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Reconceptualising Conservation: *Towards Updating a Section of the District Plan for Driftsands*

Dissertation submitted in partial fulfilment of the degree of master's in City and
Regional Planning in the School of Architecture, Planning and Geomatics
University of Cape Town
28th October 2022

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This dissertation would not have been possible without the help of various important people, which is why this dissertation is dedicated to them all.

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Abstract

With the threat of Climate change combined with rapid urban expansion, the threat to natural systems is increasingly dire (Korten, 2022). Historically, the entities of nature and people have long been pitted against each other within mainstream conservation (Kiwango & Mabele, 2022). Conservation has often been seen as a tool for the elite to control land and land use, often at the expense of marginalised communities (Kepe & Mollett, 2018). However, with the increasing threat to protected areas, there has been an emergence of alternative conservation strategies, including convivial and decolonial conservation. The dissertation will utilise the Driftsands Area as a case study to consider and investigate alternative conservation methods with a particular focus on water management. The site has seen the encroachment of people into the Nature Reserve, which has degraded the space leading to the initiation of the process of de-proclamation of the site (WCG, 2021). The needs and priorities of people and nature seem in direct conflict, where settlers are in need of land to settle however, this is threatening the ecosystems in the space and also posing a threat to people as some settlers have moved into the flood zone (WCG, 2021). There is thus a need to consider this site as a case study to rethinking conservation. The site provides an opportunity for planners to reconsider alternative methods of conservation. Therefore, the aim of the study is to introduce a layer of the sub-district plan that includes concepts that allow for people and nature to be protected together within the site and gives special consideration to protecting the valuable ecosystem systems in the area, notably the water systems (Kuilis River and Wetlands) in this space. The case study of Driftsands will be supported by desktop research, a site visit and expert interviewees in the space to introduce and develop alternative methods to conserve the site. The study showed that there are alternative methods to protect nature and people; importantly, in Driftsands, the flood zone can be introduced as a promoted rather than a protected area, namely by introducing concepts such as a multi-use urban park and identifying areas for relocation of the settlements at risk in the flood zone. The layer of the sub-district plan for Driftsands can serve as a base late for future plans. This research can contribute to the various case studies and studies around alternative conservation methods and aim to add to the various examples of sites and cases that utilised the imminent de-proclamation as an opportunity to rethink and reconceptualise urban conservation.

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List of Abbreviations

CFA – Cape Flats Aquifer
CoCT – City of Cape Town
CTSDF – City of Cape Town Spatial Development Framework
DEADP – Department of Environmental Affairs and Development Planning
DMS – Development Management Scheme
DSDP – District Spatial Development Framework
DSDP- District Spatial Development Plan
EIA – Environmental Impact Assessment
EMF – Environmental Management Framework
GSI – Green Stormwater Infrastructure
HOPE – Health Outreach Prevention Education (Project)
IDP – Integrated Development Plan
IUWM – Integrated Urban Water Management
MRC – Medical Research Council
MSDF – Municipal Spatial Development Framework
NEMA – National Environmental Management Framework
NGO – Non-governmental Organisation
NMT – non-motorised transport
SDF- Spatial Development Framework
SPC – Spatial Planning Categories
SPLUMA – Spatial Planning and Land Use Management Act
Sub-DSDP – Sub-District Spatial Development Framework
SuDS – Sustainable Urban Drainage Systems
TRUP – Two Rivers Urban Park
UCT – University of Cape Town
VPUU – Violence Prevention through Urban Upgrading
WCG – Western Cape Government
WSUD – Water Sensitive Urban Design

Chapter 1: Introduction

- 1.1. Background and Contextualisation
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1.1 Background and Contextualisation

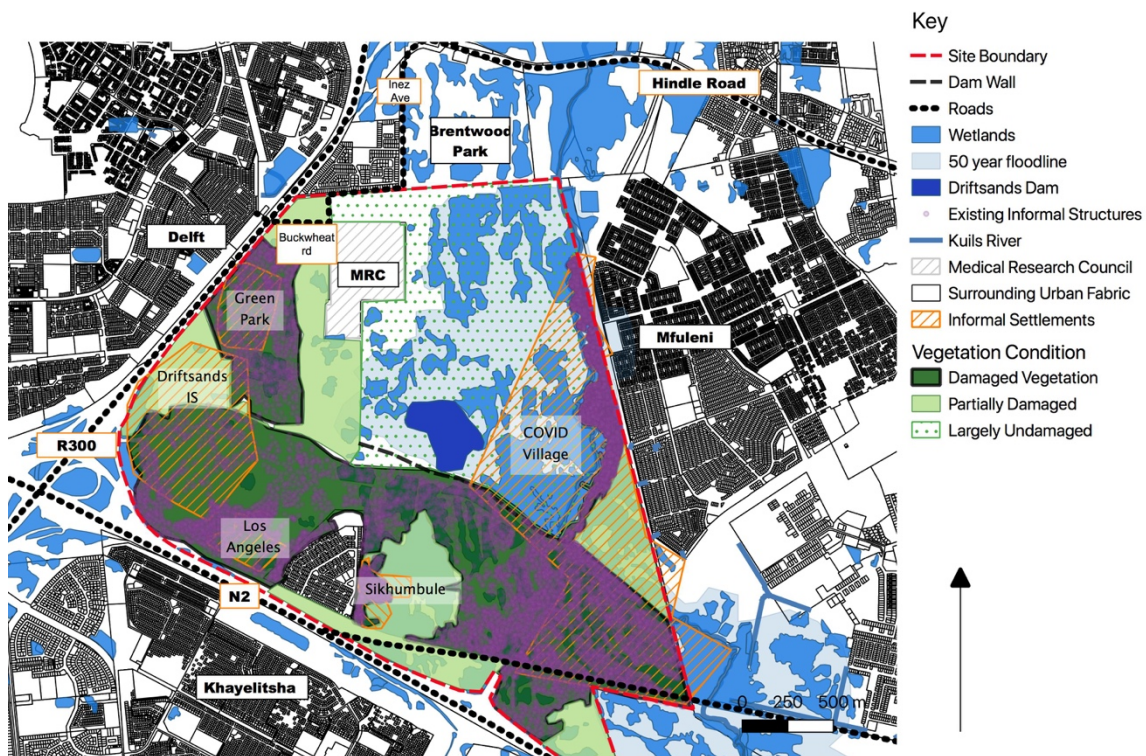


Figure 1: Site Map of Driftsands showing Structuring Elements of the Site (Own work; source: Cape Farm Mapper 2022; Conservation Expert Interview, 2022)

The area under study is the Driftsands Nature Reserve, located in Cape Town, on the Cape Flats next to Mfuleni at the intersection of the N2 and the R300 (WCG, 2021). The reserve is near the International airport and Khayelitsha (see figure 1) (WCG, 2021). The Cape Flats is an area characterised by social fragmentation; this is reflected in the fragmented and damaged ecological conditions within the site. Driftsands currently has nature reserve status and is therefore managed by Cape Nature, the provincial management authority of the Western Cape Government. The reserve was proclaimed in 1983 and is the only provincial nature reserve in the City of Cape Town metropolitan area (Driftsands Potential Study, 2005). The reserve initially covered 658ha and was established to protect the endangered vegetation type, False Bay Cape Flats Dune Strandveld, a section of the Kuils River and the connected wetland system (Western Cape Government, 2021). The reserve is known for its dune systems and covers a critical aquifer called the Cape Flats Aquifer. The Kuils river forms the eastern border of the reserve. In addition, the reserve is home to the Driftsands Detention dam, which is only filled during flooding events (see figure 1) (Driftsands Potential Study, 2005).

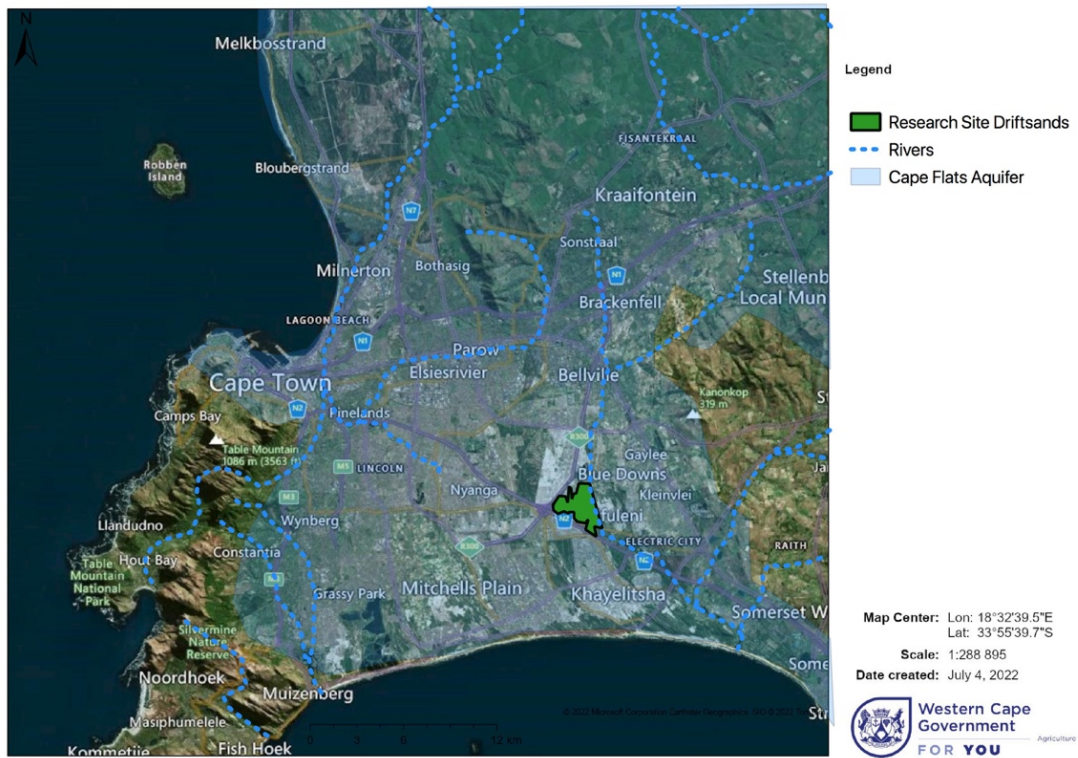


Figure 2: Map showing Driftsands in the Cape Town and Water Context (Own work; source: Cape Farm Mapper 2022)

1.2 Problem Statement

In recent news, there has been an announcement regarding the de-proclamation of the Driftsands Nature Reserve (Rebelo, 2022). The provincial minister of local government gave notice of the Department of Environmental Affairs and Planning's intention to de-proclaim the Driftsands Nature Reserve under section 6(1)(d) of the Nature Conservation Ordinance of 1974 (Rebelo, 2022). The announcement has caused a significant response and pushback from conservationists and the general public (Engel, 2022). There are many reasons for the outcry, including concern for the loss of biodiversity, the loss of protection for one of the few remaining large metropolitan green open spaces in a sea of urbanisation and the vital wetlands that will also be left vulnerable (Engel, 2022; Conservation Expert Interview, 2022). The process of de-proclamation has been initiated but still needs to go through due process (Engel, 2022). However, it seems inevitable that the de-proclamation will go ahead if the process continues its current trajectory (Engel, 2022).

The Cape Flats area, where Driftsands is found, is a space of great inequality. The Apartheid system left significant wounds and inequalities (Bowers Du Toit, 2014). The Cape Flats is known for brutal living conditions, and the area is rife with crime and gangsterism (Bowers Du Toit, 2014). Kinnes argues that the poverty and power structures created by the system and maintained post-Apartheid are the key informants of the development of organised criminal gangs in the area (Kinnes, 2000). Most Cape Flats residents are part of previously disadvantaged families, and the settlements are dense and crowded, making people's need for open space even more vital (Bowers Du Toit, 2014; Herschell, 2001).

Under Apartheid government planning, the Cape Flats developed as a spatially isolated area, separating the communities living in the space from the natural beauty of the surroundings (Herschell, 2001). Therefore, the degradation of Driftsands, one of the few environmentally rich spaces in the area, is a significant loss to communities.

The de-proclamation process was not unprecedented. The main reason for the de-proclamation has been the encroachment of informal settlements into the nature reserve,

which has caused significant environmental degradation in the site (Engels, 2022; WCG, 2021). The COVID-19 pandemic has acted as an accelerant to the rate at which people are moving into Driftsands (WCG, 2021). South Africa has laws to protect people from being evicted from their homes, namely section 26 of the constitution. The law states, 'everyone has a right to access to adequate housing, and no one may be evicted without being given suitable alternative housing' (The Constitution of the Republic of South Africa, 1996). However, many people who were living informally were still forced out and not protected by this legislature (Potter, 2020, Shabangu & Mkhebela, 2022).

As more people lost their income due to the pandemic, they could no longer afford to pay their rent, whether formal rent or informal payments to residents in Khayelitsha who had been renting out their backyards. The loss of income, therefore, resulted in an increase in homelessness (Worcester Polytechnic Institute, 2021). The Nature Reserve became prime land as it was not occupied and not heavily policed (Driftsands Potential Study, 2015). Therefore, the number of people moving into these spaces increased significantly from July 2020 (Engel, 2022). Existing informal settlements of Sikhumbule (semi-formalised), Los Angeles and Green Park have spread further into the nature reserve, and a new settlement called the COVID Village has emerged (see figure1. 1)(WCG, 2021).

The consequences of this encroachment have been significant. Firstly, having large numbers of households moving into the reserve has caused damage to the environment (WCG, 2021; Conservation Expert Interview, 2022). Secondly, the False Bay Cape Flats Dune Strandveld has been almost eradicated in the settled areas, which is a significant portion of the site (WCG, 2021). The settlers have constructed their home across the site, often on dunes and wetlands (see figure 1). Some residents have also utilised the dunes for sand mining as a form of income, which sadly threatens the delicate dune ecosystems and the lives of locals, as removal can cause dune instability and sand slides (Saul, 2015; WCG, 2021). In addition, the new settlements have negatively impacted the water quality in the area through infill to allow for the construction of houses and in the form of pollution from the settlements (WCG, 2021: Engels, 2022). In the areas that have been settled the natural vegetation as all but been eradicated.

While the loss of urban green space and biodiversity is essential and critical, another significant issue is that people have moved into unsuitable or unsafe spaces for residential settlement. The floodplain and the nature reserve play an essential role in stormwater management. The floodplain has a soft and permeable surface, and an artificial dam is at the centre (Driftsands Potential Study, 2005). Unfortunately, part of the settlement known as COVID village has encroached so far from the East that a significant number of settlements have been built on the Kuils river detention dam wall, in the spillway and the larger flood zone (see figure 1). The location of the settlements poses a significant risk to the community in wet winter months and times of flooding (WCG, 2021).

While there is great concern regarding the loss of protection of biodiversity and the threat to people in the area, the de-proclamation may be a valuable opportunity for redefining and rethinking conservation. Despite Driftsands' protection status and the special consideration given to the wetlands and vegetation, the reserve has not been successfully conserved in the past (WCG, 2021; Kotze, 2018; Engels, 2022). Currently, the western approach to conservation, namely separating people and nature in the name of protecting the environment, is failing (Engels, 2022). Furthermore, as people have moved into the reserve area, it could be argued that the current situation is a lose-lose one where nature is not being protected, and neither are people. Therefore, there is an opportunity for a rethinking of traditional ways of conservation.

Given the imminent de-proclamation and threat to people and the environment, this is a crucial moment for spatial planning to contribute. Planning can play a role in considering how precious natural areas can be protected while ensuring people are settled in more suitable areas away from harm. There is potential for spatial planning to ensure that valuable vegetation and the water and wetland systems are protected while simultaneously resettling people to protect them from flooding. In addition, this may allow for a move away from mainstream conservation that separates people and nature and create a space where people and nature can be protected together.

1.3 Theoretical Focus

1.3.1 Conservation

The literature review of this study will include research into alternative conservation methods that facilitate a much-needed transformative change away from traditional conservation, namely theories such as convivial and decolonial conservation. (Fletcher, 2019; Kepe & Mollett, 2018). These tools may help contribute to finding methods where nature and people can positively impact each other and suggest an update of a section of the draft district plan.

1.3.2 Spatial Planning

The de-proclamation is a fundamental moment for spatial planning. As the de-proclamation will very likely threaten nature and people further, it is a salient moment for a planner to take the initiative and develop an updated version of a section of the district spatial plan. There is potential for spatial planning to ensure that valuable natural systems, including the water and wetland systems, are protected while simultaneously resettling people to protect them from flooding. However, the current draft district plan that addressed the area of Driftsands makes no spatial accommodations for the issues at hand (this point will be further extrapolated in Chapter 3). Despite Driftsands having experienced encroachment for many years, the district plan shows no spatial reflection of this (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Therefore, with the increased threat to people and the environment with the increased flooding, this is an important moment for planners to upgrade this section of the district plan to reflect and address the current and imminent issues.

1.3.3 Flood Management

The high levels of rain in June 2022 caused flooding of the Kuils river, which has affected the settlements of Mfuleni (a settlement on the east border of Driftsands, see figure 2), Langa and Khayelitsha. They resulted in flooding in these informal settlements (Eyewitness News, 2022). The recent and frequent floods show the ongoing and urgent nature of the problem under study. The literature review will investigate current water management trends and

look at innovative ways to create a plan to improve water management in the study area. The literature will consider tools such as Water Sensitive Urban Designs and Integrated Catchment Management as methods that can improve water management in the space (Xiong, Sun & Ren, 2020)

1.4 Relevance, Importance and Personal Interest

I have a bachelor's degree in Environmental and Geographical Science. Therefore, when the research topic was suggested to the master's class by a Department of Environmental Affairs and Planning Official, it piqued my interest. Furthermore, research around the binary that has been created between nature and people and how there is a frequent conflict between the needs of nature versus the needs of people has always been a space of interest for me as a researcher. Therefore, the motivation for conducting the study is due to my interest in the context and the need for this research due to the threat to people living in flood-prone areas and the significant threat to the natural systems in the space, mainly from these settlers.

1.5 Questions and Objectives

1.5.1 Research Aim

The research aims to develop a section of the Khayelitsha, Blue Downs and Mitchells Plain district plan, namely updating sub-district seven, focusing on addressing the threat of flooding by utilising Water Sensitive Urban Designs while drawing on theories for alternative conservation. The aim is for this framework to support alternative ways to protect nature without using protected area status and without separating nature and people in the Driftsands area.

1.5.2 Research Questions

- How can conservation be reconceptualised in a manner that utilises innovative ways of protecting nature using Driftsands as a case study?
 - Can these methods protect people without separating them from nature and people?
- How can the sub-district plan for Driftsands be developed to accommodate the changes and encroachment of settlements and the threat of flooding?

1.6 Methodology

1.6.1 Research Methods

Two research methods will be used throughout the dissertation to investigate the idea of reconceptualising nature. Firstly, the case study method will consider the area of Driftsands. A case study is a widely used research method that investigates an event or issue in depth and in its natural context (Crowe, Cresswell, Robertson, Huby, Avery & Sheikh, 2011). The method allows the researcher to develop a deep and complex understanding of an issue in its natural context (Crowe, Cresswell, Robertson, Huby, Avery & Sheikh, 2011).

The case study method will allow me to utilise various evidence and sources to gain a deep and rich knowledge of the context (Yin, 2009). The ultimate goal is to establish a broad summary of research, providing an encompassing view of the problem under study, options, and possibilities of how the issue can be addressed. Furthermore, using the case study method will allow my research findings to be relevant and grounded in the local context of Driftsands (Flyvbjerg, 2011).

One limitation of this method that should be acknowledged is that case studies are not generalisable. Therefore, recommendations which will be suggested may not be applicable elsewhere. However, as the research being conducted is concerned in particular with the urgent risk to people and the environment in Driftsands, using a Case study is appropriate to consider a variety of approaches which could be applicable in this particular context (Flyvberg, 2011). Another limitation of case studies is the threat of researcher bias, which will be expanded upon further in the researcher's positionality section (Flyvberg, 2011).

The second method I will be using is a desk research study. One of the critical considerations of my research is to consider the reconceptualisation of conservation using the case study of Driftsands. Therefore, it is important to consider past management plans for Driftsands and broader contexts, the history and the context of the nature reserve. Doing desk research will consist of collecting and analysing information previously collected by others for systematic

study. The methods will not only provide in-depth insight into the history and current context of the nature reserve but also allow for research on management plans which have been implemented and their successes and failures (Ventresca & Mohr, 2017). The insight will improve the effectiveness of the research as a richer and deeper understanding of the site, and its management will allow for a more comprehensive and appropriate section of the sub-district plan. Importantly desk research can be a valuable tool in considering longer-term data (Jones, 2010). The method will be needed in my research as various environmental data will be considered when investigating the impact of the encroachment of settlers on the site.

The limitations of this method are the concern that reading documents and data from few sources may result in a skewed report, therefore ensuring the information read and collected is done in a broad way to allow for multiple viewpoints and sources will ensure that there is a holistic view of the history and context of Driftsands (Ventresca & Mohr, 2017). The goal is that desk research will provide a solid knowledge base for the framework and implementation.

1.6.2 Research Techniques

The research will be conducted using two distinct techniques: key informant interviews and field observation. The informant interviews will be discussed first. The interviews fall under the umbrella of unstructured interviews (Roulston, Demarrais, & Lewis 2003). As the Driftsands situation is still an ongoing and delicate matter, the number and variety of people that will be interviewed may be restricted. Due to time constraints and the community's vulnerability, the interviews will be limited to people working in an official capacity, such as Conservation and Water Management experts, again linking back to the focus of the research around conservation and water management. The interviews will aim to gain expert insight into the topic and case study. The interviews that were conducted were with a water management expert and a conservationist to provide relevant insight into the two key environmental issues.

The interview technique will allow for data to be collected that has depth and draws from experts' experience and insight (Roulston, Demarrais, & Lewis 2003). The aim is that interviews can play the role of collaborative thinking and discussion between myself and the

experts towards what is needed in the communities and nature and what can be integrated into the section of the subdistrict plan, as well as acting as a valuable source to what is occurring currently in the site. Therefore, the interview is the most appropriate tool, as interviews are often framed as spaces that allow the interviewer and interviewee to be co-researchers (Roulston, Demarrais & Lewis, 2003).

One limitation is that interviews are prone to bias (Flyvbjerg, 2011; Oishi, 2003). Therefore, a few key steps will be taken to avoid bias. Bias will also be addressed by encouraging the natural flow of conversation (Flyvberg, 2011). The flow will allow me, as a researcher, to avoid introducing potentially biased questions. In addition, the unstructured interview allows space for a less filtered viewpoint and narrative (Flyvbjerg, 2011). However, unrelated discussions will be avoided. Naturally, some small talk will occur but ensuring that the interview is kept on the topic will reduce the opportunity for me to form opinions about the interviewee that may induce bias. Also, notes will be taken during the interview, as taking notes after the interview may make my memory prone to bias or other ideas (Oishi, 2003). The interviews were recorded (with participants' consent) to allow me to have an accurate record of the discussion and results (Oishi, 2003).

It should also be acknowledged that some sources argue that unstructured interviews need more 'accuracy'; however, as the research intends to understand the opinions and views on Driftsands from expert perspectives, accuracy is optional. The interviews will allow for the expert's viewpoint and opinion to be gained through an unstructured interview (Roulston, Demarrais, & Lewis 2003). These expert opinions will also be supplemented with desk research, and statements made by experts will not be taken at face value without supporting documents.

The second technique will be field observation. Observation will allow me as a researcher to gain a first-person understanding of the current environmental context of Driftsands. While research and data will be a crucial part of this dissertation, having access to see the space first-hand will provide me, as a researcher, with a richer and more accurate understanding of the space. The technique of field observation has been found to be effective in similar situations as Driftsands (Jorgensen, 1989). By doing a site visit, I can observe the current, on-the-ground situation; my focus will be on understanding the current environmental space.

These impressions will be recorded as field notes. The first-hand experience of the space will enrich my knowledge and understanding of the context and allow for a deeper understanding of the space and area under study.

One limitation of this method is that researchers can act as an influence on the everyday context and could change the usual dynamic and happenings (Jorgensen, 1989). However, as the main focus of the observation is to gain an in-person understanding of the space and a first-hand view of the current state of the environment, the observations will not be of people and, therefore, significantly less difficult to influence.

Another limitation is that the field notes may fall plague to researcher bias. My own observations will be combined with in-depth research to ensure that no false or unsubstantiated assumptions are made.

1.7 Ethical Considerations

Careful considerations must be taken when conducting research as the subject matter is focused on a current case. Ethical approval for this research was received from both UCT and Cape Nature (see annexures 4 and 5). Confidentiality of the information is vital. Ensuring that all the research, mainly the information gathered from interviews and field notes, must be kept confidential and not circulated with the broader public without consent from the interviewees. Transcripts will all be only communicated with my supervisor and the relevant person I am interviewing. Rough field notes and rough transcripts will again not be shared or circulated past my supervisor. All information will be kept confidential, and any published work will only be released with explicit consent from interviewees (Umamaherswar, 2018).

Key steps will be taken to ensure interviews are conducted using an ethical approach. Firstly, before each interview, the interviewees must sign an ethical consent form explaining the nature of the research, aims and questions (See Annexure 1). Next, the interviewees will be required to sign a consent form which includes whether or not they want their name or job title included in the research (See Annexures 2 &3). If they indicate they want to be kept anonymous, neither their name nor job title will be recorded in the interview notes collected, and they will be referenced as an anonymous source. No other identifying features that could give away their identity will be included in any research. How their data and identities will be protected will be explained at the beginning of the interview before the consent form is signed. The ethical consent form will act as a tool to allow interviewees to make an informed decision regarding whether or not they want to participate in the research. No monetary or otherwise incentives will be used to coerce interviewees into participating. As the consent form explains, participation in the study is optional and voluntary, as interviewees can revoke their participation at any time. The consent form will ensure that participants are not coerced or forced to complete an interview that makes them uncomfortable. Lastly, the consent form will include the expected benefits and risks of participation so that interviewees can make an informed decision about whether or not they would like to participate in the research. As the consent form indicates, there are no expected risks or benefits. Participants will also be given freedom over when and what method of interviewing they prefer, whether face-to-face or online. The options will ensure that participants can contribute without being forced to have

a face-to-face meeting if this makes them uncomfortable in the current pandemic. The interviewee will be contacted by their preferred method (Whatsapp or email) and will be given access to the final research project (Oishi, 2003).

1.8 Researcher Positionality

To avoid researcher bias, I will ensure that I acknowledge my positionality as a researcher. This will be done through reflexivity, by reflecting on my own biases and life experiences that may affect my world outlook and research (Holmes, 2020). I am a white South African woman. I grew up attending the German School in Cape Town. I am currently attending the University of Cape Town, and my undergraduate degree was in Environmental Science and Psychology. My environmental background influenced my interest in considering conservation and water management research, as mentioned above. My background has also provided me with knowledge of the above topics. I must acknowledge that I exist and work in a very privileged space. My ability and interest in conservation and my view that the environment is of vital importance could also be seen as a privilege, as I have the luxury to prioritise the needs and interests of the environment without being affected by the negative impacts of environmental degradation. I exist in a space where I can care about the environment without suffering the consequences if I do not.

In South Africa, where conservation was often given precedent over people during Apartheid, it is essential to reflect on people's emotional and complex relationship with the environment and how western conservation entrenches the binary between nature and people (Fuggle, 2008). Therefore the focus of this research is such that it aims to rethink conservation or reclaim old ways that move towards a space where nature and people are protected in a more integrated and reciprocal way.

1.9 Overview of the Structure

The dissertation will consist of 6 key chapters, the role of which will be explained further. After the chapters, the reference list and appendix will be included, including ethics consent forms and other relevant documents.

