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An analysis of Urban Form as an approach to Social Sustainability.

A comparative study of contrasting housing developments.

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Abstract

This research study aims to determine the impact of urban form on social sustainability. Definitions of urban form vary in the literature. One of the definitions describe urban form as spaces that enhance the sense of community, healthy communities and place attachment, while promoting environmental mitigation and adaption measures (Eizenberg & Jabareen, 2017). Likewise, social sustainability has not been clearly defined and universally understood and as a result its importance has been compromised (Vallance, Perkins & Dixon, 2011). This study of urban form also includes testing the success of the process of implementation, with the aim of providing evidence with regards to its success in the shaping of urban form. Important implementation processes of urban form include: planning processes, policies, processes of collaboration and partnership between different agencies, local participation, financial incentives, tax incentives and investment (Burton, Jenks & Williams, 2003).

The case study of the research includes two contrasting housing developments that are at opposite ends of the housing spectrum. Masiphumelele, an informal settlement, and Lake Michelle, an Eco-Estate. Both these housing developments are situated between the areas of Noordhoek, Fish Hoek and Sun Valley in the City of Cape Town. This research project makes use of a multidisciplinary approach. Due to the spatial and social nature of the research, methods from both Geography and Urban Design were used. Qualitative methods were used, including interviews, field observation, volunteer work at an NGO, and spatial mapping.

The research study finds that urban form does have an impact on social sustainability. The findings reveal that the measure of social sustainability is a result of firstly, the type of urban form. Secondly, it is a result of the nature of the implementation process of urban form. Third, it is a result of the residents' response to the urban form. Social sustainability is thus not predictable, but the relationship between urban form and social sustainability is predictable. Both high-density and low-density urban forms have positive and negative results, depending on the specific context. Furthermore, the selected criteria with which to define both urban form and social sustainability will have an impact on the relationship between the two. Thus, calling for a uniform definition of both urban form and social sustainability, and the need for a context-specific approach to the design of urban form.

Key words: sustainable development; urban form; social sustainability; implementation processes, multidisciplinary research

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List of Abbreviations

| | |
|-----|-------------------------------|
| NGO | Non-Governmental Organisation |
| TB | Tuberculosis |
| HIV | Human Immunodeficiency Virus |
| UN | United Nations |

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CHAPTER 1: INTRODUCING CONCEPTS AND QUESTIONS

1.1 Introduction

According to the UN-Habitat World Urban Forum, the majority of the world's population will live in cities by 2008 (Blanco et al., 2009). Moreover, almost a third of the people who live in cities, live in slums (Robin, 2016). As a result, the significance of sustainable development and its role in the re-shaping of cities has increased greatly over the last decade. In 2015, the Millennium Development Goals were replaced by 17 Sustainable Development Goals that were put together by the UN. (Watson, 2016). Furthermore, in 2016, the Habitat 3 United Nations conference on housing and sustainable urban development took place in Quito, Ecuador (Robin, 2016). As sustainable development addresses an increasing population's needs, the built environment becomes important in addressing the social needs of people, while taking into consideration the impact on the environment. Therefore, urban form, needs to be understood in sustainable terms.

Definitions of urban form vary in the literature. One definition describes urban form is as spaces that enhance the sense of community, healthy communities and place attachment, while promoting environmental mitigation and adaption measures (Eizenberg & Jabareen, 2017). Social sustainability has not been clearly defined and universally understood and therefore its importance has been compromised (Vallance, Perkins & Dixon, 2011). Furthermore, Dempsey et al. (2009) states that there is a significant lack of social sustainability in the built environment. Therefore, urban form is studied in relation to social sustainability in this research project. The study of urban form includes testing the success of the process of implementation, with the aim of providing evidence with regards to its success in the shaping of urban form.

1.2 Rationale

According to Schwarz (2010), the definition of urban form is formulated according to the purpose of the study. According to the literature, the relationship between urban form and social sustainability is significant due to the crucial role that urban form plays in achieving social sustainability (Eizenberg & Jabareen, 2017). This claim is tested in this research project and urban form will be used as it is defined in a conceptual framework for social sustainability (Eizenberg & Jabareen, 2017). This framework aimed at focussing on the social aspect of sustainable development, which was previously missing in research studies (Eizenberg & Jabareen, 2017). The authors highlight four concepts in their framework for social sustainability: 'equity', 'safety', 'eco-prosumption'¹ and 'urban form' (Eizenberg & Jabareen 2017, p.1). The aspect of urban form is not only a theoretical concept of social sustainability, but also a physical and spatial aspect. This adds an interesting dimension to the study of social sustainability and leads to questions regarding the relationship between built forms and social processes in cities.

In this framework, urban form is defined as spaces that enhance the sense of community, healthy communities and place attachment, while promoting environmental mitigation and adaption measures (Eizenberg & Jabareen, 2017). The criteria with which this definition measures urban forms is: 'urban contiguity and connectivity', 'sustainable transport', 'density', 'mixed land use', 'diversity' of built form and residents, 'passive solar design' and 'greening, renewal and utilization' (Eizenberg & Jabareen 2017, pp.9,10). This definition of urban form was selected for this study, as it includes physical and non-physical factors of social sustainability while maintaining a relation between the social, ecological and economic factors (Eizenberg & Jabareen, 2017). This definition of urban form needs to be tested in the Global South since the literature focusses on the context of the Global North, and the Global South is rich with contrasting urban forms.

¹ "Eco-prosumption refers to modes of consuming, producing and gaining values in socially and environmentally responsible ways" (Eizenberg & Jabareen, 2017).

Social sustainability forms part of sustainable development in accordance with the three pillars approach in the Brundtland report: social, environmental and economic (Zaccai, 2012). In this research project, social sustainability will be defined as described by Dempsey et al. (2009). This definition argues that social sustainability consists of a combination of physical factors such as: 'housing', 'environmental quality', 'accessibility to services, employment, green space (Dempsey et al. 2009, p.291). As well as non-physical factors such as 'education', 'local democracy', 'health', 'quality of life', 'social inclusion', 'community', 'safety', 'social cohesion and interaction', 'sense of community', 'employment' and 'cultural traditions' (Dempsey et al. 2009, p.291). However, there is not only one definition of social sustainability and it is described as a 'concept in chaos' that has not been clearly defined and universally understood (Vallance, Perkins & Dixon, 2011: 342). Furthermore, Dempsey et al. (2009) states that there is a significant lack of social sustainability in the built environment.

Jenks (2006) shows that whilst sustainable urban form has been used in planning policy, practice and urban theory, there is little evidence of its success in implementation. According to Graham and Marvin (2001), when studying built form in relation to social context, the emphasis should be on the processes that shape the built form. Important implementation processes of urban form include: planning processes, policies, processes of collaboration and partnership between different agencies, local participation, financial incentives, tax incentives and investment (Burton, Jenks & Williams, 2003). This research project of urban form includes testing the success of the process of implementation, with the aim of providing evidence with regards to its success in the shaping of urban form. An increase in our understanding of the implementation of urban form, could lead to more effective implementation processes and more sustainable urban forms in the future.

There are three main debates in the literature regarding the relationship between urban form and social sustainability. First, it is argued that urban form can contribute to social sustainability (Dempsey et al., 2009). Second, the argument that a specific urban form, that of densification, contributes to social sustainability (Burgess & Jenks, 2002) and that urban sprawl as an urban form, does not contribute to social sustainability (Dieleman & Wegener, 2004).

Two contrasting housing developments have been selected as case studies. Masiphumelele, an informal settlement, and Lake Michelle, a high-end Eco-Estate. Both these housing developments are situated between the areas of Noordhoek, Fish Hoek and Sun Valley in the City of Cape Town. Masiphumelele is only 200 metres away from Lake Michelle and the two developments are separated by a wetland. Masiphumelele is currently being further developed by the City of Cape

Town, whereas Lake Michelle eco estate is an example of a private development. These two areas were selected as case studies due to the contrast in spatial, economic, social and environmental terms, and due to the close proximity in which the two housing developments are situated. By making use of two contrasting areas, the relationship between urban form and social sustainability can be tested in two very different places. In this way the relationship between urban form and social sustainability can be compared in two very different areas. This can contribute to the validity of the results, if the nature of the relationship between urban form and social sustainability is the same in the two areas.

The link between urban form and social sustainability is not clear and therefore urban form is studied in relation to social sustainability in this research project. Two contrasting housing developments have been selected as case studies to test the theoretical arguments in the context of the Global South.

1.3 Research Aim

The aim of this research is to determine the extent to which the concepts of social sustainability and urban form differ, and to what extent urban form contributes to social sustainability in contrasting housing developments.

1.4 Research Question

What is the role of urban form in contributing towards social sustainability in housing developments?

Sub-questions

1. How do both urban form and social sustainability differ in contrasting housing developments?
2. What is the role of implementation processes in the shaping of urban form in contrasting housing developments?
3. What is the relationship between urban form and social sustainability in contrasting housing developments?

1.5 An Outline of the Thesis

This thesis is organised into six chapters, beginning with the literature review in Chapter 2, including key themes that are central to the research study. Chapter 3 provides an overview of the context in which the research project took place, including an outline of the two case study sites. Chapter 4 includes the methodology, outlining the research methods, ethical consideration and limitations to the study. In Chapter 5 the research findings are discussed and analysed, along with a discussion of the findings. Finally, Chapter 6 includes the conclusion to the research.

CHAPTER 2: A REVIEW OF THE LITERATURE

2.1 Introduction

In this literature review, the following concepts are discussed: urban form, sustainable development and social sustainability. The various definitions of urban form and social sustainability are discussed. Social sustainability is discussed as part of sustainable development, specifically in the context of urban development. The contested nature of sustainable development is discussed, as well as the implications of this on the various understandings of social sustainability. Thereafter, the relationship between urban form and social sustainability is discussed with reference to specific research studies.

2.2 Urban Form

According to Burgess and Jenks (2002), there is no single definition of a sustainable urban form and it depends on the context and the objectives for achieving sustainability. What follows is a discussion on the different viewpoints and definitions of urban form.

Eizenberg and Jabareen (2017) argue that social sustainability was not integrated into sustainable development literature from the beginning stages of its emergence. They suggest that this omission has resulted in a dissociation between the social, economic and ecological issues and that this causes the social aspect of sustainable development to be undefined (Eizenberg & Jabareen, 2017). In response, Eizenberg and Jabareen (2017) develop a new social sustainability framework. Urban form is one of four main concepts in this social sustainability framework. In this framework urban form represents spaces that enhance the sense of community, healthy communities and place attachment, while promoting environmental mitigation and adaption measures (Eizenberg & Jabareen, 2017). The specific features of successful 'urban forms' are outlined as follows: 'urban contiguity and connectivity', 'sustainable transport', 'density', 'mixed land use', 'diversity' of built form and residents', 'passive solar design', 'greening, renewal and utilization' (Eizenberg & Jabareen, 2017). In this case, it can be said that urban form is viewed as an integral aspect of social sustainability, since it forms part of a social sustainability framework.

According to Jenks and Jones (2009), physical and environmental aspects of sustainability that relate to urban form include: an 'intensive use of urban land', the use of 'networks of green corridors' in urban development, a 'mixture of land use at a relatively high density' and lastly, 'local identity' (Jenks & Jones 2009, p.3). Jenks and Jones (2009) consider urban form to consist of the "physical configuration and layout, including links to the wider urban system; its land uses and functions; the typology and density of built form and presence of open space" (Jenks & Jones 2009, p.3). Bramley and Power (2009) refer to urban form as including the aspects: 'density', 'house type', 'presence of higher residential buildings', 'density of cars', 'quality of design', 'type of building and street layout', 'open space', and 'mixed use' (Bramley & Power 2009, p.35). In these definitions urban form is not part of a framework but is described as a multi-faceted concept that consists of many different aspects.

The following authors argue what a sustainable urban form looks like. First, Jenks (2006) identifies aspects of urban form that are evident in most theories of sustainable urban form. These include: diversity, high density, mixed land use, sustainable transport, a 'walkable neighbourhood', the use of 'street grids' and 'compact building design' (Jenks 2006, p.92). Secondly, sustainable urban form, according to Williams and Jenks (2000), allows change to take place over time, at a low cost and energy use (Williams & Jenks, 2000). By studying historical examples, the authors demonstrate that the shape and size of developments will change and adapt without planning for change to take place (Williams & Jenks, 2000). Third, Jabareen (2006) identifies four specific sustainable urban forms in a city. First, the 'neo-traditional development', which includes "sustainable transportation, diversity of housing types, compactness, mixed land uses, and greening" (Jabareen 2006, p.43). Second, 'the urban containment', which includes "policies of compactness" (Jabareen 2006, p.44). Third, 'the compact city', which is a high density city with mixed land use and which draws on new urbanism approaches (Jabareen, 2006). Fourth, 'the eco-city' which includes green design, ecological and cultural diversity and a city that relies on 'environmental management' (Jabareen 2006, p.46).

The success of urban form is argued in terms of residents' response to the urban form. Jenks (2006) states that the everyday behaviour of people needs to be taken into consideration when creating new urban forms. Furthermore, Jenks (2006) argues that urban form that is aimed at achieving sustainability will only be successful if it leads to a change in behaviour of residents with regards to their impact on the environment. This argument which measures urban form in the response of residents, challenges the arguments discussed above, which describe urban form as a list of criteria.

Burgess and Jenks (2002) discuss the compact city as one type of urban form (Burgess & Jenks, 2002). The compact city approach is designed with the aim to: 'increase built area', increase 'residential population densities', 'intensify urban economic, social and cultural activities' and 'manipulate urban size, form and structure' (Burgess & Jenks 2002, p.14). In short, Dempsey, Brown and Bramley (2012) state that high-density development is a key element of the compact city. According to Burgess and Jenks (2002), the compact city type can achieve social, environmental and sustainable benefits (Burgess & Jenks, 2002). This sustainable urban form leads to reduced vehicle emissions (due to shorter travel distances), public transport, waste disposal, healthcare and education and an increase in job opportunities (Burgess & Jenks, 2002). Some of the aspects that influence a compact city are: "densification, infrastructure, transport, land use and urban form" (Burgess & Jenks 2002, p.305). Jenks (2006) does not have one definition of the compact city but argues that the compact city can be defined in many ways. Furthermore, Jenks (2006) states that the effectiveness of high density development depends on the specific 'context and culture' (Jenks, 2006: 100). It is important to note that a high-density urban form is one of the attributes of the compact city, however, a high-density urban form is not synonymous with a compact city.

In contrast to the compact city, urban sprawl is defined as the growth of urban spatial patterns with low densities, large outward expansion and land uses that are spatially segregated (Dieleman & Wegener, 2004). The compact city urban form is argued as an approach that prevents urban sprawl from taking place in the city (Dieleman & Wegener, 2004). Here, urban sprawl is viewed as a type of urban form that does not contribute to social sustainability, while the compact city is viewed as a type of urban form that does contribute to social sustainability (Burgess & Jenks, 2002). However, Jabareen (2006) states that there is not one agreement on the most effective urban form that will contribute best to sustainability.

