set enforceable Compact City and New Urbanism objectives by:
  - creating a state-wide New Urbanism and Compact City policy framework,
  - limiting misalignment and reducing confusion, and
  - establishing more enforceable planning rules.
- Encourage principles of New Urbanism and Compact City by:
  - setting minimum density requirements,
  - setting higher developer levies on affordable housing,
  - using more wisely development agreements,
  - increasing viability for more mixed-use,
  - providing with upfront public transportation, and
  - establishing better control of land.
- Promote brownfield redevelopment for sustainable urban transition by:
  - promoting transit-oriented development, and
  - promoting mixed-use.
- And finally, minimize negative impacts by:
  - educating people on benefits of density, and
  - creating positive change and promote awareness of it.

The principles which were the most common and apparent in the planning documents were densification, mixed-use, affordable housing, public spaces, and built environment, with the largest cohesion found in public space, the built environment and accessibility. The Eastern district plan, which is the main strategic planning document for the inner city, managed to tick all the boxes in our analysis. It seems to follow the principles of New Urbanism and Compact City in detail (at least the principles that we have chosen for the analysis).

One of the unexpected results was the lack of provision of public transport infrastructure dedicated to supporting the increase of density.

This research sheds a light on the principles of New Urbanism and combines them with the model of Compact City in order to investigate to what extent the principles coined as the most valuable apply to the case of inner-city brownfield regeneration in Sydney. From the literature review, we have experienced that there is limited knowledge about sustainability indicators for brownfield regeneration sites in Australian context so this research contributes to the discussion in several fields of expertise and could serve as an inspiration for similar assessments in various locations.

Furthermore, it may serve as a framework for a more in-depth study of how New Urbanism principles can contribute to the creation of more sustainable and liveable outcomes.

For further research, it would be interesting to reconduct the assessment when the regeneration project is completed, as to verify if the provisions were met after all. Moreover, this research could be expanded by focusing on a broader scope with the use of more indicators to be assessed. The theories could also be reviewed in order to be more case specific and reflect more on the Australian context. Also, it would be interesting to assess the whole area of Green Square urban regeneration to see how various neighbourhoods compare and which is the most successful. Finally, an investigation could be conducted on the dynamics of land development agencies during redevelopment projects.

7. Conclusion

In the introduction of this report, several questions were posed as to be analysed and discussed in the following chapters. The information that was collected presents a valuable source for the assessment of brownfield regeneration from the point of view of New Urbanism and Compact City theories in order to achieve sustainable transition. In this chapter, an attempt will be made to answer these questions and provide a conclusion on the outcomes of this study.

How can the Compact City and New Urbanism principles contribute to creating sustainable urban transition?

These principles can contribute to a sustainable urban transition by providing a framework of indicators and criteria which need to be considered when planning for and implementing sustainable transition. If the principles are in place, they can help to create better outcomes. The sustainable transition can be achieved if the provision of infrastructure is aligned with growth, the community is aware of benefits of density, there is effective communication and alliance between different levels of governance, quality and interconnected public spaces are provided and enough affordable housing is in place in order to deliver diversity. It is argued that then the principles of New Urbanism and Compact City can help to achieve positive sustainable transition of inner-city brownfield regeneration or indeed any neighbourhood redevelopment.

To what extent is the Green Square Town Centre regeneration compliant to the principles of New Urbanism and Compact city?

Most principles of New Urbanism and Compact City were found in the case study and were incorporated in the planning documents and during implementation, such as densification, mixed-use, affordable housing, public spaces, and the built environment. We can conclude from the analysis that even though the built environment and accessibility aren't prioritized, the most important principles, densification, transit-oriented development and mixed-use are met in a way that is enough to contribute to a sustainable transition.

What are the challenges, barriers and success factors for sustainable inner-city regeneration towards a compact city form in Green Square Town Centre?

However, several barriers and challenges also arose, such as misalignment of priorities of governmental bodies, lack of funding for public infrastructure to support increase of density,

the fact that most land is privately owned and difficulties in convincing developers. All these barriers can become challenging when trying to create a denser urban fabric by limiting the capacity of necessary infrastructure provision to support and serve all citizens.

What are the main drivers to sustainable transition?

When taking into account the principles of New Urbanism and Compact City the main drivers to sustainable transition can be identified as densification, transit-oriented development, and mixed-use. These three principles are very interconnected. Though it is essential to create density within cities, this cannot be achieved successfully without public transport to take people to their jobs and social activities. Moreover, mixed-use is important to ensure access to everything needed in a neighbourhood, without having to leave it. This minimises the use of car, creates more local jobs, and increases walkability. These were the main principles identified and argued for as most essential in the beginning on this research. But after taking into consideration the strategic plans, it can be argued that public spaces are essential when regenerating brownfield sites. Access to green spaces, provision of recreational opportunities and space for cultural activities and communication are very important in order to create liveable neighbourhoods that create a sense of belonging. And what better way to deem a place sustainable, when you have achieved beyond the environmental and economic aspects, the satisfaction of the citizens.