The dissertation will begin with an introductory chapter, which provides a guiding overview of the research to follow. It will act as a roadmap to the dissertation, providing an insight into what is to come. The second chapter will be the literature review which will provide a clear understanding of the theory utilised around water management, conservation and spatial planning. Chapter three is the contextual analysis which will allow the reader to understand the Driftsands area and the context under study, which will include structuring elements and aspects such as existing management plans and a breakdown of the district plan. The following chapter will be the spatial and planning recommendations for the space. Chapter five will lead directly to inform this and outline the implementation process for the interventions suggested in the previous chapter. The intervention will include updating a section of the sub-district plan for Driftsands and providing a spatial recommendation for the space. The last chapter will be the conclusion of the dissertation which will offer a reflection on the research process, reiterative key findings and flag future research.

Chapter 2: Literature Review

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2.1 Introduction

Cities are spaces of growth, development and often innovation. However, in recent years, the trend of rapid urbanisation has resulted in many cities experiencing an increased growth rate (Madava, 2000). With this rapid growth rate, increased pressure often falls onto natural systems in the urban context (McDonald, 2015). With limited time and resources, urban space struggle to accommodate growth sustainably and healthily (Madava, 2000). Urban expansion is particularly prevalent on the African continent (Montambault et al., 2018). It is only exacerbated by colonial and, in South Africa's case, Apartheid planning resulting in unhealthy, disconnected and often fragmented urban expansion (Montambault et al.,2018; McDonald, 2015). The Apartheid planning was structured in which most African cities acted as administrative and trade centres and had limited industrial and commercial capacity to support more significant amounts of people (Montambault et al., 2018). Therefore, modern city centres are generally well-serviced but costly and often surrounded by settlements lacking services and development (McDonald, 2015). The surrounding settlements are characterised by significant uncontrollable growth in informal settlements (Montambault et al.,2018). The communities on the margins are often forced to live in inadequate spaces, like floodplains and lacking services and infrastructure (Montambault et al.,2018). Water and water systems are of particular concern as access to clean drinking water is vital to communities, and floods pose a threat to cities (Madava, 2000). The growth is an issue for the communities and urban natural systems, which can be significantly damaged by settlement encroachment and urban sprawl (Madava, 2000). The conditions make global and national pushes for sustainability and sustainable cities even more challenging (Sofianou, 2015). Therefore, comprehensive methods to manage and protect the natural systems in urban areas are needed, which importantly also consider the communities and their needs (Madava, 2000). Managing includes legislation, planning and policy and a shift in relationships and attitudes of people and community towards nature and conservation (Sofianou, 2015).

Therefore, the literature review will begin with a thematic review. The first section of the thematic review will consist of an overview of the current urban water management systems in place and the significant challenges they face. Following the various challenges, alternative systems and methods that have emerged to improve urban water management will be introduced. Water Sensitive Urban Designs and Integrated Urban Water Management will be discussed in detail and the challenges and critique these systems face. Next, a similar consideration will be taken around conservation. Mainstream conservation will be introduced, and various critiques of the current system. The various responses to mainstream conservation will be considered with a particular focus on convivial and decolonial conservation theory. The alternatives to mainstream conservation will significantly focus on moving away from the separation created between nature and people. Lastly, a broad understanding of how the above theories will be linked to the spatial planning context will be given. The theory of regenerative planning will be introduced first to provide theoretical context. Notably, the importance of spatial planning will be discussed and how it has been utilised as a tool in urban water management and urban conservation to illustrate and outline their relationships.

2.2 Urban Water Management

2.2.1 History and Current State of Urban Water Management

The threat of urbanisation is significant to hydrological cycles; the study of urban water management is still a relatively young field (McGrane, 2016). Water is essential for life, so it is unsurprising that it has historically been at the centre of cities and urban development (Chiarenza, Haug & Müller, 2020). Water is essential for the survival of people as drinking water but is also crucial for agriculture and many crafts and trades like brewers, potters, and bakers (Chiarenza, Haug & Müller, 2020). Water also plays a part in the natural systems in urban spaces that are vital for people's health. Certain water bodies can influence the type of flora and fauna found in the areas, for example, coastal birds or certain reeds found on river banks (Chiarenza, Haug & Müller, 2020). Importantly water has a significant cultural role and is often utilised in spiritual and religious practises such as baptism (Chiarenza, Haug & Müller, 2020). Not only is water essential in cities, but historically cities have been shaped by water-specific infrastructure like aqueducts, fountains, sewers, dams, and canals (Chiarenza, Haug & Müller, 2020). Measures like harbours and bridges are often significant structuring and guiding elements for urban spaces (Chiarenza, Haug & Müller, 2020).

The history of water and cities is closely linked due to people's need for water and the importance society has placed on the resource (Mays, Koutsoyiannis & Angelakis, 2007). It is believed that people only discovered agriculture and how to tame animals around ten thousand years ago (Mays, Koutsoyiannis & Angelakis, 2007). The emergence of agriculture saw the rise in permanent villages where migration had been the norm before (Mays, Koutsoyiannis & Angelakis, 2007). The first villages are primarily believed to have started in the Nile and Indus Valleys in Mesopotamia (Mays, Koutsoyiannis & Angelakis, 2007). It is believed that around 5700-2800 BC in, Mesopotamia and Egypt were the first successful water management methods (Mays, Koutsoyiannis & Angelakis, 2007). The first urban hydraulic systems developed in the bronze age around 2800-1100 BC, which included systems around water supply and sewerage (Mays, Koutsoyiannis & Angelakis, 2007).

Advanced urban water technologies also emerged around the same time in Greece, including the construction of aqueducts, wells, fountains, bathrooms and other facilities (Mays, Koutsoyiannis & Angelakis, 2007). The Romans developed engineering skills and expanded these designs throughout their empire (Mays, Koutsoyiannis & Angelakis, 2007)

However, the most significant shift was with the industrial revolutions, as the innovation in water technology allowed cities not to be limited by naturally available resources (Radif, 1999). The lack of limits allowed cities to expand in population and increase economic capacity by increasing access to available water resources (Radif, 1999). As mentioned above, water is an essential resource; however, in cities, it is used for consumption like drinking and cleaning, irrigation, recreation, and sewage removal (Radif, 1999). Therefore, water management is focused on ensuring water is distributed to the appropriate spaces in a manner that separates clean potable water from contaminated or wastewater (Bahri, 2012). In addition, water management in cities is also focused on mitigating water-related disasters such as flooding and drought and protecting human health (Bahri, 2012). Therefore, the current water management system focuses on separating water into district sectors, namely water supply, wastewater and stormwater management (Bahri, 2012). In most cities, this is managed and controlled by government departments (Farrelly & Brown, 2011). The dominant system manages these three water sectors through an extensive centralised closed-pipe system that relies on water treatment and discharge (Farrelly & Brown, 2011).

Due to the importance of water, urban water management has been highly controlled and regulated (Swatuk, 2010). As the population and cities have been growing, the demand for fresh potable water has increased simultaneously (Khatri & Tyagi, 2015). Initially, the research around urban water was dominantly on the catchment scale and considered the more significant impacts of an urban settlement on water quality downstream (McGrane, 2016). However, it has become increasingly apparent that there is a need for deeper and broader research (McGrane, 2016). Modern urban settlements significantly impact the natural hydrological and meteorological cycles (Khatri & Tyagi, 2015). Cities have increased the number of impermeable surfaces, and to accommodate the increased surface runoff, artificial drainage systems have been implemented, which resulted in a significant alteration in the amount, way and timing of the natural runoff (Niemczynowicz, 1999.). This increase in

impermeable surfaces and anthropogenic pollutants such as pesticides and sewerage has significantly affected the quality and quantity of water in urban spaces (Khatri & Tyagi, 2015). Also, systems in place to supply water and treat sewage move large amounts of water and wastewater within cities in a manner that is not part of the natural system (McGrane, 2016). If water is not managed correctly, there is a threat of untreated wastewater being released back into natural water systems, which has a notable detrimental effect on riverain flora and fauna, drinking water, water supply for food, and recreational uses (McGrane, 2016). Developing countries, in particular, are at threat of failing systems that return wastewater to the natural water systems resulting in significant degradation (McGrane, 2016).

2.2.2 Challenges to Urban Water Management

With the rising threat of climate change and increased occurrences of drought, the need to improve urban water management systems and make them more sustainable is urgent and apparent on a global scale (Levy, Woster, Goldstein & Carlton, 2016). The rise of global temperatures and related global warming has caused a change in average weather patterns (Winsemius, Jongman, Veldkamp, Hallegatte, Bangalore & Ward, 2018). Global warming has directly affected precipitation and increased heavy rainfall (Trenberth, 2005). The increased heating of the earth has led to increased evaporation, resulting in increased surface drying, namely drought (Trenberth, 2005). However, as the earth's temperature increases with every 1 degree Celsius the water capacity of the air increases by approximately 7% (Trenberth, 2005); an increase in water vapour capacity of the air influences the precipitation, increasing rain and storm events, which in turn increases the risks of flooding (Trenberth, 2005).

Most cities' water systems are managed by particular engineering approaches, namely urban drainage systems. The drainage systems consist of draining surface water, sewerage and stormwater into the same pipe system or separate pipe systems depending on the city (Sörensen et al., 2016; Herslund & Mguni, 2019). In addition, semi-urban catchments often use tools such as dams, levees and other storage facilities to address and mitigate flooding events and reduce risk (Sörensen et al., 2016). The increased pressures discussed above, namely the increased drought and flooding due to climate change and the increased urban

growth, have seen a need for a shift in the mainstream system (Sörensen, Persson, Sternudd, Aspegren, Nilsson, Nordström, Jonsson, Mottaghi, Becker, Pilesjö, Larsson, Berndtsson, & Mobini, 2016). While the system has historically worked, the nature of the centralised and technologically focused system means to make any change to the system is a challenge. The scale of the system also only allows for change to occur incrementally over long periods (Sörensen et al., 2016). With the ever-increasing demand, urban growth and pressures from a changing climate, the incremental changes are insufficient in meeting the current demands in adapting for future challenges around urban sprawl, climate change, limited resources and decaying infrastructure (Hoffmann, Feldmann, Bach, Binz, Farrelly, Frantzeskaki, Hiessl, Inauen, Larsen, Lienert, & London, 2020).

This need has caused a shift within urban water management theory to move towards theories that encourage less centralised and more flexible systems (Farrelly & Brown, 2011). Many alternatives are more sustainable and regenerative practices that protect natural water systems where possible (Farrelly & Brown, 2011). The trend towards more sustainable and regenerative cities has often translated to urban densification (a shift away from urban sprawl), reducing the amount of space and land the city is taking up (Sörensen et al., 2016). However, the densification often also translates to an increased number of impermeable surfaces which leaves the urban space much more vulnerable to flooding events than the surrounding environment (Sörensen, Persson, Sternudd, Aspegren, Nilsson, Nordström, Jonsson, Mottaghi, Becker, Pilesjö, Larsson, Berndtsson, & Mobini, 2016).

While there is a clear need for this sustainable shift, there are challenges with it as most governments are still supporting large-scale technological solutions which align with current mainstream urban water management rather than providing support for new and existing sustainable interventions, particularly in the global south (Herslund & Mguni, 2019). The large-scale responses are not unexpected, as top-down and market-based governance structures dominate the urban water space (Farrelly & Brown, 2011). The decision-making trend is argued to be a barrier to transforming urban water management away from the mainstream and towards newer and more sustainable practices (Farrelly & Brown, 2011).

2.2.3 The Emergence of Alternative Water Management Strategies

The cities in the global south are in particular need of these sustainable water transitions as their access often limits them to resources, threatened by rapid urbanisation and significant informal settlements that lack infrastructure and services (Herslund & Mguni, 2019). These conditions have resulted in the centralised water management systems often failing in African cities (Farrelly & Brown, 2011; Herslund & Mguni, 2019). Therefore, a bottom-up and decentralised water system will allow for improved water management in spaces where it is needed (Herslund & Mguni, 2019). The goal of introducing sustainable management practices is to reduce flooding in urban areas and create water systems that mimic the natural water cycle (McGrane, 2016).

However, there is debate about the most appropriate sustainable practices as there are various sustainable water practices (Farrelly & Brown, 2011). In urban spaces, the barrier to improved water management is often socio-institutional, not technical, with limited funding and motivation to make a change (Sörensen et al., 2016). It is essential that sustainable and resilient water management needs to involve flood protection but also facilitates providing access to water supply and protecting public health considerations (Levy, Woster, Goldstein & Carlton, 2016; Sörensen et al., 2016). The distinction is essential as, in recent decades, alternative flood management methods have evolved but have harmed the river ecosystems in urban and rural areas and increased the flood risks in the long term (Sörensen et al., 2016). Therefore, the solutions to urban flooding and urban water management must be vital and integrated aspects of a multifunctional urban environment (Sörensen et al., 2016).

Due to the above need for an integrated system and increasing occurrences of urban flooding, green stormwater infrastructure (GSI) has become popular in the planning space. (Chini, Canning, Schreiber, Peschel, & Stillwell, 2017). Green infrastructure aims to replace existing 'grey' infrastructure at the end of its life cycle (e.g., roads, sewerage systems) that traditionally contribute to stormwater and limit infiltration (Fitzgerald & Laufer, 2017). Green infrastructure mimics natural water cycles (Fitzgerald & Laufer, 2017). GSI also facilitates the urban space's transition through integrated upgrades that are part of everyday life and all systems, which allow for an incremental shift towards water-sensitive cities (Chini, Canning, Schreiber, Peschel, & Stillwell, 2017). The GSI philosophy includes practices such as Water

Sensitive Urban Designs, Sustainable Drainage Systems, Integrated Urban Water Management and 'sponge cities' (Chini, Canning, Schreiber, Peschel, & Stillwell, 2017). The approaches are supposed to achieve more sustainable outcomes (Xiong, Sun & Ren, 2020). The literature review will focus on two of the above, the Water Sensitive Urban Designs and Integrated Urban Water Management, as these have been most heavily introduced in urban areas in the global South (Xiong, Sun & Ren, 2020; Sørensen et al., 2016).

2.2.3.1 Integrated Urban Water Management (IUWM)

Integrated Urban Water Management (IUWM) allows for integrated urban planning and flood protection. It moves away from approaches that only focus on addressing Urban Drainage. The concept was introduced in the 1960s-1970s by the Research Council to the American Society of Civil Engineers (Vercruyssen, Dawson, Glenis, Bertsch, Wright, & Kilsby, 2019; Fletcher, Shuster, Hunt, Ashley, Butler, Arthur, Trowsdale, Barraud, Semadeni-Davies, Bertrand-Krajewski, Mikkelsen, Rivard, Uhl, Dagenais & Viklander, 2015). It was the first theory introduced to address the consistently unsustainable water management in cities (Vercruyssen et al., 2015).

IUWM is a part of the larger concept of Integrated Water Management, which looks at the whole catchment (Fletcher, Shuster, Hunt, Ashley, Butler, Arthur, Trowsdale, Barraud, Semadeni-Davis, Bertrand-Krajewski, Mikkelsen, Rivard, Uhl Dagenais & Viklander, 2015). IUWM, as the name implies, focuses on the urban space (Fletcher et al., 2015). In cities, the approach addresses the management of the water supply, groundwater, wastewater and stormwater (Fletcher et al., 2015). It considers the management structures around these and their interactions as mainstream water management does (Vercruyssen et al., 2015). However, integrated urban water management shifts away from a siloed approach, promotes collaboration with various stakeholders and provides a space for work across and between different sectors (Vercruyssen et al., 2015). The system is facilitated by the complexities of social structures and infrastructure in urban areas (Vercruyssen et al., 2015). The need for new and improved water management strategies to improve the resilience of cities to flooding events is clear, particularly with the rate of urbanisation and the failure of current systems due to their inflexibility (Vercruyssen et al., 2015). Therefore, introducing integrated urban

water management will allow for innovative adaptations to be implemented while simultaneously integrating existing infrastructure systems (Vercruyssen et al., 2015).

IUWM was first popular in the 1990s (Fletcher et al., 2015). Geldof was one of the first contributors to the concept and began to outline a framework which considers how to approach the issues around scale, level and assessment (Fletcher et al., 2015). While these vary slightly from author to author, there are four general principles of IUWM (Fletcher et al., 2015). The first principle takes a holistic view of the water cycle by ensuring all parts, including natural and constructed, are considered and treated as a connected system (Fletcher et al., 2015). The second principle states that all water requirements should be addressed by the environment and people (Fletcher et al., 2015). Thirdly, IUWM requires the context to be considered, which includes all social, cultural and economic perspectives and needs (Fletcher et al., 2015). Finally, the last principle of sustainability IUWM must strive to ensure all needs, environmental, economic and social, are met and can continue to be met in the long term (Fletcher et al., 2015).

The IUWM approach calls for urban development and water management to align and be brought together in a way to contribute to achieving sustainable, economic, social and environmental benchmarks. On a larger scale, planning for urban water needs to be inherently linked to other urban sectors like land use, housing, energy, conservation, public health, tourism and transport to ensure that management is comprehensive and cohesive while pushing towards one clear goal (Bahri, 2012). Therefore, IUWM promotes improved cross-sector partnerships and work (Bahri, 2012). On a smaller scale, IUWM will require collaborative approaches to addressing water management by involving stakeholders in setting priorities, taking action and assuming responsibility (Bahri, 2012).

2.2.3.2 Water Sensitive Urban Designs (WSUD)

Water Sensitive Urban Designs (WSUD) is one of the most popular of the GSI (McGrane, 2016). WSUD aims to reduce the impacts of urban spaces on water systems (McGrane, 2016). The design importantly pushes urban water systems back into a space as close to the natural water networks and systems as possible (McGrane, 2016). WSUDs aim to achieve this

while considering the systems holistically and ensuring that the needs of nature and people are both addressed and considered. (McGrane, 2016). Water Sensitive Urban Designs emerged as a term in the early 1990s in response to the American concept of IUWM as a reaction to water management issues, particularly around quality and quantity in Western Australia (Armitage, Fisher-Jeffes, Carden, Winter, Naidoo, Spiegel, & Coulson, 2014). The concept of Water Sensitive Urban Designs was developed at Murdoch University in Perth (Armitage et al., 2014). However, in recent years WSUD has gained popularity in southern Africa, particularly in South Africa and Namibia, due to the country's water scarcity and as a tool to address issues of flooding and drought in municipalities such as George (Lottering, du Plessis & Donaldson, 2015).

WSUD aims to ensure that water-sensitive approaches to water management would be a regular and integrated part of the urban planning and service delivery in all cities and ultimately contribute to a more sustainable environment (Armitage et al., 2014). WSUD is not so much technology focused but rather a collection of ideological shifts to facilitate an improved design and management of water-sensitive urban areas (Armitage et al., 2014). WSUD is a multi-disciplined approach to water management in an urban space (Armitage et al., 2014). The design takes a holistic approach to water management and aims to consider the urban water management systems' environmental, social and economic implications (Barton & Argue, 2007). The ultimate vision of WSUD is that the urban water system is managed in a manner that benefits all in social and economic contexts while also ensuring the environment is protected (Barton & Argue, 2007). The hope is that WSUDs have the potential to reduce the risk of water scarcity, mitigate water pollution, contribute to social equity, increase sustainability and contribute to building resilience (Armitage et al., 2014).

The WSUD, when applied practically, has four broad categories stormwater management, wastewater management, water demand reduction and green-roofing (Barton & Argue, 2007). The tools utilised to implement these practices will be discussed per section.

Firstly, stormwater management considers how to control flooding, limit pollution and prioritise water harvesting for reuse (Barton & Argue, 2007). A big focus of stormwater management is environmental protection and flood mitigation, which are facilitated by

limiting the quantity and improving the quality of stormwater runoff (Barton & Argue, 2007). WSUD facilitates the retention of stormwater which can then be re-filtered into aquifers, wetlands and other recreational water bodies. To limit the quantity and improve the quality of stormwater runoff, WSUD utilised vital activities, including source control elements that limit the quantity of water entering the system and reduce pollution (Lottering, du Plessis & Donaldson, 2015). The tools that fall under this activity are implementing rain sensors, which limit excess water from entering the stormwater system; also rainwater harvesting through roof runoff into rainwater tanks; implementing landscaping practises that reduce runoff and allow for slow and sustainable filtration into the groundwater (Lottering, du Plessis & Donaldson, 2015). The second activity that helps mitigate stormwater consists of reusing water which can be implemented with both storm and wastewater and often together (Lottering, du Plessis & Donaldson, 2015).

The second category is the management of wastewater or water reuse, which addresses pollution, treatment and reuse/recycling of wastewater (Lottering, du Plessis & Donaldson, 2015). Tools to facilitate water reuse and help improve wastewater management include rainwater harvesting tanks and greywater systems, which allow water reuse (but not for drinking). These can be implemented across the private and public sectors and reduce the amount of potable water wasted for practises such as toilet flushing or garden watering (Lottering, du Plessis & Donaldson, 2015).

Thirdly, techniques reduce water demand (Lottering, du Plessis & Donaldson, 2015). The tools and methods used to facilitate this are reducing leakages, limiting wastewater flows and improving consumer awareness of the cost of water use both in environmental and financial space (Armitage et al., 2014). The change in awareness can result in behaviour changes like installing low-flow taps and showers, low-flush toilets, limited irrigation systems and water-conscious appliances (Lottering, du Plessis & Donaldson, 2015; Armitage et al., 2014).

The last category comprises green roof installation (Lottering, du Plessis & Donaldson, 2015). Green roofs allow for the retention of stormwater, improve air quality and allow for increased or maintained biodiversity in an urban space contributing to regenerating the environment (Armitage et al., 2014).

On the whole, WSUD is a multi-disciplinary Design tool that allows water-saving and sensitive tools to be integrated into the urban context, often through more minor scale upgrades to existing grey infrastructure (Armitage et al., 2014). This tool can be vital in transitioning spaces into water-sensitive areas without big-scale, expensive, technologically driven investments (Armitage et al., 2014).

2.3 Urban Conservation

2.3.1 Understanding of Mainstream Conservation

Conservation is a broadly utilised term; therefore, there are various definitions for the term (Muñoz-Viñas, 2012). The National Geographic Encyclopaedia defines *conservation* as protecting the earth's natural resources for current and future generations (National Geographic Encyclopaedia, 2022). The Cambridge Dictionary, however, defines it as the 'protection of plants and animals, natural areas and valuable and essential structures and buildings, especially from the damaging effects of human activity (Cambridge Dictionary Online, 2022). Daniel McGilvray argues that due to the words broad scope and tasks that fall under this term, there is significant confusion around the true meaning or definition (Muñoz-Viñas, 2012). For this dissertation, we will consider the concept of conservation that covers a broad range of strategies and activities, including protected areas, skills and education training, ecotourism, rewilding and renaturing programmes, trade interventions and many more (Muñoz-Viñas, 2012; Larkham, 1996). Not only do the strategies vary but also the actors involved in conservation, including conservation organisations, NGOs, academic programmes, government bodies, community lead projects and commercial interventions (Larkham, 1996; Büscher, Sullivan, Neves, Igoe, & Brockington, 2012). However, mainstream conservation is very distinctive. Two essential characteristics of mainstream conservation are that it remains focused on separating people and nature by implementing protected areas (Larkham, 1996). Protected areas are important tools and methods used by mainstream conservation to enforce the separation of nature and people (Larkham, 1996). Protected areas are enforced by an intricate set of systems (Bücher & Fletcher, 2019). With the complex history of protected areas, this dispossession often falls on those who have been historically disadvantaged (Keep & Mollett, 2018). Protected areas have been a significant part of colonial histories (Keep & Mollett, 2018). They have enforced the above power system with nature and the environment being put above local people's rights to land and resources (Keep & Mollett, 2018). Secondly, mainstream conservation notably works within the confines of capitalism and with it rather than challenging any aspects of the system (Larkham, 1996). These key characteristics mean that mainstream conservation does not challenge the standing global capitalist order and contributes to the existing belief that nature and people are distinctly separate (Bücher & Fletcher, 2019).

2.3.2 Challenges in Mainstream Conservation

A significant issue with mainstream conservation has been the conflicts with other human activities that have been arising around it recently on a global scale (Redpath, Young, Evely, Adams, Sutherland, Whitehouse, Amar, Lambert, Linnell, Watt & Gutiérrez, 2013). These conflicts can be destructive and costly and compromise efficient conservation, resource sustainability and economic development (Redpath et al., 2013). Conservation conflicts are common and occur when two parties have opposing opinions that clash, mainly when one party's interest are seen to be prioritised at the expense of another (Balmford, A., Moore, J.L., Brooks, T., Burgess, N., Hansen, L.A., Williams, P. and Rahbek, C., 2001.). The conflicts are significantly more challenging to address when one of the parties is non-human and unable to participate in the conflict resolution (Redpath et al., 2013). The critical issue with mainstream conservation is how compromise is usually needed from one party or another, and the environment is often undefended (Redpath et al., 2013). Therefore, limiting the negative impact is not enough to protect the environment and natural resources (Redpath et al., 2013). Conservation is still human and capitalistically centred, often resulting in the environment taking the brunt of the cost (Kepe & Mollett, 2018).

Another significant concern around mainstream conservation is how conservation, which is framed as a mechanism to improve global environmental conditions, is often instead utilised as a tool to control resources and the environment (Kepe & Mollett, 2018). Conservation organisations often take a non-political and 'science-driven' approach to conservation without acknowledging the underlying power structures and imbalances around nature and resources (Choudry, 2013). Conservation depicts people as separate and threatening the environment (Kepe & Mollett, 2018). Under this entrenched belief system, local people are asked to give up their land and resource access (often including food security and livelihoods) (Di Minin, Clements, Correia, Cortés-Capano, Fink, Haukka, Hausmann, Kulkarni & Bradshaw, 2021).

The conservation effort and land often benefit the larger global affluent community that uses these to merchandise biodiversity, green developments and other ways to make these

conserved spaces productive (Di Minin, Clements, Correia, Cortés-Capano, Fink, Haukka, Hausmann, Kulkarni & Bradshaw, 2021). The systems in place around mainstream conservation are significant politically and entrench a system that disadvantages the poor and marginalisation and benefits the rich (Kepe & Mollett, 2018). Mainstream conservation, as a mechanism, can facilitate the dispossession and dehumanisation of people for the benefit of the state and elites (Kepe & Mollett, 2018).

2.3.3 Understanding Urban Conservation

Conservation is a very contentious topic due to the abovementioned points around conservation being utilised as a tool for land control and division in colonialism (Kepe & Mollett, 2018). Conservation in urban areas is vital with ever-expanding cities, as urban landscapes are now replacing or degrading the natural environment and reducing the availability of nature for a large number of people (Shwartz, Turbé, Julliard, Simon & Prévot, 2014). If conservation cannot be implemented effectively in the urban area, the environment will continue to be under increasing threat (Shwartz, Turbé, Julliard, Simon & Prévot, 2014). Therefore, ensuring that cities can become spaces where conservation is an essential step in protecting the future of nature and people will move towards creating sustainable and even resilient cities (McDonald, 2015).

Despite cities' threat to conservation, many academics, advocates and government members have suggested that conservation in urban areas is a space of innovation (Shwartz, Turbé, Julliard, Simon & Prévot, 2014). Cities can play positive roles in this change and help achieve sustainable or even regenerative cities in a way that benefits both people and nature in an integrated manner (Shwartz, Turbé, Julliard, Simon & Prévot, 2014). While protecting urban biodiversity seems to be a challenge in urban spaces, it is also an opportunity to protect urban ecosystems and space from contributing to the protection of global biodiversity. Therefore, ensuring that cities are spaces where people and natural systems can exist and be protected together (McDonald, 2015). With the knowledge that urban green spaces can be critical areas of biodiversity and contribute significantly to the surrounding environment (both for people and nature). This increase in knowledge has seen an increase in sustainable

and biodiversity-friendly designs and management plans (Shwartz, Turbé, Julliard, Simon & Prévot, 2014).