Jenks (2006), argues that sustainable urban form has been used in planning policy, practice and urban theory, however, its implementation has been compromised. According to Jenks (2006), implementation should respond to the specific 'society and culture' (Jenks, 2006: 100). Tonkiss (2014) points out that the plan for an urban area often looks very different to the outcomes. According to Graham and Marvin (2001), when studying built form in relation to social context, the emphasis should be on the processes that shape the built form. Based on these arguments, it becomes evident that the processes of implementation are important in achieving a sustainable urban form. Important implementation processes of urban form include: "planning processes, policies, processes of collaboration and partnership between different agencies (planners, local

authority, developers, land owners, public service providers, businesses and residents), local participation, financial incentives, tax incentives and investment” (Burton, Jenks & Williams 2003, p.238).

In sum, it has become evident that there is no single definition of urban form. However, the different definitions have many criteria in common, allowing one to form a comprehensive idea of the important aspects based on the specific context. In addition, the importance of implementation processes is stressed, as well as its relevance to the specific context. Furthermore, the compact city and urban sprawl are described as two opposing models that form as a result of the urban form (Burgess & Jenks, 2002). The compact city is argued to contribute to social sustainability, while urban sprawl is argued not to contribute to social sustainability (Dieleman & Wegener, 2004).

2.3 Social Sustainability

The concept of social sustainability forms part of sustainable development. The Brundtland report in 1987 and the United Nations Conference on Environment and Development in 1992 were the first major shapers of sustainable development as a concept (Zaccai, 2012). The well-known three pillars approach, consisting of the three objectives: social, environmental and economic, was only included in the definition of sustainable development in the late 1990's (Zaccai, 2012). Only after the World Summit on Sustainable Development in Johannesburg in 2002, social themes were included in the definition. These themes were: “public health, demographics and migration, and fighting global poverty” (Zaccai 2012, p.80).

Since the popularisation of sustainable development, it has become a contested concept (Williams & Millington, 2004). The lack of definition of sustainable development has been criticized by some and has been viewed as a space where collaboration and conversation can take place by others (Polk & Kain, 2015: 4). Certain debates about sustainable development include arguments for ‘strong’ and ‘weak’ sustainability (Williams & Millington 2004, p.99). ‘Weak sustainability’ argues that the availability of resources needs to be increased (Williams & Millington, 2004). Whereas ‘strong sustainability’ argues that we need to demand less resources from the planet (Williams & Millington 2004, p.100). ‘Moderate sustainability’ argues for a combination of the two: that resources need to be expanded and demands need to be reduced (Williams & Millington, 2004).

According to Vallance, Perkins and Dixon (2011), the social aspect of sustainable development has been neglected over the last two decades, and instead the focus has been on environmental issues and economic growth. Meadowcroft (2007) argues that to ensure sustainable development, a balance needs to be maintained between the environment, society and the economy. Dempsey et al. (2009) argues that social sustainability has its own right within sustainable development. Furthermore, Dempsey et al. (2009) builds on this issue stating that social sustainability has not been clearly defined and that there is a significant lack of social sustainability in the built environment. Vallance, Perkins and Dixon (2011) agree with Dempsey et al. (2009) when stating that social sustainability is a 'concept in chaos' and that it has not been clearly defined and universally understood.

In this way, the importance of social sustainability has been compromised (Vallance, Perkins & Dixon, 2011: 342). However, providing one confined definition of social sustainability would not serve the complexity of the concept (Vallance, Perkins & Dixon, 2011). As a result, Vallance, Perkins & Dixon (2011) have identified three categories with which to define social sustainability. First, 'development sustainability' which includes the provision of basic needs, social justice and the creation of social capital (Vallance, Perkins & Dixon 2011, p.342). Second, 'bridge sustainability' which includes changes in behaviour to achieve environmental goals (Vallance, Perkins & Dixon 2011, p.342). Third, 'maintenance sustainability' which includes the preservation of social culture during change (Vallance, Perkins & Dixon 2011, p.342).

Social sustainability is viewed as a 'dynamic concept' which changes over time and across different scales (Dempsey et al. 2009, p.291). A list of factors forming part of social sustainability are put together by various practitioners and theorists (Dempsey et al., 2009). The factors are divided into physical factors and non-physical factors. Some of the physical factors include: housing, environmental quality, accessibility to services, and sustainable urban design (Dempsey et al. 2009, p.291). Some of the non-physical factors include: education, health, quality of life, social inclusion, safety, social cohesion and interaction, sense of community, active community organisations and employment to name a few (Dempsey et al. 2009, p.291). The authors point out that many of these concepts are closely related (Dempsey et al., 2009). In addition, Dempsey et al. (2009) identifies five concepts of social sustainability at a neighbourhood scale: "social interaction, participation in collective groups and networks in the community, community stability, pride/sense of place and safety and security" (Dempsey et al. 2009, p.294). In this way, Dempsey et al. (2009) has responded to the need for a more concrete definition of social sustainability. In

turn providing a set of criteria with which to measure social sustainability, both from a theoretical and a practical perspective.

Another attempt to create a more concrete definition of social sustainability includes a conceptual framework for social sustainability by Eizenberg and Jabareen (2017). According to the authors, the framework includes the physical and the non-physical aspects of social sustainability, while maintaining a relation between the social, ecological and economic factors of social sustainability (Eizenberg & Jabareen, 2017). There are four main concepts in this conceptual framework for social sustainability. First, 'equity', which includes the value of identity, 'economic restructuring' as a solution to injustice and 'public involvement' in new development as a means of creating a sense of community and a healthy attachment to place (Eizenberg & Jabareen 2017, p.1). Second, the concept of 'safety' which includes prevention of harm (Eizenberg & Jabareen 2017, p.1). Third the concept of 'eco-presumption' which includes the production of values that are socially and environmentally responsible (Eizenberg & Jabareen 2017, p.1). The fourth concept is 'urban form' which represents spaces that are socially desired, enhance community, safety and health, as well as achieve environmental goals (Eizenberg & Jabareen 2017, p.1).

In sum, there is no single definition of social sustainability, just as is the case with urban form. It has become evident that the social aspect of sustainable development has been neglected. Therefore, social sustainability becomes an important aspect to be studied in urban development. We can do so by building on the existing frameworks for social sustainability. However, in comparison to urban form, the arguments for defining social sustainability are more complex, making it challenging to define. In this case it would not be possible to combine different definitions as they have different frameworks of understanding. This discussion on the literature relating to social sustainability has revealed that social sustainability remains a 'concept in chaos' (Dempsey et al. 2009), making it difficult to measure.

2.4 The Relationship between Social Sustainability and Urban Form

Jenks and Jones (2009) argue that there is a lack of evidence and theory regarding the extent to which urban form can contribute to sustainability. Similarly, Bramley and Power (2009) argue that more work needs to be done on the analyses and measurement of social outcomes as well as the relationship of social outcomes with urban form. What follows is a discussion of the research studies that have been completed regarding the impact of urban form on social sustainability.

Dempsey et al. (2009) studies the relationship between certain aspects of social sustainability and built form at a neighbourhood scale. The aspects that are studied are: “social equity, social interaction and sense of place” (Dempsey et al. 2009, p.291). First, Dempsey et al. (2009) argues that social equity is an aspect of social sustainability that is provided in built form (Dempsey et al., 2009). Central to social equity, is equal access to services (Dempsey et al., 2009). Second, with regards to social interaction, Dempsey et al. (2009) argues that built form impacts social interaction in the form of “density, layout and mixed land use” (Dempsey et al. 2009, p.295). High density developments are claimed to increase social interaction among residents (Dempsey et al., 2009). Third, with regards to sense of place, Dempsey et al. (2009) argues that built form can contribute to a person’s identity and sense of belonging.

It is argued that built form can contribute to the sense of community in a neighbourhood (Dempsey et al., 2009). The sense of community in a neighbourhood is impacted by the “norms and behaviour” of residents (Dempsey et al. 2009, p.296). According to Dempsey et al. (2009), the “norms and behaviour” are informed by the physical built environment (Dempsey et al., 2009). Residents’ sense of place can also impact social interaction and their perception of safety in that neighbourhood. In agreement with Dempsey et al. (2009), Williams and Jenks (2000) claim that urban form is only sustainable if it is “acceptable to its inhabitants” (Williams & Jenks 2000, 97). Thus, “a positive sense of attachment” to a place can contribute to several aspects of social sustainability (Dempsey et al., 2009). In sum, Dempsey et al. (2009) finds that social sustainability is provided in built form and that there is a link between urban form and specific aspects of social sustainability.

Bramley and Power (2009) conduct a study in the United Kingdom with the aim to determine the impact of urban form on social sustainability. Urban form is measured according to: “density, house type mix, presence of high residential buildings and density of cars” (Bramley & Power 2009, p35). They make use of two aspects of social sustainability in their study: ‘social equity’ and ‘sustainability of community’ (Bramley & Power 2009, 30). They collect data from the ‘Survey of English Housing’ (Bramley & Power 2009, 30). The study finds that results differ when demographic and socioeconomic factors are taken into account (Bramley & Power, 2009). Bramley and Power (2009) find that compact urban forms have a negative effect on residents’ satisfaction with the neighbourhood, whereas it has a positive effect on the access to services (Bramley & Power, 2009). In response to these contradicting findings, the authors conclude that different solutions are necessary for different contexts (Bramley & Power, 2009). The authors conclude with a call for more studies relating to the measurement of social outcomes and the

relationship to urban form (Bramley & Power, 2009). Jenks and Jones (2009) agree with Bramley and Power (2009) when stating that urban form should be relevant to the specific 'social context' (Jenks & Jones 2009, 9). For example, the 'inner city' would require a different urban form than the 'suburban residential' context in order to achieve social sustainability (Jenks & Jones, 2009: 9). Thus, it has become evident that certain urban forms do not always have a positive effect on social sustainability.

Williams and Jenks (2000) explore the relations between social equity, as an aspect of social sustainability, and high-density housing, as a type of urban form. In this case, social equity is measured according to the following criteria: "access to superstores, green space and jobs, use of public transport, pedestrian and bicycle use, amount of living space, health, crime, segregation, job opportunities and affordable housing and wealth" (Williams & Jenks 2000, p.25). Williams and Jenks (2000) find that compactness, which is a form of high density housing, has a positive effect on some aspects of social equity, and a negative effect on other aspects of social equity (Williams & Jenks, 2000). With regards to these contradictory findings, Aquino and Gainza (2014) state that there are many positive aspects to densification, and that there are also many contradictions, especially in cities where there are 'socio-spatial disparities' (Aquino & Gainza 2014, p.5876). Bramley et al. (2009) agree when stating that densification is complex and research studies on densification often reveal contradictory findings. For example, density can offer better access to infrastructure due to compact layout of services, however, it may add to dissatisfaction in the neighbourhood (Aquino & Gainza, 2014). In addition, Aquino and Gainza (2014) found in a study that the rich value low-density living, and that the poor value better accessibility and urban features, at the expense of living in high density developments. Thus, there is a contrast in the relation between urban form and social sustainability, depending on the aspects of social sustainability and urban form, and the specific context.

Bramley et al. (2009) undertake a study in five British cities, to determine the links between certain urban forms and several aspects of social sustainability, including: "residential satisfaction, stability, neighbourhood environment and safety" (Bramley et al. 2009, p.2125). The study made use of surveys, neighbourhood maps and sociodemographic data. Social sustainability was measured in terms of 'social equity' and 'sustainability of community' (Bramley et al. 2009, p.2126). In the study, social equity includes: "access to services, recreational opportunities, open space, transport, job opportunities and affordable housing" (Bramley et al. 2009, p.2126). Sustainability of community refers to neighbourhood attachment, social interaction, safety, quality of environment, satisfaction with home and participation in group activities (Bramley et al. 2009,

p.2126). Urban form in residential neighbourhoods is measured according to the following aspects: “gross density, dwelling type, story height, residential buildings, gardens, green space, roads, percentage of green space, net dwelling density, average garden building height, rundown areas and mixed use (Bramley et al. 2009, p.2130). The results of the study revealed that residential satisfaction and safety and stability are lower in high-density areas (Bramley et al., 2009). The study also concluded that urban form consists of different aspects, which have ‘differing social effects’ (Bramley et al. 2009, p.2125). Furthermore, social outcomes were greatly influenced by the socioeconomic and demographic mix of communities (Bramley et al. 2009, p.2139). The study highlighted the importance of taking into account the behaviour and outcomes in a broader context of urban form (Bramley et al., 2009). Bramley et al. (2009), argue that the most prevalent relation between urban form and social sustainability is densification.

Lin and Yang (2006) describe high density as an important concept of the compact city. According to Turok (2011), density leads to inclusivity and social interaction and is thus regarded as a sustainable urban form. Turok (2011) states that densification is aimed at supplying suitable housing and services in the central city. Similarly, Bramley et al. (2009) argue that urban densification can increase social interaction, sense of community and place attachment. Burgess and Jenks (2002) agree when arguing that the sustainability of urban form is influenced by the density and compactness of the urban layout, land use, mixed use, layout, building typology and green open spaces. Aquino and Gainza (2014) have a similar view, they state that developments that are high density and compact are socially sustainable urban forms. These developments protect open space, encourage pedestrian activity, contribute to social cohesion and make use of urban resources more efficiently (Aquino & Gainza, 2014). More specifically, Aquino and Gainza (2014) study density with regards to: ‘functional organization of the city’, ‘the neighbourhood condition’, the funds spent by the local authorities and the ‘socio-economic conditions’ (Aquino & Gainza 2014, p.5877). Here, high density development is argued to be a sustainable urban form, and forms part of the compact city type.

In sum, these authors have argued that there is a link between urban form and specific aspects of social sustainability. The type of urban form that most often contributes to social sustainability, is high density development. However, there are often contradictory findings when studying the relationship between urban form and social sustainability. These results vary depending on the criteria used for urban form and social sustainability, and the specific context of the study.

2.5 Conclusion

It has become evident that there are different frameworks of understanding when it comes to definitions of social sustainability. It has been identified that the physical aspects of social sustainability are easier to control and measure than the non-physical aspects. With regards to the relationship between social sustainability and urban form, the authors find that there are often contradictory findings. One of the contributing factors that is mentioned repeatedly, is the 'socioeconomic' and 'demographic mix of communities'. As a result, studies are found to be context-specific and results are influenced by the behaviour of residents. In conclusion, the complex and unpredictable nature of the relationship between urban form and social sustainability calls for further study in this field.