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9. Appendixes

Appendix 1

Transcript from interview with Gabriela Quintana Vigiola - lecturer of planning at University of Technology of Sydney, 10 April 2019, UTS Haymarket.

O: So, can I ask you for a brief introduction?

G: Gabriela Quintana, I am a lecturer of planning at UTS.

O: Ok Perfect, Thank you so much

G: Ok so you were saying?

O: What do you think are the most pressing issues for the city of Sydney from the perspective of urban planning?

G: I think and maybe I am biased because that is what I am doing now, but I think **housing is one of the major issues** that they have as a council. Like the city itself - Sydney and CBD - from the planning perspective we have issues with or we should be focusing on issues like security, like terrorism, definitely housing, because there is a mix of not enough housing in the CBD to keep it active, but at the same time there is a lot of demand for us to have more housing in the city. And I think that another pressing issue at the moment is finalizing the light rail. Definitely finishing that and improving the connections that we have I that is also a current issue, but they are working on that which is good.

O: Do you feel that the urban planning framework in Sydney favours brownfield redevelopment over greenfield? And is there any policy for it to be done in a sustainable way?

G: Ok when you are mentioning Sydney, do you mention the metropolitan area or just the city of Sydney?

O: I mean the greater metropolitan area.

G: I think that **they say that they are promoting more brownfield development, however looking at the different plans and action that they are taking, I think they are really favouring greenfield development.**

O: And if we are speaking only about the inner city?

G: The inner city cannot grow and the city of Sydney as a council they have always **promoted**, well not always but for a several years now, **sustainable measures of growth** and they have a compact city approach so definitely the council itself and I am not so sure its because they cannot grow but I think they are supportive of the compact city model and the redevelopment of inner-city areas. But in general, the state who is in charge of the development of the whole city, they say that they are pro brownfield development, however, a lot of the growth planned is in the outskirts of the city.

O: Do you think it's because it is easier in a way to implement the greenfields or do you think there are barriers for it?

G: **Politically it is easier**, it is easier to just develop new areas where there is no one than to say people they are going to densify their suburbs.

O: And do you think there is a big opposition to a densification of the city?

G: **Yes,** I think there are massive, there is a **massive opposition from resident**s. On one side I think it's because **they're used to not being dense** and they don't really know what Real density is and I can see that talking to people like oh my god Sydney is so dense lately, and Sydney is not dense at all. in comparison to other cities in the world, so I think that they are just used to it and no one likes well most people don't like change. So, it's hard to implement change wherever it is. So, I think **a lot of Sydneysiders still have that image of having and backyard and all of that** and honestly, I can understand why. For example, I just moved from a unit to a house and it's the first time in my life then I've lived in a house and I love it. So, from an individual perspective and selfish perspective, I can understand why, but so yeah politically it's easier just to Greenfield development.

O: Yeah well I live in a house now as well and apart from my parents' house I've lived in a shared apartment in the inner city in Copenhagen or in Czech, so I know what you mean it's kind of hard to give up.

G: It is and if that's how you grew up, for example, I don't mind going back to the unit because well actually I was born in a Terrace house but I've lived since I was 3 years old in a unit on the 9th floor and then on the 11th floor. So, I am used to that so and then I moved here to a unit and then I only moved after 7 years so it wouldn't be that hard for me to go back to the unit, it would be an easy change. But imagine if your whole life you have a lived in a house it's

different, it's difficult. For example, my partner he always lived in a house and he moved into my unit for a few months and he was going crazy because he didn't have the backyard, so it's difficult for people to change. So, I think it is the main barrier that we have to Brownfield development. Because it's not a politically I mean **its political suicide for most politicians** unless you live in areas which are already densified or they're already in densification process, and those areas are closer to the city. So even with that for example the council the Randwick City Council, all the people in a South they are in a position of redevelopment of densification there is this new development close to Eastgardens on Bunnerong Road and everyone was like oh this is a death and I mean half of the apartments are empty but it's not too bad. It doesn't make that much of an impact. They are between a big building that is a shopping centre and golf course that is not harming anyone so they're not even overshadowing issues. And next to a vacant lot that will eventually be redeveloped. And on the other side they have a big school so it's well-positioned development but everyone like all the locals are against it and it doesn't affect them at all.

O: So you don't think is just because of the scale of the buildings
G: yes there is a different scale but if you from an urban design perspective if you see the morphology and the bulk of the buildings and you see the size of Bunnerong Road like it doesn't really make an impact on the road, it's actually a better proportion of buildings than having houses.