2.3.4 Challenges within Urban Conservation

Despite cities acting as spaces of innovation, urban conservation still faces significant challenges (Sushinsky, Rhodes, Possingham, Gill & Fuller, 2013). For example, the social aspect where while urban green spaces are essential for people in terms of mental health and a degraded environment can have adverse health effects on people, if there is a lack of space and land is needed, research has found that some management choices become trade-offs against social benefits (Sushinsky, Rhodes, Possingham, Gill & Fuller, 2013). Urban conservation as a field has therefore become a space where the ecological, social, geographic and economic needs intersect (Shwartz, Turbé, Julliard, Simon & Prévot, 2014). However, the consensus within this field is that healthy green spaces and nature are essential for urbanites (Shwartz, Turbé, Julliard, Simon & Prévot, 2014). However, the issue in urban spaces has often been the tension between utilising the land for urban development and environmental values (McDonald, 2015). Therefore, it is essential to consider methods and tools within conservation that move away from this conflict and consider how the land can be utilised to benefit and protect nature and people and be a space of development and conservation (McDonald, 2015). While much of urban conservation has taken steps to move away from mainstream conservation as will be discussed in the next section, cities are often the spaces where this conflict between nature and people becomes apparent. Urban management systems are siloed and still modelled on mainstream conservation practices such as protected areas (Büscher & Fletcher, 2019).

2.3.5 Evolving Conservation Approaches

In reaction to the urban expansion and increasing threat of climate change, various methods and projects centring around conservation have developed (Korten, 2022). These range from projects like the 'half-earth' project, which proposes an extension of terrestrial and marine protected areas, so that at least half the earth is a protected area (Locke, 2014). A project similar to this is, 30 by 30, which promotes 30% of land and sea becoming somewhat

protected by 2030 (Waldron, Adams, Allan, Arnell, Asner, Atkinson, Baccini et al. 2020). These projects align with mainstream conservation ideals.

However, alternatively, there have been reactions to the increased need for conservation that reject the tools and concepts around mainstream conservation (Massarella, Krauss, Kiwango & Fletcher, 2022). This reaction is called *new conservation*, which aims to integrate conservation and human development (Massarella et al., 2022). New conservation suggests this can be implemented by realising a 'post-wild' city that utilises technological advances and market-based approaches to resource management (Massarella et al., 2022).

However, both new conservation and the half-earth project have faced significant critiques (Massarella et al., 2022). The critiques around the half-earth project include that these methods do not offer sufficient protection to local communities and largely entrench the division between people and non-human nature (Massarella et al., 2022). While arguments against new conservation states that the conservation method still cater to the ideas of colonial conservation methods, due to the heavy reliance on technology and capitalist ideals (Massarella et al., 2022).

2.3.5.1 Convivial Conservation

Convivial conservation is a move away from mainstream conservation ideas and has been framed as a radical alternative to approaches such as half-earth method and new conservation (Büscher & Fletcher, 2019). Ideologically separating nature and people, poses many challenges. With rising populations and increased need for land, encroachment on these 'protected areas' is inevitable, particularly in the urban context (Kiwango & Mabele, 2022). The imminent threat is where the idea of convivial nature comes into play (Kiwango & Mabele, 2022). The concept of convivial conservation draws on several viewpoints and suggests a post-capitalist approach to conservation (Kiwango & Mabele, 2022). Convivial conservation is an extreme shift and pushes concepts such as spatial equality, radical equity and environmental justice (Fletcher, 2019; Büscher & Fletcher, 2019). . Mainstream conservation has a history of overlooking the knowledge, experience and methods used to look after the environment. However, there has often been an overlap between significant

biodiverse areas and the spaces managed by indigenous people (Lordâchescu, 2022).

Convivial conservation must be discussed through a decolonial viewpoint to move towards a breakdown of the power dynamics around labour and knowledge production (Krauss, 2021).

The theory pushes for transformative approaches to participatory justice to allow for the local actor to be framed as a priority (Massarella, Krauss, Kiwango & Fletcher, 2022).

Convivial conservation entails two key aspects firstly, removing the boundary between people and nature and instead encouraging people to live in and with nature, notably in a way that does not deplete or damage the resources (Büscher & Fletcher, 2019). The second step is to utilise nature as this resource but in an economically beneficial way that does not damage the resource base (Büscher & Fletcher, 2019).

Convivial conservation pushes for promoted rather than protected areas to challenge the structure of mainstream conservation (Kiwango & Mabele, 2022). The strategy is focused on addressing the binary created between nature and people. The idea of shifting the language is to move ideologically away from the separation of nature and people to 'conserve' an area and instead push to involve people in conservation and make sure spaces are seen as celebrated and sacred (Büscher & Fletcher, 2019). The concept in practise entails inviting people into conservation space to celebrate areas rather than restricting access (Kiwango & Mabele, 2022). The promoted areas shift the framing from protecting nature to celebrating human and nonhuman nature in a manner that acknowledges and celebrates both the needs and interdependencies of each (Krauss, 2021). Promoted areas do not enforce the binary between people and nature and instead aim to identify areas where nature can be promoted to and by people (Büscher & Fletcher, 2019). The aim of convivial conservation is not to promote eco-tourism or similar capitalist ventures but rather to create spaces where people are welcome visitors or dwellers to natural spaces (Kiwango & Mabele, 2022). Promoted areas, therefore, include encouraging tourism in a long-term engagement rather than promoting short-term tourism (Krauss, 2021). The ideological shift is key to this, where the goal is no longer to exploit natural resources or maximise productivity but rather establish sustainable, long-term, flexible relationships between people and the environment (Büscher & Fletcher, 2019). A significant ideological shift in how people think about conservation, is necessary to transform conservation. Instead of considering conservation as 'saving' only the environment, humans and nature must be saved and celebrated together and intrinsically linked (Büscher & Fletcher, 2019).

2.3.5.2 Decolonised Conservation

Convivial conservation is a radical anti-capitalist alternative to mainstream conservation. However, academics argue that when implementing this theory in the global South, for it to be effective, the theory must be implemented in conjunction with socio-ecological justice approaches that put significant focus on the systemic incorporation of the right and responsibilities of parties from the standpoint of justice (Kiwango & Mabele, 2022). Due to this need, convivial conservation in the global South must be supported by decolonial ideologies, to ensure that the history and practises of south African's in centred and not overlooked (Kiwango & Mabele, 2022). The idea of conservation is deeply rooted in ideas of colonialism and capitalism (Diouf, 2020). It is common amongst many non-western communities to view nature and people as one and people as inherently part of nature (Diouf, 2020). Colonialism strategically used land and space. In Africa, in particular, land and resources were seen as available for the taking by the most influential colonial power (Barnett, 2021). Nature, in colonial ideologies, was commonly framed as a resource to be utilised for people's benefit (Colins & Esterling, 2019). Mainstream conservation in the manner it is usually implemented in urban spaces with protected areas, and a separation of people and nature that is often a physical barrier often lacks inclusion and is mainly orientated on western ideologies, needs and interests (Diouf, 2020). The conservation movement has been accused of being racially exclusionary and can undermine the needs of people for the sake of the environment (Diouf, 2020).

Due to mainstream conservation trends, the conservation movement has many narratives of whiteness and privilege (Diouf, 2020). In reaction to this, there has been a push to decolonise the conservation movement, create inclusive conservation spaces, and bring back older, less restrictive ideologies, to promote social and economic justice (Diouf, 2020). Decolonised conservation involves a significant ideological shift back to indigenous ideas around nature and natural resources (Anderson, 2005). Therefore, decolonial conservation moves away from the colonial idea of nature as separate from people and considers them inherently linked, allowing for them to be addressed together and not as silos (Acosta, 2010). Addressing both simultaneously can allow for the interactions and effects of people and nature and vice versa to be observed and addressed more clearly (Acosta, 2010).

Decolonised conservation pushes for the return of more traditional and indigenous natural resource management. For example, utilising native Californian fire management tools (Anderson, 2005). The methods involve burning specific areas and types of vegetation to adapt their natural growth patterns to optimise them for basket weaving and introducing controlled burns to manage the landscape (Anderson, 2005). The critical aspect of these practices is that they were introduced in specific areas and limited quantities, allowing the resource in question to be protected and preventing depletion, which links back to convivial conservation ideas about respected and sacred spaces (Anderson, 2005; Kiwango & Mabele, 2022). Therefore, decolonial conservation pushes the rhetoric of people as part of nature, and therefore the need to respect, use and manage natural resources in sustainable ways that do not degrade nature (Acosta, 2010).

2.4 Linking Conservation and Water Management to Spatial Planning

The various tools and innovative methods discussed above to address water management and conservation issues will be guided by an overarching Spatial Planning umbrella. Firstly, the theory of regenerative urban planning will be introduced as this theory underpins the ideologies of planning interventions. This is because the above conservation and water management concepts aim to rewild and rethink mainstream ways of simultaneously protecting natural systems and people. Furthermore, the above ideas align with the ideals of regenerative urban planning that looks to the city as a space of innovation and potential for rejuvenation.

2.4.1 Regenerative Urban Planning as an Underlying Theory

Many theorists believe in the face of the current climate crisis that sustainability is not a sufficient step and that regenerative cultures are the solution (Wahl, 2016). Sustainability, like conservation, is a much-utilised and debated term. As defined by the online Cambridge dictionary, sustainability is to be made in a way that does little or no damage to the environment (Cambridge Dictionary, 2022). In the academic space, sustainability is argued to be an ambivalent term with many slightly different definitions (Moore, Mascarenhas, Bain & Straus, 2017). However, for this dissertation, we will consider sustainability as 'meeting the resource and service needs for current and future generations without compromising the health of ecosystems that provide them' as this definition is commonly used in environmental and conservation fields (Morelli, 2011:7). As many other fields have, urban planning has begun to push and shift beyond the concept of sustainability and sustainable development.

The idea of developing a 'regenerative city' has emerged, which is said to increase the city's wealth (Fusco Girard, 2014). Regenerative is defined as the practice of reversing the degradation of the environment and introducing human systems that can coexist with the natural environment, rather than just sustainability which looks at limiting the damage that is being done to the environment (Crowley, Marat-Mendes, Falanga, Henfrey & Penha-Lopes, 2021). However, the regenerative city moves away from the concept of wealth only, meaning

economic development or productivity (Fusco Girard, 2014). Instead, the factors influencing a city's wealth' are assessed by their contributions to achieving a thorough and connected landscape (Fusco Girard, 2014). Therefore, a city's wealth is multi-dimensional (Fusco Girard, 2014). The regenerative city is characterised by its circular processes and synergy. In this context, urban planning is introduced as a tool which can help increase a city's wealth by contributing to the circular economic model (Fusco Girard, 2014). A circular economic model is a production model rooted in the concepts of sharing, reusing, refurbishing and recycling existing resources to utilise them for as long as possible (Smol, Adam & Preisner, 2020). Creative urban planning should support the innovative new economy and financial base. Furthermore, regenerative urban planning must prioritise shared and considered decisions (Fusco Girard, 2014).

The push from sustainable to regenerative cities will require a significant shift in the management structures (Wahl, 2016). The process of moving towards regenerative cities will require citizen participation, bottom-up planning practises, and citizen lead designs, where people are part of creating the future they see for their cities. Wahl outlines six key stages to move from the current degenerative way of life to the desired regenerative systems, which are as follows: conventional practice (current state of our system), Green (relative improvements), Sustainable (not increasing damage/neutral), Restorative (people helping improve nature), Reconciliatory (humans integrated as part of nature) and lastly Regenerative (people constructing significant participation and design as part of nature) (Wahl, 2016). The aim of reaching this regenerative culture is to make people's role as part of nature implicit and from their designs and systems suited to contribute to the unity of people and nature (Crowley, Marat-Mendes, Falanga, Henfrey & Penha-Lopes, 2021).

Wheatley & Frieze argue that to reach this space of community practice, one must consider their idea of 'act locally, connect regionally, learn globally', which consists of 3 key stages (Wheatley & Frieze, 2006:9). The first stage is developing networks where ordinary meaning and goals are established. The second stage is communities of practice, where communities collaboratively create and develop new practices. The last stage is systems of influence, where the new practices are integrated into everyday life and become the norm (Wheatley & Frieze, 2006).

Importantly regenerative planning builds on existing community networks and ideas at all scales, allowing for a participatory process to achieve spaces which are inclusive and protect people as part of nature (Crowley, Marat-Mendes, Falanga, Henfrey & Penha-Lopes, 2021). Importantly regenerative frameworks allow spaces where the way people inhabit and live on earth and their relations to nature can be transformed and shifted (Crowley, Marat-Mendes, Falanga, Henfrey & Penha-Lopes, 2021). In this way, active citizens take their roles as crucial parts of their ecosystems who then can collaborate with other participants to allow for mutually beneficial life and development. (Crowley, Marat-Mendes, Falanga, Henfrey & Penha-Lopes, 2021). Therefore, by implementing practise such as convivial conservation and WSUD, which promote public participation and community lead change and, notably, circular economic practices, the suggested intervention can move towards contributing to the regenerative city.

2.4.2 Spatial Planning and Urban Water Management

The need for water in urban spaces is becoming an increasingly contentious topic in cities with the rise in population and the effects of climate change impacting natural water cycles (Wiering & Immink, 2006.). The reaction to these challenges has seen the emergence of sustainable urban water practises such as Integrated Urban Water Management and Water Sensitive Urban Designs have been put forward by academics to address the water challenges in urban spaces (Hurlimann & Wilson, 2018). However, integrating systems such as these into the urban space is vital (Hurlimann & Wilson, 2018). Hurlimann and Wilson have argued that spatial planning is the tool that can facilitate this full and holistic integration of sustainable water practises into the urban context (Hurlimann & Wilson, 2018). Academics argue that concepts around sustainable water management practises are largely still elusive and a challenge to implement (Hurlimann & Wilson, 2018). The argument is that spatial planning can act as a tool for implementation, particularly in introducing adaptations to climate change in urban water management (Hurlimann & Wilson, 2018). Spatial planning is an appropriate tool as it addresses economic and service sector activities, including aspects such as development, transport, water and waste, and other activities that have spatial or land use implications for the social and or environmental context in which they occur (Hurlimann &

Wilson, 2018). Therefore, spatial planning allows for implementation with an understanding of natural and environmental resources in the context and considers long-term implications (Hurlimann & Wilson, 2018). These factors are vital when considering urban water supply needs as these will change and develop with urban growth and climate change developments (Hurlimann & Wilson, 2018). Spatial planning also involves vital tools to facilitate this implementation around spatial visions, policies, regulations and designs, which will help realise sustainable water practises (Hurlimann & Wilson, 2018). Therefore, spatial planning is suited to act as a bridge to implement sustainable water practices in the urban space (Hurlimann & Wilson, 2018).

2.4.3 Spatial Planning and Urban Conservation

Land-use planning and decision-making have been significant challenges in spaces rich in natural resources such as biodiversity or water systems (Brownlie, De Villiers, Driver, Job, Von Hase & Maze, 2005). In spaces rich in natural resources, these resources often make up an essential part of the country's economy, livelihoods and quality of life (Brownlie et al., 2005). Therefore, while many countries have utilised the mainstream tool of protected areas, these are either ineffective in protecting the natural resources or, in many spaces, these natural resources are also found outside the protected areas (Brownlie et al., 2005). Therefore, planning for and accommodating the need to protect these resources is a mandate of spatial plans (Brownlie et al., 2005). Urban expansion and development may seem to conflict with this land's natural resources (Forman & Collinge, 1997). However, studies have found that uncontrolled urban development results in approximately five times more vegetation loss than when developments are planned and considered (Forman & Collinge, 1997). Therefore, planning can be an essential tool in protecting natural resources utilising tools such a spatial planning categories or land-use plans (Forman & Collinge, 1997). Historically many countries' planning systems have prioritised development and technological focus (Wei-Ju, 2019). While discussed, biodiversity and conservation were often considered and planned for in separate plans, taking a siloed approach (Wei-Ju Huang, 2019). Therefore, it is crucial to ensure that with urban expansion and climate change, the environment and the protection of natural systems are prioritised in mainstream planning (Wei-Ju Huang, 2019).

2.5 Conclusion

The focus of this literature review was to illustrate the need for a shift within urban water management and conservation due to various factors, including urban expansion and climate change. In addition, the goal was to illustrate some alternative water management and conservation methods in urban space and, notably, the role of spatial planning in facilitating and implementing these tools.

Overall, this literature review began by illustrating the urban context's mainstream conservation and water management trends. Mainstream water management was characterised by centralised and strict management by experts (Farrelly & Brown, 2011). However, these systems have broken down the natural water cycles in urban spaces (Herslund & Mguni, 2019). Furthermore, pressures such as increased demand and climate change have resulted in systems failing and flooding and drought (Herslund & Mguni, 2019). The failing systems have resulted in the emergence of alternative water management strategies, namely more sustainable and decentralised systems like Integrated Urban Water Managed and Water Sensitive Urban Designs (McGrane, 2016). The alternatives aim to reduce flooding in urban areas and mimic natural water systems as much as possible (McGrane, 2016).

Mainstream conservation has also been highly critiqued in the recent past. Conservation has been framed as a factor in opposition to urban development. This binary of nature versus people has been used to separate and control people, particularly under capitalism and colonialism (Kepe & Mollett, 2018). Alternative theories have emerged to move away from this binary (Büscher & Fletcher, 2019). These include theories such as convivial conservation and decolonial conservation. Convivial conservation, on the whole, critiques the mainstream idea of protected areas in conservation as they represent the clear binary and divide created between nature and people (Büscher & Fletcher, 2019). Convivial conservation puts forward the concept of promoted areas; that still highlight the protection of natural systems and resources but invite people into these spaces to celebrate the value of nature (Büscher & Fletcher, 2019). Decolonised conservation also aims to move away from mainstream conservation and back towards traditional ideas of nature and people being inherently linked

and connected (Diouf, 2020). Decolonial conservation aims to delink the concept of conservation from its colonial and capitalist framing and move conservation back to being inclusive and bringing back older ideologies (Diouf, 2020).

Lastly, the review considered how urban water management and urban conservation would be linked to planning decisions (Fusco Girard, 2014). The theory of regenerative planning was introduced as an underlying concept as in the current state of the earth with the increase in populations, urban sprawl and climate change planning need to move beyond sustainability and focus on making cities regenerative (Crowley, Marat-Mendes, Falanga, Henfrey & Penha-Lopes, 2021). Regenerative practises would translate to cities not only limiting impact but maintaining to reuse, refurbishing and remodelling resources where possible and creating urban spaces that may even positively impact the natural systems and environment rather than only focusing on reducing harm (Crowley, Marat-Mendes, Falanga, Henfrey & Penha-Lopes, 2021).

Spatial planning can be utilised as an effective tool to implement sustainable water management practises as planning is concerned with vital tools such as visions, policies, regulations and design that allow for an effective shift of water management to a more sustainable space (Hurlimann & Wilson, 2018). Spatial planning and conservation are also important to consider together. Unplanned settlement and development are often significantly more harmful to natural systems; therefore, planning allows for the development and urban expansion to be facilitated to limit harm and protect natural systems (Wei-Ju Huang, 2019).

The review has shown that urban spaces face many challenges in terms of natural resources and management of these but also serve as spaces of innovation for various alternative resource management methods. Spatial planning in the urban context can be a vital tool for implementation and allow for regenerative urban planning.

Chapter 3: Contextual Analysis

3.1 Introduction

3.2 History of the Driftsands Area

3.3 Analysis of the Driftsands Area

3.3.1 Settlement, Land-Use and Current Infrastructure

3.3.2 Vegetation Analysis

3.3.3 Assessment of Water Systems and Flooding

3.3.4 Stakeholders

3.4 Conservation Efforts and Existing Management Plans

3.4.1 City of Cape Town Biodiversity Network

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3.4.3 Human Settlement Project

3.4.4 Violence Prevention through Urban Upgrading Risk Assessment

3.5 The Planning Context

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3.5.2 Breakdown of the Khayelitsha, Mitchells Plain & Blue Downs District Plan

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3.6 Key Issues and Priorities for Driftsands

3.6.1 Key Issues

3.6.2 Key Priorities

3.6.2.1 Stakeholder Priorities

3.6.2.2 Planner Priorities

3.6.2.3 Integrated Priorities for the Driftsands Interventions

3.7 Conclusion

3.1 Introduction

The dissertation will be looking in depth at the case study of the Driftsands Area, as this area is a prime example of where the needs of nature and people come into conflict due to the way that mainstream conservation forces a separation. The chapter will aim to provide context to the site under study and consider the history and current state of the area. Driftsands has long held an essential role in Cape Town's open space network (Saul et al., 2015). However, with increasing pressures from the surrounding urban growth and development, the protection status of the site is under threat (Turok, Visagie & Scheba, 2021). The provincial nature reserve is located within the Cape Flats district, which is home to historically marginalized spaces and communities (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012). Driftsands falls within the Cape Town planning district of Khayelitsha, Mitchells Plain and Greater Blue Downs (see figure 3) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012). The area is characterized by limited economic activity, with a high unemployment rate of 42.8% in 2012 (Turok, Visagie & Scheba, 2021). The low economic activity combined with the expected population growth shows an increased need for services and economic stimulation within the area (Turok, Visagie & Scheba, 2021). Currently, those who are employed are often forced to travel and spend large proportions of their incomes on transport as there are few employment opportunities within the Cape Flats (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012; City of Cape Town, 2022). With the surrounding pressure for housing and accommodation, Driftsands has long been home to informal settlements such as Driftsands Informal Settlement and Green Park (WCG, 2021). The settlements have expanded since COVID, with new settlements emerging (WCG, 2021). While these settlements may seem like a threat to the reserve, it is essential that the people in these spaces are also protected. Therefore, this polarization of nature and people are a significant challenge as it pits people and nature's needs against each other rather than finding compromised and inclusive solutions.

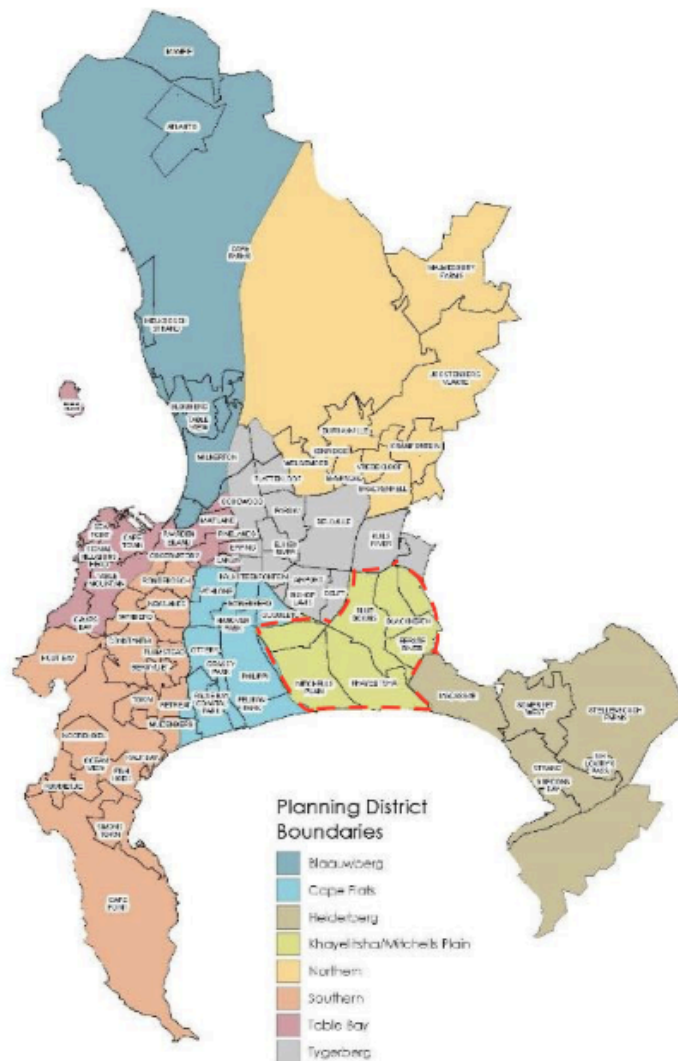


Figure 3: City of Cape Planning Boundaries (Southern District Plan, 2022).

This chapter will begin with a history of Driftsands to gain an understanding of the background of the Driftsands case study. Next will be a broad analysis of the area under study. This step will consider the current settlements and land use patterns in the area and the current infrastructure, particularly around the dam and dam wall. This chapter will consider the formal and informal spaces on the site. Furthermore, the analysis will introduce the natural systems in Driftsands with a particular focus on vegetation and water systems analysis. Lastly, to pull together the site analysis, all the stakeholders in this space will be introduced to provide context for all those involved in the space. Following on from this, the past conservation efforts and existing management plans for Driftsands will be summarised to understand how the space has been managed until now and how it has reached this point. Moreover, the current planning policies and strategies will be considered to examine the

objectives and guidelines they have suggested and implemented. As the intervention chapter will be focused on upgrading a section of the District Plan, the contextual analysis will focus on unpacking the district plan and highlighting the gaps. Linked to the identification of gaps and to draw in the introduction and literature review, the key issues and priorities for the Driftsands space will be put forward. The chapter should provide an in-depth understanding of what is currently happening on the site and act as an understanding of the space's social and environmental dynamics.



Figure 4: Map showing the Driftsands Site in the Context of Cape Town (Own work, 2022)

3.2 History of the Driftsands Area

The Driftsands Area was home to the Khoi and the San and used to house large herds of livestock and wild game (Anderson & O'Farrell, 2012). The Khoi and San are a historical group of hunter-gathers from South Africa who share cultural and linguistic similarities that are often grouped together (Lee & Hitchcock, 2001). Within the Khoi and San's practises, they utilized controlled burns to alter the natural landscape for better grazing for the livestock (Anderson & O'Farrell, 2012). With the arrival of European colonialists in the 1600s, the Cape saw a significant shift with increased natural resource use and upscaling of existing trade routes (Anderson & O'Farrell, 2012). The general trend was reflected in the Cape Flats and resulted in a notable human impact in the broader space; while the Driftsands was not settled, it was utilized by the Khoi and San for herding and forestry (Anderson & O'Farrell, 2012). The alien trees were introduced to stabilize the sandy area and dunes and provide wood to the growing population (Anderson & O'Farrell, 2012). By the late 1930s, Driftsands was still largely undeveloped. While there is evidence of informal agriculture, it was primarily dominated by dune fields and natural veld (Saul et al., 2015).

On the 22nd of July 1983, the area was proclaimed a Provincial Nature Reserve under the Nature and Environmental Conservation Ordinance (Ordinance 19 of 1974) in the provincial gazette of 4276 by proclamation No. 192. It gained protection status to protect the rare endemic Cape Flats Dune Strandveld and the Kuils river system (Energy, Environmental & Spatial Planning Directorate, 2015; Jarman, 1986). However, for the first 18 years (1983-2001) after the area was proclaimed, but the site had no formal management leaving it vulnerable to encroachment, and ad hoc uses (Saul et al., 2015). The management gap allowed for time for informal settlements to be established in the area, as was the case for Driftsands Informal Settlement which was established in 1994 (Anderson & O'Farrell, 2012). Formal management by Cape Nature (also known as the Western Cape Nature Conservation Board) was only introduced between 2000 and 2001 (Anderson & O'Farrell, 2012). In 2016, part of the reserve land was transferred to the City of Cape Town, leaving around 507ha of the area instead of the original 736,86ha (WCG, 2021). By January 2021, only around 372ha of the reserve remained undamaged, showing the consistent encroachment of the urban fabric and decrease in the area (WCG, 2021).