CHAPTER 3: CONTEXTUALISING THE RESEARCH

3.1 Contrasting Housing Developments

This research project made use of two contrasting housing developments as case studies. These are Lake Michelle, an Eco-Estate, and Masiphumelele, an informal settlement. Lake Michelle, situated around a lake, provides a comfortable and safe living environment for those who can afford estate living. The estate is also surrounded by the natural environment, including fynbos, indigenous trees and wildlife. Masiphumelele is an informal settlement only 200 metres from Lake Michelle, bordering the wetland that separates these two developments.

These developments are situated between Kommetjie, Fish Hoek and Noordhoek in the Peninsula, Cape Town (refer to Figure 1 below).

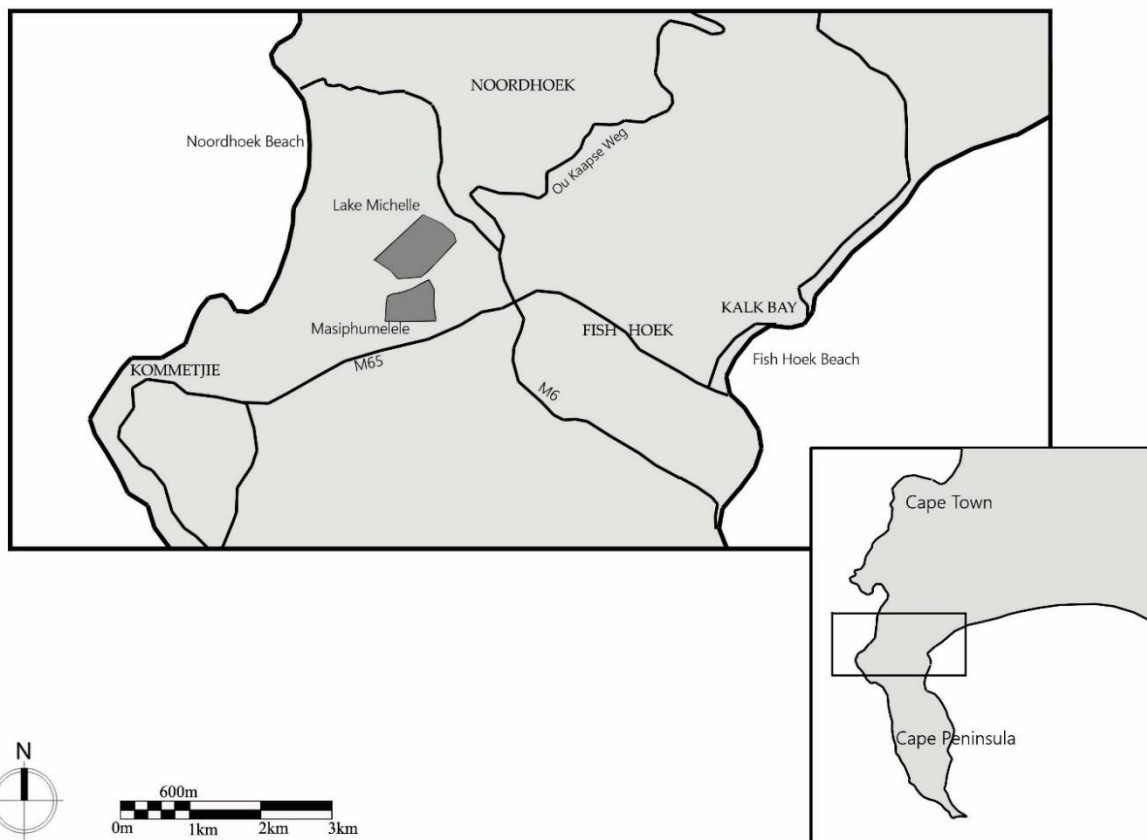


Figure 1: Map of the Southern Peninsula (Source: Author's own, 2018)

3.2 Introducing Lake Michelle

The estate is 90 hectares large and includes wetlands, a 22 hectare salt marsh lake and smaller man-made ponds (Hello House, 2016). In Figure 2 below, the area outlined in red, is the Northern area and the area outlined in blue is the Southern area. The Southern part of Lake Michelle was built approximately 24 years ago. Whereas the Northern part was built about 11 years ago and is built in a Cape Cod architectural style. There are approximately 180 homes in the Southern part and approximately 210 homes in the Northern part of the estate.



Figure 2: Lake Michelle Context Map (Source: Author's own, 2018)

The Northern area's houses were subject to strict guidelines and regulations to create a coherent aesthetic in this part of the estate (Simon McCullagh Architects, 2018). The Northern side of the estate only has fynbos and indigenous plants (see Plate 1 and 2), whereas the Southern part consists of grass lawns and mostly palm trees and other alien plants (see Plate 3 and 4).



Plate 1, 2 (above): Lake Michelle, Northern area (Source: Author's own, 2018)

Plate 4, 3 (below): Lake Michelle, Southern area (Source: Author's own, 2018)

3.3 Introducing Masiphumelele

Masiphumelele means 'we will succeed' in isiXhosa and was formerly known as 'Site 5' (Hokisa, 2018). Masiphumelele originated in the 1990's, when people moved there from Khayelitsha and the Eastern Cape (Hokisa, 2018). It became evident when speaking to residents, that many of the residents living in Masiphumelele have homes in the Eastern Cape. There is no recent government census data available regarding the population in Masiphumelele. According to most sources, there are between 26 000 and 38 000 people who currently live in Masiphumelele (The Scenic South, 2018). Most of the residents in Masiphumelele speak English, isiXhosa or Shona. Others speak Chichewa and Xitsonga.

In many cases, a yard in Masiphumelele consists of a brick house and 4-5 shacks built in the same yard (see Plate 5). The yard belongs to one person, and the shacks on the property are rented out by the owner (see Plate 6). The brick house and the shacks share electricity and an outside tap and toilet. According to one of the residents living in Masiphumelele, it costs R400 per month to rent a shack in a backyard. There are also flats in Masiphumelele and the rent is R1500 per month for one room only. According to the NGO, Masicorp, about 15% of residents in Masiphumelele live in brick houses, and about 85% live in shacks (Masicorp, 2014). The most densely populated area in Masiphumelele is the wetlands area, which consists only of shacks. Here residents share about six toilets and two taps between more than 300 people.

The area outlined in red in Figure 3 below, is the wetlands area in Masiphumelele.

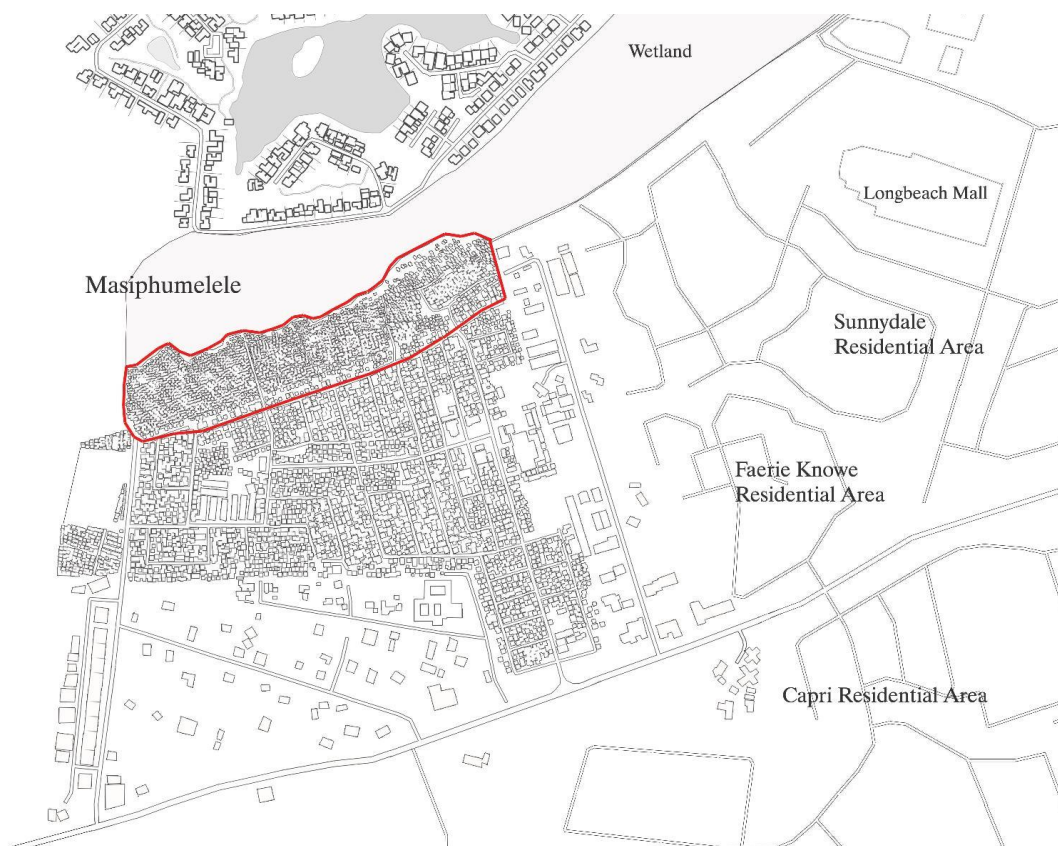


Figure 3: Contextual map (Source: Author's own, 2018)



Plate 5 (left): Masiphumelele informal shop (Source: Google, 2009f)



Plate 6 (above): Masiphumelele canal (Source: Google, 2009c)

3.4 Study Sites Compared

In the aerial photograph below, Lake Michelle is the development on the right, and Masiphumelele is the development on the left. The wetland is the open space between the two developments.

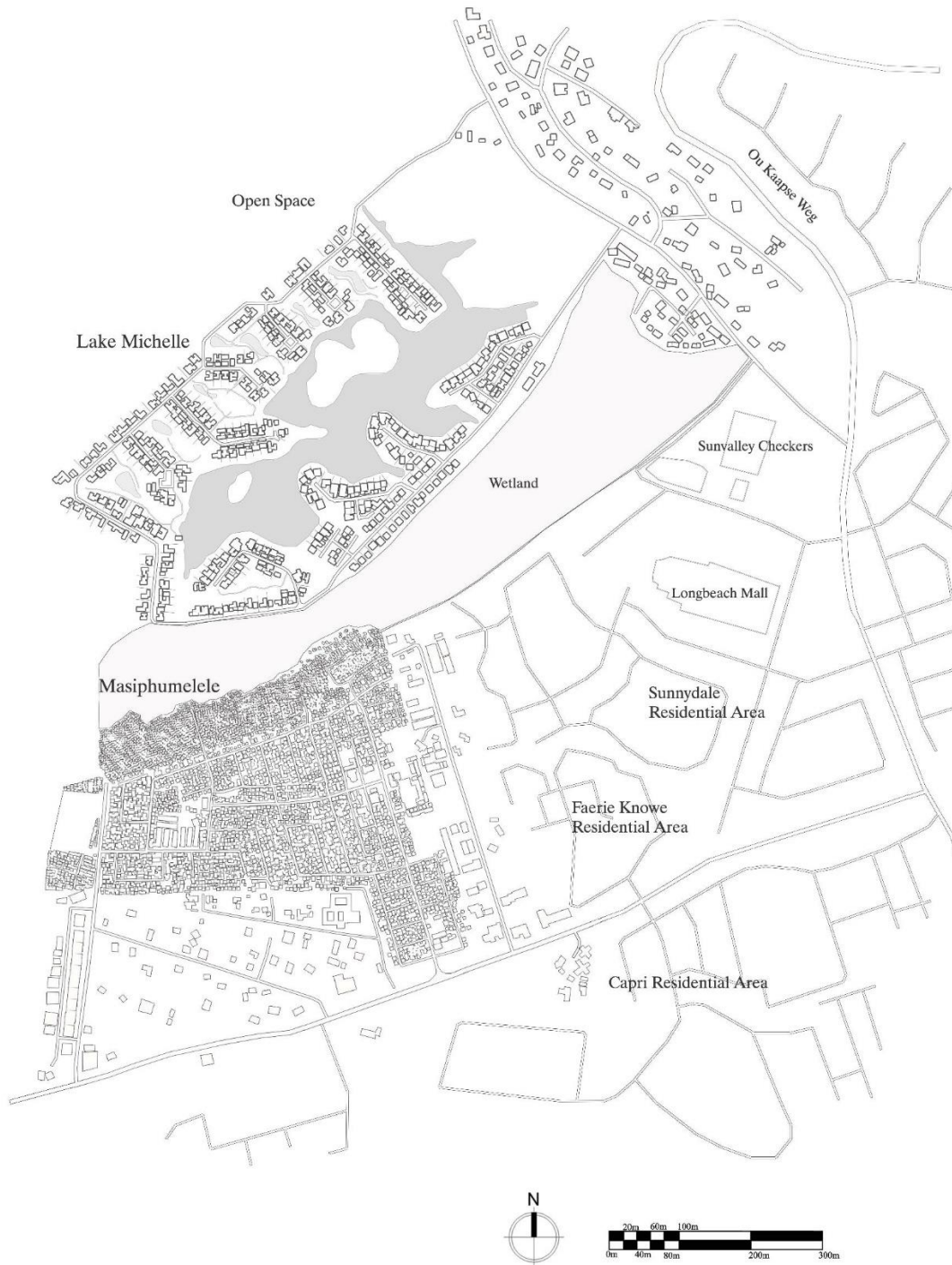


Plate 7: Aerial photograph of Masiphumelele and Lake Michelle (Miller, 2016)

As seen in Plate 7, Masiphumelele consists of informal houses that are built very closely together leaving little open space. On the right, is Lake Michelle which consists of houses that are larger than the houses in Masiphumelele. The houses in Lake Michelle are also built further apart than in Masiphumelele, with private gardens and open spaces between clusters of homes. In this way, Masiphumelele is an example of a high-density development and Lake Michelle an example of a low-density development. As seen in Plate 7, the houses, roads, green spaces and level of compactness differ in the two housing developments. From looking at Plate 7, one can also predict a contrast in social aspects, due to the apparent difference in quality of houses. Due to this contrast, these two housing developments will be studied to determine the relationship between urban form and social sustainability.

Map A

Base Map



Refer to Appendix 1 for full size of Map A.

Figure 4: Map A, Base Map (Source: Author's own, 2018)

3.5 Summary

In this chapter, the two case study sites have been discussed. It is evident that Lake Michelle and Masiphumelele are two very contrasting housing developments. Masiphumelele and Lake Michelle serve as one example of the poor and the wealthy living closely together, in high and low-density housing developments.

CHAPTER 4: METHODOLOGY

4.1 Introduction

Polk and Kain (2015) argue that knowledge concerning urban challenges should be produced in a collaborative manner by different disciplines. Urban form is not only a theoretical aspect but also a physical and spatial aspect, forming part of the built environment. Therefore, urban form will be studied from both the perspective of urban geography and that of urban design by making use of methods from both these fields.