O: So what do you think are the barriers and challenges to brownfield development? We already discussed this a bit.
G: **I think its politics and community opposition based on what they are used to** and community opposition because of **lack of education and information about urban renewal.**

O: So, if I asked you what would have to change in order for the framework maybe for the city in terms of the policies and strategies for people to accept it more?
G: I think they would have to start educating people. But education is not like saying you're dumb and this is what we need to do but rather from the start begin explaining where are we going how we are going to go there, and what are the effects on the society, economy, the environment, if we keep on doing the things that we are doing. Then how that is going to affect them directly, but if we don't do anything or if we do it. So I think in that sense, and do that since early ages.

O: From early stages of the development or?

G: no, from early ages - people in school. Start teaching about urban planning and development like not the subject because they are not going to become planners but for them to understand what happens with the sustainability issues.

O: Ok so do you think there is enough community engagement during redevelopment processes?

G: In quantity yes but I think it's at very late stage. I think **people should be involved earlier** and the communicating back to residents should be better dealt with.

O: And that's for the whole city of Sydney?

G: For everything. Definitely the state government needs to do a better job at it and for example, I just participated in community engagement process that was about developing some like measurement criteria for to see if we are meeting the objectives of the greater Sydney commission. But we weren't even given the information of what we are even doing during the session and when I started talking to people, I can tell you that at least third of the people there were planners

O: Ok I see.

G: Because they said this is the only way that I can have a say so how representative of the community is that a third of planners who have an interest in this, so I think that the transparency with the community should be better done.

O: Can you maybe think of any instance of community engagement which was done well or a successful?

G: I think I'm biased because I'm a planner, so I always look forward to participating so, for example, the Randwick City Council I think they do a great job. They do things like post, write email, they have their website, they have there "have a say" or I don't know what is the name of the website, and you can comment on anything from strategic planning to the smallest thing, They invite everybody to participate however I have an interest in it and I always read all the emails that the council sends me. I don't really know how effective this strategy is for people that are not like me who are really looking forward to these things. For example my partner he wouldn't even know that the council have a participatory or a community engagement group, he wouldn't even have a clue. And he is like the opposite to me, so he goes to the other side of

the spectrum, so I don't know how they deal with getting to the ones in between, to the ones who are like I am interested but I am not going to actively look for it. So in that sense, I don't know how effective that is but I think for me that I am interested in the topic and I actually look for that, I think they have in general a good approach to this. And I know they do focus groups and things like that however I don't know how they pick people because I've never even been invited, and I've been living in Randwick for seven years.

O: *that is interesting maybe it is some kind of a random process.*

G: It has to be a random process, but I have no idea how they do it.

O: *Would you say that there is established functioning cooperation between the state and municipality and the state government I mean the planning department?*

G: Yes and I think it is still improving I mean the **state still overpowers the council's** but I think they're building better relationships.

O: *I've read some news articles that communication wasn't always the best?*

G: It is not always the best but I think it's been improving so. I'm not saying it's perfect but definitely, from 5 years ago I think there has been an improvement in how they operate and you can see it in these big projects. For example with the light rail all the first bit was they didn't even consider the council but they are certainly incorporating, but it's like another tick in a box, but now, for example, talking about the extension of the Light Rail, I think they are having more discussions with council about that, so I think those things are improving.

O: *So it is going in the right direction?*

G: For the little that I've seen yes, and I hope it keeps on improving because they need to work together   definitely.

O: *So I am just going to ask you if you are familiar with the Green Square development and if yes, would you say that the Green Square would become a vibrant neighbourhood from the location, from the scale of the buildings that are proposed?*

G: Yes I am familiar with the development and I think **it has all the potential to become vibrant space** considering the closeness to the train station, considering the closest to the city CBD and all the amenities that they are putting in place so I think it is assigned in a way that you can have 24/7 activation in the space.

O: They are now building place around the library like a small city centre and it looks very nice actually.

G: Yes it does look very nice. I think that has a lot of potentials and I honestly believe it is going to be a success. But then there is one thing that I **think will not work is and that is transport.** The thing is that they only have the train and the buses and that's all they have.

O: Yes I've read that the city of Sydney has reserved the road for the light rail but the state doesn't want to do it?

G: Yes that is a part of the lack of communication between these two entities and maybe not the lack of communication, maybe they have been communicating that's why the city reserved that space, **but the state government has other priorities** and they say well that's what I guess that this area is already being served by the train where is other areas need to be served and there is only a limited capacity of money kind of. So I think that is kind of just preventing that they are just going to do everything and when it collapses they will be like oh we just need a light rail, let's build it but we'll see. But at least someone is thinking ahead.

O: Another question, do you think that the development agencies and by that, I mean Landcom are better in following the sustainability framework then maybe private companies or if the city would develop the area itself?