3.3 Analysis of the Driftsands Area

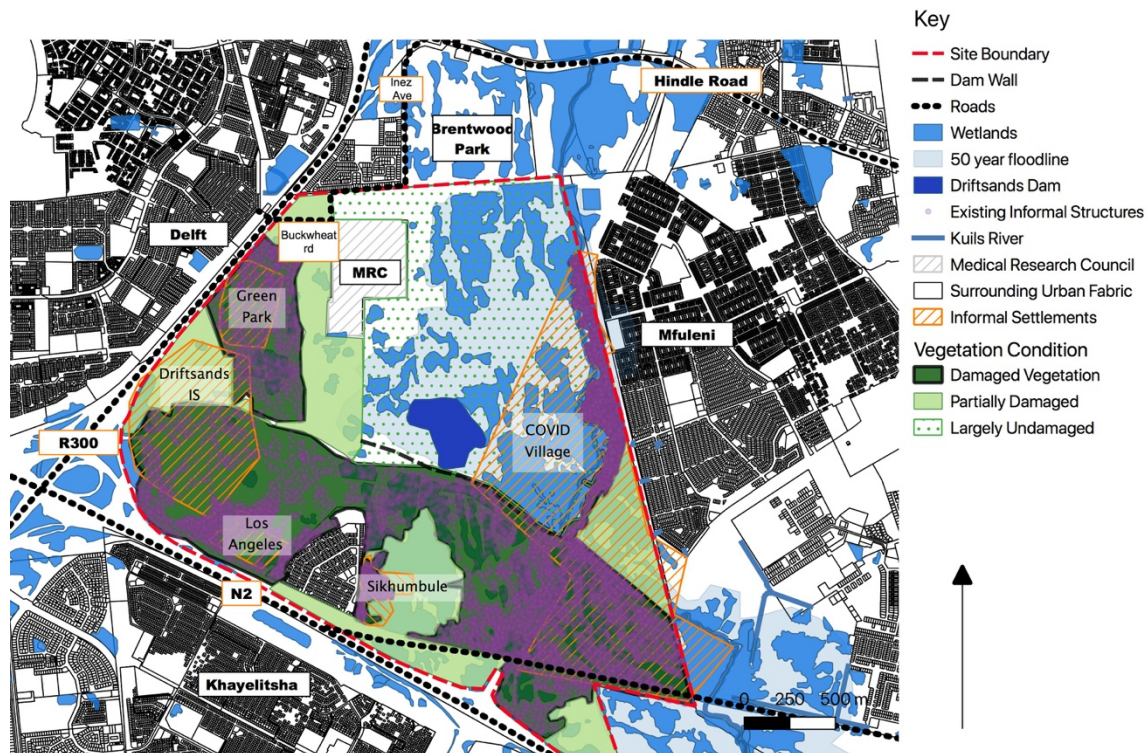


Figure 5: Map showing the Main Structuring Elements within the Driftsands Site (Own Work; Data from CoCT Open Portal, 2022; WGC, 2021; Conservation Expert Interview, 2022).

3.3.1 Settlement, Land Use and Current Infrastructure

The Cape Flats, the area in which Driftsands resides, is an area which illustrates the immense power of the Apartheid state around spatial segregation (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012). The provincial nature reserve is located opposite the informal settlement of Khayelitsha (Saul et al., 2015). Khayelitsha was created during Apartheid in the 1980s for black Africans as a solution to rural migrants from the Eastern Cape and the overpopulation of other informal settlements in the area (Turok, Visagie & Scheba, 2021). Apartheid urban planning separated settlements and simultaneously access to resources, including green spaces, with the enforcement of strict areas for different racial groups; the effects of these areas are still felt today (Bux, Anderson & O'Farrell, 2021). In addition, the Apartheid planning systems have enforced segregation in modern Cape Town, which has many effects, including a lack of access to conservation areas and open spaces by underprivileged communities (Bux, Anderson & O'Farrell, 2021). The above effects are reflected in the Cape Flats, where Driftsands resides (Turok, Visagie & Scheba, 2021). The population of the Cape Flats in 2021 was around 400 000 people, with high levels of informal

housing, limited food access, lacking employment opportunities and high transport costs (Turok, Visagie & Scheba, 2021).

It reflects how the Cape Flats is illustrated as an island in the broader context of Cape Town with limited access to job-rich areas and service provision. (Turok, Visagie & Scheba, 2021).

Therefore, the area surrounding Driftsands lacks space and accessibility, which has been forcing people to move into and occupy the Driftsands area (see figure 9) (WCG,2021).

While the Driftsands area has had protected area status since 1983, the number of settlers needing land to build their shacks on has been on the rise (WCG, 2021). The encroachment of informal settlements such as Driftsands, Green Park and Los Angeles has been an ongoing problem. However, the encroachments were somewhat manageable for Cape Nature and limited as Cape Nature had the facilities to police and reduce the number of people moving into the space (WCG, 2021). However, Cape Nature's response has been mainly aligned with mainstream conservation methods such as fencing and patrolling, which enforce a nature and people divide (Saul et al., 2015).

The increased pressure and need for land due to COVID-19 have resulted in an acceleration of this encroachment. It has resulted in a significant increase and growth in the existing informal settlements and the emergence of a new informal settlement, COVID Village (WCG, 2021). The settlement patterns indicate that COVID Village was established in an opportunistic manner due to the need for land for housing in the greater context (Cape Nature Site Visit, 2022). However, Cape Nature primarily believes that the extension of the Sikhumbule and Los Angeles informal settlements ate shack farming (Conservation Expert Interview, 2022; Cape Nature Site Visit, 2022). Shack farming often occurs in areas in high demand for housing which is not being met (Ngwenya, 2014). The high demand results in some land-owners or opportunists allocating land to erect shacks which is rented out to turn a profit (Ngwenya, 2014).

The Western Cape Government and Cape Nature estimated that there were approximately 10794 settlers in the site as of August 2022, with approximately 3427 shelters that were situated in immediate danger. The danger is due to their construction in the floodplain and on the dam wall, which is primarily the COVID Village settlement (see figure 5) (WCG,2021).

The encroachment is also threatening the wetlands around the Kuils River and degrading flora and fauna on the site (WCG,2021).

As the Driftsands area is still formally a nature reserve, there is minimal formal infrastructure in the area (WCG, 2021). The space has various road and jeep tracks that run through the site that act as service and access roads. These roads were used mainly as servitude roads (Saul et al., 2015). There are jeep tracks linking the informal settlements of Los Angeles and Driftsands and another linking Mfuleni to Khayelitsha Mew Way, which is highly travelled by pedestrians (Saul et al., 2015). Inze Avenue runs off Hindle Road to provide access to the MRC Offices, Cape nature Offices and Site (see figure 6). The west of the site leads into a pedestrian bridge over the R300, which provides non-motorised access to Delft (WGC, 2021). More formal infrastructure is found at the far north outside the site in the form of the Medical Research Complex, which is also partially rented out to Cape Nature and houses the Nature Reserve Offices. The nature reserve is also home to an initiation site. The site is an area found in the north-western section of the reserve. The site includes a 5m² house enclosed by a fence and gate (Saul et al., 2015).

The City of Cape Town has various infrastructures around service delivery that runs through the area (Saul et al., 2015). Firstly, pipes that run through the area, which help contribute to the bulk water supply for the city (WCG, 2021). Linked to the city's water pipelines are also the stormwater infrastructure and retention dam, which are both parts of the city's bulk water supply (WCG, 2021). The area has a sewerage pipeline running through it which is vital for waste disposal for the City of Cape Town (WCG, 2021). Lastly, Eskom has an 11 000-volt network power transmission running through the area. It is also important to mention that there are plans from Eskom to implement a 400KV line to stabilise and expand the grid and power in the surrounding area (WCG, 2021).

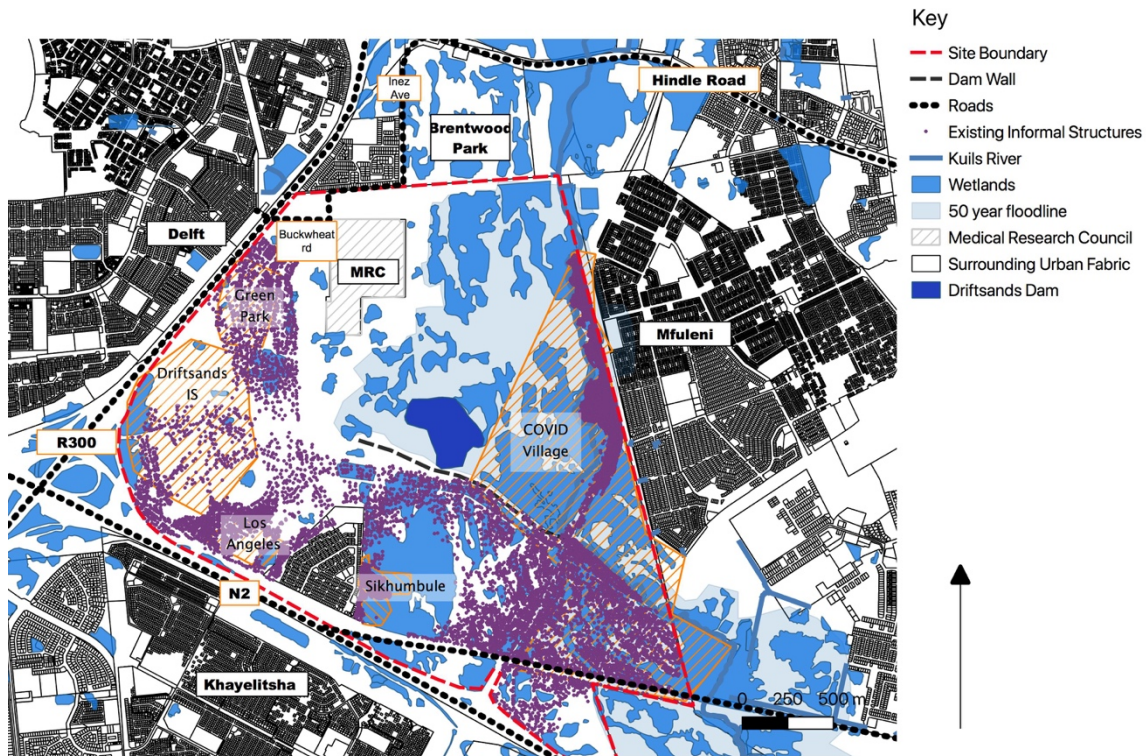


Figure 6: Map showing the Infrastructure in Driftsands (Own Work; Data from CoCT Open Portal, 2022; Cape Nature, 2022; Conservation Expert Interview, 2022)

3.3.2 Vegetation Analysis

Driftsands is home to the prosperous floral kingdom, Cape Floristic Kingdom, which contains about 9000 vascular plant species. The Cape Floristic Kingdom has been identified as an area of international biodiversity importance as a UNESCO World Heritage Site (CapeNature, 2018). The kingdom is made- up of 5 endemic families (Goldblatt & Manning, 2001). In addition, Driftsands was identified as a vital Core Flora Conservation Site within the city due to its large quantity of False Bay Cape Flats Dune Strandveld, which is becoming increasingly endangered (Holmes, Rebelo, Dorse & Wood, 2012; Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012). Later, the site became part of the Cities of Cape Town Biodiversity Network and was flagged for protection under this plan (Bux, Anderson & O'Farrell, 2021).

The Driftsands area is primarily dominated by lowland fynbos ecosystems and the Strandveld (Kotze, 2018). However, a significant portion of flora and fauna in this space has been

damaged by the encroachment of people and by illegal waste dumping that was happening in the years before, mainly along the edges of the site next to Mfuleni and Los Angeles (see figure 6) (Saul et al., 2015; Kotze, 2018). Driftsands makes up approximately 24% of the False Bay Cape Flats Dune Strandveld that is left in the City of Cape Town area (Conservation Expert Interview, 2022). The vegetation type is critically endangered (Conservation Expert Interview, 2022). Due to the critical condition of the vegetation type, there is a Strandveld Implementation Plan that aims to protect and conserve the little vegetation type that is left (Holmes *et al.*, 2012; Conservation Expert Interview, 2022). The threat to the Strandveld means the vegetation, fauna and water systems must be protected as much as possible. No formal recent biodiversity assessment for Driftsands has been completed yet; however, plans to implement one are in progress (Conservation Expert Interview, 2022). While the natural systems have been largely disturbed, the importance of Driftsands is not in maintaining a particular plant or animal but rather in the ecosystem as a whole and the site's status as a green space (Conservation Expert Interview, 2022). Due to the location of Driftsands, it acts as an essential island of green space for the health of the surrounding ecosystem, including people and nature (Conservation Expert Interview, 2022). Due to encroachment, a significant amount of vegetation and biodiversity has been identified as irrevocably damaged, namely most of the spaces that have been settled (see figure 7) (Conservation Expert Interview, 2022). However, around 305ha of the site that falls within the flood plain have been left largely unharmed. It is essential it be maintained due to the ecosystem significance of the vegetation, wetland and river systems in this space (WCG, 2021; Conservation Expert Interview, 2022).

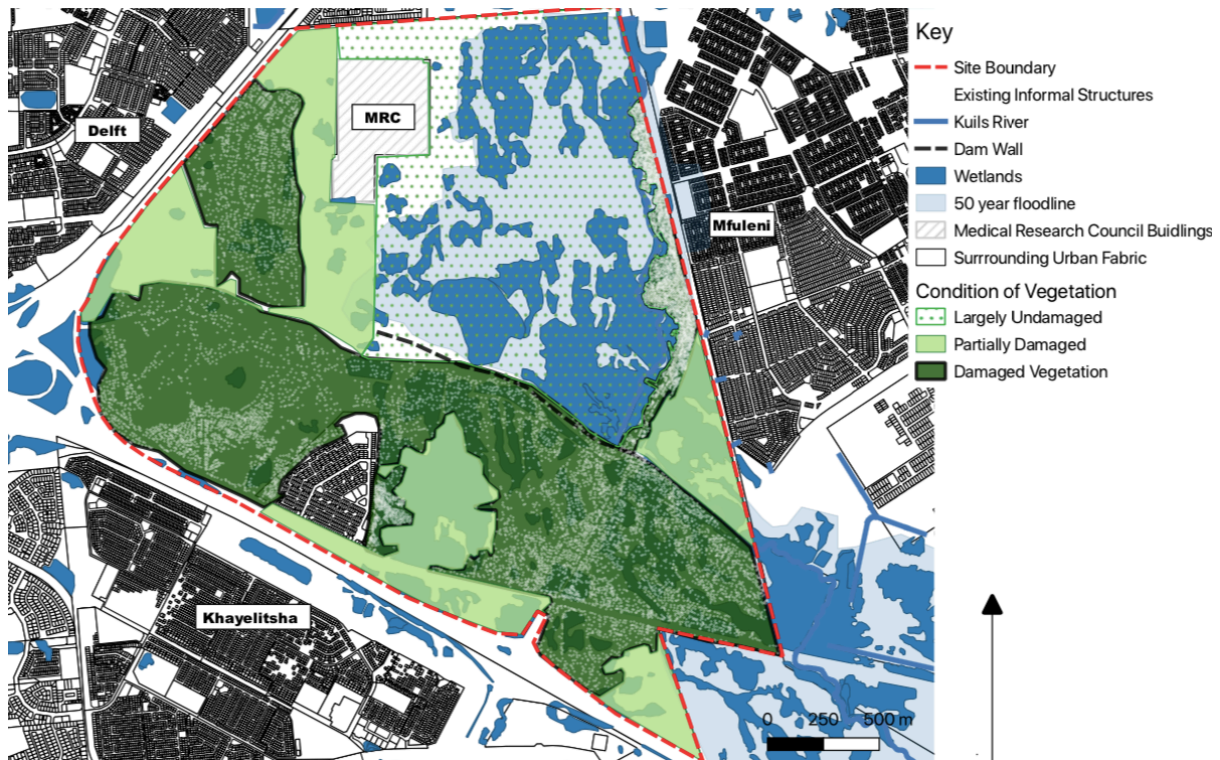


Figure 7: Map showing the Vegetation in Driftsands (Own Work; Data from CoCT Open Portal, 2022; Cape Nature, 2022; Conservation Expert Interview, 2022).

3.3.3 Assessment Water Systems and Flooding

The Driftsands Area is located in the Eerste catchment; the Kuils river is one of its main tributaries of the catchment (Saul et al., 2015). The catchment covers around 66 680ha and is home to 1183 wetlands (Holmes et al. 2012). Driftsands is characterised by a collection of wetlands around the Kuils river, mainly in the east of the site (Holmes et al. 2012). The Kuils river runs through the eastern portion of the Driftsands reserve next to Mfuleni (see figure 8) (Snaddon & Day, 2009). Jarman identified the river as a conservation priority when it began to be threatened by urban development in the 1990s (Jarman, 1986). Protecting the Kuils river is part of a long-term strategy to conserve freshwater systems (Holmes et al. 2012). The river had an extensive Dune Strandveld floodplain and borders parabolic dunes (Holmes et al. 2012). However, the river's proximity to the urban area, particularly informal settlements, has resulted in high pollution levels and poor water quality (Mwangi, 2014). In addition, the river has been serving as drainage for stormwater from the surrounding developed areas (Holmes et al. 2012). Flooding occurs when sewerage and stormwater runoff increases in the rainier winter months (Saul et al., 2015; WCG, 2021).

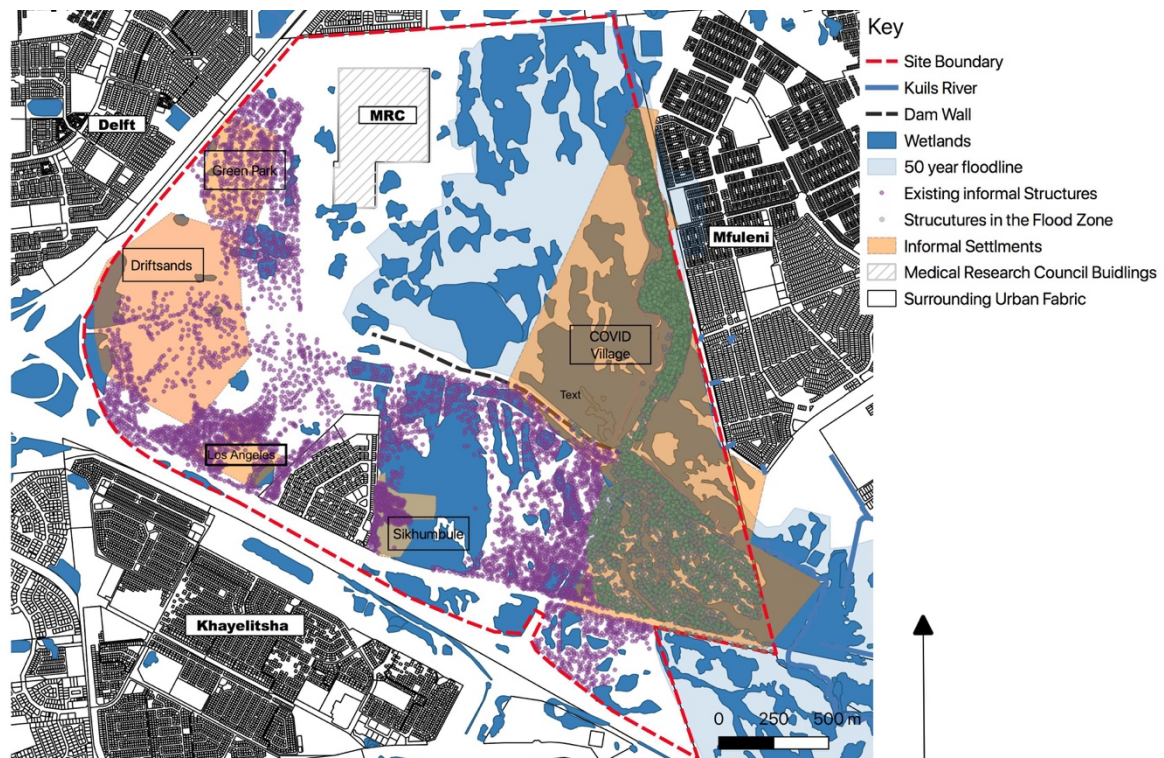


Figure 8: Map showing the Water Systems in the Driftsands Area (Own Work; Data from CoCT Open Portal, 2022; Cape Nature, 2022)

The eastern area of the reserve is also characterised by a vast network of wetlands (See figure 8). The wetlands within the Driftsands area are one of 3 types of Dune Strandveld wetlands isolated seep, isolated depression or floodplain (Snaddon & Day, 2009). The wetlands in the nature reserve have been identified as Critical Biodiversity Areas and categorised as moderate to very high in terms of importance and ecological sensitivity (Snaddon & Day, 2009). While not all the wetlands are in danger, the floodplain wetlands, particularly, are threatened by the encroachment, mainly from the new informal settlement called COVID Village (see figure 8) (WCG, 2021). The threat to the Driftsands wetlands is significant as many of the Strandveld dune wetlands are threatened by urban development, stormwater discharge, alien vegetation and infrastructure (WCG, 2021). As shown in figure 7, some settlements have been constructed on wetlands; these settlements have significantly damaged the wetlands as construction has often involved infill, which allows for the construction of the settlements and prevents flooding (WCG, 2021; Conservation Expert Interview, 2022). The Driftsands area has also experienced many fires and the threat of alien vegetation, which has damaged the delicate wetland ecosystems (Snaddon & Day, 2009). The wetlands are the features in Driftsands that were valued highest in conservation within its

status as a nature reserve (Helme, 2009). The floodplain is a vital part of the Driftsands Detention dam and is, therefore, essential to be managed for flood and water management purposes (Conservation Expert Interview, 2022).

The water system in Driftsands is also, in part, artificial (WCG, 2021). The Driftsands dam is a permanent body of water that is 25ha big and has a capacity of 2 500 000m³ (WCG, 2021). The dam is a storage method for water, utilised during flooding to store excess surface and stormwater runoff (Saul et al., 2015). The Western Cape Regional Services Council constructed the dam in 1991. Within a 1 in 50-year flood, the dam holds 222m³ of water and only releases 100m³ (Saul et al., 2015). The dam's role in stormwater management shows the importance of the dam in flood protection and mitigation (WCG, 2021). With the increased pressure of the communities living on the dam wall (the dam wall is an artificial dune) and in the 50-year flood zone, the wall urgently needs repair (WCG, 2021). However, negotiations are still in place to remove settlers from the dam wall before upgrades occur (VPUU, 2022; Cape Nature Site Visit, 2022). As it currently stands, the dam is lacking in its ability to protect Mfuleni from flooding (as has been seen in the July 2022 floods in Mfuleni), and the Western Cape government recommends an extension of the dam wall to lower the risk and threat of flooding to Mfuleni (WGC,2021; Ntseku, 2022).

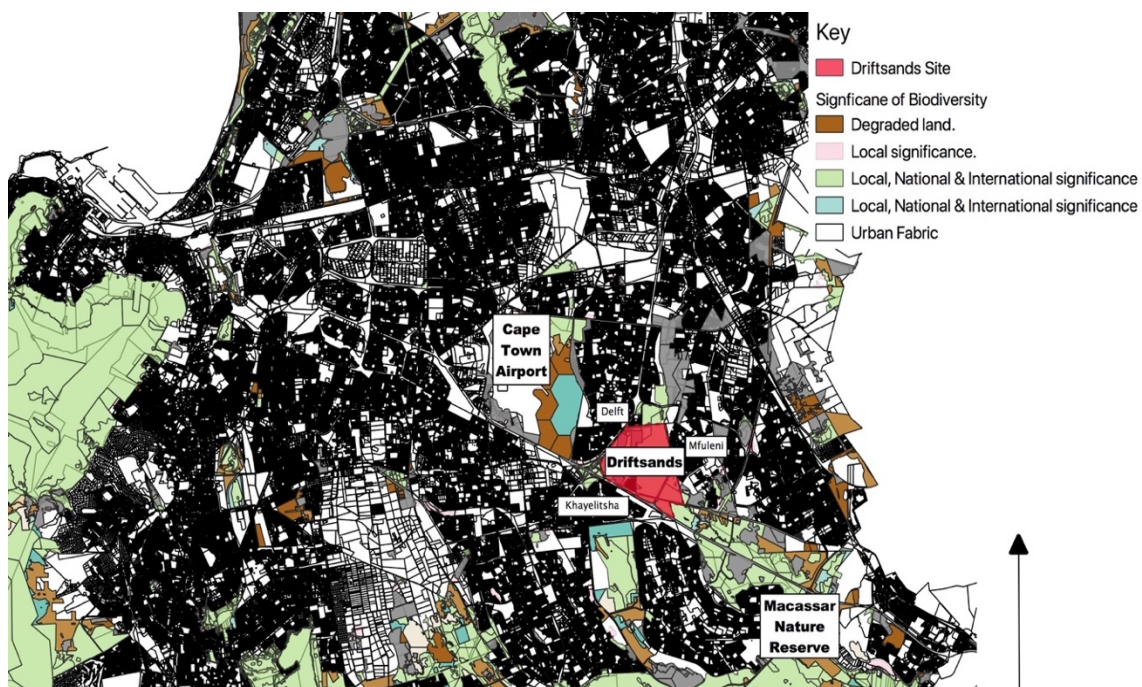


Figure 9: Map showing Driftsands in the Greater Cape Town Biodiversity Context (Own Work; Data from CoCT Open Portal, 2022)

The City of Cape Town has plans and systems to implement a Masterplan of Stormwater infrastructure that will aim to manage the quantity and quality of stormwater runoff at the Cape Town International Airport (WCG, 2021). This project will involve the Driftsands area due to the proximity of the area to the airport (See figure 9). The project has been outsourced to KFD Wilkinson Consulting engineers. The project entails designing, managing and providing monitoring services to upgrade stormwater infrastructure (KFD Wilkinson, 2022). The project includes the implementation of two more detention pods (with surface areas of 2ha and 0.5ha), the construction of two stormwater pump stations and an online fuel spill containment basin. It is vital that any plans made account for the involvement of the airport stormwater masterplan and the expected implications for Driftsands (KFD Wilkinson, 2022). Although the master plan includes a potential detention pond being constructed in Driftsands, the location is still debatable (KFD Wilkinson, 2022). The plan has potential for the research as this site may have future value in helping maintain and improve stormwater runoff and, therefore, potential financial investment and interest from the City of Cape Town.

3.3.4 Stakeholders

The Driftsands area has various interested and affected parties. Cape Nature has interest from a conservation perspective as they are the provincial body that manages provincial nature reserves (WCG, 2021). Therefore, Cape Nature's priorities have primarily been focused on protecting the natural systems in Driftsands, notably biodiversity, water systems and dune systems (Cape Nature, 2015). Linking to this, as the reserve is a provincial nature reserve, the space is valuable to the provincial government in meeting larger-scale conservation goals, particularly around the Cape Strandveld Fynbos (Saul. et al. 2015). The de-proclamation process for the provincial reserve is imminent and will likely be processed imminently (Engel, 2022; Cape Nature Site Visit, 2022). If the area is de-proclaimed, this will mean that Cape Nature steps back from its role as the manager of the site (WCG, 2021; Cape Nature Site Visit, 2022). Cape Nature is also limited in its powers and abilities to intervene and assist in issues around things like encroachment and human settlements (WCG, 2021; Cape Nature Site Visit, 2022). Its mandate is conservation, and this is where its budget and resources are required to be invested (Saul et al., 2015; Cape Nature Site Visit, 2022).

In 1996 a portion of the Nature reserve, which covers a total of 21.6 ha, was sold to the Medical Research Council (MRC) (See figure 5). The MRC Offices are now also partially rented out to Cape Nature, from which they manage the reserve (Saul et al., 2015). The South African Institute of Medical Research also has an interest as their offices, and a small industrial node are located on the site's border (WCG, 2021). Their involvement may be around safety considerations.

The Non-Governmental Organisation (NGO) Violence Prevention Through Urban Upgrading (VPUU) is also heavily involved in the Driftsands case. The VPUU was brought into the area by the Western Cape Government to complete a risk assessment of the communities living in the area (VPUU, 2022). The risk assessment aimed to achieve a holistic understanding of the households and people living in the area (VPUU, 2022). This understanding would allow for improved planning and more appropriate risk management and viable solutions to issues around moving communities out of the flood zone (VPUU, 2022). The NGO has significant experience connecting and communicating with residents in informal spaces, which was reflected in their approach in the Driftsands context (VPUU, 2022). Therefore, the VPUU is a vital resource in the implementation process to the other stakeholders and hopefully in engaging effectively towards implementation. The NGO has developed a successful dialogue with the communities which have settled in Driftsands (VPUU, 2022). The VPUU's ability to conduct workshops and focus groups with the community leaders in the space will allow for easier and more effective public participation in the various interventions and ensure the needs and wants of the communities are heard and communicated (VPUU, 2022). More details regarding VPUU's assessment will be discussed in the management plan section of this dissertation (VPUU, 2022).