4.2 Overview of Research Methodology

I have made use of qualitative research methods that are used to gain an understanding of the whole, and to understand people, cultures and social practices (Tracy, 2012). Quantitative research methods aim at collecting numbers and statistics and translating data into 'mathematical models and predictions' (Tracy, 2012). This type of data collection does not suit this research project, which aims at gaining an understanding of how people live and the nature of the built environment.

Qualitative research makes use of a combination of different methods to attain a 'research synthesis' (Tracy, 2012). From the field of urban geography, I have made use of volunteering, interviews and field observation to gain an understanding of social sustainability in both housing developments. From the field of urban design, I have made use of drawing spatial maps to gain an understanding of the urban forms in both housing developments.

4.3 Tools for data collection

4.3.1 Sampling Methods

Most of the residents who were interviewed in Lake Michelle were referred to me by people who were working at Living Hope NGO. With that as a starting point, I made use of snowball sampling and asked each interviewee to refer me to other residents who would be willing to be interviewed. Snowball sampling allows the sample size to expand as the researcher receives more recommendations (Tracy, 2012). This method of sampling was successful in providing me with

interviewees. The residents from Masiphumelele who were interviewed were employees at the NGO where I was volunteering. Making use of the opportunity to interview people at the NGO, created a safe context for me to do the interviews and an opportunity to build a trust relationship with some of the people before interviewing them. Since most people who are working at the NGO, live in Masi, I did not need to use snowball sampling for the interviews with Masiphumelele residents.

4.3.2 Volunteer Work

To meet the objective of determining the state of various aspects of social sustainability in Masiphumelele, I volunteered at an NGO that works with people in informal settlements, of which Masiphumelele is one. Getting involved with an NGO could help the researcher gain access to participants (Flowerdew & Martin, 1997). In addition, offering to complete voluntary work for the organisation is a way of reciprocating their help with accessing participants (Flowerdew & Martin, 1997). By volunteering, I received access to residents from Masiphumelele to interview while creating an opportunity to give back to the organisation.

My reason for approaching the NGO was to gain access to Masiphumelele, to meet and talk with people who have experience working in Masiphumelele and to ensure my safety when accessing Masiphumelele. I approached them during one of their open days and arranged for a formal meeting with the co-founder. During my first meeting with the NGO, I shared my research project focus and the research question. They were happy to help me for the exchange of my time as a volunteer.

During my time of volunteering, I worked in the main admin office. After spending a few weeks in the office, two of the employees at the NGO introduced me to other employees that I could interview. When conducting interviews as part of research, it is to the researcher's advantage to build a trust relationship with interviewees (Esterberg, 2002). All the employees were open and willing to be interviewed and after volunteering a short while most of them had seen me work in the office. I was no longer viewed as an outsider, but as a volunteer.

Living Hope NGO is involved with helping people in various informal settlements in the Peninsula in the form of health care, life skills, agricultural training and finding jobs. I attended an open day at the NGO with the aim of interviewing some of the people. After a meeting with the founder of the NGO, it was arranged that I would complete work in the admin office and interview employees while working in the office.

Volunteering at the NGO created many opportunities for conversations with people who have worked in Masiphumelele for years. In this way I gained insightful background knowledge about Masiphumelele. It also gave me access to in-depth information relating to households in Masiphumelele. I worked specifically with household assessments in the admin office. This gave me insight into the problems that residents are faced with in Masiphumelele. The assessments documented information regarding the health status of all the residents living in the household, and basic information regarding their living conditions. Specifically, they were asked how many people share the house, whether they have access to running water, electricity and a flushing toilet, as well as the house type: freestanding brick house, shack or backyard shack. After completing the minor-thesis, I am still volunteering at the NGO and plan to continue for as long as I have the time to do so.

4.3.3 Interviews

I made use of semi-structured interviews to generate data on social sustainability in Masiphumelele and Lake Michelle. This type of interview includes a set list of questions thought out before the interview, but still allows for flexibility during the interview process and allows for more depth in the conversation (Tracy, 2012). In this way, there is a chance that interviewees might bring up topics that the interviewer was not aware of allowing for “rich, multi-layered” data (Flowerdew & Martin, 1997). Interviewees provide an account of their own experiences in their own words (Flowerdew & Martin, 1997). The structure of pre-planned questions makes it easier to compare the data, while the flexibility of discussing new topics during the interview process as they arise, leads to the discovery of issues that the interviewer was not aware of while setting the questions (Tracy, 2012). In this way, interviews were useful in gaining an understanding of different aspects of social sustainability, such as education, community, health etc. Respondent interviews were selected in this research study. This means that the interviewees spoke for and of themselves about their own experiences (Tracy, 2012). This was useful when aiming to understand the similarities and differences (Tracy, 2012) between the different residents’ experience of social sustainability.

I completed interviews with 10 residents living in Lake Michelle and interviews with 15 residents living in Masiphumelele. In the case of Masiphumelele, volunteering gave me access to more people to interview. It was easier to gain access to Masiphumelele residents to interview, than Lake Michelle residents. Thirteen of the residents living in Masiphumelele were interviewed at the NGO, and two were interviewed at Lake Michelle. These two interviewees work as domestic

workers in Lake Michelle. The remainder of the Masiphumelele residents were interviewed at the NGO in an environment where they felt safe and were surrounded by people whom they trust. The residents were interviewed in English. For most of the Masiphumelele respondents, English is their second language. As a result, I had to explain many of the questions as they did not always understand the questions. Thus, more interviews were conducted with residents who live in Masiphumelele, however, due to English being their second language in most cases, the interviews did not last long, and the residents had very short answers to the interview questions. In the case of Lake Michelle, for most of the residents, English is their first language. The interviews with Lake Michelle residents provided more information as the conversations were longer. As a result, I could conduct less interviews in Lake Michelle while still collecting adequate information. In order to gain access to Lake Michelle, I arranged a time to meet with each resident at their home. They were contacted by the security guard at the gate of the estate, who let me into the estate. In order to contact these residents, I was given their contact details by those who referred me to them.

4.3.4 Field Observation

I have made use of non-obtrusive observation during site visits to both Masiphumelele and Lake Michelle. This type of observation means that the researcher is present in the 'background', and the researcher does not take on the identity of a researcher (Tracy, 2012). It proved useful to observe how residents naturally live in the housing developments, to study the urban form in relation to aspects of social sustainability. A limitation of this type of observation is that the researcher cannot be obtrusive during data collection (Tracy, 2012). This was a limitation during observation in Lake Michelle, as there were security guards patrolling the estate. In Masiphumelele I could observe freely without being questioned.

In this part of the study, I took photographs, and made notes in order to record my observations during site visits (Kitchin, 2000). These methods allowed me to collect data relating to the differences in urban form in the two housing developments. I observed Lake Michelle every time that I visited the estate to conduct an interview and one of the residents in Lake Michelle offered to show me around the estate after the interview.

One of the interviewed Masiphumelele residents also offered to take me on a walking tour of Masiphumelele. This allowed me to observe all the different areas in Masiphumelele, including

the wetlands area. During the tour, I also had the opportunity to ask this resident any questions related to what I saw. This was a very insightful method with which to access Masiphumelele. This time of observing Masiphumelele contributed toward my understanding of the urban forms in Masiphumelele, as well as several aspects of social sustainability.

4.3.5 Maps

Sanoff (2016) makes a case for the combination of verbal research methods and visual methods in environmental research. The author emphasises the importance of visual design methods, such as maps, photographs and drawings, in understanding the interaction between people and the built environment (Sanoff, 2016). Sanoff (2016) writes about observation of the 'physical evidence' that has resulted due to the interaction between people and their environment (Sanoff, 2016). Graham and Marvin (2001) agrees with Sanoff (2016) and recommends the representation of projects in map form when drawing links between processes of built form and the nature of social settings.

In this research project, I have drawn maps to represent the spatial data related to urban form. The maps represent the aspects of urban form that were used to study urban form in this research project. Specifically, the Land Use map (refer to Appendix 4) illustrates the different land uses in Masiphumelele and Lake Michelle. The Green Space map (refer to Appendix 3) illustrates the amount and type of green space in Masiphumelele and Lake Michelle. The Density map (refer to Appendix 2) illustrates how many people live in each home and which areas are more densely populated.

I collected the data for the maps during observation and during interviews. I used Google Maps for the basic layout of the area. First a base map was drawn, showing Masiphumelele and Lake Michelle and the immediate context. This includes the roads, houses and the lake. The other maps were drawn by adding layers of information onto the base map with a legend explaining the meaning of different colours. On the Density Map, different intensities of the same colour were used to represent different densities. The maps were drawn in Adobe Photoshop, Illustrator and Auto Cad. The maps are aimed at representing the data visually in a way that communicates the results without words. This method was useful in representing the contrast between urban form in Masiphumelele and in Lake Michelle.

4.4 Ethical Consideration

Before beginning with data collection, I applied for ethical clearance. I also attained informed consent from each interviewee before conducting interviews. In addition, I explained to each interviewee the voluntary nature of the interview and informed them about the anonymity and confidentiality of the information gathered during the interview process.

4.5 Research Limitations

There were certain limitations to the research study. Due to the time of volunteering at the NGO, I grew more familiar with Masiphumelele than with Lake Michelle. The private nature of Lake Michelle, and the security measures in the estate made it difficult to spend much time there. Working at the NGO contributed greatly to my understanding of Masi. Whereas, my time in Lake Michelle was limited to my visits to the interviewed residents' homes. A limitation when interviewing Masiphumelele residents, was that English was their second language. This led to a lack of understanding at times during the interviews with the Masiphumelele residents. Lastly, the research study was limited by the selected criteria, due to the restricted nature of the minor-thesis, with which both urban form and social sustainability were studied. These criteria were selected based on the specific context of the case study areas. Thus, the case study areas were selected first. A more comprehensive list of criteria would allow for a more through understanding of urban form and social sustainability. This type of study could be undertaken in a full dissertation.

Furthermore, my positionality influenced the limitations of the research. My position as a young white female, made me feel unsure about going to the informal settlement by myself. I was warned by one of the employees at the NGO about my lack of safety when going to Masiphumelele alone and I was advised to go with a group of people. In addition, I did not walk in Masiphumelele with my camera as I was warned not to do so, and as a result made use of Google Street view images instead of my own. Thus, it can be said that in Masiphumelele a lack of safety compromised my time spent there, while in Lake Michelle the extreme security compromised my time spent there.

4.6 Data Consolidation and Analysis

All data collected from interviews, volunteer work and observation were transcribed immediately after data collection. The data that was collected from the interviews, field observation, and volunteer work was consolidated to gain a coherent idea of what is included in the research findings. It was then summarised and sorted according to the main relevant themes. While documenting the findings, I consolidated the data from all methods, and represented the data in different categories. The data relating to urban form was drawn as overlays on the base maps, soon after the data was collected.

I have made use of interpretative data analysis by categorising the data according to themes to compare the findings from the two developments. The use of themes made it possible to break down both urban form and social sustainability into smaller parts. Interpretative analysis makes use of connections between the data in order to identify interactions between the different categories of data (Kitchin 2000, p.231). This method of analysis was useful in determining the relationship between aspects of urban form and aspects of social sustainability.

The mapped data was analysed according to the main themes for urban form. The data was analysed in written form, in relation to data collected from interviews, volunteering and photographs. The findings that are illustrated on the maps was written down with the aim of explaining what each map is communicating. The process of bringing this data in conversation with data collected from other methods, provided a thorough study with findings that can be cross referenced.

In order to formulate themes for the analysis of data, one definition for urban form and social sustainability each was selected from the literature, as a basis on which to build during the data collection. The definition of urban form by Eizenberg and Jabareen (2017) was used as a basis upon which to develop the criteria for data collection. This definition describes good urban form as including each of the following aspects: 'urban contiguity and connectivity', 'sustainable transport', 'density', 'mixed land use', 'diversity of built form and residents', 'passive solar design and greening, renewal and utilization' (Eizenberg & Jabareen 2017, pp.9,10). While completing fieldwork, the criteria were reframed and integrated to form aspects that are relevant to the two housing developments.

It became evident that density is a key aspect of urban form in both Lake Michelle and Masiphumelele. In addition, the degree to which mixed land use differs in the two contexts was revealed as another important aspect. Likewise, the diversity of built form and residents was

evidently an important contrasting aspect in the two housing developments. Greening, renewal and utilization was narrowed down to green space since green space was a very apparent aspect in Lake Michelle. The aspects of renewal and utilization were not apparent in either of the two case study sites and did not add to the importance of green space. Sustainable transport and passive solar design formed part of the social sustainability criteria and therefore was not duplicated in the urban form analyses. Finally, urban contiguity and connectivity was found to play an important role in how urban forms relate to one another.

In sum, the following aspects form part of the urban form data collection and analyses:

- Density
- Green space
- Land use
- Diversity of built form and residents
- Urban contiguity and connectivity

The following are important implementation processes of urban form: “planning processes, policies, processes of collaboration and partnership between different agencies, local participation, financial incentives, tax incentives and investment” Burton, Jenks & Williams 2003, p.238). These aspects have been used in the data collection and analysis of implementation forms in Masiphumelele and Lake Michelle.

The definition of social sustainability formulated by Dempsey et al. (2009) was used as a basis in the data analyses of social sustainability. This definition divides social sustainability into physical and non-physical aspects. Some of the physical factors include: housing, environmental quality, accessibility to services, and sustainable urban design (Dempsey et al., 2009). Some of the non-physical factors include: education, health, quality of life, social inclusion, safety, social cohesion and interaction, sense of community, active community organisations and employment to name a few (Dempsey et al. 2009, p.291). Similar to the criteria of urban form, these aspects were renamed, and some were combined based on what was relevant to the specific context.

The following list outlines the criteria that was used in the social sustainability data collection and analyses:

- Access to services:
 - o Access to health care
 - o Transport services
- Education
- Community organizations
- Employment
- Sense of community:
 - o Social cohesion and interaction

- Quality of life:
 - o Health
 - o Residents' perception of their Safety
 - o Housing

4.7 Summary

In sum, the qualitative methods for the research project have been discussed. These methods consisted of a combination of urban geographical methods and urban design methods. These methods are: interviews, volunteering, observation and spatial maps. The data was analysed according to the selected criteria for urban form and social sustainability. Triangulation was used during the data analysis process in order to ensure sound findings. The aim was to draw connections between these categories in both housing developments to determine the relationship between urban form and social sustainability, as well as the differences between the two housing developments.

CHAPTER 5: FINDINGS AND DISCUSSION

5.1 Introduction

What follows is a discussion of the research findings, with a discussion of each category. The discussions place the research findings in relation to the literature. The categories that are discussed are firstly urban form, second, social sustainability, third the role of implementation processes on the shaping of urban form and last, the relationship between urban form and social sustainability.