G: I think they have the frameworks, but they are not really developers themselves so they just do all the planning and then sub hire other companies and they make the other companies do projects in a sustainable way which I think it's one perfect way of doing it. But definitely, I mean I think the government does it because they have to do it a sense that they really have to do it and a private developers do it because it's a selling point because it's something that is marketable and they are obliged to do it by government.

O: And maybe the last question would you say that the social aspect of sustainability is still left out in the frameworks?

G: I think **in some projects it's still left out** and in some, it is not. For example the West Connex they have quite a lot of the properties and they really haven't thought about a strategy like a real strategy of how to facilitate the relocation of these families in the same area. It's just I'll give you the money and see whatever you do. So definitely that shows a lack of commitment to social sustainability. Because it's not just like let's make things more equitable to people no, social sustainability it's also about what happens with the people who are all there already there

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and so I think there is not much commitment to that yet. **I think that there is no understanding of what social sustainability is.**

O: And that kind of connects to the education

G: yes we and we also have to educate planners and **politicians because I think they don't understand what social sustainability is.**

O: Ok so maybe just last one about the streamlining of the planning process do you think that would help the redevelopment processes to be more efficient and that the citizens would be actually more satisfied with the outcome

G: what do you mean by streamlining. I know what the word means but how would you streamline it?

O: So the planning process may not be transparent to the citizens so to make it more transparent and simple at the same time like limiting the number of steps.

G: That seems ideal. I am not sure how to do it but definitely, that sounds ideal because it's effective and transparent, but I am not so sure how that would work. I think it's possible to do it but there has to be political change to do it and we would have to think of a change on how to incorporate communities voices in the earliest stages so afterwards they could say this is really approved by the community so whatever the developer proposes if it fits in these guidelines it goes to the streamlining thing and and we tick all the boxes and that's it and we don't have to do the extra community participation process and all of that, that would be an way and with the white paper of 2013 they tried to do that but that fell apart because it was not well thought of. Well, that was one of the things that was not well thought of.

Appendix 2

Transcript from interview with Annette Walter, project leader and Amanda Ziegler Dybbroe, project assistant at By og Havn, 25 April 2019, Copenhagen.

R: So my first question is what do you think are the most pressing issues in Cph from the perspective of urban planning? I am mostly looking for general challenges.

BoH: Well, Copenhagen is developing very fast, we have a lot of people moving in, and it has been expanding for a while and it has been very popular. I mean there is a lot of construction going on here and what we are finding is that there is, we are starting to see some resistance

among the citizens that they feel challenge because they are **not enough green areas,** like we are developing areas here in Orestad - maybe you are aware of the project here, that was cancelled because just before the election for the municipality, there was a lot of protests because this is a green area and it is a part of the long term strategic plan that Orestat has to be developed, which is near the Metro. But there was one particular area down here that there was a lot of protests - in 2017. And the project was already almost ready but the mayor decided to cancel the whole project because there was public resistance. So for the past year they have been working to find a different areas to develop to sort of do that instead, so now we are developing in a different place in Orestad, and also in Sydhavn instead, and still we are facing a lot of - you know resistance from people - they don't want more people to live in that area and want green space - even though there are a landfill areas - they still think it has a value and they are still quite upset.

R: *Yes, for example from what we saw in Nordhaven and Sydhaven - it is really areas which used to be industrial so I assume there was contamination and like a process of cleaning the soil and al of that but was it the same for Orestad or was it more like a greenfield ?*

BoH: Well, Orestad was actually greenfield but there is area here (V...something - could not understand) that was actually landfill. So that that is very polluted - there are gases there and things and Sydhavn is construction waste which has been filled up, which is very contaminated as well, but when you leave it there for a while, it starts getting green and people perceive it as being a green area even though it is a landfill. Whereas Nordhavn is industrial area so there has not been any protest against developing.

R: *So you would say it is citizens protesting against it?*
BoH: I think the challenge is that the city is growing and people who live here they feel challenged that it is growing. And they want to have cheap and nice apartments but do not want to miss out the green areas and that is a problem - How can we develop and save the green areas at the same time?

R: *I don't know if you made clear also that these are not greenfield areas but contaminated ?*

BoH: Oh yes, wse have been working a lot on that but it is very political and some of these areas they used to be protected - I don't know why they actually protected a landfill but they

had to pass a legislation about two months ago in the parliament where they decided that these areas are not going to be protected anymore and of course all the nature organizations were very upset. I think the challenges here in Copenhagen are a bit different from Sydney because **I have heard about the discussions in Sydney and my impression is that down there is a lot about gentrification and displacing people whereas here it is more about nature that people think that the nature is being displaced.** But both issues is about growing cities, - when cities are growing and you are making denser cities then the people who live there they feel challenged, so you need to make sure to do liveable cities.