The settlers that inhabit the informal settlements in the area are also affected parties. Many of the community members are reluctant or unable to move as they have already set up their houses and employment (VPUU, 2022). Cape Nature initially located an alternative area for settlement in the Driftsands areas; however, no transport has been provided. Moving will mean rebuilding their homes and re-establishing their links and connections (WCG,2021). However, the high levels of rain in winter have already proven that many of the settlements are built in flood-prone areas and have caused damage to houses and settlements, making it

very taxing and expensive to stay in the established informal settlements (Mnyobe & Damba-Hendrik, 2022). The communities in Driftsands, while often discussed as one entity, are varied across the site (Cape Nature Site Visit, 2022). While the time limitations of this dissertation have not allowed for direct engagement with the community, the desktop research, particularly from the VPUU Risk Assessment, the site visit and the expert interview from Cape Nature, has produced some details around three critical communities in the area. Cape Nature analysed the settlement patterns, and from the VPUU's engagement, the first community are those who largely live on the banks of the Kuils river (VPUU,2022; Cape Nature Site Visit, 2022). This community is primarily found in the informal settlement called COVID Village (see figure 5). The research found they settled here due to desperation and need for land and shelter. The VPUU found that their priorities are access to shelter and services, and many families need more financial resources to be able to relocate. The second group of the communities found at the south of the site, which includes extensions of Sikhumbule, Los Angeles and the south section of COVID Village, were instead identified as being shack farming (Cape Nature Site Visit, 2022). VPUU has struggled more to engage with these communities, and Cape Nature has suspected there is more illegal activity in these areas, particularly around sand mining (VPUU, 2022, Cape Nature Site Visit, 2022; WCG, 2021). The socio-economic context of the community will make public participation and engagement with these communities regarding the implementation of the interventions much more challenging. The last grouping is communities that have been residing in these informal settlements on the site before COVID-19 and the significant influx of encroachment in 2020 (WGC, 2021). The community includes informal spaces on the periphery of the site that have encroached into the site, like Green Park (Cooper, 2006; Conservation Expert Interview, 2022, Cape Nature Site Visit, 2022). VPUU and Cape Nature have found there are tensions around new settlements. Many of the existing informal settlements have existed for 10-20 years, and many are due and have been promised an upgrade (Cape Nature Site Visit, 2022; VPUU, 2022). Therefore, many community members feel the new settlers have, in a sense, 'jumped the queue' (Conservation Expert Interview, 2022; Cape Nature Site Visit, 2022). That is why it is essential that the needs of these communities are addressed and protected (VPUU,2022). Even though the threat might not be as imminent as the flood risk, the communities also need improved access to services (WCG, 2021; Cape Nature Site Visit, 2022).

The City of Cape Town Municipality is also interested in the area as they own various sets of infrastructures, which have been discussed above (WCG, 2021). The CoCT owns the road reserve, wastewater and bulk water pipeline that run through Driftsands. The city is also interested in this space as the loss of more urban green space and biodiversity will be a loss to the larger city's green network (WCG, 2021). However, as Driftsands is still a nature reserve, it does not fall within the City of Cape Town Municipalities' mandate (WCG, 2021; Cape Nature site visit, 2022). The site is vital to the city as its contribution to ecosystem services is part of the more extensive water network and life support systems (WCG, 2021). Protecting the residents and ensuring that the Driftsands area is protected as much as possible will be beneficial to the city in helping reduce the housing backlog in the city and improving the quantity and quality of urban green spaces in the Cape Flats Area (WGC, 2021).

The Western Cape government, particularly the Department of Human Settlement, is interested in this site as the area falls within their mandate around ensuring all Western Cape residents have access to sustainable housing or shelter (Cooper, 2006). In addition, human settlements have already tried to implement a project in this area, as mentioned in chapter 3 (Cooper, 2006). Therefore, the Western Cape Government sees potential in this site as an area for new residential development (Cooper, 2006). Another interest the Western Cape Government has in this space is the precedent the de-proclamation is setting for other protected areas and the province's future of conservation (Engel, 2022). Therefore, ensuring that this area maintains its role in conservation is vital for future threats to other green and protected spaces in Cape Town and the broader context (Engel, 2022).

The Department of Environmental Affairs and Development Planning is a Western Cape Government department (Western Cape Government: DEADP, 2022). Their role is to protect the natural environment in the Western Cape and ensure sustainable development (Western Cape Government: DEADP, 2022). The Department of Environmental Affairs and Development planning has been involved in this project as the chair of the Ad hoc technical task team that was put together to address this issue in 2021 (WCG, 2021). Due to their mandate, their intentions in this space are to promote sustainability and protect the natural environment in Driftsands where possible (Western Cape Government: DEADP, 2022).

3.4 Conservation Efforts and Existing Management Plans for Driftsands

3.4.1 The City of Cape Town Biodiversity Network

In 2016, the City of Cape Town introduced the Biodiversity Network, a conservation plan for the area, to protect the complex biodiversity network across the city, including the Cape Flats Dune Strandveld (Bux, Anderson & O'Farrell, 2021). The Biodiversity Network plan is updated regularly and is a systematic and detailed biodiversity plan (Bux, Anderson & O'Farrell, 2021). The plan was informed by previous conservation studies, including the 1982 'Greening the City Plan' and the Cape Flora Conservation sites project of 2003 (Bux, Anderson & O'Farrell, 2021). The objectives of the plan are solely focused on biodiversity conservation (Bux, Anderson & O'Farrell, 2021). The suggestion was to expand the Biodiversity Network in the Driftsands context to include areas north of the reserve (Brentwood Park) which also had high biodiversity value (Energy, Environmental & Spatial Planning Directorate, 2015). With the pressures in the area and the high threat of urban development, there were high rates of degradation of the valuable vegetation, even before the massive encroachment (Saul et al., 2015). The environmental plan was aimed to be a game-changing document which allowed for a focused strategy to protect and manage rare vegetation types (Saul et al., 2015). While the Biodiversity Network is applicable, it is not a planning document (Energy, Environmental & Spatial Planning Directorate, 2015). It is instead used as a base layer in planning documents such as the EMF and SDF to identify critical areas of risk, opportunity and challenge.

3.4.2 Driftsands Nature Reserve Management Plan

The plans around Driftsands were primarily controlled and implemented by Cape Nature as they were the managers of the space from the early 2000s (Saul et al., 2015). Cape Nature produces a protected area management plan for Driftsands every five years, as is required of them to develop for each of their nature reserves (Saul et al., 2015). The most recent version of the plan was produced in 2015 for the period between 2015 -2020 (Saul et al., 2015). The plan was developed with the intention of conserving biodiversity as a grounding of the sustainable economy, which provides ecosystem services and opportunity and access to everyone (Saul et al., 2015).

The plan consists of seven sections (Saul et al., 2015). The first section provides context to Cape Nature protected area plans and information regarding their general structure, approval and review processes (Saul et al., 2015). The second section gives more specific detail and a clear outline of the management framework for the Driftsands Area (Saul et al., 2015). Section three of the plan considers the legal framework under which Cape Nature and the areas function (Saul et al., 2015). Section four moves on to the planning context for the reserve and how it fits into the larger regional, provincial and national contexts (Saul et al., 2015). Section five outlines a Conservation Development Framework for Driftsands (Saul et al., 2015). Section Six is the crucial step in introducing a Strategic Implementation Framework for the Driftsands Reserve (Saul et al., 2015). The last section, section seven, consists of the references and appendixes for the plan (Saul et al., 2015).

On the whole, this plan is supposed to look at the current status and clearly outline the area's management plan and, importantly, how it fits into bigger scale legislature and how it will be implemented (Saul et al., 2015). Under the mandate of the National Protected Area Expansion Strategy, Cape Nature had plans to extend the reserve's borders before it was de-proclaimed (Saul et al., 2015). The intention was to expand the area in such a way that would allow for Driftsands to be consolidated with vital spaces along the Kuils river Corridor and eventually link up with the City of Cape's Macassar Nature Reserve (see figure 10) (Saul et al., 2015). The goals were to protect this critical biodiversity area and preserve the ecosystem around the Kuils river (Saul et al., 2015).

3.4.3 Human Settlement Project

With the increased demand for housing in the greater Cape Flats area discussed above, a new plan emerged around the 2000s called the Driftsands Human Settlements Project (WCG, 2021). The project aimed to reconceptualise the area into a more mixed-use space which would allow for the human and conservation needs to be met, which aligns well with the dissertation goals (Cooper, 2006). The project aimed to use the land located between the informal settlements and implement housing to limit the encroachment of settlements further into the reserve, therefore protecting the environment and land with high

environmental value (WCG, 2021). The city was proposing the introduction of a human settlement project of 2000 housing units in the area between Los Angeles and Green Park Informal Settlements (suggesting development where Driftsands Informal Settlements is located (see figure 6)) (Cooper, 2006). This project aimed to not only provide much-needed housing for people in the area but also allow for the formal consolidation of the informal settlements (Cooper, 2006). Notably, the houses were aimed to be constructed for residents from both Los Angeles and Green Park (Cooper, 2006). The houses were supposed to be implemented as the last settlements in the reserve area, and no other informal structures would be permitted (Cooper, 2006). The location of the houses was designed to allow for improved access to services such as clinics, community halls and other amenities (Cooper, 2006). The project was also intended to help reduce the flooding problems in Los Angeles and allow for the rehabilitation and protection of wetlands and dune areas around Los Angeles (that were at the time occupied by informal dwellers)(Cooper, 2006). CCA Environmental was appointed as the independent consultancy for this project (Cooper, 2006). The City of Cape Town did receive environmental authorisation for this project in 2011, which was further amended in 2014, which ultimately approved 3241 housing units to be constructed, which would act as a boundary wall for the reserve (WCG, 2021). However, the project was never implemented as there was encroachment by settlers into the land between 2018 to 2019 and the construction never began (WCG, 2021). The failure of this project seemed to largely hinge on the slow process of this development, as the significant gap between the plan and implementation resulted in encroachment on the areas that were set out to be developed.

3.4.4 Violence Prevention through Urban Upgrading Risk Assessment

The Western Cape Government put out a call for proposals for a Driftsands Risk Assessment in an effort to consider informal settlements as more permanent factors in the urban landscape (Mnyobe & Damba-Hendrik, 2022). VPUU responded to this call and put forward a proposal focusing on community-based planning and enumeration (VPUU, 2022). The proposal resulted in the organisation being appointed as a service provider for the settlements in Driftsands (VPUU, 2022). VPUU has since then come up with a project plan to

implement Community Stakeholder engagement, a household risk assessment, GIS Mapping and participatory planning with the communities that have settled in the area (VPUU, 2022). The VPUU's risk assessment has five key objectives (VPUU, 2022). Firstly, to implement a participatory stakeholder process that helps the data collection process to allow for an accurate and current assessment of the status quo within Driftsands (VPUU, 2022). The second objective of the risk assessment is to scale down the assessment and conduct a household risk assessment which importantly also includes a sort of census of the number of settlements and people in the area (VPUU, 2022). The third objective is linked to the last, as it consists of developing accurate GIS maps of the area, including the settlements within the area (VPUU, 2022). Objective four consists of assessing the data that has been collected and producing reports of the status of the various data. The last objective is to develop a database that links household information to the physical location and structures (VPUU, 2022).

While VPUU's primary step was to conduct the risk assessment, they also conducted a workshop with the community of COVID Village (VPUU, 2022). This workshop aimed to engage the community on how to prevent land encroachment around the high-risk dam wall and on the floodplain once settlements were safely relocated to less threatened areas. The workshop produced five key recommended actions for the Driftsands area (VPUU, 2022). The recommendation included for community leaders to raise awareness around the danger of living on the dam wall and flood plain with community members at meetings (VPUU, 2022). The second action will involve implementing clear signage around the area with warning signs to communicate the danger to those who may have missed the meetings (VPUU, 2022). Another step consists of leaders and community members patrolling the site and dam wall to ensure no more encroachment into high-risk areas (VPUU, 2022). An additional proposed action is closely linked to the previous one, with the police offering and providing support for community patrols (VPUU, 2022). The last action is an overarching guideline which recommends consistent collaboration between the government and community in order for any changes or projects to be successful (VPUU, 2022; Mnyobe & Damba-Hendrik, 2022).

3.5 Planning Context

3.5.1 Relevant Cape Town Planning Tools

In the context of Cape Town, there has been a significant conflict between land invasions and conservation, where there has been tension between nature and people in their competition for land (Ehrlich & Ross, 2015). As conservation in Cape Town is still largely aligned with mainstream trends, the methods are exclusionary of the disadvantaged and structured for the privileged (Balmford, Moore, Brooks, Hansen, Williams & Rahbek, 2001). In a Spatial planning context, as has been the global trend, society and nature are primarily addressed separately and framed in tension and competition with each other (Brownlie et al., 2005). Therefore, it is essential that, as planners, we respond to the socio-economic and environmental context to contribute to human development and aim to achieve environmental sustainability. Following this, it is vital that these practices are reflected in planning legislation (Brownlie et al., 2005).

In my view, the City of Cape Town has taken a step in the right direction along this thinking. The City of Cape Town has eight key district plans for the city's different areas, allowing for more detailed and contextual planning (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Each district plan includes a Spatial Plan for the District in question and develops an Environmental Management Framework (EMF) for the space as a section of the plan (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). This structure ensures that the spatial and environmental plans align (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012). The 2022 draft of the district plan has taken a step further and integrated the EMF completely into the District Spatial Development Plans to move even further away from the previously siloed approach (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). This dissertation will be focused on upgrading the development guidelines outlined for the section of the district plan relevant to the Driftsands area, which is subdistrict seven (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). All proposals that are part of the district plan are also required to achieve or maintain the desired state of the environment as set out by National Environmental Management Act (NEMA) requirements (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012).

The EMF considerations in this plan are developed through EIA regulations that again align with NEMA guidelines (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The dissertation will aim upgrade district development guidelines for Driftsands. The above shows that district plans for Cape Town have been introduced in a way that moves away from the siloed approach (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012).

3.5.2 Breakdown of the Khayelitsha, Mitchells Plain & Blue Downs District Plan

As mentioned above, the district plan's purpose is to provide a spatial vision for the built environment through land use guidelines and the identification of critical projects for implementation (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The plan affects the smaller scale socio-economic and environmental decision-making for Driftsands and the surrounds (Saul et al., 2015; Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012; Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan Draft, 2022).

3.5.3 Alignment of the District Plan with Relevant Legislation and Regulations

Importantly the district plans do not exist in isolation (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). This section will illustrate the connections to other legislation and regulations that should be considered. As this is a district plan for the City of Cape Town, the focus will be on establishing the linkages for the district plan to other municipal plans and documents (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).

It should be clearly stated that the plan does not replace the Development Management Scheme (DMS) but rather should be read in collaboration with other planning documents and added to them (see figure 10) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Furthermore, the DSDFs is aligned with the City of Cape Town Municipal Spatial Development Framework (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Therefore, this section will begin by expanding on the land-use guidelines for the Driftsands area (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).



Figure 10: Flow Chart showing the Connections between the MSDF and the District Plan (Own work, 2022, Source: Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022)

The draft district plan introduces new development areas (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The new development areas are considered to be spaces suitable for the relevant development suggested (industrial, residential, or other) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The draft new development areas are then put into a land use model to ensure that potential services and industries are distributed evenly across space (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Once this has been ensured, the potential future development will influence the sector plans, including provision for community facilities, housing infrastructure and services (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Once completed, the sector plans are aligned with the district plan. New development areas and land use models are used to develop a development strategy; the strategy ensures that service provision is aligned with the vision of Cape Town contained in the MSDF and the eight integrated district SDFs and EMFs (district plans) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The MSDF vision is based on the existing backlog of services and estimated future growth for which the capacity of services needs to be increased. The district plan and revised MSDF are then aligned with the new IDP (see figure 11) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).

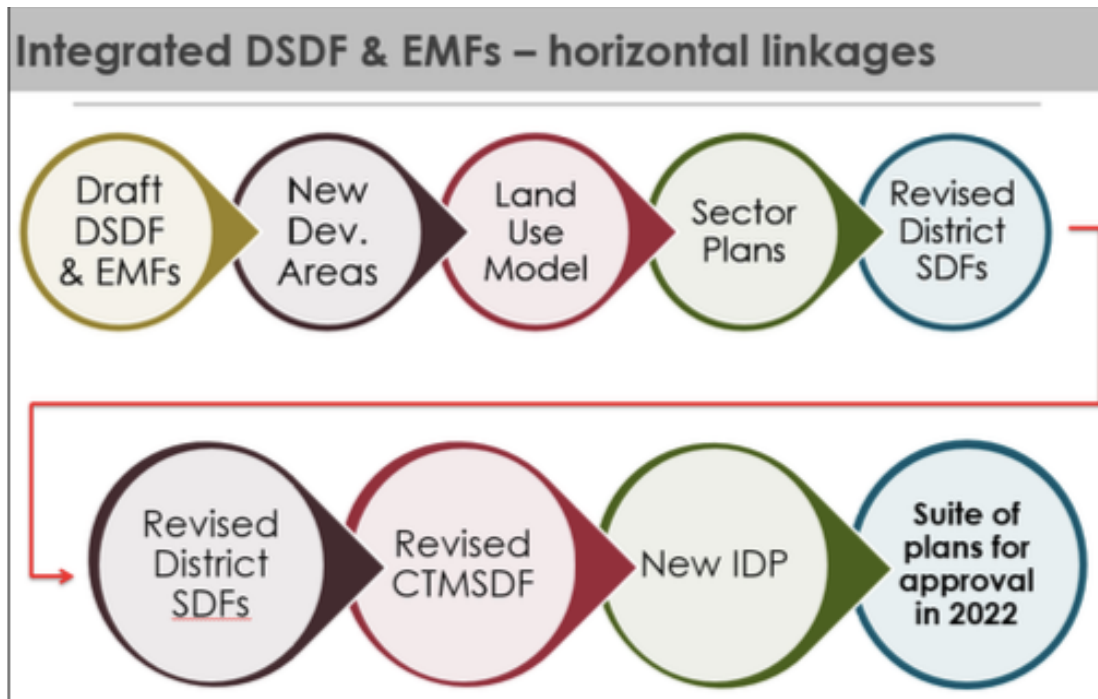


Figure 11: Flow Chart showing the Relationship between Municipal Documents (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).

3.5.4 Structure of the District Plan

The district plan is structured into four sections: the introduction, the spatial objectives, the spatial development framework (SDF): the district development guidelines and lastly, the sub-district plans (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). To provide adequate context, the plan will be broken down, and critiques and gaps within the plan will be established to suggest spaces for improvements.

The introduction aims to orientate the plan physically and legally. It begins with the purpose; the district plan is a medium-term document (as it is renewed every ten years) which guides the spatial development of a particular district within Cape Town (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Notably, the purpose of this document includes the City of Cape Town's motivation in integrating the District SDF (DSDF) and EMF completely, which is to address the significant backlog in services, and housing and to align with SPLUMA Principles (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The integrated DSDF and EMF are structured to facilitate a space that will aim to breed innovative ideas and approaches to long-lasting spatial challenges while promoting environmental

sustainability (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The plan's priorities align well with my own priorities for this dissertation that link back to finding inclusive solutions to the issues in the site that protect both the needs of people and those of nature. The introduction also touches on the district plan's mandate and its relation to other plans. The district plan must align with the provincial spatial developmental framework (PSDF), Cape Town's Integrated Development Plan (IDP) and the Cape Town Spatial Development Framework (CTSDF) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The plan is part of the decision support tools in land use and environmental decision-making processes (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The introduction also outlines the legal status of the district plan and consistency principle (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The district plan, as mentioned, comprises two components: the district spatial development plan (DSDP) and the Environmental Management Framework (EMF), which are developed along two different pieces of legislation. The DSDP is a structured plan that is guided by the Land Use Planning Ordinance (LUPO) of 1985 in terms of section 4(10) and with the CTSDP. The EMF section of the district plan is developed along the National Environmental Management Act (NEMA) Action 107 of 1998 along sections 24(5) and 44 of the Act (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The introduction also includes an outline of the location of the district. The district covers Mitchells Plain, Blue Downs, Blackheath and the Eersteriver. It is bounded by the R300, Stellenbosch Arterial, Vanguard Driver and Sections of Lansdownes Road and the N2 (see figure 12) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012).

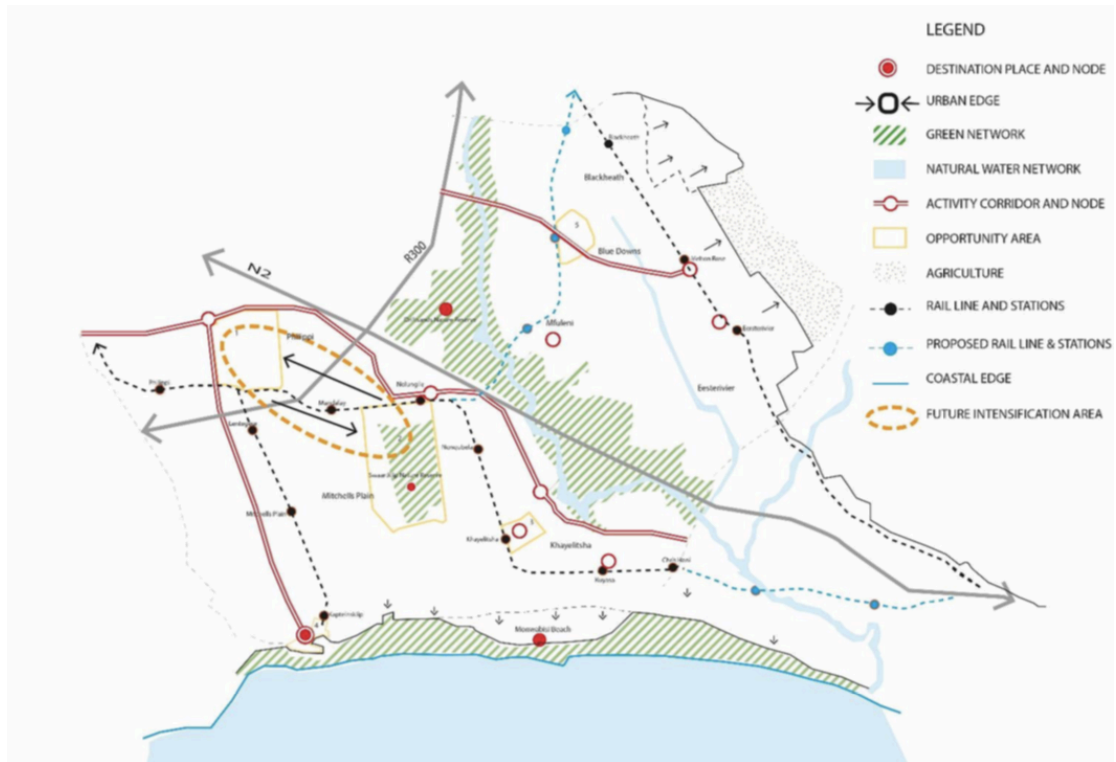


Figure 12: Map of the District Spatial Development Plan for Khayelitsha, Mitchells Plain & Blue Downs Area (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).

The second section considers the spatial objectives for the district, which align with the MSDP's spatial strategies to support the city's transformation, which includes three strategies (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The first strategy entails building an inclusive, integrated, vibrant and healthy city. The second strategy suggests managing urban growth and creating a balance between urban development and environmental protection. The last strategy outlines job creation and improving access to economic opportunity (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The strategies touch on many of the issues that align with my priorities for the dissertation; however, strategy two still paints urban development and environmental protection as opposing forces that need to be balanced rather than finding methods that contribute to both environmental protection and development. Therefore, shifting the lens to ensure nature and people are seen, treated and managed as interconnected is vital. To rethink conservation and move towards a space where people and nature can be protected together is essential (see figure 3.10) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The third section of the plan is the SDF: District Development Guidelines

which consists of applying the spatial concepts extrapolated above. The plan consists of 5 overarching types of categories, namely environment, urban development, transport routes, conceptual designation and development edges (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Approaching a space by considering the different spatial structuring categories may be necessary for understanding the 'layers' in the space (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). However, it still promotes this siloed thinking. A significant critique of this section is that Driftsands is still treated as one homogenous area and earmarked for core biodiversity protection and as a destination place, despite the significant degradation and encroachment of informal settlements that have been prevalent even pre-COVID-19 (see figure 14) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Section four consists of the guidelines for developments in each of the subdistricts in the area. This dissertation's case study addresses the Driftsands area sub-district 7 (see figure 13) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).

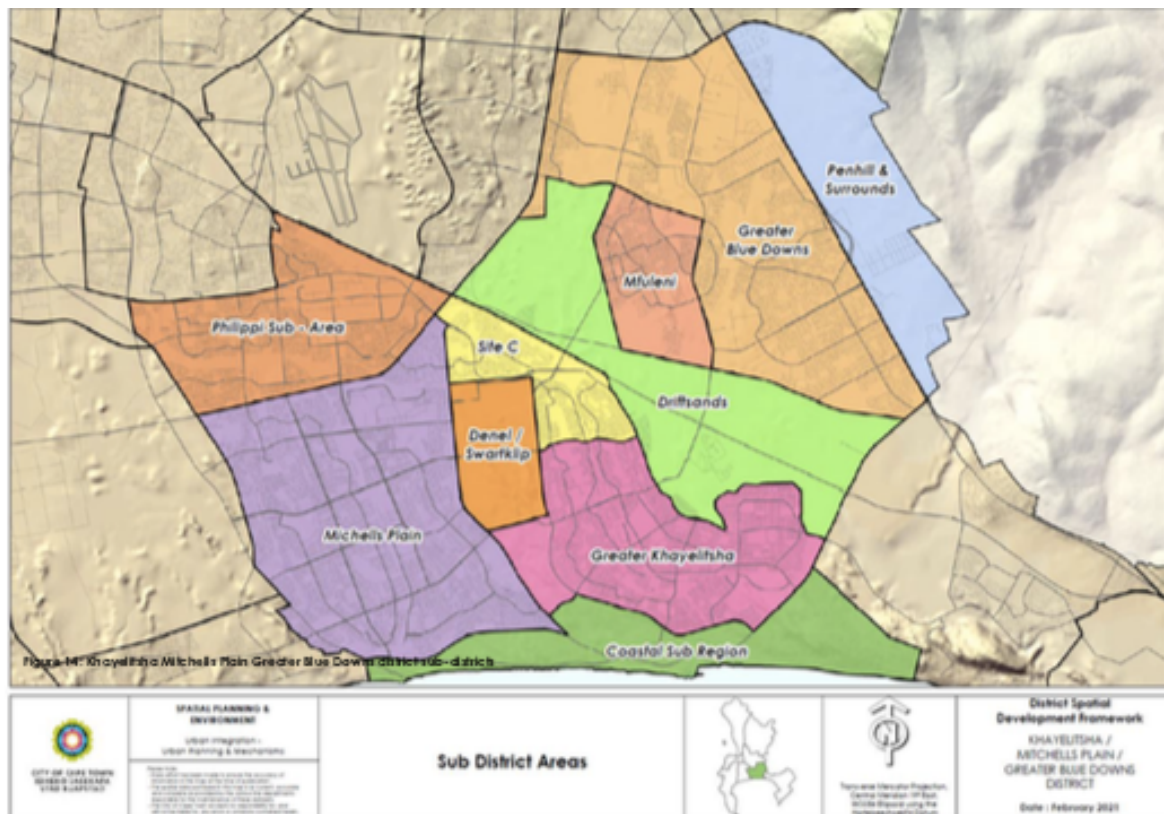


Figure 13: Map showing the Sub District Areas in the Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022)

3.5.5 Critique and Breakdown of Sub-District 7: Driftsands Plan

Table 1: Table adapted from District Plan showing the Development Guidelines for Sub-District Seven: Driftsands (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).