5.2 Urban Form- Findings

- Density

There is a stark contrast between density in Masiphumelele and Lake Michelle. When looking at Figure 5 below, it is evident that Masiphumelele is higher in density than Lake Michelle. This means that the houses are built closely together in Masi, while the houses in Lake Michelle are built further apart. There are also more people living in each house in Masi than in Lake Michelle, even though the houses in Masi are much smaller. The map (figure 5) shows the number of people per household. As seen in the legend, the intensity of colour is relational to the increase in density. Thus, the darker colours in Masiphumelele represent a high density, while the lighter colours in Lake Michelle represent a low density. The area in Masiphumelele that has the highest density, is the wetlands area. As seen in Figure 5 there are clusters of dark blue indicating high density in the wetlands area. The wetlands area is an informal area within Masiphumelele consisting only of shacks, whereas the rest of Masiphumelele is more formal consisting of brick houses and backyard shacks. As seen in Figure 5, there are open spaces between the homes in Lake Michelle. In Masiphumelele, there are fewer open spaces between the houses.

Map B

Household Density

*number of people living in each house



Figure 5: Map B, Household Density Map (Source: Author's own, 2018)

Refer to Appendix 2 for full size of Map B.

Based on Google Maps images and the use of the scale bar, a typical brick house in Masiphumelele is 35m², and a typical shack is 20m². A typical house in Lake Michelle is between 300m² and 500m² (Property24, 2018). Figure 5 shows the distribution of household numbers in the two areas. Most homes in Lake Michelle have 2-4 people sharing. There are only a few homes in Lake Michelle that consist of 5 or more people. In Masiphumelele, most households consist of 3 to 4 people. The numbers increase to 7 to 8 people in the blocks of flats. Thus, the homes in Lake Michelle are much bigger than the houses in Masiphumelele, and there are more people per household in Masiphumelele.

Lake Michelle has 13 people per hectare if it is assumed that 4 people live in a dwelling unit. While Masiphumelele has 416 people per hectare based on the population in 2011 (Ernstson & Baigrie, 2017). This means that the ratio of people per hectare for Masiphumelele is 32 times more than that of Lake Michelle. Thus, Masiphumelele is higher in density than Lake Michelle, both on a macro scale relating to the development as a whole and on a micro scale relating to individual households. It has become evident that the density of urban form differs greatly in two developments.

-Green Space

In the map below (refer to Figure 6), each colour represents a different type of green space. Purple represents the wetland, which separates the two developments and forms part of Lake Michelle. The light blue colour represents the Lake and the ponds around which the houses are built in Lake Michelle (see Plate 8 and 10 below). The light green colour represents private gardens that belong to individual households. The dark green colour represents open green space, which does not include any buildings or developments. The brown colour represents abandoned open space. These are areas of vacant land that are not being utilised.

Map C

Green Space



Refer to Appendix 3 for full size of Map C.

Figure 6: Map C, Green Space Map (Source: Author's own, 2018)

As seen in Figure 6, each household in Lake Michelle has a private garden. There are no green spaces in Masiphumelele, but only abandoned open spaces. In Masiphumelele, I was taken on a tour by one of the residents who lives in the wetland. There were only a few trees and some of the sidewalks have some grass (see Plate 12 below). There are no park areas, only children playgrounds with tar surfaces. In contrast, as I was walking through Lake Michelle I could hear running water from the lake. I could also see water when passing small ponds. The sidewalks were full of fynbos and other indigenous plants and trees. It looked and sounded as though I was in a nature reserve. There is one club house in Lake Michelle, which is surrounded by gardens. There is also a big park with a children's playground (see Plate 11 below). Most of the homes in Lake Michelle overlook the lake, and all the homes have a private garden.

As seen in Figure 6, Lake Michelle is surrounded by open green space which borders a part of Table Mountain National Park. Thus, Lake Michelle has an abundance of green space, while Masiphumelele lacks green space. There are, however, open spaces in Masiphumelele that could be transformed into green, usable spaces in the future. Although Lake Michelle has an abundance of green space, the environmental impact of the estate on the larger surroundings and natural system can be questioned. It can be argued that Lake Michelle is a stand-alone sustainable development in relation to the larger natural system. It is, thus, an isolated green development, that does not take away from the lack of green space in other developments in the area.



Plate 8, 9, 10, 11 (clockwise): Lake Michelle pond, road, boardwalk and playground

(Source: Author's own, 2018)



Left- Plate 12: Masiphumelele road (Source: Google, 2009a)

Right- Plate 13: Masiphumelele canal (Source: Google, 2009c)

-Land Use

Figure 7 below, is a map showing the different land uses in the two housing developments. Each land use is represented in a different colour, as seen on the legend. On this map in figure 7, Masiphumelele is much more colourful than Lake Michelle, meaning Masiphumelele has a mixed land use, while Lake Michelle consists mainly of residential and some commercial in the form of three guest houses.

As I spent time in Masiphumelele, it was clear that there are many informal shops around every corner. These shops sell meat, vegetables, clothes, cell phones etc. There are also many informal hairdressers. Formal services in Masiphumelele include a primary school and a high school, as well as a clinic, a library and a community centre (see Figure 8). The interviews with residents who live in Masiphumelele, said that they mostly use the shops, doctor, clinic and schools in Masiphumelele. The one resident said: "I always go to the same place to buy meat. The shop has been there for years, and I can walk there". Whereas the interviewed residents in Lake Michelle drive as far as Constantia for healthcare and schools. One of the interviewed residents in Lake Michelle said:" In sum, it is evident that Masiphumelele has a mixed land use, whereas Lake Michelle consists mainly of residential land use.

The everyday behaviour of people (Jenks, 2006) differs greatly between Masiphumelele residents and Lake Michelle residents. The activities that take place in Lake Michelle consist of residents spending time in their private homes, attending classes at the clubhouse or walking on the boardwalks around the estate. The activities that take place in Masiphumelele are more diverse and consist of residents walking to informal shops, going to the clinic, library, community centre and church (see Figure8, p.42). In both the developments, kids play outside at the playgrounds.

Masiphumelele residents are known for pedestrian movement, whereas Lake Michelle residents only walk for leisure in the estate. Lake Michelle residents drive when they need to go to the shops, church, doctor etc. As a result, Masiphumelele residents are more familiar with their urban environment than the Lake Michelle residents. Furthermore, the informal shops in Masiphumelele are accessed from the street, as seen on Plate 12 above. Here, the sidewalk becomes the threshold to the informal shop. As a result, Masiphumelele residents have a closer interaction with their surrounding built environment and spend more time outside their homes. Lake Michelle residents spend most of their time inside their private homes and view the estate environment from the perspective of their car window. In addition, the private nature of the estate, prevents Lake Michelle residents from freely moving around in the estate. Thus, the difference in land use in the two developments, has an impact on the residents' behaviour and the nature of their interaction with the built environment.

Map D

Land Use



Figure 7: Map D, Land Use (Source: Author's own, 2018)

Refer to Appendix 4 for full size of Map D.

Figure 8 below shows an area of Masiphumelele, where all the land use types are found in one area. To see where this area is in Masiphumelele, refer to Figure 7.

Diagram 1

*see map D



1. Primary School
2. Informal shop
3. Clinic
4. Church
5. Library
6. Mobile Police Station
7. Community Centre
8. Industrial building

Figure 8: Diagram 1: Urban Node in Masi (Source: Author's own, 2018)

-Diversity of Built Form and Residents

During field observation it was noted that apart from the Northern and Southern parts of Lake Michelle that have different urban forms, specifically different housing types, there is not much diversity of built form in Lake Michelle. Within the two parts of Lake Michelle, the built form is all similar and shares an aesthetic quality and built design. In contrast to this, Masiphumelele is more diverse with built form. There are shacks of different sizes and different materials and there is no set formula or design. In addition to shacks, there are brick houses which are more uniform in design. This diversity in Masiphumelele could be out of necessity and due to a lack of regulation in the form of building regulations and body corporate guidelines, which are apparent in Lake Michelle.

With regards to the residents, there are people of different nationalities living in Masiphumelele. Among the people who I interviewed, there were people from South Africa (mostly from KwaZulu-Natal), Zimbabwe and Malawi. The cultures of these people were Zulu, Xhosa and Shona. All the people who I interviewed and saw in Lake Michelle were white, English speaking South Africans. Thus, it can be said that there is more diversity in residents and in the built form in Masiphumelele. Lake Michelle does not have the rich diversity of culture or house structure as is evident in Masiphumelele.

-Urban Contiguity and Connectivity

Contiguity means “bordering or being in contact with something” (Oxford University Press, 2018).

Lake Michelle borders Crofters Valley residential area on the East. On the North and on the West, Lake Michelle borders the Table Mountain Nature Reserve. Masiphumelele is in contact with more residential developments than Lake Michelle. On the East, Masiphumelele borders Capri residential area and on the North, Masiphumelele borders the Imhoff's Gift residential area. Masiphumelele and Lake Michelle are bordering residential areas, however, they are separated by the wetland. Thus, Masiphumelele is more closely connected to the surrounding urban developments than Lake Michelle.

In conclusion, it has become evident that Lake Michelle and Masiphumelele have very different urban forms (see Table 1 below). Specifically, as discussed, Masiphumelele has more mixed

land use than Lake Michelle. Lake Michelle, being an Eco-Estate, has more green space than Masiphumelele. Masiphumelele is a high-density development, while Lake Michelle is a low-density development. Masiphumelele is more diverse in residents and built form than Lake Michelle. Lastly, Masiphumelele is more connected to the surrounding urban developments than Lake Michelle.

Table 1: Urban Form in Masi and Lake Michelle

| | Masiphumelele | Lake Michelle |
|---------------------------|-----------------------------------|------------------------------|
| Density | High density | Low Density |
| Land Use | Mixed land use | Residential land use |
| Green Space | Lack thereof | Abundant |
| Residents | Diversity of residents | Homogeneity in residents |
| Built form | Varying built form | Uniform built form |
| Urban Connectivity | Borders various residential areas | Borders one residential area |

5.3 Urban Form- Discussion

Aquino and Gainza (2014) found in a study that the rich value low-density living, and that the poor value better accessibility and urban features, at the expense of living in high density developments. As discussed, Masiphumelele is a high-density development and Lake Michelle is a low-density development. The residents in Lake Michelle, prefer living in a high-end private estate, in a home with a private garden, while the residents in Masiphumelele value accessibility in the form of informal businesses and shops, local health care and everything they need within walking distance, at the cost of living in a high-density informal settlement. Thus, in this case the research findings agree with the literature regarding high and low-density urban forms.

5.4 Social Sustainability- Findings

What follows is a discussion of the findings, and an analysis of how each aspect of social sustainability differs in Lake Michelle and Masiphumelele.

-Health

The interviewed Lake Michelle residents have access to private health care. One of the residents who was interviewed lost her husband to cancer. Another resident had recovered from cancer. In both these cases, they had accessed private health care.

The main health problems which were documented in the household assessments at the NGO, were HIV and TB. Out of 50 household assessments completed in 2017, 17 households had at least one person with between one and three of the following 6 health problems: TB, HIV, Hypertension, Diabetes, Asthma, Mental Health (with TB and HIV being the most prevalent). The rest of the households did not have any of the 6 health problems. Recently, Living Hope NGO completed a TB screening to determine how many people in Masiphumelele have TB. During the screening, residents who had any of the symptoms of TB, had to follow up by going to the clinic at the NGO, to get a sputum test done. A large percentage of these residents never followed up. The results showed that the residents are hesitant in taking responsibility for their health problems. It was also reported that many of the residents who are sick, did not collect their medicine from the clinic.

In sum, the household assessments at the NGO revealed that residents in Masiphumelele are mostly suffering from TB and HIV. In the words of one of the NGO employees: "We are trying to teach the people in Masiphumelele that is important for their health to take their medication and to follow up by returning to the clinic". Another employee explained: "The shacks are very small and there is a lack of ventilation. This causes TB to spread easily. We are trying to raise awareness of how to stop the spreading of this disease". The lack of ventilation in the houses in Masiphumelele, contributes to the spread of disease in the development.



Plate 14: Masiphumelele clinic (Source: Google, 2009d)

-Access to Health Care

All the residents from Masiphumelele who were interviewed access health care, doctors and the clinic, in Masiphumelele. If they need to go to hospital, they make use of False Bay hospital. The NGO, Living Hope, is situated across Masiphumelele and offers free health care to the residents in Masiphumelele. There is a small clinic on the premises. The NGO undertakes various projects relating to relevant health concerns in Masiphumelele and other informal settlements in the area. Thus, the residents in Masiphumelele have reported that they do have access to health care.

The interviewed residents from Lake Michelle states that they prefer going to Mediclinic Constantia berg hospital or Melomed Tokai hospital, which are both private hospitals. Some of them mentioned that in an emergency they would go to False Bay hospital, which is a government hospital. Three of the residents who were interviewed, go to Long Beach Medical Centre for medical services.

In sum, both the residents living in Masiphumelele and the residents living in Lake Michelle have access to health care. Overall, residents in Lake Michelle make use of private health care facilities, whilst residents of Masiphumelele make use of the facilities made available by the NGO, and the state hospital.

-Transport services

All the residents from Lake Michelle who were interviewed, owned two cars per household, whereas none of the residents from Masiphumelele who were interviewed owned cars. Masiphumelele residents walk or take taxis to travel to work. Their friends, family, shops, the clinic and the churches are all within walking distance, making it convenient for them to walk where they need to go. Thus, residents living in Masiphumelele make use of public transport or walk, whereas residents living in Lake Michelle have their own cars.

-Education

Most of the interviewed residents from Masiphumelele have children who attend the school in Masiphumelele. This includes a day care for toddlers, the primary school and the high school in Masiphumelele. Some of the other residents' children attend schools in Retreat, Philippi and Ocean View. Most of the interviewed Lake Michelle residents who have children attend Reddam House school in Tokai. One of the interviewed residents from Lake Michelle have children who attend Sun Valley primary school. Thus, both the residents from Lake Michelle and Masiphumelele have access to education. Like their access to healthcare, the quality of education differs between the schools in Masiphumelele and Lake Michelle, the schools in Lake Michelle being private schools and the schools in Masiphumelele being government funded.

-Community Organizations

There are many NGO's in Masiphumelele. Some of the well-known NGO's are: Masicorp, Living Hope, Hokisa and Sinethemba Special Care Centre. These NGO's work with health care, children and education. Many of the interviewed residents are aware of the NGO's but are not involved with them. Only 5 out of the 15 interviewed Masiphumelele residents are involved with community organisations.

Most of the interviewed Lake Michelle residents are involved with community organisations. Lake Michelle has its own fundraisers and often reach out to the poor when there is a need. For example, when there were fires in Masiphumelele in February 2016, some of the Lake Michelle residents donated food and clothes to the Masiphumelele community. One of the residents said: "I organise a yearly fun-run in the Estate to raise funds for the Masiphumelele community".