R: We had an interview with an urban planner in Sydney and she told us that also with politics that mayors think it is a political suicide to tell people - oh we are going to build this and you won't have a view anymore or you won't have the garden you had before. So I think that is a challenge there as well. So the other question is do you think that the framework in Cph favours bf over gf development? Or is it more about transit-oriented development.

BoH: The new plan for Copenhagen city states that they focus on developing brownfield, but another goal is they want to develop it near the transit line, so it is very important part of development strategy that development is near the metro line.

R: What do you think are the main barriers and challenges to BF development?

BoH: I think it depends very much whether you are looking on urban renewal in residential areas or whether you are making renewal in industrial areas. I mean this is residential area, you have some people living here who are upset about the fact that there is going to be more people, more transport and that some of the areas are going to disappear. Out here we have completely different issues in Nordhavn. We have a project that we have DGNB certified so we know this project very well through the lens of sustainability with DGNB and some of the things there were environment - it is polluted so you have to clean it up. Sometimes it is about transport. **A huge area like this which has been industrial area has no public transport, so it has been a prerequisite for the project that the metro is going to be there and we only have been able to do it because the metro is coming.** But another thing is that we made a master plan for developing this area - and we were going to start building. But actually we have reached the limit of how much we can develop now so when we sold a new plot of land we had to postpone this whole project because according to the planning legislation from the municipality, we have to have a tunnel for traffic out here because otherwise the road in here

would be congested. So we are not allowed to develop this area before this tunnel is going to come so infrastructure is sort of - it can steal a project completely if you do not have that in place. So that is one barrier. Another would be that there are no green areas out here. When we started building, it was just industrial harbour. So we had to develop some green areas but actually there is not much room for green areas so we developed the possibility to use the water as a recreational area and we have other solutions like the parking house with a park on the top so we are trying to develop alternatives. So I would say that the challenges are traffic and pollution and then another issue is noise. I mean if there is problem there like the areas down here, we have noise issues from shooting range and that - if we are not able to do things to minimize that we might not be able to build it so when you start developing in brownfield area you need to look at transport, noise, congestion - and these are really critical things and if that is ok there are other issues like how do you make it green. But also other services like kindergarten, school, shops, so you have an environment out there. So we are actually dependent here that there is going to be new public facilities and the city has to have budget for that which might also slow the project if they can't find the money to develop that.

R: Are you aware of the new urbanism principles? One of them is how to create a centre for the community, the second one affordable housing, which is one of the things we want to look into, then public transit and architecture that blends with the surroundings. About affordable housing - I know that there is a law that there should be 25% affordable housing but is it mixed with the residential areas, or one building for affordable housing? And how do you insure that there is a mix of social fabric and not just - I know that the houses will be very expensive ....

BoH: It is a part of our agreement with the city that we need to allow for 25% of social housing and we do that in the long-term planning. There is going to be built social housing on some of the plots. We had an architecture competition between the social housing agencies and they this particular project has social housing and some retail or kindergarten, There is going to be a lot of social housing in this area near the school so it is sort of - our sales department they know they have to sell certain plots for social housing. So the good spots are sold to those who can actually pay because we need to fund the metro and also make sure to reserve areas for social housing. So in all our areas we are going to have a social housing. We are partnering with social housing agencies to develop smaller family units also social housing where you can have different generations living together. So we are trying to have some flagship social housing projects.

R: So what do you think are the lessons learnt from North Haven or what you could have done differently or if it was the opportunity?

BoH: I think both of us are relatively new. but I think we evaluate how we think how we do things all the time so when we do it. I mean we tried a lot of different things like what I said the proximity to amenities and shops is important. And it is always difficult in a completely new area to make sure that you have a good shopping area so we are kind of developing retail in the area to make it attractive. We take pride of it but it is very very difficult.

R: As you said there are people living there so has there been some sort of Citizen engagement, brainstorming, bringing ideas from people to see what they think about this project and if they agree or not agree with all the planning?

BoH: We had some meetings with the people who are living there like once a year, I think. But we have also had a big competition when we talked about the whole area, where there were some workshops where over 300 people anticipated. And some of the ideas are within in the project. They were asked how we can provide a good social life in the area or, how can it be more sustainable, so they came up with some ideas which were integrated in the competition. And then we had people commenting on that public hearings and things and then some of the residential areas we made some analysis of who we expect to who is going to move in and what their characteristics are. So we had some public hearings just for the general public. I think maybe it is difficult to develop the part because there are some people who are going to live in a building site for many years because it takes like 10 years to develop and if the construction is in front of your house. So it's possible to make a plan where it is sort of more done systematically from one area to the other that would be good but sometimes it's difficult because you are very dependent on which plot do you sell and in order to sort of compensate for that we have been trying to work. We are having do-it-yourself projects so if you have just a plan of land and nothing is on it, they are invited to make a public space there. We've had a football field and things like that.