Local Objectives	Guidelines
<ul style="list-style-type: none"> a. Identify alternative housing opportunities for Informal Settlements and support initiatives to improve access of communities to basic services, including engineering services, health services and education b. Ensure the retention of unique environmental assets that exist on land. c. Facilitate increased connectivity and integration with surrounding areas. d. Relocation of informal settlement within the dam wall and other wetland areas. e. Establish measures to project the Kuils river corridor from pollution. 	<ul style="list-style-type: none"> 1. Promote the protection and enhancement of the Driftsands Nature Reserve by encouraging the development of appropriate recreational and educational facilities to promote the nature reserve as a destination. 2. Care should be taken in the development process to prevent further extensions of informal settlement, which will be to the detriment of the nature reserve. 3. Investigate the feasibility of establishing initiation sites within this sub-district. 4. Support in situ upgrading of Green Park and Los Angeles informal settlement. Investigate the possibility of housing development opportunities. 5. Adequate linkages should also be established to link the existing settlements within the Driftsands Nature Reserve to areas across the R300 and N2. 6. Support residential and mixed use infill development within and around the Cape Town Film studio. Development to ensure appropriate interface with natural biodiversity corridor.

While the objectives and guidelines for Driftsands are on track and align quite generally with the ideals and goals of the dissertation, there are a few fundamental critiques (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Firstly, regarding how generalised and non-specific the guidelines are for reducing encroachment. The areas threatened by settlements are not explicitly mentioned (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The lack of detail is also reflected spatially, where none of the encroachment has been spatialised (see Figure 14) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Secondly, the threat to the water systems through Kuils river, the wetlands and the settlement in the flood zone are not spatialised on the map at all, which is a significant threat to people and nature and an urgent objective that needs to be addressed spatially (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The third critique is around the lack of detail and specifics; many of the objectives and the mapping feel very generalised, and a more nuanced approach should be encouraged for the space to allow for the unique contexts found within site to be managed and protected adequately (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Lastly, the plan focuses on relocating the informal settlements rather than finding better ways to manage and integrate the communities into the space or even identifying areas for relocation (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Lastly, while the objectives need to speak to various key goals, there is limited integration between them, and therefore they still feel somewhat siloed (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).

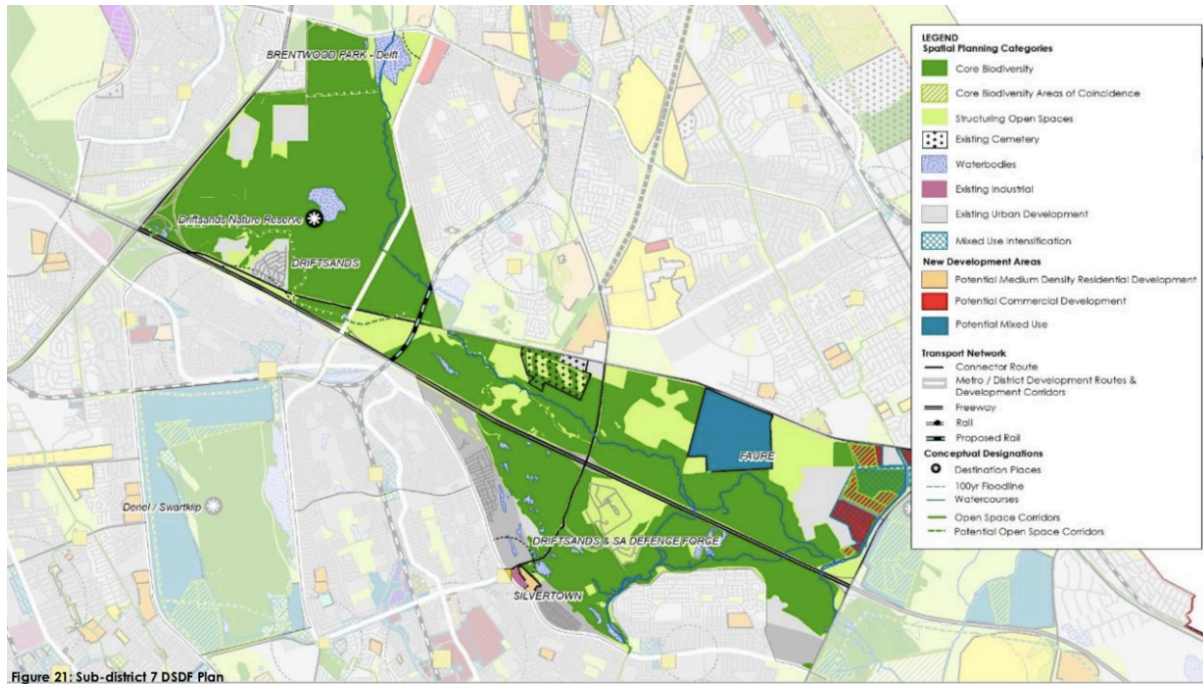


Figure 21: Sub-district 7 DSDP Plan




 <p>CITY OF CAPE TOWN ISISEKO SASEKAPA STAD KAAPSTAD</p>	<p>SPATIAL PLANNING & ENVIRONMENT Spatial Planning & Design Urban Planning & Mechanisms</p> <p><small>Provisional: - Does not constitute a guarantee of the accuracy of information or the completeness of the information provided in this document. - The City of Cape Town is not responsible for any errors or omissions in this document. - The City of Cape Town is not responsible for any errors or omissions in this document.</small></p>	<p>SUB-DISTRICT : 7 Driftsands</p>	  <p><small>Information: Municipal Planning Unit, Central Office at 100 East Maitland, 7945, Cape Town 7945, Cape Town</small></p>	<p>District Spatial Development Framework KHAYELITSHA / MITCHELLS PLAIN / GREATER BLUE DOWNS</p> <p>Date : AUGUST 2021</p>
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Figure 14: Spatial and Environmental Plan for the Sub-district of Driftsands (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022).

3.6 Key Issues & Priorities for Driftsands

3.6.1 Key Issues

An area like Driftsands has various issues, many of them with different values and importance depending on whom one asks (VPUU, 2022; Saul et al., 2015). However, two distinct issues plague the area that has been identified and highlighted by various reports and stakeholders (WCG, 2021; Saul et al., 2015; Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012)

The first key issue is the loss of biodiversity and green space with the de-proclamation and encroachment (see figure 7). The challenges with losing biodiversity and value False Bay Cape Strandveld Fynbos is not only an environmental concern (Kotze, 2018). As mentioned in the biodiversity section, the site makes up 24% of the veld type. Therefore, preserving Driftsands ecosystems is vital as it acts as an island of green in the Cape Flats and connector to the broader green space system (Conservation Expert Interview, 2022; Kotze, 2018). Losing this area as a green space also has significant social and economic implications (WCG, 2021). It has become even more apparent during the lockdown that green and open spaces are vital in urban areas for the mental and physical well-being of people residing in urban areas. Studies have shown the importance of spending time outside to support and improve mental and physical health (De Luca et al., 2021). In an area like the Cape Flats, which is overpopulated and lacks green open space. The site's role and importance are even more pronounced (Turok, Visagie & Scheba, 2021). In addition, if the green spaces in urban areas are always compromised to accommodate more housing and no method can be found to allow for the cohabitation of people and nature, it sets a precedent for the urban context. It promotes urban spaces that lack green areas, which is a loss to both people and nature (De Luca et al., 2021). Lastly, it is of economic importance, as biodiversity hot spots can attract tourism and other economic activities to an area. Therefore, the loss or threat to biodiversity also threatens any income or potential income the attraction may have provided (Saul et al., 2015; WCG, 2021).

The second key issue is the significant amount of people currently residing on the dam wall and in the flood zone (see Figures 3 & 4) (WGC, 2021). This issue is a clear threat to the safety and health of the communities living there, particularly in the rainy wet winter when the space is flooding prone. The failing and damaged dam wall infrastructure also notably threatens other settlements further down the Kuils river (WGC, 2021). If the dam wall eventually fails, the consequences of the flooding will affect many settlements down the river (WGC, 2021). The settlers in the flood zone also threaten the integrity of the ecosystems, which are so essential. The settlements often utilise infill, remove vegetation and pollute the space (WGC, 2021; Conservation Expert Interview, 2022). The flooding and lack of water management also threaten water quality in the area; this is significant as the runoff feeds into the Cape Flats Aquifer, a vital part of Cape Town's Water System (Winter, 2022). If the water is not managed correctly and too much polluted water infiltrates into the groundwater, the aquifer's water quality could be compromised (Winter, 2022). Therefore, the encroachment affects various aspects, firstly, the safety of the people living in the area, the integrity of the water systems and the health of the ecosystems.

3.6.2 Key Priorities

3.6.2.1 Stakeholders Priorities

Due to the range of interested and invested parties in the area, the priorities will differ depending on whom you ask. Therefore, the priorities of each of the stakeholders will be discussed. From these various priorities, an inclusive priority list will be compiled, which will address the stakeholders' various interests and needs as much as possible while prioritising keeping people and ecosystems safe.

Firstly, the communities living in the area. The VPUU's study showed that the community's needs are based on basic needs around food, shelter and employment (VPUU, 2021). VPUU and the communities prioritise ensuring the safety of the communities living in Driftsands. The focus means finding a way to protect the people living on the dam wall and in the flood zone, particularly with all the flooding that has been occurring during the winter months in Cape Town (VPUU, 2022; WGC, 2021.)

Cape Nature's priorities have been focused on the protection of the natural resources and ecosystems in the area, namely the rare Strandveld and the water systems (Saul et al., 2015; Conservation Expert Interview, 2022). Cape Nature's Reserve Management Plan includes six key prioritised objectives (Saul et al., 2015: 19):

1. To protect ecosystem services and rehabilitation of ecosystems while considering the needs and requirements of the surrounding urban space.
2. To set legal guidelines which will be enforced by adequate staff
3. To create and implement adaptable and novel methods that contribute to economic development and benefit society.
4. To improve connectivity and contribute to resilience building in the border context
5. To implement partnerships that help maintain the sustainability of conservation efforts.
6. Introduce environmental education, and awareness and foster conservation on all levels of society

(Saul et al., 2015)

3.6.2.2 Planner Priorities

The City of Cape Town's priorities, reflected in the district plan for Driftsands and the surrounds, have three key focuses. Firstly, ensuring adequate housing and safe spaces to settle for people, a right to shelter is part of the South African constitution (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012). Secondly, to protect the valuable green open space that Driftsands represents in its value to people in the dense urban area. Thirdly, the need to protect biodiversity, water systems and rich natural systems as part of the more extensive Biodiversity networks in the City of Cape Town. Therefore, the priorities of the City of Cape Town and planners are to protect the area, the people and the natural systems in the space (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012).

3.6.2.3 Integrated Priorities for the Dissertation Interventions

From the above priorities, here are the six key priorities for the dissertation interventions:

1. To protect and accommodate the communities living in the area, identify appropriate areas to relocate communities.
2. To conserve and rehabilitate the ecosystems in the area, namely the Kuils river, wetland and Cape Flats Strandveld.
3. To introduce tools which allow for the area to play a role in contributing to society and the economy.
4. To protect the water systems and address the flood risks to Driftsands and Mfuleni by introducing regenerative water management strategies.
5. To introduce inclusive and regenerative conservation efforts into the area.
6. To allow the area to act as a space for all and as a connector in the urban fabric of the Cape Flats.

3.8 Conclusion

The contextual analysis was aimed to provide a holistic understanding of the case study of Driftsands. It considers the status quo of the area by providing an understanding of space. It began with the physical structures in the space in the form of the infrastructure, such as the MRC offices and dam wall, the informal settlements and the various formalised offices such as the Medical Research Council. The natural systems in the form of the diversity and water system were then introduced, importantly the valuable endemic Cape Dune Strandveld and the critical Kuils river and connected wetlands and flood zones. Next, the stakeholders were introduced to provide context to the people and institutions involved, namely, Cape Nature, VPUU, Eskom, the City of Cape Town and, notably, the communities living in the area, to round out the consideration of the structuring elements of the area. To understand how Driftsands arrived at its current status quo, a history of the area and its status as a reserve since 1983 was discussed. The history interestingly showed the long-standing issue of encroachment since the beginning of its reserve status, as the need for land for housing continues to conflict with mainstream conservation needs. Finally, the previous and existing management plans for the space were discussed, including the Cape Nature management plans were discussed, the human settlement project, the Biodiversity Network and the VPUU's Driftsands risk assessment. In addition, the District Plan was broken down in detail as this is the dissertation's focus. The breakdown included an analysis and critique of the plan. Lastly, the key issues and priorities for the space were outlined to guide and focus on the next chapter. The chapter intended to provide an understanding of the Driftsands Area, its current state, history, management and its potential and problems.

Chapter 4: Towards a Sub-District Plan for Driftsands

Reconciling the Needs of Nature and People

- 4.1 Introduction
- 4.2 Spatial Intentions
- 4.3 Precedents
 - 4.3.1 Multi-Use Urban Parks
 - 4.3.2 Two Rivers Urban Park
- 4.4 Interventions
 - 4.4.1 Identify and Develop Areas for Relocation: New Residential Development
 - 4.4.2 Establish a Multi-Use Urban Park
 - 4.4.3 Updating a Section of the Sub-District Plan
- 4.5 Conclusion

4.1 Introduction

It is clear from the contextual analysis that there are various conflicting goals and ideals from different groups and people, as well as environmental needs and goals involved in the Driftsands space (WCG, 2021). The draft district plan demonstrates an intersectional understanding of spatial and environmental management. However, this plan has gaps and challenges, as discussed in the previous chapter (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012; City of Cape Town, 2022). A significant issue identified was the lack of specific planning for the Driftsands area, as the sub-district 7 is still all completely classed as conserved and green space, not including informal settlements that have been on the site for years (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The planning intervention will be focused on upgrading the spatial planning guidelines for sub-district 7 (Driftsands) to acknowledge the area's nuance, namely the area's imminent de-proclamation and the need for more detailed guidelines. The chapter aims to illustrate a breakdown of the suggested intervention. The breakdown will show how it will aim to address the various issues and challenges facing the Driftsands area. The plan will suggest interventions that allow for people and nature to be protected together and in a manner that does not compromise the wellness of one for the other, linking back to convivial and decolonial conservation theories addressed in the literature review. The structure of this chapter will begin with the intentions and goals of the interventions, which will be illustrated to show the motivation behind the various interventions, namely continued conservation, improved water management and social justice. The following section will introduce precedents for the suggested interventions, including ideas around multi-use urban parks and the Two Rivers Urban Park (McManus, 2021; WCG, 2019). Next, the following section will introduce the three critical interventions for the space. The interventions will include identifying areas for relocation, establishing a multi-use urban park and updating a section of the sub-district plan. Each intervention will include a table outlining the appropriate steps to be taken around it, a map to represent it spatially, and a write-up to motivate and explain the interventions. Notably, each of the interventions will be linked to the spatial planning categories and the existing plans in the draft district plan to show the logic and motivation behind these interventions and the updates. The interventions will move away from mainstream conservation and water management towards alternative methods.

4.2 Spatial Intentions

The spatial intention of the upcoming interventions will be introduced, aligning with the previous chapters. The spatial intention will outline what upgrading the current development guidelines for the Driftsands sub-district aims to achieve spatially in the Driftsands context. The spatial intentions will draw in the literature review's three key sections: maintaining Driftsands as a Conserved and Green space, urban water management and social justice (see figure 15).



Figure 15: Visual showing the Spatial intention for the Driftsands Area (Own work; Data: Canva, 2022)

Therefore, while drawing on conservation theories from the literature review, the first intention is to maintain Driftsands' role in conservation where possible and its status as open green space in the Cape Flats context. The conservation focus will need to be balanced with other priorities, but importantly the Cape Strandveld and water systems must be considered vital for pathways to a life-affirming future. As touched on in the contextual analysis, ensuring that the larger scale ecosystems in the area is vital. The focus entails ensuring that while the ecosystems are protected, so are the needs of people; this draws on decolonial thinking of conservation where nature and people are connected and must be protected as one rather than in competition (Anderson, 2005). Notably, while the interventions may promote a coexisting of the informal settlements and green space, the value of the area as an open green space, in an island of development should aim to be maintained.

The second underpinning is social justice. It has been found often in spatial planning that informal spaces are commonly overlooked or not planned as adequately as formal spaces (Roy, 2009). The lack of planning may be attributed to a lack of data around informal spaces and the unstructured growth of the spaces, which make them very difficult to plan for as well as the higher incentive to invest planning resources into higher income spaces as these are areas where taxpayers reside (Roy, 2009). In the South African context, there is a continued gap in planning and governance regarding the informal (Blessings, 2022). While the issues around informality, which symptoms are only worsened by rapid urbanisation, are not new, they are ever persisting 28 years post-democracy (Blessings, 2022). It must also be acknowledged that in South Africa, many of the people living in these informal settlements are those who have been historically disadvantaged by the Apartheid system (Pieterse, 2006; Turok, Visagie & Scheba, 2021). The history means it is even more vital that these communities are planned for and their needs prioritised (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2012). It is essential that spatial planning helps move towards an equal society while acknowledging the oppression of the past (Pieterse, 2006; Blessings, 2022). However, in our context, where spaces like Khayelitsha have existed for decades, informal settlements must be acknowledged as permanent spaces and areas that build vibrant and functional communities and economies (Turok, Visagie & Scheba, 2021). Therefore, the second intervention promotes social upliftment and community building in the informal settlements in the area. While these settlements were largely unplanned, our role as planners is to contribute to making places inhabitable, safe, more dignified and welcoming to communities. Therefore, interventions like providing infrastructure for essential services can go a long way in contributing to making a place feel more like a community (Mangat, Zain & Jamaluddin, 2018). Notably, after the effects of COVID and the increase in the cost of living, ensuring that the more vulnerable communities like the ones that have moved into Driftsands, are protected and given access to essential services is vital (Parry & Gordon, 2021).

The last underpinning drawn from the literature review is urban water management. The literature speaks to the challenges of mainstream urban water systems. However, due to the rigid human-made system of mainstream urban water management, the field has emerged innovative methods around urban water management (Farrelly & Brown, 2011). The review's

focus considered two methods: Water Sensitive Urban Designs and Integrated Urban Water Management. Both these approaches suggest methods to implement water management systems that push urban water systems back towards natural water systems as much as possible (Fletcher et al., 2015). The methods utilised involve various approaches in different contexts, such as reducing water demand by educating businesses and people about water consumption and introducing systems like grey water or stormwater filtration (Bahri, 2012; Barton & Argue, 2007). Furthermore, the holistic approach ensures that storm and wastewater runoff are reduced and recycled where possible (Bahri, 2012; Barton & Argue, 2007). As naturally follows from this idea, the last intention is thus to improve water management in Driftsands. This is a multifocal intention: it involves protecting the wetlands where possible in the areas that are affected by encroachment, improving the water quality of the Kuils river and also, therefore, helping prevent polluted stormwater infiltration into the valuable Cape Flats Aquifer. As a planner, I can suggest locations where the above tools can be implemented and support structures that will assist in setting up these. The last aspect of this intention will be to address flooding in the informal settlements, which will involve various strategies, including addressing relocating the settlements in the space and investing in maintaining the dam wall.

4.3 Precedents

The precedents introduced will aim to serve as inspiration for the interventions in this chapter. The aim is to draw from local and global examples of alternative conservation and water management in similar contexts or situations. The precedents will include considerations around Multi-use urban parks which have been successfully implemented in New Zealand and Copenhagen (Mariano & Marino, 2018; Davis, 2021). To draw from a local example, the Two Rivers Urban Park will be discussed mainly the flood and recreational development around the Liesbeck River (Western Cape Government, 2019)

4.3.1 Promoted instead of Protected Areas – A Precedent of Multipurpose Urban Parks

The precedent of Multipurpose and multi-functional urban parks speaks to the concept of conviviality and decolonial conservation (Le, Devisch, & Trinh, 2019). The parks have become increasingly popular in the urban planning space as the field is acknowledging the need for public space to also be an area that positively contributes to water management, urban temperature and biodiversity while also contributing to public service and recreation (Le, Devisch, & Trinh, 2019). With the spread of urban areas, open green space and urban parks have become increasingly valued. However, in urban areas where land is highly valued, urban parks must have more than one purpose or use (Davis, 2021). The planning field is therefore seeing a rise in plans which include public spaces that are designed to provide support for the life and recreation of local residents while also contributing to improved air quality, improved water management, a buffer to stormwater and other valuable and sustainable functions (Le, Devisch, & Trinh, 2019). However, while the theory and idea have become more popular, it is still not the norm when implementing or designing a park. Due to the nature of this dissertation, the precedents we consider will be twofold; firstly, Cornwall Park in Auckland that has integrated urban agriculture and livestock into the recreational space and Enghavepark in Copenhagen that was implemented to address the city's urgent water challenges (Mariano & Marino, 2018).

The case study that will be considered is Cornwall Park in Tā maki-makau-rau, Auckland, New Zealand (Davis, 2021). The park was planned to have multiple functions and benefits in the

same space, including ecological, recreational, leisure and agriculture (Davis, 2021). The park includes spaces for grazing for livestock belonging to local people and spaces fit for urban agriculture while also providing space for the usual recreational functions (Davis, 2021). Having livestock in the area can also be helpful in job creation, gardening and composting. The multipurpose park introduces a holistic consideration of the space that allows for the park to address environmental needs and the needs of local people. Importantly the agriculture and livestock introduced into Cornwall park already existed in the surrounding areas and were an income to communities; therefore, the park acted as a space of expansion and upgraded existing livelihood strategies (Davis, 2021).

Multi-Use Urban Parks have also been found to be effective stormwater management methods (Le, Devisch, & Trinh, 2019). This concept has become popular in urban areas, in particular, to increase urban resilience in coastal cities, with the increase in flooding events due to climate change (Le, Devisch, & Trinh, 2019). Flood-resilient urban parks are introduced to serve two vital functions: public recreational spaces and pieces of water infrastructure (Le, Devisch, & Trinh, 2019). A prime example of this implementation is the Enghaveparken in Copenhagen, which aimed to shift flood risk mitigation towards urban regeneration strategies (Mariano & Marino, 2018). Copenhagen as a city faces challenges around flooding and water management due to its coastal location and high levels of rainfall (McManus, 2021). In response to this, the city implemented an adaption plan called the Cloudburst Management Plan, as the long-term cost of flooding vastly outweighed the cost of this project (McManus, 2021). Within this plan, the idea of floodable parks came became a focus. The parks were outlined as sustainable urban drainage systems that utilised blue-green infrastructure (McManus, 2021). Importantly these parks use Sustainable Urban Drainage Systems (SuDS) to reduce urbanisation impacts on flooding and help preserve biodiversity and water quality that consider local needs (McManus, 2021). SuDS's are low-cost and easily installable and aims to mimic natural pre-development water and drainage systems (Fletcher et al., 2015). SuDS's aim to address urban waste and stormwater management with tools such as buffers around areas and installing pipe systems made from recycled materials (Fitchett, 2017). One of the parks that was upgraded along this guideline was Enghaveparken in Copenhagen (McManus, 2021). The upgrades included lowering features such as the hockey court and rose garden to act as reservoirs during flood events (McManus, 2021). To

ensure the park as a whole could store and collect water, levees were built to encourage water from the surrounding areas to flow towards and into the park (McManus, 2021). The park gates can also act as tools to release the water slowly when necessary. In severe cases, the whole park can fill up and act as a reservoir (McManus, 2021). Other tools in this park are wetlands (constructed or natural) to help with the slow release of water and rain gardens to encourage infiltration. Overall, the park plays its usual role as a space of recreation while also being a vital tool in flood management when and where it is needed (McManus, 2021).

4.3.2 Two Rivers Urban Park

The Two Rivers urban park will be used as a precedent as this park is located in the Cape Town context and falls over a flood zone of the Liesbeck and Black rivers (Western Cape Government, 2019). The focus will be drawing inspiration from various aspects of the park, including the Riverwalk, water and flood management methods that align with WSUD principles, and the park's alignment with convivial conservation principles.

To provide context, the two rivers urban park is located in Observatory, Cape Town. The park includes recreational and green corridors along the rivers and mixed-use and residential areas on the site (Western Cape Government, 2019).

The vision for the park includes an intention to have this open structure space act as an area of recreation and a natural network (Western Cape Government, 2019). The open structure will help promote its usefulness to the community while still ensuring its functionality as a space of recreation. Another aspect of the vision that aligns with the principles of convivial conservation is the idea of making this space sacred and valued (Western Cape Government, 2019). The principle is represented in promoting the space's complexity and layers by honouring the park's memories, cultural heritage, science and diversity. Lastly, the vision sets out to encourage healing and environmental resilience (Western Cape Government, 2019).

The focus of this precedent is the green Riverwalk that has been implemented in the Two Rivers Urban Park. This aspect of the park consists of river corridors lined with non-motorised transport routes that encourage public access and recreation along the Liesbeck river (Western Cape Government, 2019). The walk connects various recreational spaces.

Importantly this route aims to act as a celebration of culture and community heritage and is aimed to change over time to adapt and include community and changing memory of space and people (Western Cape Government, 2019). The Riverwalk also promotes natural vegetation and river flow to encourage the river's natural flow and management (Western Cape Government, 2019).

4.4 Key Interventions of the Driftsands Area

This section will detail the three key interventions put forward for the Driftsands area. To reiterate, the interventions will draw from theories from the literature review and aim to protect Driftsands as an ecosystem while aiming to integrate people into this process.

4.4.1 Identify and Develop Areas for Relocation for Settlements in the Flood Zone

Challenges:

- The long-standing issue of settlers in the flood zone
- High risk to lives of the community
- VPUU report found there was little incentive for dwellers to move due to lacking infrastructure and services at other sites (VPUU, 2022)
- Limited resources of residents poses a challenge as it is costly to move (VPUU, 2022)
- Damage, mainly in the form of pollution to the Kuils river, removed vegetation and degraded Wetlands.
- Damage to the environment → aim to develop housing in areas that are of low environmental value.
- Much of the site has wetlands → wet areas unsuitable for development, and valuable wetland should be conserved.
- Dune systems on the site → challenging to build on due to the incline
- Accessibility to services is needed for the new areas.