In sum, there is a good awareness of community organisations, and the residents in Lake Michelle are more involved with community organisations than the residents in Masiphumelele.

-Employment

Out of the ten residents from Lake Michelle who were interviewed, four residents are retired, and two residents work from home. Two of the families consisted of a husband who works and a wife who does not work. Overall, only half of the interviewed Lake Michele residents work.

All fifteen of the residents from Masiphumelele who were interviewed work for the NGO, Living Hope. However, while working through the household assessment documents at the NGO, it was clear that there are many residents in Masiphumelele who do not have jobs and many of them live off another family member's grant. There were a few people in the household assessments who are living by themselves, who are sick and cannot work. There were also cases where the child must look after their sick parent who was not fit to work.

Thus, unemployment is a problem in Masiphumelele, as is a lack of support for families. Whereas in Lake Michelle, most residents are retired, or comfortably live off one family member's salary.

-Social Cohesion and Interaction

Out of the 10 interviewed Lake Michelle residents, only 6 know their neighbours. The residents described their interactions with their neighbours as "greeting" and "chatting over the fence". One mother described her relationship with other residents as "more functional than social" in the form of a lift club for her children. One of the residents said that one of their neighbours 'ignore' them. Another resident reported that there is a resident in their street who "does not speak to anyone".

One of the residents said that they have community in the estate due to the clubhouse. Another resident who said that they have community are living in one of three Evergreen retirement homes, which are built closely together. In total, 3 residents said that they experience a sense of community in the estate. 7 Residents said they don't have community in the estate.

One of the residents explained: " We thought we would have much more of a community when we moved here. We only met people through our kids' friends". One of the married couples said that they had only one married couple as friends in the estate and that they met through their kids who became friends first. Three of the residents who said that they do not have community in the

estate, stated that there is an opportunity for community in the estate. In the words of one of the residents: "I could put in more effort".

One of the residents who has been living in the estate for 10 years, said that there is no real community in the estate. She added that because the boathouse, the clubhouse, is private it is not a place where people can socialize.

According to one of the residents who has lived in both the old and the new parts of the Lake Michelle, the old part has more of a sense of community. The resident reported that while she lived in that part of the estate, she would visit her neighbours often. Whereas now that she is living in the new part of the estate, she says that people are not open to interacting with other people. She says that people immediately retreat to the privacy of their homes when returning home. Thus, there is more of a sense of community and more social interaction among residents in the old part of Lake Michelle, than in the new part.

In Masiphumelele, most of the residents who were interviewed have an estimate of 20 friends and family members who live in Masiphumelele. Thirteen of the fifteen residents said that they do have community in Masiphumelele. Only two of the fifteen residents who were interviewed said they do not experience a sense of community in Masiphumelele.

In sum, most of the residents in Masiphumelele feel part of a community. In Lake Michelle, on the other hand, most of the residents do not experience a sense of community in the estate even though there is opportunity for social interaction.

-Residents' perception of their Safety

Two residents in Masiphumelele stated that they felt safe in Masiphumelele during the day, but not at night. Five residents stated that they felt safe, of which two were women and three were men. Eight residents stated that they do not feel safe in Masiphumelele for the following reasons:

- "because of drunk people"
- "I don't know when I will have to move again. There is no sense of security about the future"
- "because of gangsters and crime"
- "I'm worried about electricity and water causing a fire"
- "because of stories that I hear, but nothing has happened to me"

- “because there is a tavern in the backyard, I can’t sleep on weekends because of noise”
- “because of violence, crime, drugs, robbing and drugs”

One resident reported that him and his sister has been robbed several times in Masiphumelele. He complained about the lack of police presence in Masiphumelele. He said that it is not safe to walk around in Masiphumelele at night. He does, however, feel safe in his home in Masiphumelele. He also complained about one specific shebeen that does not close at night, and that people get drunk and cause trouble.

During the interviews it was also revealed that residents fear floods and fires. Out of the 15 Masiphumelele residents who were interviewed, 7 of them said that their house had burnt down at least once. One of the residents who lives in the wetlands area reported that their house has been destroyed by floods many times. One of the residents who lives in a backyard shack said: “When it rains I can’t use electricity, because I can get shocked. It’s dangerous. My electricity is supplied with an extension cord from the other house.” The interviewed residents in Lake Michelle all said that they feel safe in the estate. The estate has security cameras, controlled access at the gate, security guards, electric fencing and armed response. One resident said that in the fourteen years of living in the estate, there had only been two break-ins. Another resident stated that there was one instance where people climbed over the fence and broke into one of the houses.

Thus, the two housing developments face different types of safety problems, Lake Michelle facing house break-ins and Masiphumelele facing personal safety, especially at night.

-Housing

The housing in Masiphumelele is in contrast with the housing in Lake Michelle in many ways. Specific differences include: size, building materials, safety, durability, building quality, comfort, privacy, gardens, natural light and ventilation, aesthetic value, monetary value, erf size, services and infrastructure.

The homes in Masiphumelele are built out of brick (see Plate 15), and the shacks are built out of sheet metal (see Plate 16). These structures are not durable, and cannot withstand the rain, wind or fires. The shacks are not protected from floods or fires. The homes in Lake Michelle are built out of brick, concrete, timber cladding and timber roof trusses which has been treated to withstand fire and insects, including roof tiles and insulation, waterproofing and ceilings (see Plate 17,18 and 19). Unlike a shack in Masiphumelele, these homes are safe and secure, durable and

comfortable. In addition, the houses in Lake Michelle are private and are surrounded by a garden which is fenced off. The shacks in Masiphumelele are built very closely together leaving no space for privacy or a garden.

The homes in Lake Michelle are built with modern infrastructure for water, electricity, heating, air conditioning and sewerage systems. There is a lack of this infrastructure in Masiphumelele, specifically in the wetlands area. It was reported in one interview that in the wetlands area in Masiphumelele, “more than 300 people” share 5 toilets and 2 taps. In addition, there is no storm water runoff, resulting in a lot of mud. In the interviews, it was revealed that the people living in areas other than the wetlands, share one outside flushing toilet and one outside tap with between 3 and 30 other residents.

According to the South African building regulations, one needs to supply 2 toilets for up to eight people if there are females. (SANS 10400, 2017). In addition, the National building regulations require adequate fire resistance and roof support, which the shacks in Masiphumelele do not adhere to. With regards to natural light and ventilation, the National Building Regulations require at least one opening for natural light, in addition to artificial lighting (SANS 10400, 2017). The regulations also prescribe a minimum requirement for air in a room depending on the number of people.

In sum, the difference in quality of life between Lake Michelle and Masiphumelele is immense, specifically with regards to the difference in health, safety and housing conditions. The results have shown that the poor housing conditions and lack of infrastructure in Masiphumelele lead to a lack of health and safety.



Plate 15: Masiphumelele brick house (Source: Google, 2009b)



Plate 16: Masiphumelele shack (Source: Google, 2009e)



Plate 17 (top left): House in new part of Lake Michelle (Source: Author's own, 2018)

Plate 18 (top right): House in old part of Lake Michelle (Source: Author's own, 2018)



Plate 19 (left): House in new part of Lake Michelle (Source: Author's own, 2018)

In sum, Masiphumelele and Lake Michelle differ greatly in all aspects of social sustainability (see Table 2 below). With regards to access to health care, both the residents in Masiphumelele and Lake Michelle have access to health care. The residents in Lake Michelle can afford private health care, private education and transport. Whereas the residents in Masiphumelele make use of public education, transport and health care. Many of the residents in Masiphumelele need a job, whereas most residents in Lake Michelle are employed or retired. With regards to community, Masiphumelele has a strong sense of community, and Lake Michelle lacks community. The residents in Masiphumelele face health problems such as TB, HIV and Asthma. With regards to safety, Lake Michelle does not have a problem due to the thorough security measures. Whereas Masiphumelele is need of police presence due to a lack of safety. The quality of life in Lake Michelle is higher than in Masiphumelele, except with regards to community and social cohesion.

In terms of social sustainability, Masiphumelele has a greater measure of 2 aspects of social sustainability, whereas Lake Michelle has a higher measure of 7 aspects of social sustainability. It is not possible to determine which of these aspects of social sustainability are more important, this would be subjective. However, it is safe to say that the residents in Lake Michelle do have access to a higher measure of social sustainability than Masiphumelele. However, the residents in Masiphumelele make more use of the opportunities to achieve community and social cohesion.

Table 2: Social Sustainability in Masiphumelele and Lake Michelle

| Social Sustainability | Masiphumelele | Lake Michelle |
|--|--|--|
| Access to health care | Public health care | Private health care |
| Transport services | Public Transport Pedestrian | Private transport |
| Education | Public Schools in Masiphumelele | Private Schools in neighbouring areas |
| Community organizations | Many active organisations | Annual fundraiser Private clubs |
| Employment | Evident unemployment | Employment and retirement |
| Social cohesion and interaction | High measure of social cohesion and community | Lack of social cohesion and community |
| Health | Prevalent health problems Lack of education | Private health care Quick recovery |
| Safety | Major lack of safety | Safety precautions Very secure |
| Housing | Poor housing conditions Does not adhere to Building regulations | Opulent housing Adheres to Building regulations |

5.5 Social Sustainability- Discussion

Since Masiphumelele and Lake Michelle measure higher in different aspects of social sustainability, neither one of the two housing developments are more socially sustainable. Both Lake Michelle and Masiphumelele have positive aspects and negative aspects of social sustainability. If the positive aspects from both developments could be combined, a high measure of social sustainability would be achieved. These varying results are due to the disparity in density, the one development being very high in density and the other being very low in density. The literature speaks about this problem. Bramley et al. (2009) state that densification is complex and research studies on densification often reveal contradictory findings. In response to this, the authors conclude that different solutions are necessary for different contexts (Bramley & Power, 2009). The research results concur with these arguments.

5.6 Implementation Processes- Findings

In the case of implementation processes in Masiphumelele, two aspects of the development were studied. First, the existing informal development, specifically the wetlands area of Masiphumelele, which is continually being developed by the residents. This is an informal area which is shown in Figure 9 below.

Second, a new housing development project in Masiphumelele, which is currently being developed by the City of Cape Town, called the Phase 4 housing project. The aim of the project is to provide one plot, one toilet and one electricity box for all the residents who qualify (refer to Figure 9) (Ntongana, 2018a). The project includes 227 newly built houses for residents living in backyards in Masiphumelele, residents living in the wetlands area of Masiphumelele, residents who have special needs and also residents who have been on the waiting list for a long time (Ntongana, 2018b). The two sites on which the new houses will be built is erf 1912 and erf 5131 (McCain, 2018). According to ward councillor, Felicity Purchase, the city is applying for two environmental impact assessments in order to go ahead with new developments (Fillies, 2018). The earthworks were completed in 2016 (McCain, 2018). In January 2018, the engineering services for the phase 4 project were completed (McCain, 2018) with project completion estimated to be complete by 2020 (Ntongana, 2018a).

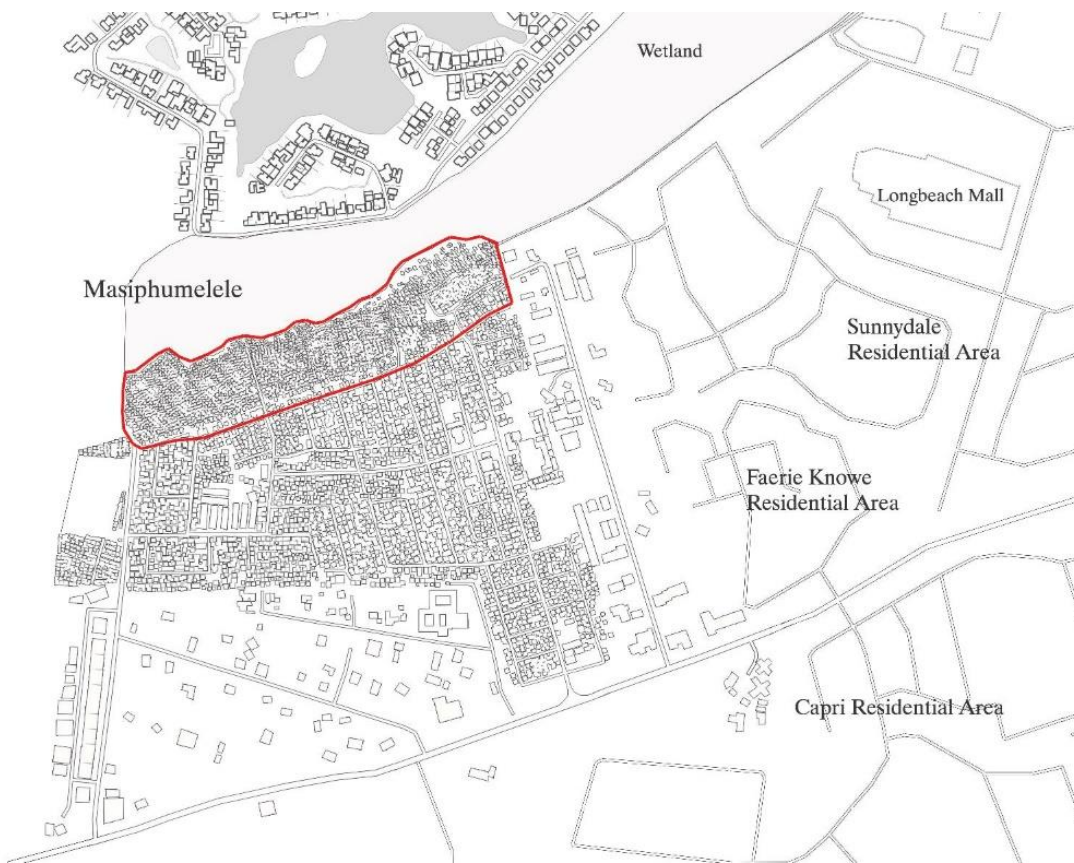


Figure 9: Map of wetlands in Masiphumelele (Source: Author's own, 2018)

The most significant contrast between the implementation processes of urban form in Lake Michelle and Masiphumelele, is the nature of the planning processes. Lake Michelle was formally planned by CNdV Africa Urban Designers and Planners (CNdV africa, 2016). In contrast, the wetlands area in Masiphumelele included no formal planning. In the wetlands, the residents build their shacks where they find an open space. Currently the wetlands area is built up with shacks, leaving only space to walk in between the shacks. According to one of the interviewed residents, when new residents want to move to Masiphumelele, they must arrange to rent a backyard shack or a flat. Furthermore, residents who have built shacks in the wetlands have found an open space to do so and do not pay rent.