R: I assume this is someone written but I didn't find it, but do you have a number regarding density basically saying this is how dense the area should be and we don't want to go about increasing it? And also regarding the amount of amenities that would be provided in the area. I've read that there is a 40,000 people limit but can I go behind that or can increase?

BoH: No. they are very strictly regulated by the city and the City decides. Maybe you should look at the municipal plans which are stating out the strategy for municipalities for the development over the next four years and it's just in hearing process at the moment they're going to decide on it later next year. For instance it says that they want to do more brownfield, it says that public transport and biking is important and that they want more green areas and 25% social housing, but it also looks at every single neighbourhood in the city and it looks what you can develop over the next five years after that. And how many people are allowed to live there and if it is going to be on the housing or infrastructure area. And it also says how many percentages of construction you can have in a site so it's completely regulated by the city.

R: Do you think there is an established and functioning cooperation between the municipality and the state because I guess the state has also its own regulations and laws and developments, so are they in line between them or does the state hinders development in the municipalities. Although I know the city of Copenhagen has a lot of influence on the policies and national policies but do you think that is a case here?

BoH: There is a lot saying how you should develop. But do you know the finger plan? So if you get a look at the urban planning, this plan basically says that he can only build a bit in between the fingers and the rest the big green area. So things like this are regulated on the state level. So it is like transit oriented development basically. It has actually been revised because many of the cities in the suburbs want to develop more and they have been prohibited because of this plan so they have been challenging it and there was just made the revision of it and there is actually a debate going on. There is an agreement between the city and the government and By og Havn that there is going to be a new island here from the landfill and is it it is going to be as big as Nordhaven. And that is going to allow for 40000 new residents, and this have been given some discussion because some of the people living in the suburbs and they think it is very crazy to build an island here just to extent the land. But So the tunnel and the metro will be financed by this project and at the same time it's going to be used to make it easier to protect the city against floods.

R: So you told me there is a law that says brownfield should be favoured over greenfield but is there any policy for it to be done sustainably?
BoH: The municipality has a goal for sustainable development and so they want to be co2 neutral in 2025.

R: So do you think that there is anything that needs to be improved in communication between government and municipality to have more sustainable outcomes?

BoH: I think they are doing a lot of work to communicate it out. Maybe sometimes it is too much what we communicate through the sustainable development because what is in it should be more concrete maybe.

R: So is it concrete or do you think it should be more concrete?

BoH: It is good to be concrete in what you mean about sustainable development. Like indicators and what you actually do.

R: Do you use other frameworks apart from DGNB?

BoH: We use DGNB like a concrete tool in all our areas. It is very specific and has a lot of indicators that you should follow. But we also use it for inspiration and it can be critical how you use different criteria.

R: So you are using DGNB for the neighborhood as well not only for the buildings?

BoH: It is actually for areas and buildings as well, there are two different kinds. And we actually used the area one but then when we sell the area, the one who is building the house should also do it for their own building - it is mandatory.

R: And is there a way that you are trying to connect Nordhaven to the surroundings?

BoH: Yes, I think they are trying to be but I think we have one road which is going through Nordhaven so there are some shops and so on, so it is connected to the area, but it is a whole new big area.

Appendix 3

Interview with Tamara Bruckshaw, manager of the Green Square at The City of Sydney, Sydney Town Hall, 16. May 2019.

T: So I am Tamara Bruckshaw, I am the manager of the Green Square (GS) and other major projects so that is in strategic planning. My job is general strategic planning projects in context - that means planning controls and how they facilitate infrastructure and housing and other

kinds of things so I'm in the planning controls and also in the strategic places if you like or portfolios such as affordable housing, infrastructure delivery, value capture.

O: Thank you. So my first question would be: Do you think that the planning process in Sydney regarding the brownfield redevelopment is unnecessarily complicated and do you think it favours brownfield redevelopment over greenfield?

T: I guess yes, it is very complicated, **it is a very complicated system.** What I would say that probably from the council's perspective there are **reasons why we made the planning framework for it quite complicated** and I will speak specifically to GS. Because there are great examples of good brownfield development and not great examples of good brownfield development. And most people know when they see them, and they get a feel for the place but as a general principle (they) **need public transport** so people do not own a lot of cars, **have services**, have retail available, that they got **open space, access to all the state infrastructure** that they need - like school, hospital, so that is what good urban renewal looks like. The problem - or I suppose the reality is that **somebody needs to pay for all of that**. So financing is a big problem - it is an ongoing problem. Councils are subject to rules about the section 94 contributions what they can collect, it is not enough, any way near enough for to pay for a train station or open space particularly in the inner-city environment where land is a very scarce thing. So it is an ongoing issue. **So the State government often don't have the resources to put in hospital or train station or a school there until the growth is there,** so their modelling is kind of a bit off - everything is already a mess before the infrastructure that is needed comes along behind it, because the **view is that if there is no immediate need for it then why fund** it so you kind of end up with apartment buildings with whole of parking there so everybody has a car so if you had to put the public transport there first, that would have been unnecessary you know less people would have cars. That is one example of many. **People are living without open space for five years before they get a park, their kids need to go to other schools** so I guess there is a bit of **mistrust between state and local** governments. Local governments do all their planning around new housing and where they are going to put is and there is a lot of mistrust that the state government will do a good job in delivering the infrastructure. **And also just not enough money in local government to provide the infrastructure that they need to provide - the community centre, the open space.** Councils are kind of in a position that you got people's pressure for housing from developers and the state government says yeah provide housing but they know they will have residents that will not have access to the infrastructure that they need. **So the way the Green Square planning**