SPC considerations

- Conservation or public open spaces are appropriate land uses in flood-prone areas
- Avoid urban development in 1:50 year flood zone
- Informal settlements should be directed away from flood risk areas below 1:100 year flood line
- Activities in core biodiversity areas must be conservation related and consider the conservation management plan

Alignment with the Draft Sub-District Plan (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022)

- existing draft sub-district plan suggests infill (mixed-use and residential) in the area
- Limited information on the areas suited to relocation
- The draft plan proposes the relocation of dwellers in the flood zone and on the dam wall

Proposed Intervention

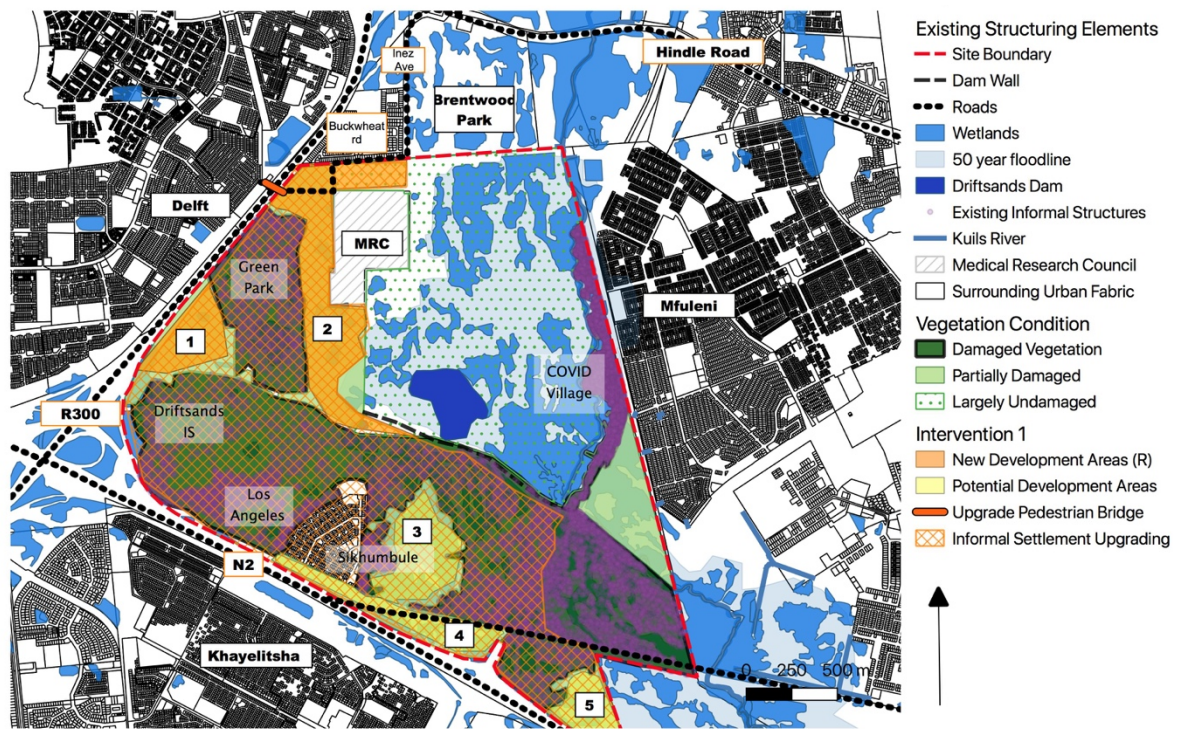


Figure 16: Map showing the spatialisation of Intervention 1 (Source: Own Work; Data source: City of Cape Town, 2022; WCG, 2021; Conservation Expert Interview, 2022)

Table 2: Intervention 1: Identify and Develop Areas for Relocation

Actions	Details	Spatial Intention
Identify new development areas (residential)	<ul style="list-style-type: none"> • Identify areas 1 and 2 as alternative housing areas for communities at risk • Prioritise infill development of housing within the existing informal and formal settlements 	<ul style="list-style-type: none"> • Community Building and Social Justice • Driftsands as a conserved and green space
Develop emergency housing in the new areas combined with informal settlement upgrades	<ul style="list-style-type: none"> • This is the Department of Humans Settlements Mandate • These housing units are needed urgently to ensure the safety of communities → development of emergency housing and informal settlement upgrade is essential 	<ul style="list-style-type: none"> • Community Building and Social Justice
Produce an EIA for the areas	<ul style="list-style-type: none"> • Due to the lack of recent environmental data for the space and Environmental Impact Assessment should be done for the new areas to ensure they are not significant harming natural systems 	<ul style="list-style-type: none"> • Driftsands as a conserved and green space
Set up mobile services	<ul style="list-style-type: none"> • This will be a temporary provision to incentive communities to new development areas • Mobile services → temporary basic services • Aspects such as electricity, water and sanitation are the priority 	<ul style="list-style-type: none"> • Community Building and Social Justice

<p>Improve access to basic services for these settlements (Connect them to surrounding or existing infrastructure)</p>	<ul style="list-style-type: none"> • Improve access to basic services for new infill developments and the existing residents (water, electricity, shelter) • Important to provide services to facilitate to incentives the move • Potential to implement mobile or periodic services while the bridge is being upgraded • Priority to upgrade pedestrian bridge over R300 → to provide access for communities in the West of the Site to Delft and the services there 	<ul style="list-style-type: none"> • Community Building and Social Justice
<p>Encourage sustainable practises or upgrades where possible (WSUD)</p>	<ul style="list-style-type: none"> • Introduce solar water heaters in new developments • Encourage the use rainwater tanks • Reduce the number of impermeable surfaces in new developments to encourage infiltration • Urban Water harvesting • Implement SuDS in the new settlements • Promote increased setbacks to allow for filtration • Green-roofing on new developments should be encouraged 	<ul style="list-style-type: none"> • Improved Water management • Driftsands as a conserved and green space

As seen in figure 16 above, a significant number of settlements are located in the flood zone. The risk assessment done by the western cape government showed that this area poses a significant danger to people's lives during flooding events, with the most risk to the settlements in the 1 in 50-year flood zone and on the dam wall (WCG, 2021). As indicated in grey in figure 16, the settlements are all marked for relocation as they fall within the 1:50-year flood line. While this number has most likely increased, in 2021 there were approximately 3421 structures in danger (WCG, 2021) Ensuring that people are not at risk is a priority, as high levels of rainfall are predicted to result in catastrophic flooding that could lead to loss of life. Even in instances of slightly higher rainfall, many of the houses found in the flood zone have experienced low-level flooding in the winter months (Eyewitness News, 202; WCG, 2021). The flooding left residents in shallow water for weeks, which caused significant damage to their houses and was a health and safety risk to the residents (WCG, 2021). Due to the challenges that the community faces and the history of South Africa in terms of conservation and local residents, the relocation must be transparently negotiated with the community members (Kepe & Mollett, 2018). Relocating settlements outside of the flood zone will also significantly reduce pollution in the Kuils river system. The relocation will, therefore, also promote the protection of the water systems in the space.

The relocation of dwellers out of the flood zone raises the issue for planners of where the settlers can feasibly be resettled. However, it is crucial when establishing that the settlements must be moved to identify critical areas that are appropriate for relocation; therefore, this intervention will spatialise the recommended areas for these developments. The appropriateness of the areas includes considering safety from flooding events, limited impact on natural systems and access to services like water, electricity, housing, schools, medical care and more. Importantly these developments will be situated in areas that are of as low of environmental significance as possible to prevent further damage to the area, namely avoiding development in areas of ecosystem significance, importantly avoiding wetlands, the flood zone and well-maintained vegetation. See figure 16 for the suggested relocation areas that will provide access to surrounding established and informal communities and promote a more integrated urban fabric in the space.

Importantly various locations have been identified for relocation of the dwellers at risk. Therefore, all the areas 1-5 will be discussed, and then the recommendations for which areas are appropriate for resettlement will be put forward.

Area 1, as indicated in figure 16, is optimal as it will serve to connect the two existing settlements of Driftsands Informal Settlement and Green park informal settlement. Area 1 is also located directly across from the settlement of Delft which is home to various services, including the delft hospital, various schools and shopping facilities (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). While the R300 forms a barrier, there is a pedestrian bridge over the R300 off Hindle road that can provide access to Delft for the Area 1, Green Park and Driftsands Informal settlement (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). At Cape Nature's assessment, the site does not have any key critical natural assets that must be protected. The site is somewhat degraded from movement between informal settlements and a small number of settlements already established in the space (Conservation Expert Interview, 2022; Cape Nature Site Visit, 2022). However, there are some challenges with this site. Firstly, there is one wetland in the site that must be protected by a 35m buffer, as is necessary for all wetlands (as can be seen in figure 16). Another challenge is that the site is primarily made up of dunes making the terrain difficult to build on (Conservation Expert Interview, 2022; Cape Nature Site Visit, 2022; WCG, 2021). However, there are two possible solutions to this; namely, many settlements and structures are already built on this uneven terrain; therefore, it is possible to achieve. Secondly, the department of human settlements has suggested and considered levelling the terrain to allow for a housing development to be implemented (Conservation Expert Interview, 2022; Cape Nature Site Visit, 2022; WCG, 2021).

Area 2 is located close to the Medical Research Council. The area neighbours Brentwood Park also provides access to services; while it provides access, there are fewer facilities than Delft as the area is smaller and less populated. Nevertheless, this area will also have access to services from Delft through the pedestrian bridge. However, there are some significant challenges with this space. As can be seen in figure 16, Area 2 falls over various wetlands. The impact on the wetlands will be significant; however, it does not all within the flood plain. Settlements in this space would require some adaptations to ensure that residents are not

building or living in a wetland and experiencing the same health issues they were relocated to avoid. Notably, ensuring that the wetlands are protected by 35m is vital. As with Area 1, this space has limited other environmental impacts in terms of biodiversity, as it has already been primarily degraded by people moving and travelling through it (Conservation Expert Interview, 2022; Cape Nature Site Visit, 2022; WCG, 2021). Another challenge in this space is the terrain, as the area also has various dunes. However, as with area 1, there are solutions to the issue of dunes in building as has been and developments for human settlement.

Area 3 is in the south of the site, located to the east of Sikhumbule. The area again could act as a connector for the urban fabric linking the existing informal settlement of Sikhumbule and the south section of COVID Village. Sikhumbule could also provide services to the new development area. The issue or challenge that faces this space is that the whole area is a wetland. The wetlands will be an issue for the settlers moving into the space and naturally degrade their state. The area could be infilled with sand or other material by the department of human settlement to make it habitable; however, this will completely destroy the wetland and is not recommended.

Area 4 is similar to area 3. The site is located next to the N2 and below Sikhumbule. The area could act as a connector between Sikhumbule and the south section of the COVID Village settlement. Sikhumbule could link and provide services to the new development area. However, the key challenge with area 3 is that it also has a significant number of wetlands, as seen in figure 16. Another issue with this space is its proximity to the N2. The main national road will provide much noise and air pollution very close to the settlement, decreasing the quality of the living condition for the space.

Lastly, area 5 is located in the very South-East of the site. The site faces challenges as it does not connect to any existing settlements and, therefore, will struggle to receive access to services. Another challenge with this space is that it falls over wetlands but is few compared to other sites. Area 5 faces a similar issue to site 4 in terms of its proximity to the N2, making it a less desirable area to live in.

Therefore, the recommendation is to focus on developing areas one and two for resettlement and upgrading and promoting infill in the other existing settled spaces. While dunes are a challenge in this space, they are the areas with the best realistic access to services and the most negligible impact on the valuable wetlands and ecosystems. The vision of these new residential spaces will be essential to provide land and housing to the settlers who were located in the flood zone. The new residential developments will importantly aim to impact the environment as little as possible. Limiting residential development will allow for ecosystem protection, which is why only two of the five considered sites were put forward. It is vital that an environmental impact assessment or truth grounding is done for the area of development to ensure that there are guidelines set out around protecting any environmental assets in the space, such as wetlands.

Notably, the planning guidelines for these new development areas will set out recommendations to integrate sustainable urban water practises that align with Water Sensitive Urban Design principles, such as promoting sustainable water consumption through education, grey water systems and encouraging development with permeable surfaces to increase infiltration. Importantly any wetlands in the development areas should, as is for the rest of the site, have a 35m buffer protecting them to ensure the protection of the wetland and avoid settlers moving into wet or unsuitable land.

The locations of the new developments will also lend themselves to acting as connectors in the urban fabric. Importantly, this proximity to existing settlements will aim to help provide access to services to the new development. The upgrading of the pedestrian bridge that is put forward in this intervention will hope to improve non-motorised access to Delft and, therefore services in this area. Overall, the new development areas will primarily aim to ensure the safety of the people currently living in the flood zone and help conserve the valuable wetlands and Kuils river system.

4. 4.2 Develop the Kuils River Flood Zone into an Urban Park

Challenges:

- Ensuring the area is not immediately reoccupied (WCG, 2021)
- The area, particularly the river, has been degraded (WCG, 2021Cape Nature Site Visit, 2022)
- There are currently still settlements in this area (addressed by intervention 1)

SPC considerations (Open Structured Space & Water Bodies)

- Conservation or public open spaces are appropriate land uses in flood prone areas
- Establish the feasibility of green infrastructure and ecological function of the open space
- Agriculture can occur in flood prone areas but must go through an EIA process
- Sports fields, golf course or picnic areas in 1:50 flood zone must have floor levels above the flood line
- Areas around water bodies can be useful as parts of the cities non-motorised transport routes → allow for people and nature to reconnection and improve health and wellbeing
- Landscaping must be approved by the City of Cape Town and indigenous riverine plants and vegetation are highly encouraged
- Infiltration capacity of water bodies should be encouraged by WSUD and SuDS like permeable paving, sustainable water storage system and landscaping
- Encourage stormwater quality and quantity management

Alignment with the existing Draft Sub-District Plan:

- The existing plan suggests an urban park within the nature reserve
- However, the site for the urban park has not been indicated
- This will include administrative offices, visitor centres, education facilities and conservation areas that play an educational role, which form a key part of the conservation space

- The park would be introduced as having a key recreational role in the space.

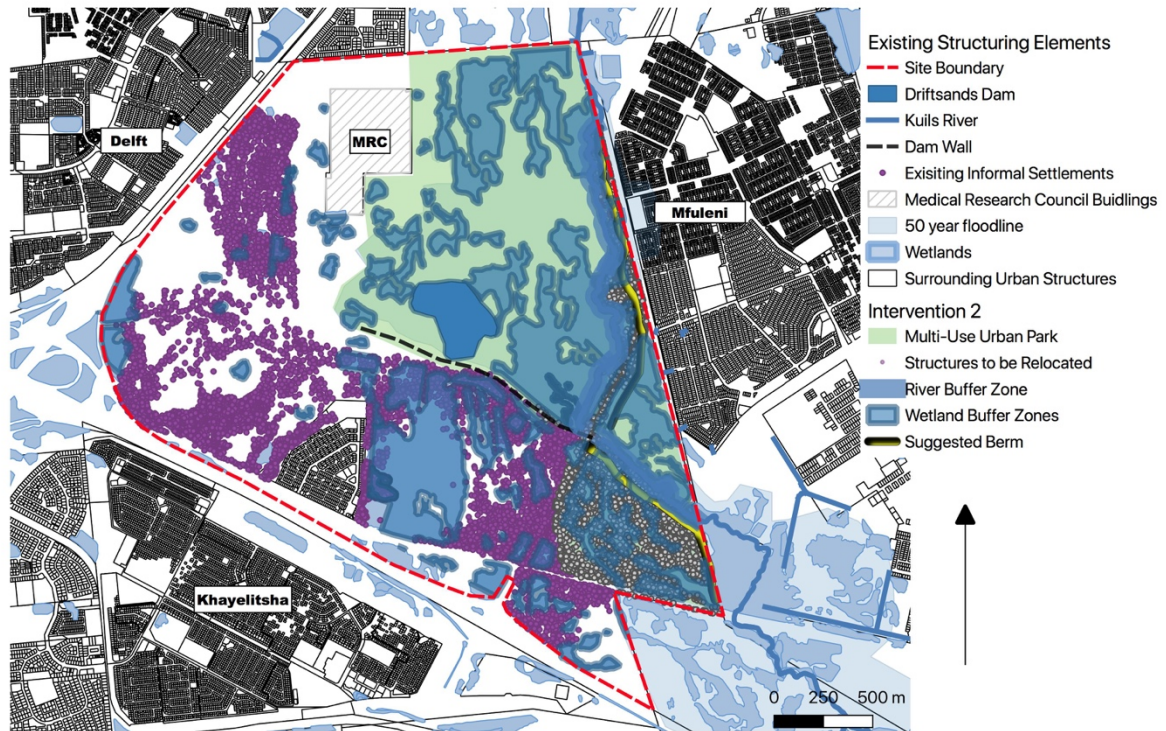


Figure 17: Map showing the spatialisation of Intervention 2 (Source: Own Work; Data: City of Cape Town Open Portal, 2022; Cape Nature, 2022)

Table 3: Intervention 2: Develop the Kuils River Flood Zone into a Multi-Use Urban Park

Actions	Details	Spatial Intention
Establish the Kuils River Flood zone as an urban park & biodiversity garden	<ul style="list-style-type: none"> • Urban park should be collaboratively planned to ensure that the needs of the community are included in the design of the public area • The priority is the protection and maintenance of natural and existing vegetation and biodiversity • Encourage infrastructure development at the periphery that serve the communities (e.g., schools, hospitals) • Introduce footpaths to encourage connectivity of the space and various settlements → paths along the river for recreation • Ensure the area can be used for recreation → encourage visibility from surrounding developments and good lighting to promote safety) 	<ul style="list-style-type: none"> • Community Building and Social Justice • Driftsands as a conserved and green space
Water Sensitive Adaptions to the Urban Park	<ul style="list-style-type: none"> • Enforce a 35m buffer zone around the Kuils river and wetlands → no development can occur in the area • Rehabilitate the riparian vegetation on the riverbanks • Consider the introduction of infrastructure in the 	<ul style="list-style-type: none"> • Improving Water Management • Driftsands as a conserved and green space

	<p>park that makes it a flood-managing park namely a tiered basin system to prevent flooding (WSUD & IUWM)</p>	
Multi-Use Considerations for the Park	<ul style="list-style-type: none"> • Ensure the park is a multi-functional space by encouraging urban agriculture • Consider the space as an initiation site • Ensure there is a public participation process in designing the park 	<ul style="list-style-type: none"> • Driftsands as a conserved and green space • Community Building and Social Justice
River and Wetland Rehabilitation	<ul style="list-style-type: none"> • 35m buffer around river and wetlands • Replant natural riparian vegetation • Rehabilitate wetlands to act as natural filters • Reduce pollution and clean up river 	<ul style="list-style-type: none"> • Driftsands as a conserved and green space • Improving Water Management
Raise the natural dune and create a barrier on the boarder of the park (NB on the East of the river) (see figure 3) (WSUD Tool)	<ul style="list-style-type: none"> • The physical barrier will avoid encroachment of further settlements • The berms will also act as part of the infrastructure that makes the urban park a flood management tool • Waste material and sand from around the site can be utilised to create the berms 	<ul style="list-style-type: none"> • Conserving Driftsands • Improving Water Management
Suggest the development of a river walk along the Kuils river	<ul style="list-style-type: none"> • Promote this as a NMT route • Encourage recreational activities along the walk • Promote this as a space to honour and protect community memories and heritage through educational walks, art installations or any 	<ul style="list-style-type: none"> • Improving Water Management • Driftsands as a conserved and green space • Community Building and Social Justice

	<p>other community promoted initiatives</p> <ul style="list-style-type: none">• Enforce the 35m buffer around the river → rehabilitate the riverain vegetation in this space and encourage the natural flow of the river	
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The intervention focuses on establishing the flood zone as a multi-use urban park. The park will aim to protect the natural systems where possible and the integration of nature and people. The green and natural spaces around Cape Town have historical and continued cultural and spiritual significance to communities. The aim of suggesting an urban park is that as a planner, I can provide a framework and guide for the area for the urban park but that the design and development of the park are planned from the bottom up for the surrounding community. Therefore, as touched on in the table, the design for the park will be collaboratively planned to ensure the needs of the surrounding community members are respected and included. To protect the ecosystems in the area the natural vegetation will be protected and rehabilitated where possible to ensure Driftsands stays a site of Cape Flats Strandveld.

It is essential that the urban park plays a recreational role but also serves various other functions. By suggesting this urban park covers the 1:50 year flood zone, the park can act as a recreational space and help protect the water quality in the area and as a barrier to prevent further resettlement of the flood risk area. As was the case with the precedents discussed from Copenhagen, an adaption for these flood-management urban parks, berms can be introduced to guide the water into the area and ensure that it acts as a reservoir during flooding. In addition, the berms and similar infrastructure can act as physical barriers to prevent the resettlement of the flood zone once communities at risk have been settled. The public participation process of the park designs should include discussions around flood adaptations and promote designs with fewer impermeable surfaces to allow for infiltration along WSUD principles. Ensuring the urban park is a multi-use park that focuses on improved water management also has the benefit of helping protect the valuable Kuils river, the wetlands, the Cape Flats Aquifer and general water quality in the space. Notably, flood protection will include ensuring the wetlands are protected by a 35m buffer in which no development can occur. To protect the water systems in the space, a river clean-up project should be implemented, and pollution should be removed and reduced where possible. Natural riparian vegetation should be protected and replanted where necessary. Importantly, wetlands should be rehabilitated to act as natural filtration systems to the river, which speaks again to IUWM principles.

Another benefit of introducing a multi-use park draws from the second intention, where the park acts as a green space that conserves the natural vegetation in the area but is also a space of functionality, namely urban agriculture and livestock holding. The concept also ties in nicely with the intervention in the draft sub-district plan that aims to protect, and conserve threatened vegetation, as the reports from Cape Nature identify the flood zone as the least impacted and most feasible to protect (WCG,2021). Therefore, the urban park will promote Driftsands as a green and open space and protect the valuable ecosystems in the space. Ensuring this green space is maintained as the conservation and protective nature of the Driftsands area that has historically encapsulated. However, it importantly also ensures this conservation happens with people as part of a space. Making the urban park a functional and productive space will encourage care and investment from locals into the area, as the space is valuable. In an area like the Cape Flats, with land being such a limited resource, ensuring that it is utilised in as many ways as possible is essential.

The vision is for this park to revitalise and rejuvenate the area as a sacred and valued space by the surrounding communities. The urban park will cover the flood zone, ensuring that the activities taken in this space are respectful and non-harmful to natural systems. The river walk combined with the 35m buffer around the Kuils river will ensure that the river is protected and rehabilitated to its natural state, tying back in with IUWM's practises of ensuring the natural water systems are maintained where possible. The Riverwalk that is proposed along the Kuils river will form a part of a more extensive network of footpaths to encourage non-motorised connectivity of the space and various settlements and serve recreational uses simultaneously. The Riverwalk can also speak to Cape Nature's and the Biodiversity Networks intention to expand the green space/site that is Driftsands (Bux, Anderson & O'Farrell, 2021; Saul et al., 2015). I recommend the river walk is extended past the borders of the site if possible therefore connecting the green spaces of Driftsands, Brentwood Park and Macassar Nature Reserve Nature Reserve. Not only will this link the fragmented green space in the Cape Flats but will improve and extend non-motorised transport routes and the protection of the Kuils river on a larger scale which speaks to ideas around IUWM. The collaborative planning and design will allow for the river walk to include spiritual and cultural adaptations and spaces that will contribute to making the site a sacred and valued space. To set up the space as appropriate for an open public space, visibility will

be encouraged from surrounding developments and good lighting to promote safety. The safety considerations will allow communities to use this space to reconnect with nature and decolonise the way green spaces can be conserved. The aim is to ensure that communities have significant control and effect on what happens with this land, meaning the detailed design will be set out by the communities in collaboration with bodies like the City of Cape Town department of recreation, Cape Nature and VPUU. This process will be expanded upon in the implementation section.

The hope is that this park will act as a collaborative and multi-use space that serves the community. By promoting this space to the community for practices, they deem necessary, like recreation, urban agricultural, cultural and religious practises, the main goal is to reimagine this space as a valued and sacred space that aligns with convivial conservation. In the collaborative design, ideas around implementing urban farming and using the site for grazing will be put forward. However, it is important that the communities are the ones that determine what uses they deem as necessary to them, and this is what will be included in the space. This will allow community members to be central to the design and therefore encourage communities to value the space. If the space is important and valued by the communities, this will promote the idea of a sacred space but also discourage encroachment.

4.4.3 Intervention 3: Updating the Sub-district Plan for Driftsands

The last intervention considers updating the sub-district plan for Driftsands. The plan has been broken down and considered in the previous chapter. This intervention will link in the previous interventions showing how they all together move wards a more appropriate plan for the current context of Driftsands than the existing one. Therefore, to show the changes and upgrade, the current SPC for the Driftsands site will be outlined. Next, the suggested updates and motivations behind these will be introduced.

4.4.3.1 Current Spatial Planning Categories

The spatial planning categories (SPC) that have been utilised in the existing district plan will be utilised for the planning intervention for this dissertation to show how this suggested layer of a sub-district plan for Driftsands could be plugged into the existing District plan draft. The spatial planning categories used by the district plan also align with the SPC used for the MSDF in the bioregional planning framework and within the broader SPC for the city (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). The spatial planning categories are introduced to illustrate the land use suitability of the city's environmental, cultural and urban landscapes for development.

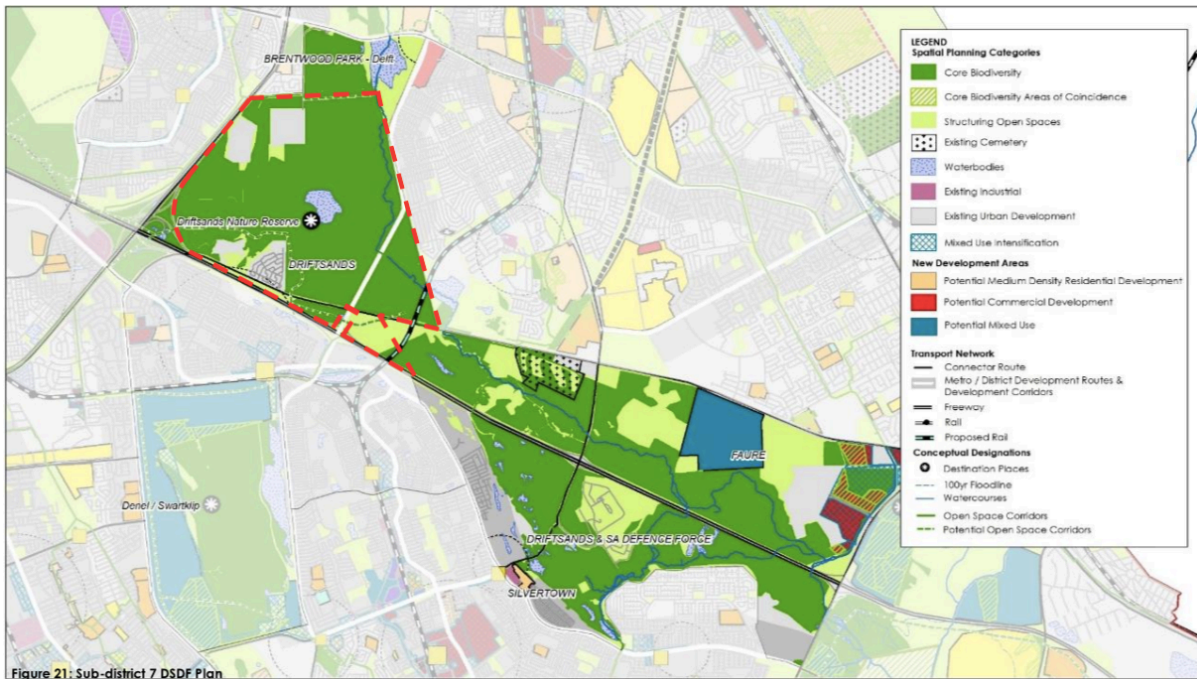


Figure 21: Sub-district 7 DSDP Plan

 CITY OF CAPE TOWN ISIXENSO SASAKAPA STAD KAAPSTAD	SPATIAL PLANNING & ENVIRONMENT Spatial Planning & Design Urban Planning & Mechanisms <small>Provisional: This plan is a preliminary proposal for the integrated development of the area of the Driftsands area. The final plan will be subject to a public consultation process and the final plan will be subject to the approval of the Council of the City of Cape Town.</small>	SUB-DISTRICT : 7 Driftsands	 <small>National Institute for Spatial Information Central Office: 121 East Mitchell Road, Durban 4001</small>	District Spatial Development Framework KHAYELITSHA / MITCHELLS PLAIN / GREATER BLUE DOWNS Date : AUGUST 2021
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Figure 18: Map showing the Area of Study within the Sub-District Plan (adapted to include the site outline) (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022)

As can be seen in figure 18 the Driftsands area is largely categorised as core biodiversity area with some spaces of structuring open space and water bodies. The Spatial Planning Categories will be expanded upon to show the context and guidelines set out by the City of Cape Town for this area.