The planning process with regards to green space in Lake Michelle was completed by a landscape architect from CNdV Africa (CNdV Africa, 2017). There is a lack of green space in the wetlands area of Masiphumelele, since housing was the residents' priority. With regards to land use, Lake Michelle was planned as a residential development. Due to the informal nature of development in Masiphumelele, as well as a lack of formal planning, there is a mixed use of land. With regards to diversity of built form, a lack of formal planning in Masiphumelele has led to a rich diversity of different housing built out of found materials and planned in response to the needs of the residents. By contrast, in Lake Michelle, where a formal planning process led the development, the built form is static.

It can be said that a formal planning process lead by professional planners, architects, landscape architects and developers, results in an urban form that is planned specifically according to the developers' intentions. In the case of Lake Michelle, the results are a low-density development, with a large amount of green space and residential land use. Whereas, a lack of planning in Masiphumelele has resulted in high density development, no green space, and a mixed land use. The difference in priority is evident in these results, the one development aiming for comfort, open space and privacy, while the other is aiming for housing. Thus, it has become evident that there is a clear link between the planning process and the resulting urban form.

The case of the contrasting developments of Lake Michelle and Masiphumelele has revealed the importance of policies in the implementation process. Furthermore, processes of collaboration and partnership between different agencies forms an important part of the implementation process of urban form. In the case of Lake Michelle, several architects were involved in the design of the homes. These were: Simon McCullagh Architects, Bouwer Architects, Michelle Sandilands and Dennis Berman (Hello House, 2016). The developer for Lake Michelle was Plan Trust Developers (Property24, 2006). The Landscape Architect and the Urban Designers were CNdV Africa (CNdV africa, 2016). The Civil engineers were De Villiers Sheard (Gerbera, 2018) and the Environmental Scientists were AVDS Environmental Consultants and DH Environmental Consultants (DH Environmental Consulting, 2018).

It is evident that Lake Michelle was developed by many different professionals who collaborated to create an urban form which is low-density, private, environmentally focused and which is exceptional in security measures as well as aesthetic quality. In this case, it has become evident that a collaboration of different professionals leads to a specific urban form, whereas a lack of this type of implementation process results in a chaotic, overpopulated development.

Another important aspect of implementation process of urban form is public participation. With regards to the development of Lake Michelle, the completion of an environmental impact assessment was required. Even though the environmental impact assessment is focused on the impact that the development will have on the natural environment, one of the aspects of this assessment includes public participation. This part of the process gives the local community the opportunity to have a say regarding the impact of the development. It is important that the public is informed about the plans of the new development, including the visual and noise impacts and the impact on traffic due to an increased number of residents.

The Phase 4 Housing project was initiated by the City of Cape Town, who have hired sub-contractors for the project, such as a specialist in structural and electrical infrastructure (Ntongana, 2018b). The development planning has also been sub-contracted to various environmental consultants (refer to Plate 20 below). In this case the process of implementation was completed by a collaboration between different agencies, governmental and private practitioners. With regards to communication between the City of Cape Town and Masiphumelele residents, a city official is appointed to communicate with Masiphumelele community leaders. The community leaders then communicate with the residents. There have been several community meetings, where city officials have met with the community to discuss the project's plans and progress. There have also been pop-up offices in Masiphumelele in attempt to answer the residents' questions (Fillies, 2018). The city has also set up an office in Masiphumelele, where residents can communicate their complaints (Fillies, 2018). In this way, public participation has formed part of the implementation process.

The financing and investment are the last aspects forming part of the implementation processes of urban form. In Lake Michelle, the development was funded by Plan Trust Developers (Property24, 2006). One of the interviewed Lake Michelle residents said that the individual erfes were sold on a plot and plan basis. The resident reported that new land owners had to build their own homes according to the prescribed plans and requirements.

The Phase 4 housing project in Masiphumelele is funded by the City of Cape Town. The piece of land for the project was sold to the City by the Table Mountain National Park in 2004 (Ntongana, 2018b). Thus, the Phase 4 project is a government funded development, whereas Lake Michelle is a private development which has become an investment to many home owners.

In conclusion, it has become evident that the planning aspect of the development, together with the collaboration of different stakeholders, are the most impactful aspects with regards to the

shaping of urban form. In the case of Masiphumelele, residents remain concerned and display a lack of trust despite the City's effort to bridge the communication gap. In this case, public participation has not been effective in the process of implementation.

Figure 1.1: Project Locality Map depicting the Wetland Informal Settlement (WIS) and its different zones.

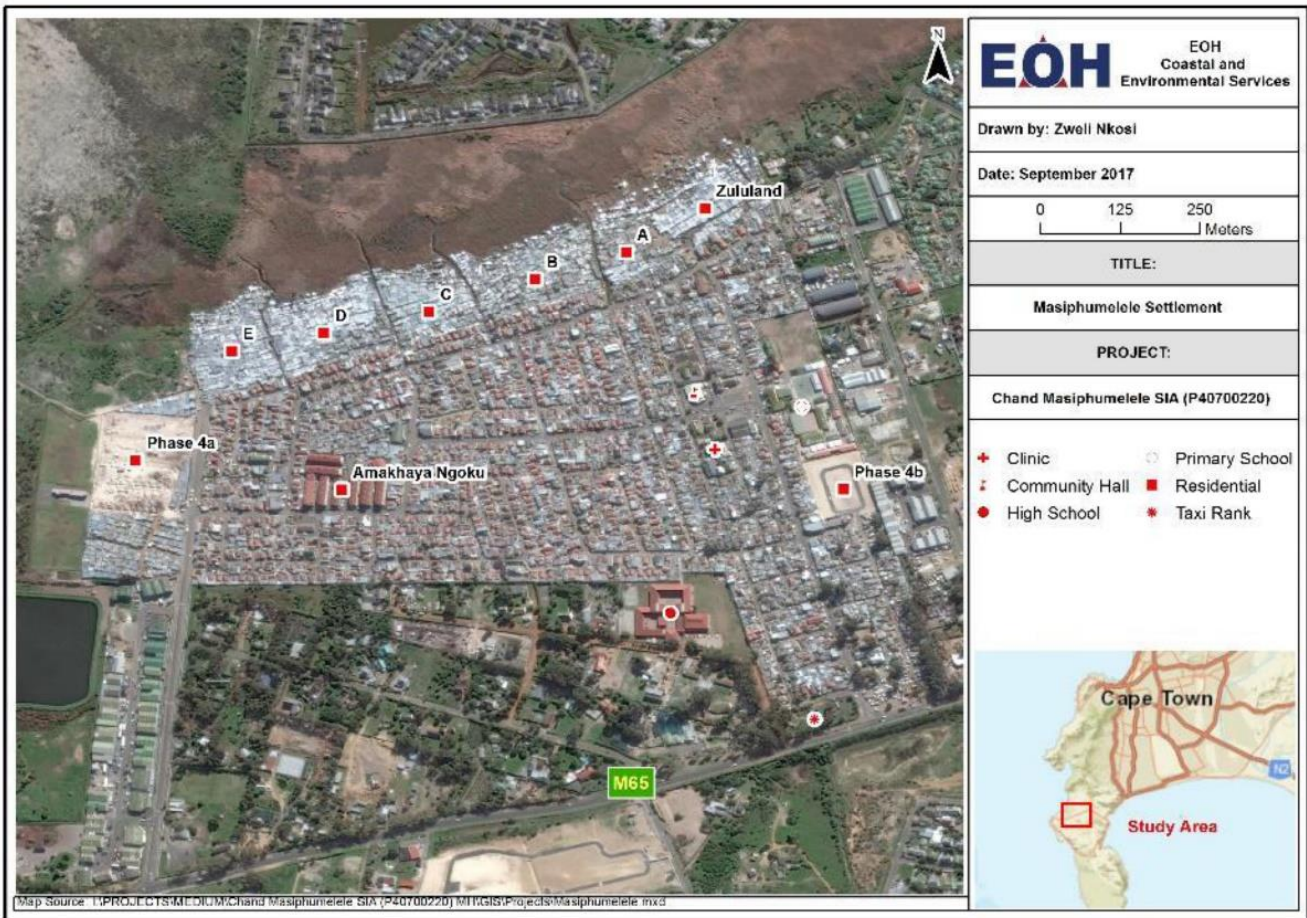


Plate 20: Map of Phase 4 housing project, Masiphumelele (Source: EOH Coastal and Environmental Services, 2017)

5.7 Implementation Processes - Discussion

By studying historical examples, Williams and Jenks (2000) demonstrate that the shape and size of developments will change and adapt over time without planning for the change. This change simply takes place due to the residents' response to the urban form. This has been true for Masiphumelele, but not for Lake Michelle. Masiphumelele has changed and adapted significantly over the last 20 years. The development is still growing today, as more shacks are built on every remaining open space. However, this type of change has not taken place in Lake Michelle, due to the formal nature of the planning and development process. The freedom that residents in Masiphumelele must develop the settlement, has led to needs-based solutions and conveniently accessible services. Whereas, the urban form in Lake Michelle cannot be expanded or modified to suit the residents' needs. Thus, the research has revealed two different types of implementation processes, and the impact of this on the resulting urban form. Masiphumelele and Lake Michelle have served as fitting case studies to determine the causes of formal and informal housing developments and the resulting urban forms.

This process of change is restricted in Lake Michelle by the nature of the implementation process, restricting further growth in social sustainability. In Masiphumelele, this process of change has led to a growth in social sustainability but has also led to overpopulation. The results with regards to urban form have thus emphasized the importance of implementation processes in the shaping of urban form, and the opportunity to increase social sustainability.

5.8 The Relationship between Urban Form and Social Sustainability - Findings

In the previous question, the differences in both urban form and social sustainability in the two housing developments, were discussed. In this section, the relationship between urban form and social sustainability will be discussed. When referring to urban form and social sustainability, the specific aspects listed previously are once again used as categories in order to define these two concepts. Table 3 below outlines the specific aspects of urban form that have the potential to lead to specific aspects of social sustainability.

Table 3 The relationship between aspects of urban form and social sustainability

| Urban Form | Social Sustainability |
|--|--|
| Density | Sense of community Social cohesion and interaction Access to healthcare and transport Community organizations Employment Housing Health Safety Quality of life |
| Green Space | Employment Sense of community Social cohesion and interaction Health Quality of life |
| Land Use | Access to health care Employment Education |
| Diversity of built form and residents | Social cohesion Housing |
| Urban contiguity and connectivity | Sense of community Social cohesion and interaction Community organizations |

In Masiphumelele, the high-density development, it was found that the residents do experience a sense of community, and that there is a high measure of social interaction and cohesion. There is also a prevalence of community organizations in the community. In the low-density development, Lake Michelle, the residents experience a lack of community, and a low measure of social interaction and cohesion. These findings reveal that there is a direct relationship between the density of the development and the sense of community, social interaction, social cohesion and community organizations.

The high-density development, Masiphumelele, consists of low-quality housing, has a prevalence of health problems, a lack of safety, and thus a general lower quality of life. Whereas, the low-density development, Lake Michelle, has good quality housing, is safe, and people have access to private healthcare. In this case study, the low-density development has a higher quality of life, creating a link between the aspects of density and quality of life.

Next, green space as an aspect of urban form, has an impact on various aspects of social sustainability: employment, sense of community, social cohesion and interaction, health and quality of life. In Lake Michelle, where there is an abundance of green space, employment is created for gardeners. In addition, the communal green spaces, such as the boardwalks around the lake, the children's playground, and the park are spaces where people can interact and build community. Furthermore, green space increases mental health, can create opportunities for people to do exercise, and thus increase the quality of life in the housing development.

In Masiphumelele, where there is mixed land use including residential, commercial and industrial, there is access to health care and education in the settlement. The schools and clinic in Masiphumelele are in the settlement, allowing residents to access these services by foot. The prevalence of local shops and informal stalls in Masiphumelele, create opportunities for employment, as well as opportunities to increase community and social cohesion.

Furthermore, there is a link between the diversity of residents and built form, and social cohesion. In Masiphumelele, where people from different nationalities and cultures are living together, there is an opportunity for social cohesion as residents live together in close proximity. Whereas, in Lake Michelle, even if there is a diversity of residents, they do not interact and keep to themselves. In addition, the diversity of built form in Masiphumelele, where there are many different types of homes of different income, allows for a personal expression and freedom for residents to build where and how they choose. This also gives them the option for mixed-income, creating diversity in land use. Whereas in Lake Michelle, residents are very

restricted when building their homes due to strict regulations and in this way remain a high-end estate.

Last, urban contiguity and connectivity can lead to an increase in community, social cohesion and an increase in community organizations. This became evident in Masiphumelele, where the settlement is surrounded by other residential developments. The surrounding developments have easy access to the community organizations in Masiphumelele and will be able to see if there are fires or floods in Masiphumelele. Masiphumelele also borders main roads, unlike Lake Michelle that is set aside. Lake Michelle is private, closed off and fenced off, separating residents from the surrounding developments.

It has become evident that there are clear relationships between these aspects of urban form and social sustainability. In these two contrasting housing developments, the results have shown that in certain cases where the urban form has been formally planned by professionals, it has led to social benefits such as green communal space, safety and security, and comfort. At the same time, it has revealed that a lack of formal planning and an informal building process completed by the residents, can also lead to social benefits such as social cohesion, convenience, local shops that supply their specific needs, that are close by, increasing a sense of community and social interaction among a diversity of residents. However, this type of urban form in Masiphumelele has led to a lack of safety and security, and a lack of infrastructure.

In conclusion, there are certain aspects of urban form that lead to multiple aspects of social sustainability. In the two housing developments, different aspects of social sustainability are present, however, the aspect of urban form that has the biggest impact on social sustainability, is the density of the development.

5.9 The Relationship between Urban Form and Social Sustainability - Discussion

Both urban form and social sustainability are complex concepts, consisting of many different aspects, making it difficult to measure. Bramley et al. (2009) argue that higher density developments impact all aspects of social sustainability. The research findings have shown that this is true for both low-density and high-density developments. In both Masiphumelele and Lake Michelle, the urban form has impacted all aspects of social sustainability. Specifically, high-density developments are claimed to increase social interaction among residents (Dempsey et

al., 2009). This has proven to be true in Masiphumelele. The findings for Masiphumelele agrees with Dempsey et al. (2009), who states that built form can contribute to the sense of community in a neighbourhood.

Jenks' (2006) argument states that the real success of urban form is found in the 'everyday behaviour of people' and a change in behaviour, and not just in including a specific checklist of criteria as listed above. Furthermore, Dempsey et al. (2009) states that the "norms and behaviour" of people are informed by the physical built environment. The results of the research agree and have shown that the residents' behaviour is a response to the specific type of urban form, while the measure of social sustainability is informed by the urban form.