process is structured is very complicated but the reason is that we had to use the planning system to make sure that developers make an appropriate contribution to infrastructure and we can't do that in the normal planning framework.

O: That is kind of leading towards my other question if developers could be pushed somehow to provide amenities for people or public space?

T: There are mechanisms in the planning system to do that, but again they are complex and they require very skilled planners to try and work with a complex system so I am talking about planning agreement specifically so when we change planning controls we can use planning agreements for the developer to deliver a park or ...but doing that in an equitable way is really challenging because of the **unwillingness from the developer.** Planners are not economists, we do not know how much value we are creating by changing the planning controls, we got to get somebody to do that. There is all kinds of conjecture to do that, you know it is really complicated those VPAs and you get into the legal side, you have to have lawyers - it's a mess, it takes ages and sometimes it is impossible to get it done so there is that problem. So that is when you are changing planning controls. Certainly, **through the development application process there is no leverage for councils to make a developer deliver something**. They can willingly enter through VPA but there is not many developers who would say hey let me give you some of my land - that is not very common. **In somewhere like the GS town centre that was a unique arrangement and I looked at what we call an un-deferral system**. **What it does is it kind of rezones the land and tell the developers to pay x amount of dollars that they should be paying towards the contribution.** And that's when they get their rezoning. So it is kind of a tricky planning instrument - a legal way to get more from developers. It has been very successful - I think there is about 1.4 billion $ of what will be provided, **but there still is a gap**. Council itself benefited from enough money to provide world class library facility, **the transport was put in early in GS**, South Sydney council which used to be in charge said there is no way we are rezoning it until the state government fund it and build a train station. So, it is about kind of savvy political leadership as well. So it is about making sure that the state government will do their job and that is not always possible because local government is here by grace of the state government, we are not a standalone government. There are opportunities to do it well but it is very timely and resource intensive and Sydney's council has lot of money and we have time and very smart people work here. So that is a good example of how you can do it but it is a messy planning approach.

O: I visited a talk about densification in Sydney and they mentioned that Sydney is incredibly bad about density, could you maybe elaborate a bit more on that? They were mentioning the whole metropolitan region.

T: I think there is a very strong cultural influence in Australia for their single dwelling house and quarter acre block. **Suburban Sydney is a very strong influence in a lot of people's minds.** Having a very slow transition towards a population who is happier to live in density, so that is a first social / political problem that people are very resistant to seeing density. I think that the second problem is that there **haven't been a lot of great examples of Good density being provided in Australia.** It is very thin on the ground, so you are getting a lot of people looking around going "Hold on! It is getting denser, but I can't get on the train. I don't have any open space". So there is a lot of people with whom the resistance continues, because people don't see the benefits, or understand the benefits, density can bring. **Government does a terrible job at speaking to people about it and they go back and forth about the regulations.** Communicating to the community about what some really great things about density are and I think if you spoke to a lot of people in the inner city in Sydney and Melbourne as well, these are people that love it. They don't have any problems with more buildings.

O: and do you maybe think it's because of the scale of the project maybe? Because when I look at for example Bondi Junction, all the buildings are kind of very tall in regards to what is built around and what is the kind of suburban feel that it has.

T: yeah, design is absolutely an issue. People want to be comfortable in the city and you would argue that some people perceive density as height, and they don't like height and some people would just proceed density as I can't get on the train and so on. So having sensitive design that is respectful of people's need to be comfortable in those environments is very important. For example, across Ryde council you can build 6 or 7 stories and unconstrained. You can have incredibly dense environment but it's not actually too offensive to look at. When you think about Paris or places like that are some of the most beautiful cities in the world. It's because there is some winners and losers and some people get their stand it's a problem like people can't look at it and just go that's ugly. Sometimes those are transition areas.

O: Yes I feel the same way. Like the middle part of the density is missing in Sydney.