Compact city developments, are high-density developments, protect open space, encourage pedestrian activity, contribute to social cohesion and make use of urban resources more efficiently (Aquino & Gainza, 2014). The compact city is viewed as an urban form that contributes to social sustainability, while urban sprawl is viewed as an urban form that does not contribute to social sustainability (Dieleman & Wegener, 2004). In terms of these definitions of the compact city, neither Masiphumelele nor Lake Michelle are examples of a compact city. Urban sprawl, on the other hand, is defined as the growth of urban spatial patterns with low densities, large outward expansion and land uses that are spatially segregated (Dieleman & Wegener, 2004). It can be argued that both Lake Michelle and Masiphumelele have developed as a result of urban sprawl, even though they differ in density. Masiphumelele is thus not a compact city, even though it is a high-density development. Neither Masiphumelele nor Lake Michelle have been successful in achieving overall social sustainability, as defined in the literature. While Lake Michelle is formally developed as an Eco-Estate, Masiphumelele has developed from need and desperate circumstances as an informal settlement, even though there are certain areas in Masi that are more formal than others.

Jenks and Jones (2009) state that urban form should be relevant to the specific 'social context' (Jenks & Jones, 2009). As shown in Table 3 above, there is a significant contrast between the urban form in Masiphumelele and Lake Michelle. This means that Masiphumelele and Lake Michelle would require very different models of urban form and require different aspects of social sustainability. In this way, the research results corroborate with the literature with regards to the importance of social context when determining the relevant urban form.

According to Aquino and Gainza (2014), although there are many positive aspects to densification, there are also many contradictions, especially in cities where there are 'socio-

spatial disparities' (Aquino & Gainza, 2014). This is the case in Masiphumelele and Lake Michelle. These contradictory findings of density that are mentioned in the literature, are also apparent in the research findings.

5.10 Overview

The discussion has suggested that to determine the relevant type of urban form, a list of criteria that is specific to the context, and that is open to future adaptations and changes due to the residents' response to the urban form, is required. It is thus suggested that the process of designing an adequate urban form should be a continuous process, taking the residents' behaviour into consideration. In this case, the research results do not agree with the literature that a high-density urban form lead to social sustainability. The literature also fails to mention the importance of implementation processes of urban form. Thus, the results have shown that there is not a one-size-fits-all solution to urban form when aiming to achieve social sustainability in housing developments.

CHAPTER 6: CONCLUSION

This study sought to understand the impact that urban form has on the shaping of social sustainability. It was found that not only does urban form have an impact on social sustainability, but the implementation process of urban form and the residents also play a role in the shaping of social sustainability. It was found that a high-density urban form, in this case Masiphumelele, does not necessarily lead to a high measure of social sustainability. In the same way, a low-density development, in this case Lake Michelle, does not necessarily lead to a lack of social sustainability. However, there are correlations between specific aspects of urban form and aspects of social sustainability. Thus, the relationship between urban form and social sustainability is dependent on which criteria define urban form and social sustainability. These criteria are context-specific, thus, calling for a context-specific definition of urban form and social sustainability. One of the limitations of the study, were the selected criteria that were used to measure both urban form and social sustainability. In future studies, a more comprehensive set of criteria will allow for a more thorough understanding of these two concepts. Another limitation to the research was the language barrier between me, the researcher, and the Masiphumelele residents. This can be addressed with the use of an interpreter in future studies to allow for improved communication between the two parties.

The results have shown that Masiphumelele and Lake Michelle have different strengths and weaknesses with regards to the different aspects of social sustainability. The two developments can learn from one another with regards to their different strengths. The implications are that it is not possible to predict the outcome of social sustainability since the result will depend on the specific context. In addition, the implementation process of urban form must be designed in such a way to suit the specific context. Furthermore, the role of the residents in the shaping of social sustainability must be taken into consideration when designing the urban form and when formulating the implementation process.

There is potential for future research to develop a framework with which architects, urban designers and planners can plan a housing development with the aim to ensure a high measure of social sustainability. This framework would need to be specific to the context, the history, future residents' needs, future opportunities for growth, finance and investment and implementation processes. The framework would also need to be a continuous process that develops according to the residents' response to the urban form.

With regards to the methodology of the study, it has been of value to make use of a mixed methods approach. The drawing of maps, allowed me to become well acquainted with the case study areas. Combining methods from different fields of study have added depth to the data and added new dimensions to approaching the results. With regards to the spatial and visual nature of urban form, the mapping of results increased the impact of the representation and analysis of the data.

In conclusion, social sustainability can be described as unpredictable, and must be treated as a complex, context-specific concept, that responds to the surrounding urban form and the people who inhabit the urban form. Due to multiple variables that define social sustainability, architects and urban designers must prioritise context-specific aspects when designing the urban form. This research project serves as an example of an attempt at conducting a context-specific study with which to determine the impact that urban form has on social sustainability. The results revealed the unpredictable and dynamic nature of the relationship between urban form and social sustainability, leaving opportunity for future research to refine the understanding of cause and effect in urban environments.

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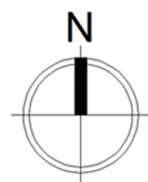
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7. Appendices

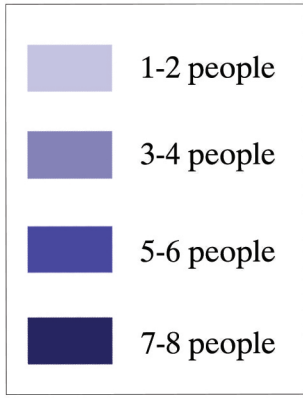


Map B

Household Density

*number of people living in each house

Legend



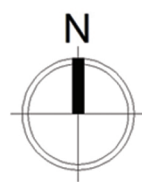
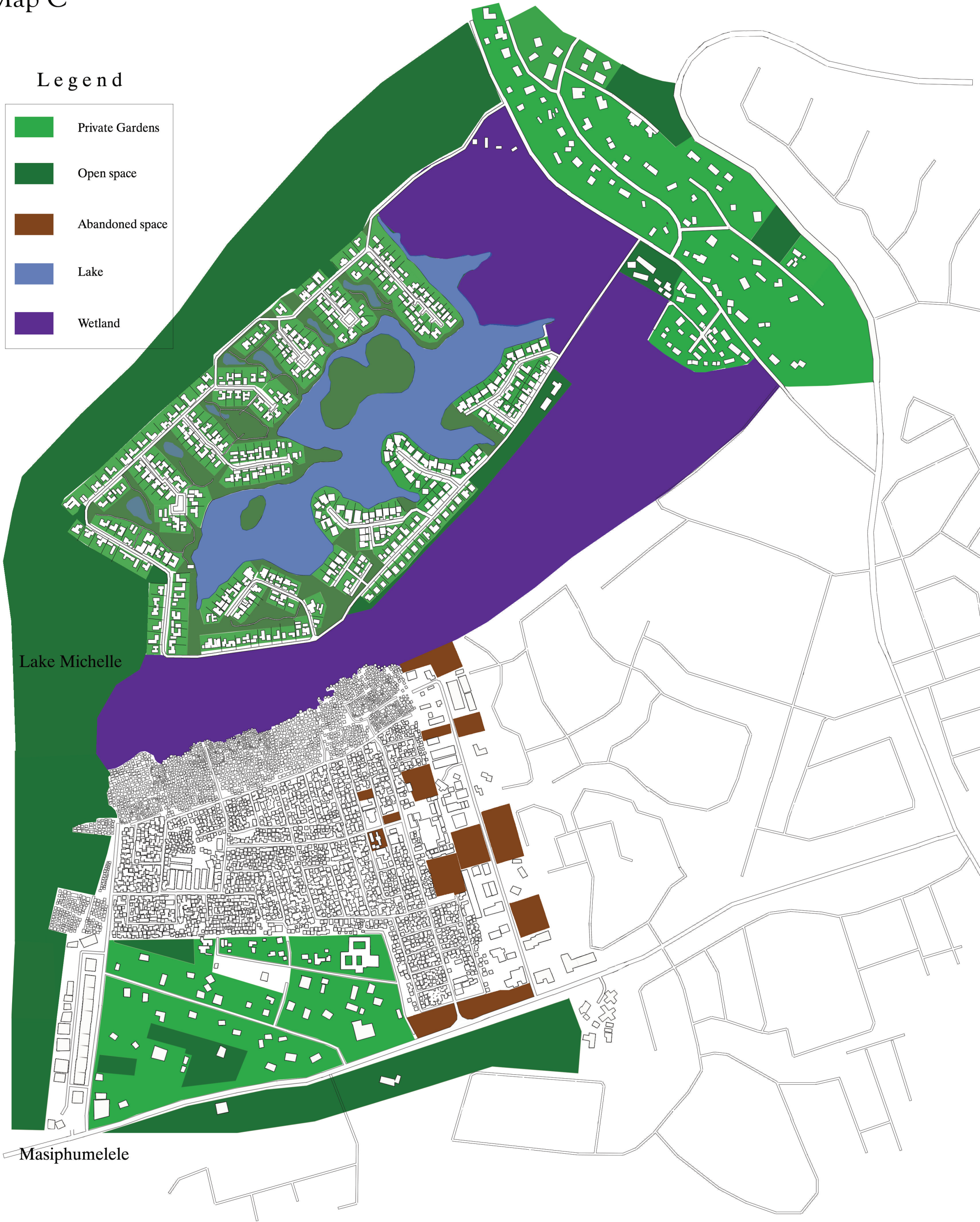
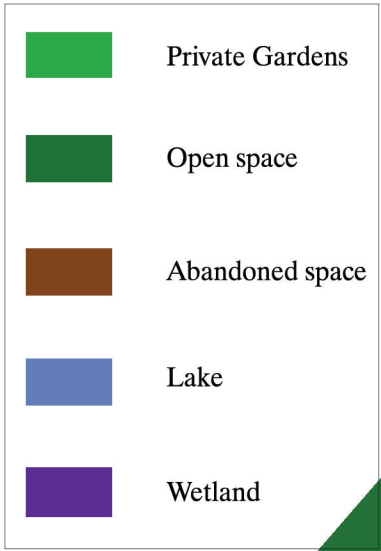
Lake Michelle

Masiphumelele

Map C

Green Space

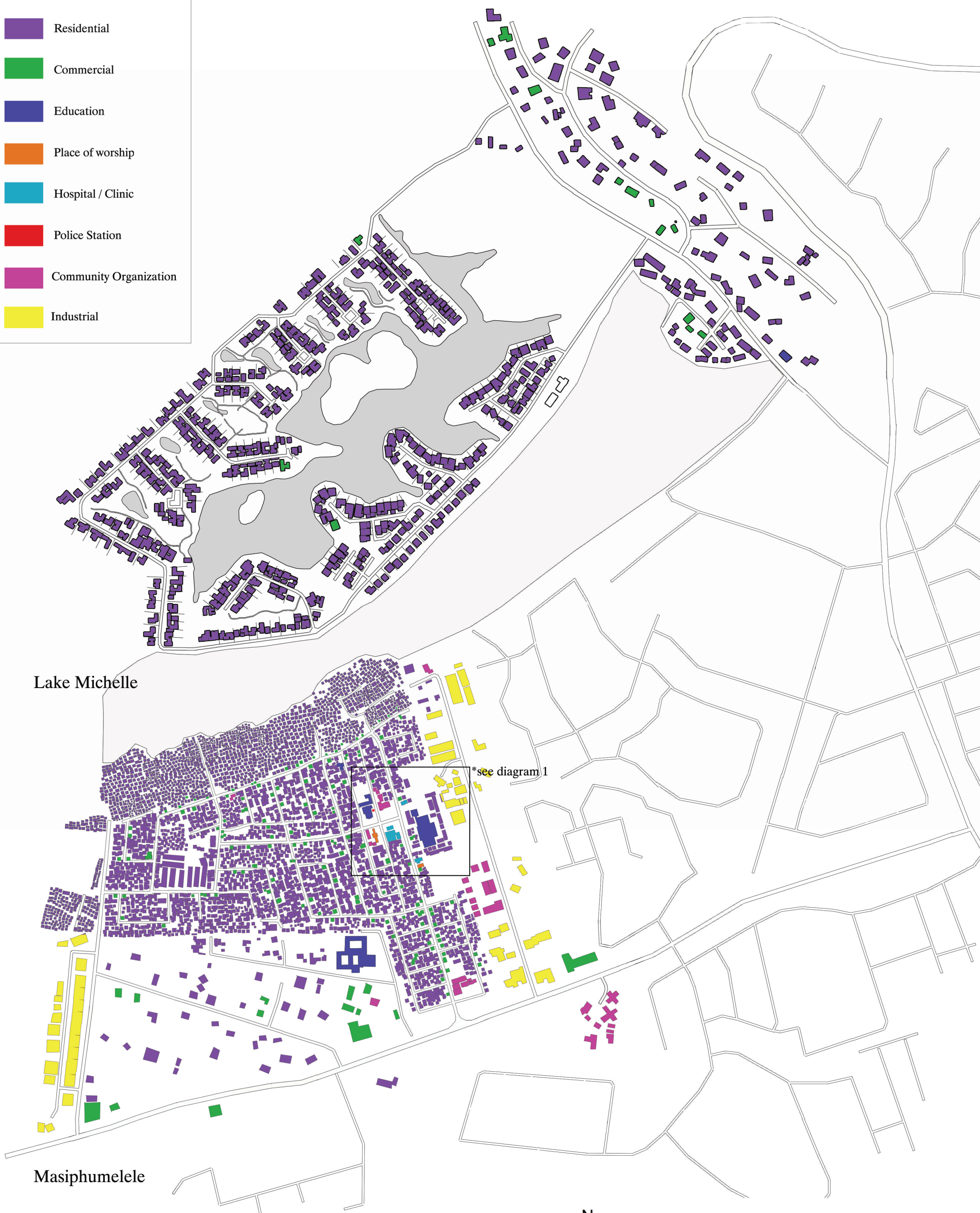
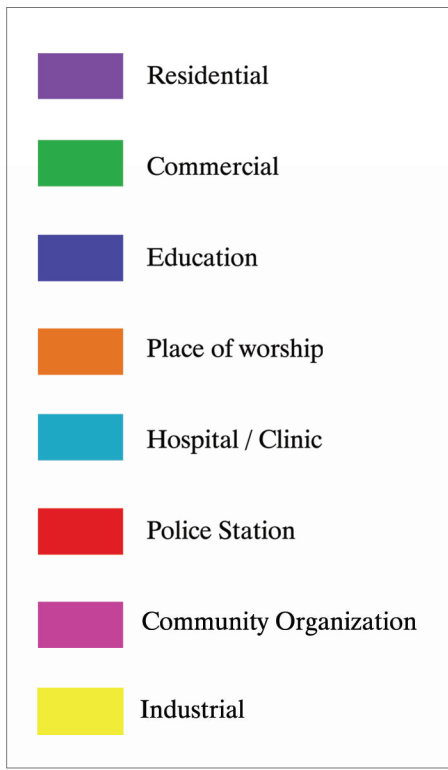
Legend



Map D

Land Use

Legend



Lake Michelle

*see diagram 1

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