T`: **Yes definitely.** Are you aware of the middle density corridor? It is SEEP that the government provide and it's about facilitating what they call middle density and it's like houses which are two or three stories, I can't remember. And secondary dwellings like granny flat or

a second dwelling in the back. So some products which are allowed to happen under the code. That's been incredibly successful in places like Canterbury Bankstown where there has been an extraordinary increasing density like the amount of people per square metre per se. But again it comes back to the infrastructure problem because that has happened and people are like "this happened without me knowing, I can't park on the street, I can't get on the train, I don't have my open space anymore, I can't sit down my coffee". **Like this is a problem you can't do that stuff without the infrastructure, people will not have it.** We are going to have a systems problem with densifying the city.

O: And do you think that's because the state government is responsible for the provision of infrastructure?

T: Yes it is not the city of Sydney - there is a clear line between what we are responsible for and what the government is responsible for. There is a confusion in the community about that, but there is no confusion from the state government and from us who is responsible for what. **It's about timing and timely delivery** and different points of view of what infrastructure is needed so for example we say we need, we're advocating for a metro station to be at Zetland because it's in the middle of Green Square which is going to be the densest area in Australia. From our perspective that seems like a completely right thing to do. But the state government has other priorities around transport, like the 30-minute city so it's not that easy. It's politics - it's compromise what goes where in the city. The city has a very firm position of what's needed but it's not anywhere near the straight line unfortunately. **But the delineation of who's responsible for what is not confusing.** Governments are responsible for schools and health and utilities and public transport buses, and councils are responsible for libraries, community facilities and open space and by parts on the local roads and whatever it is that's us.

O: Just going back to Green Square context what are the challenges that Green Square is currently facing and we already mentioned some of them but if you could maybe handpick some of the other issues that would be great?

T: The Green Square community is actually pretty good but there is an upset in the community about the pace of change. From local facilities perspective it is doing pretty well . It's got the aquatic centre coming, it has the library, the plaza, it has some affordable housing, like it is not doing that terribly on the scale of things. **It has ongoing problems with balancing the need for jobs**, with housing so the recent housing boom everybody went like let's build an

apartment. and **the council could not talk to developer in building commercial buildings** or living room at the bottom of their building for a small supermarket, that's a problem.

O: So maybe the mixed-use part of the development is not being followed?

T: that's right yes. **You've seen almost all of the employment in Green Square is kind of push out to the western side that is zoned for employment**, and almost none in what is zoned B4 - mix use. so when you are looking at the zoning map you can see the difference between the two and **you've got a real separation** and you've lost all or employment floor space from Green Square I think the split this like 95 and 5 in floor space.

O: So it's not going to be very mixed use area?

T: No. I mean the Green Square renewal area does have some land zoning employment and there is always the idea that this would be a great mix community and more intense employment here. Well you certainly have that still, but **that is a big problem in Green Square, that balance.** Then flooding with the trunk drainage has been sort out a little bit and also contamination there is urban hazard for example **noise and air quality.** I'm not saying that it's horribly polluted but for people who live along the busy roads and it's not certainly comfortable. So there are other issues with flooding and contamination so buildings can be expensive. Also **lack of affordable housing has been a big problem** but that is really constrained in our planning system. There is a program that gets maybe 3% of affordable housing but it takes a lot to explain the document but essentially that's what it says and that's just no way in enough. So we have we've got relatively wealthy community with **not a lot of income diversity**, you have a quite a bit of ethnic diversity. And **not a great deal of age diversity either** which is not unusual for the city of Sydney, we have quite a big proportion of people under 35.

O: Just maybe a last question. Going back to the provision of mixed use as you mentioned, do you think that it's because of the developers' side that they are not very keen on providing that or is it from the regulations?

T: **B4 allows for both but it's been very strongly influenced by the different capital values between non-residential and residential. It's a lot more valuable and they get a lot more money from building residential development** or certainly have over the last five years. It's slowed down now and there is a bucket of slight decline so we are not getting that much

pressure this year but it will probably be back to what it was last year or two. So it's because they make so much money of residential.

O: And the City of Sydney couldn't say for example you have to provide this percentage of mixed use or shops or whatever?

T: In some areas we have some success in some places. **So, in places like the Green Square Town Centre where it was written in the planning control that you must do this but there's not really an easy way for councils to use the planning systems to split.** Zoning on the land was kind of done before all the housing boom and before nobody understood the problems that they're coming. It was kind zoned for B4 and you can't change it after that. **So once you've set up planning rules it's very difficult to go back and make them more restrictive** because people pay for that site based on planning rules. So to come in later and say half of that needs to be commercial, there would be house of outrage from here to the Prime Minister's office. **There's been some example to push it through but it's very moderate, it's very difficult.** It's not like it's never happened, but it's incredibly difficult. There is planning directions in the legislation that you are not to curtail residential potential on site, so there is kind of difficulties and planning framework to do it but that is just messy political difficulties with doing it too.