Table 4: Current Spatial Planning Categories (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022)

SPC	Guideline and Management priorities
Core Biodiversity Area (show up on the SDF and Sub-district maps)	<ol style="list-style-type: none"> 1. CBAs are already protected as part of the TMNP 2. Activities in these spaces must be conservation related and consider the conservation management plan 3. Any proposed development → need new land use rights, which should be guided by this district plan and consider risks such as flood risk
Structuring Open Space	<ol style="list-style-type: none"> 1. Developments surrounding and bordering the open space should encourage movement and activity towards the open space; ensuring that bordering developments do not cut off the open space (e.g. high walls) 2. Encourage high to medium density development along open space borders to promote passive surveillance 3. Promote upgrades in open spaces that encourage safety and security 4. In feasible areas, promote commercial developments that are appropriate for this space and will encourage activity 5. Where feasible introduce low impact sustainable use of open space (e.g. urban agriculture) 6. Consider the implication of development on social and cultural uses of the space 7. Establish the feasibility of green infrastructure and ecological function of the open space 8. Ensure the context is being consider when introducing new projects 9. Promote urban cooling through greening of the space (tree planting, vegetation) 10. Optimise connectivity by encouraging pedestrian networks in open spaces

Water Bodies and Flood
Prone Areas

1. Conservation and public open space are appropriate land uses in flood prone areas
2. These areas can be useful as parts of the cities non-motorised transport routes → allow for people and nature to reconnection and improve health and wellbeing
3. Avoid hard fencing or structural barriers → promote access
4. Avoid urban development within 1:50 year flood zone
5. Limit building setback in flood prone areas to encourage infiltration where possible
6. Agriculture can occur in flood prone areas but must go through an EIA process and ensure that it does not co
7. Sports fields, golf course or picnic areas in 1:50 flood zone must have floor levels above the flood line
8. Landscaping must be approved by the City of Cape Town and indigenous riverine plants and vegetation are highly encouraged
9. Fencing must be visually permeable and should not have a negative impact on the water flow or movement as well as not disrupting aquatic wildlife or birds
10. Informal settlements/dweller should be directed away from flood risk areas below a 1:100 flood line
11. Infiltration capacity of water bodies should be encouraged by WSUD and SuDS like permeable paving, sustainable water storage system and landscaping
12. Encourage stormwater quality and quantity management
13. New developments overlooking the river should be orientated towards the river and WSUD should be included where possible

4.4.3.2 Suggested Updates to the Spatial Planning Categories for Driftsands

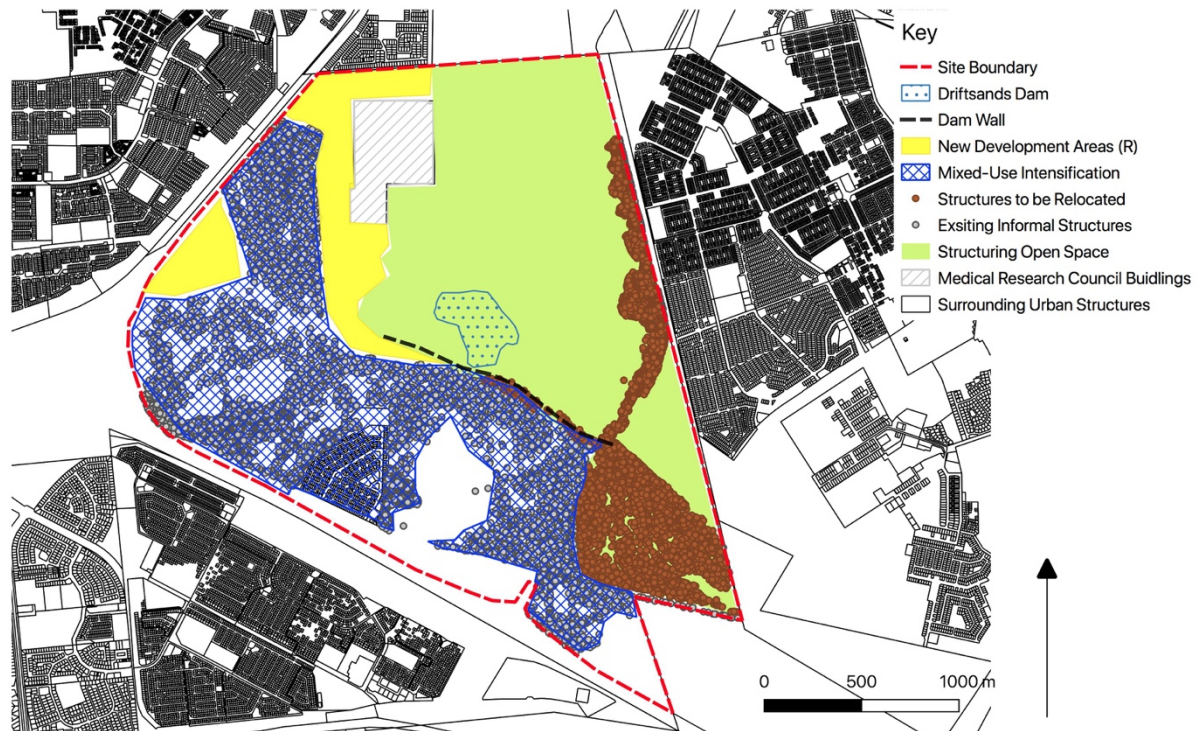


Figure 19: Map showing the suggested Spatial Planning Categories for the Driftsands Site (Intervention 3) (Own work)

Understandably, these SPC cannot be changed until the status of the Driftsands as a nature reserve is officially lost. However, while the categories are important, the reality of what is occurring on the site must be reflected by the district plan; the plan needs to reflect structures and settlements even if they are in core biodiversity areas. In addition, this planning intervention will begin by suggesting an SPC for the likelihood of Driftsands losing its nature reserve status imminently. The reconceptualised will bring forward considerations around how this area can still be protected in a manner that also considers a large number of settlers currently in the space. Importantly the aim is to ensure Driftsands' role as a conservation and open space within the greater Cape Flats area is not lost. As seen in figure 19, the suggestion is to classify the Kuils river flood zone as a structuring open space to allow for the area to still be a green and open space but move away from the strict protected and separated area. The west of the site will be a combination of mixed-use and residential upgrades and new residential developments to accommodate the move of the settlements out of the flood plain (urban park), as can be seen as represented as brown dots in figure 19.

The vision for this intervention is that the district plan addresses the current context of Driftsands. The existing draft sub-district plan suggests developments or interventions for the Driftsands area. The interventions are well thought out; however, they often lack spatialisation within the Driftsands context. Therefore, the suggested interventions will aim to upgrade and, importantly, spatialise the interventions for the Driftsands area. As iterated in previous sections, despite the longstanding encroachment of informal settlements, these settlements are not reflected in the District Plan for the area. Therefore, this intervention aims to integrate the two other interventions, namely the new residential developments and the multi-use urban park, into this plan, integrating ideas around improved water management and new conservation for the site. The focus of intervention three is to ensure an accurate spatial representation of structures, natural systems and settlements in Driftsands and spatially reflect the plans and interventions put forward to address the various challenges the space faces.

4.5 Conclusion

The interventions chapter outlined the three critical interventions for the Driftsands space. The chapter was initially framed with the site's spatial intentions, namely maintaining this space as an area of conservation, improving water management in the space and promoting community building. The following section introduces the two key precedents to guide and frame the interventions. Firstly, the multi-use park in Copenhagen and New Zealand that serve as recreation spaces and improved water and flood management to allow for adaptations in times of significant rainfall and integrates herding and urban farming respectively. Secondly, the Two Rivers Urban Park in Cape Town, introduces a local example and draws inspiration around the vision for the park and the river walk that links back to the theory of convivial conservation. These precedents led directly to the three critical interventions for the site.

The first intervention focuses on identifying spaces for the relocation of settlers out of the flood zone. As a planner, the intervention is to identify the appropriate area for relocation and some guidelines for these new developments. The intervention identifies two critical areas in the west of the site that have the most negligible impact on the wetlands and natural systems and has sufficient proximity to neighbouring settlements for access to services and improved connectivity of the urban fabric.

The second intervention draws heavily from the precedents. It aims to establish a multi-use urban park over the 1:50-year flood zone to protect the wetlands and river and avoid having residents living and at risk in this space. This park aims to be a space of recreation and conservation, drawing on ideas of convivial conservation to promote this area instead of a protected area utilising tools such as implementing a river walk and creating buffers around the water systems in the space. The park will be ultimately designed in collaboration with the communities to ensure their needs and wants are protected and represented in the space. At the same time, ensuring the natural systems are protected.

The last intervention is the update of the sub-district plan; this brings together the first two interventions and ultimately argues for the need for appropriate, spatial and relevant plans

to be made for Driftsands. While the draft district plan does consider aspects like the encroachment in the write-up, there is no spatial representation of any settlements, even older informal settlements in the site, making specific spatial planning like the relocation of settlers a significant challenge. Overall, the interventions aim to contribute to making a promoted are that considers people and nature together.

Chapter 5: Implementation

5.1 Introduction

5.2 Phasing of Interventions

5.3 Responsible Parties and Funding

5.3.1 Identify and Develop Areas for Relocation

5.3.2 Multi-Use Urban Park

5.3.3 Update Section of the Sub-District Plan for Driftsands

5.4 Consideration to promote Successful Implementation

5.4.1 Public Participation

5.4.2 Institutional Cooperation and Collaboration

5.4.3 Establish Partnerships

5.4.4 Monitoring and Evaluation

5.5 Conclusion

5.1 Introduction

The implementation chapter serves as a direct continuation of the intervention chapter above. For the update of the sub-district plan for Driftsands, the plan needs to be applied in practice to achieve what has been set out as its goals. Namely, this links to the overarching theme of reconceptualising conservation. Therefore, this implementation's approach will focus on three key aspects. Firstly, the phasing of the various interventions to show the order in which they need to be implemented to be effective. The phasing will illustrate each intervention's urgency and the timeline for when these can feasibly be implemented. Finally, the phasing will include how the interventions will be prioritised in relation to each other.

After the phasing, each intervention will be discussed individually regarding funding and involved actors. The first consideration will be the discussion around who should be involved in each intervention and who should lead or drive the intervention. The distribution of responsibility will also aim to illustrate various parties are involved and hold some degree of responsibility and, importantly, illustrate the spaces where certain actors must take a more significant portion of the effort and responsibility. The options around funding for each intervention will be discussed for each intervention as well. The last section will be concerned with setting out the four critical factors recommended to achieve successful implementation: public participation, institutional cooperation, establishing partnerships and monitoring and evaluation.

On the whole, this chapter aims to clearly outline the breakdown of the various interventions, people and institutions involved. Altogether, the chapter should paint a clear picture of the proposed interventions, how they can realistically be introduced into the area, a timeline for each and who holds the key responsibility for the various interventions. The hope is that this implementation chapter sets out a practical guideline for implementation to ensure the sub-district plan has the most support in achieving the goals it has set out.

5.2. Phasing of Interventions

This section aims to clearly outline the timeline for the three critical interventions. Firstly, identifying areas more suitable for settlement out of harm's way. Secondly, the introduction of a multi-use urban park in the flood zone and, lastly, the update of the sub-district plan for Driftsands. Each intervention will be discussed, and the timeline and phasing for the various sections of this intervention will be introduced to show clearly the long-term and short-term steps that need to be taken to implement the interventions below. See the table below for the proposed timeline of interventions for the Driftsands Area and how they will be prioritised.

Table 5: Gantt table showing the Phasing of the Interventions

Proposed Interventions Actions	Implementation Time in Years									
	1	2	3	4	5	6	7	8	9	10
Identify and develop new residential areas										
Identify new development areas (residential)	■									
Produce an EIA/ground truthing for the areas	■									
Set up mobile services (temporary)	■	■								
Connect new areas to surrounding Infrastructure and utilities → service provision		■	■	■	■	■	■	■		
Develop emergency housing in the new areas combined with informal settlement upgrades	■	■	■	■	■	■				
Encourage sustainable water practises in new developments (WSUD)	■	■	■	■	■	■				
Establish a Multi-use urban park										
Public participation park design process	■	■								
Wetland and River Rehabilitation		■	■	■	■	■	■	■	■	■
Flood adaptations (dune barriers)		■								
Set-up River Walk		■	■	■						
Update the sub-district plan		■	■	■	■	■	■	■	■	■
Integrate the update of the sub-district plan into the District plan		■								
Conduct consistent monitoring and evaluation of the plan		■	■	■						

The update of the sub-district plan must be the first step, as this plan includes the other two interventions and sets out the vision for Driftsands as a convivially conserved and well-water-managed space. The current district plan that has been considered in this dissertation is the draft version that is due to be finalised this year (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Therefore, the update of this section of the sub-district plan can be submitted to be included in the final version of this plan. While the district plans for the City of Cape Town are usually only renewed every ten years due to the environment's ever-changing nature and urban fabric, I recommend that the plan be evaluated and monitored every three years. Regular monitoring and evaluation will allow the plan to be adjusted accordingly to ensure the plan aligns with what is occurring on the ground.

Due to the imminent threat to the life of residents living in the flood zone, the first phase and, therefore, the top priority of the various interventions is identifying and developing alternative areas for settlements for these communities to ensure relocation can occur quickly and efficiently (WCG, 2021). As a planner, my concern is focused on identifying appropriate land for relocation. As discussed in the interventions chapter, the key considerations around the new development areas were focused on finding spaces that make the most negligible environmental impact on wetlands and ecosystems in particular and considering the access to services and location of the new settlements to incentivise the move for the residents. Therefore, while the new areas have been identified, mobile services should be set up to ensure the areas are desirable to move to. While the areas for relocation have been identified, the recommendation is to work in collaboration with Cape Nature and an Environmental Assessment Practitioner to do a detailed environmental assessment and ground truthing of the two sites to confirm what measures need to be taken to protect any natural assets in the development areas. The assessment is necessary due to this site's limited recent environmental data and its status as a protected area. Importantly the Department of Human Settlements is responsible for developing and introducing emergency housing and informal settlement upgrades for this space to ensure that the at-risk residential areas have shelter to move to (Western Cape Government: DHS, 2022). The residential development will be a longer-term project, as seen in the table above. From a planning standpoint, my concern is not to facilitate the relocation of people. As a planner, my priority is ensuring the new development areas are safer and more appropriate in terms of access to

service and location, not in flood zone/wetlands. Facilitating this will help and assist in motivating settlers to relocate, meaning the relocation will follow the steps above, namely the EIA, the mobile services and the identification of the new areas.

Once the settlers have been relocated, the priority will be ensuring that the area set out for the urban park is not encroached on. Therefore, the timeline for resettlement and the building of the urban park will follow each other closely and should be an accelerated project. As the human settlements project showed, it is vital to facilitate the developments quickly; otherwise, people at risk will be forced to make an alternative plan and further encroachment may occur (Cooper, 2006). The park's development's public participation process will start immediately and will occur while the new residential areas are assessed and approved. Once the settlers are moved off of the dam wall, it will be the City of Cape Town's Stormwater Management Service mandate to upgrade the wall to ensure the safety of communities downriver like Mfuleni (WGC, 2022). It will contribute to improving water management in the space. To discourage resettlement of the area and also to start the process of constructing a flood-protective park, the construction of the berms will be the priority. It is, however, imperative that this process of designing the park is firstly collaborative and secondly for the interventions to occur at an accelerated pace to ensure that the encroachment issue is not reoccur. A crucial part of the development of the urban park will be the river walk, which will promote connectivity of the space and improve access; this will be introduced with the river and wetland clean-up process to ensure the river walk is a desirable space for recreation. The buffers for the rivers and wetlands will be set up as guidelines linked to the district plan and enforced with the river clean-up and river walk development as the park is developed and designed.

5.3 Responsible Parties and Funding

This section will consider the three interventions, namely the new residential developments, the introduction of an urban park and the updating of a subdistrict plan. Each intervention will be discussed regarding the departments and parties involved in the relevant intervention and some funding opportunities.

5.3.1 Identify and Develop New Residential Areas

The ad hoc task team needs to lead the intervention of suitable land to ensure that the appropriate areas have been identified. The ad hoc task team is also a good facilitator as it is a collaborative team that ensures that various perspectives and parties are involved in this process. The Department of Environmental Affairs and Development Planning (DEADP), who are part of the task team, and the City of Cape Town Planning and Design Department, will be primarily concerned with the environmental assessment for the areas (WCG, 2021). In addition, they can ensure the plans are translated into the district plan. The development of the new residential areas needs to be led by the Department of Human Settlements; as mentioned above, housing falls within their mandate (Western Cape Government: DHS, 2022). Importantly, this will fall under the category of emergency housing provision and informal settlements upgrade, as many of the older informal settlements in the site are due for an upgrade (Cooper, 2006; Conservation Expert Interview, 2022; Cape Nature Site Visit, 2022). However, due to the urgent nature of this issue, the City of Cape Town's Disaster Risks Management Centre (DMRC) should play a key role in assisting in the relocation, setting up of the new settlements and the provision of services and promote the efficient implementation of this intervention. Firstly, funding can be sourced from the Department of Human Settlement for developing new urban areas, upgrading services and infilling mixed-use and residential development (Western Cape Government: DHS, 2022). The municipal infrastructure grant could be considered to implement and develop the necessary infrastructure for service provision on the site (Western Cape Government: DHS, 2022). This fund provides funding to address the backlog of municipal infrastructure in previously disadvantaged communities and help ensure that communities have access to essential services, namely water, sanitation, accessibility and lighting (Western Cape Government: DHS, 2022).

5.3.2. Introduction of an Urban Park

The urban park is a multi-use space meaning it will need various actors and stakeholders to develop it. Firstly, the City of Cape Town, namely the Department of Recreation and Parks, should be the entity leading this intervention (City of Cape Town: Department of Parks and Recreation, 2022). The department aims to create high-class recreation areas and conserve and further expand the spaces for future and current generations (City of Cape Town: Department of Parks and Recreation, 2022). Notably, the first step in this process must be public participation involving all the communities, particularly leaders, in the site and the surroundings. Cape Nature should be involved to represent the conservation needs and the Kuils river restoration project run by Asset research. As the site has City wide biodiversity and water relevance actors such as SANBI, the City of Cape Town Environmental and Stormwater management department should be consulted on this process. The consultation will ensure that the park conserves the natural assets adequately while linking them to larger city-wide natural systems. The public participation process should involve VPUU due to their connection and established correspondence with the community leaders in Driftsands (VPUU, 2022). It would be helpful to involve the Department of Water and Sanitation to ensure that the flood protective infrastructure addresses adequate surface runoff and wastewater management. Along the same line of thinking, water management experts from academic institutions like UCT, UWC and Stellenbosch University could be used as consultants. The academics can provide insight into the best ways to integrate the various alternative water management practices like WSUD and IUWM and flood protective strategies that were identified as priorities in the public participation process.

As the site falls within the Cape Town area, there are some budgetary provisions for this project, particularly around developing open spaces like the urban park (WCG, 2022). The urban park could potentially draw on the national green fund, which provides catalytic financial support for green initiatives that will help South Africa move towards a greener future and economy (SA Government, 2022). Efforts to rehabilitate the Kuils river and wetlands could also draw on the working for water initiative, which supports eradicating any alien vegetation in the site and replanting indigenous vegetation (SA Government, 2022). When implementing the river clean-up project involving community members and providing

employment, this initiative could draw off the Extended Public Works Programme and consider linking up with them (SA Government, 2022). Another interesting source for funding for the urban park, particularly around the Kuils river flood management adaption, is that it be integrated into the existing Cape Town Airport Stormwater Plan (KFD, 2022). By integrating these, there is the potential to source funding from the Airports Company South Africa if the Driftsands site can become vital and beneficial to the suggested stormwater system upgrade that was discussed in chapter three. A funding option could also be to approach a business or organisation to adopt the park as part of its environmental awareness programme, which could link in with education around improving water and environmental management attitudes in communities (WSUD principles). Along this line of thinking, another funding option could be reaching out the international donors like the world bank or WWF for investments into this site as a pilot project (SA Government, 2022).

Importantly linked to the relocation is the development of the dune barriers in the site and other flood protective strategies. The action needs to be led by the City of Cape Town Urban Mobility Director's Stormwater Management Service (WGC, 2022). They aim to plan stormwater infrastructure, control land, and, importantly, introduce stormwater infrastructure (WGC, 2022). The VPUU should again be involved in the role of negotiating with the community and helping discourage resettling. Another party that can help protect this area is the City of Cape Town's Disaster Risks Management Centre. The centre could provide support and security to deter resettlement (City of Cape Town: Disaster Risk Management Centre. 2022). Cape Nature should also be consulted on the impact of the dune barriers and readjust their location if any environmental issues arise.

Along this same line of thinking, the dam wall must be protected from potential encroachment or resettlement. However, notably, the City of Cape Town's department of water services are responsible for implementing the dam wall upgrade that is due and an imminent threat to the safety of communities downstream but does not fall under the planning mandate (Western Cape Government, 2022).

The Kuils river and wetland rehabilitation need to be a collaborative project. The project should be spearheaded by the Department of Recreation and Parks, namely the Catchment

and Storm Water Management branch, as the river and wetlands will fall within the urban park and, therefore, in their mandate (City of Cape Town: Department of Parks and Recreation, 2022). However, community members are vital and invested in supporting this project. Notably, in vegetation clearing, the Cape Town Invasive Species group should be involved to ensure indigenous vegetation is replanted into the areas that are affected by alien invasions or lacking in invasion (Friends of Liesbeck, 2022). In addition, NGOs and other community leaders or resident's associations should be involved where possible to ensure this project is protecting the river in a manner that also protects and uplifts the community through improving the quality of space or even creating or providing employment for residents in the form of river clean-up or vegetation planting (Friends of Liesbeck, 2022). NGOs that could be involved are Health Outreach Prevention Education (HOPE) project based in Delft due to their proximity and VPUU due to their involvement (Guru, 2021; VPUU, 2022). On the whole, this project needs to ensure that the different parties with their different needs are all involved and contribute where possible to ensure the Kuils river and the larger catchment are conserved and protected.

5.3.3. Update Section of the Sub-District Plan for Driftsands

The updates and revision of the district plan must be led by the City of Cape Town's Urban Planning and Design Department, in particular, the District Spatial Planning branch, as they are the branch responsible for drafting and implementing the District plans (City of Cape Town DUPD, 2022). Importantly, Cape Nature and the City of Cape Town's Disaster Risks Management Centre should be involved as they have more detailed knowledge of the issue and, notably, the urgency of the issue at hand. In addition, the Western Cape Department of Environmental Affairs and Planning, specifically the ad hoc cross-departmental task team mandated to address this issue, should be involved (WCG, 2021). Finally, due to the nature of this plan change and the need for housing in the Driftsands area, the Western Cape Department of Human Settlements should be involved in an advisory capacity.

5.4 Consideration to promote Successful Implementation

This section will focus on three factors that should be utilised in the implementation to help contribute to the success of the interventions. Some of the factors have been touched on in the above section but will be expanded upon for further clarity. The three factors are public participation, institutional cooperation, establishing partnerships and monitoring and evaluation.

5.4.1 Public Participation

An important aspect of the plan for Driftsands to outline as a planner is the community participation process. The process gives clear guidelines to involve the voices and opinions of interested and invested parties. Notably, in disaster and risk management like the Driftsands case, local-level bottom-up planning that involves evident participation of the broad public has been found to be essential for the successful implementation of interventions (Pearce, 2003)

My recommendation would be a community participation process for Driftsands. The motivation for this recommendation links back to the literature review and the critical concepts of convivial and decolonial conservation. Convivial conservation aims to create these promoted spaces that invite people into conservation to allow for the celebration and protection to happen with people in the space (Kiwango & Mabele, 2022). Therefore, ensuring the design involves community members will contribute and help create a space where this promotion and celebration of nature can exist and move away from the separation of nature and people (Kiwango & Mabele, 2022). Public participation creates space for decolonial conservation where local knowledge can be utilised to help protect natural systems, utilising the local community's first-hand knowledge and experience (Diouf, 2020).

The recommendation is that the public participatory process will be modelled after the Two Rivers Urban Park public participation process, as it led to the successful creation of a public park in a flood zone in the Cape Town context (Sun Development, 2022). The public

participation process aims to be a consultative space which allows for the co-design or participatory planning between the public sector (namely the City of Cape Town and the Western Cape Government) and the stakeholders. The stakeholders include Cape Nature, VPUU, the Department of Environmental Affairs and Planning, Cape Nature, the Department of Human Settlements, and Community Leaders, allowing for the collaborative planning of promoted areas. The above list is not exhaustive, and the stakeholders will include the government, the directly affected groups and any invested parties (WCG, 2021). The community participation process aims to allow for the Driftsands Areas' future, particularly around the multi-use urban park and the new residential developments, to be planned transparently and with stakeholders. The process aims to ensure that all the various needs and wants for this space are reconciled by the various stakeholders and included in the upgraded district plan (Sun Development, 2022). As the vision is for this park to be an asset to the city, the community participation should involve metro-scale stakeholders such as the City of Cape Town Department of Parks and Recreation and metro-scale NGOs like the Development Action Group and the Environmental Monitoring Group. This space will also provide a platform to set out each stakeholder's roles and responsibilities and involve variously interested and invested priorities in the discussion and design process (Sun Development, 2022). The public participation process is intended to lead towards an active participation process through co-design exercises (Sun Development, 2022). To begin, the various stakeholders who have been identified will be engaged in a series of meetings and focus groups with the help of the VPUU as facilitators. The public participation process will begin with introduction meetings and then quickly move into stakeholder meetings to ensure all voices in this space are represented (SUN Development, 2022). The most important section will be the co-design workshops which will be a space where stakeholders can be actively involved in designing the multi-use urban park and the broader site (Sun Development, 2022). There will be nine workshops ranging from introduction, manifesto creation, establishing constraints and opportunities, visions for the park, establishing a baseline, doing a walkabout, setting out scenarios, stakeholder presentations and specialist studies (Sun Development, 2022). This process will lead to a clear plan for the urban park and relevant updates to the suggested plan for the Driftsands space being collaboratively created with the help of urban planners and designers.

5.4.2 Institutional Cooperation and Collaboration

As is clear from the discussions above, the various interventions require input from different departments and interested and affected parties. The interventions will require cooperation and collaboration between departments from different fields and backgrounds with varying priorities and investments. Therefore, a culture of cooperation will speed up the interventions and implementation for the interventions to be implemented successfully. Another benefit of this approach is establishing a culture of goodwill and support across departments and involved parties. The approach will encourage parties to work together to achieve their shared priorities that will help protect people and nature in the space. Spatial planning, in this case, the District Plan, should act as a space to facilitate and allow this collaboration as the plan addresses issue that affect and need input from a diverse range of actors (Bröchner, Gregorowicz-Kipszak, Gustafsson & Hanson, 2021.). However, for planning to occur collaboratively, there will need to be buy-in from all parties, from government departments to the private sector, and a policy of transparency.

5.4.3 Establishing Partnerships

As is true for most plans, implementation is made much more successful when linked to existing plans or organisations. Therefore, I recommend that this plan be implemented in partnership with other projects. Importantly this list is not exhaustive however includes some exciting and important projects that have the potential to be linked to the suggested interventions.

As mentioned in the phasing section and previous chapter, to incentivise the movement of settlers to an alternative location, providing improved access to services is vital (VPUU, 2022). Therefore, I recommend that the residential areas be identified and developed as outlined above but in partnership with HOPE Cape Town's Nex project (Guru, 2021). This NGO is Cape Town-based organisation which has a Nex project which focuses on community outreach in Delft (Guru, 2021). This focus includes job creation, upgrading infrastructure, transforming urban space and improving health care. The project is currently working with the City of Cape

Town, the Western Cape Government, funding from the Bavarian Government, and working with VPUU on implementation (Guru, 2021). I recommend expanding their scope to include not only Delft but also the communities in Driftsands. The HOPE project has the potential to be linked to the river clean-up project and the introduction of the urban park as a space of job opportunities for Delft and Driftsands residents (Guru, 2021). This partnership may also allow for improved connectivity between Delft and the Driftsands neighbourhoods; existing links with the VPUU will make this collaboration easier (Guru, 2021).

When considering the Kuils river and wetland protection, I recommend that a partnership be established with the existing Kuils river restoration project that Stellenbosch University runs, A Rocha, South African Environmental Observation Framework and ASSET Research (Xotyeni, 2022). These partners have worked together to develop a framework to restore the Kuils river, including considerations around governance, society and ecology (Xotyeni, 2022). Significantly this project aligns with decolonised conservation ideas around having community members be co-custodians for their natural resources and take responsibility for conserving these (Diouf, 2020). Therefore, the multi-use park will fit in well with the larger scale plan and allow for a space for these ideas around community members as custodians to be implemented in the Driftsands space.

Lastly, in terms of protecting the valuable green space of Driftsands, I recommend collaborating with the City of Cape Town Environmental Resource Management Department, as mentioned in the contextual analysis of the Department as a conservation implementation plan for the Strandveld in the city (Holmes et al., 2012). Only approximately 25% of the false bay Strandveld remains, meaning that a priority of the Department is to maintain the vegetation where possible (Holmes et al., 2012; Conservation Expert Interview, 2022). The Department has a budget for conservation management of priority areas, of which Driftsands could be utilised to assist in the development of the urban park and the rehabilitation of indigenous vegetation in this space (Holmes et al., 2012)

Another project concerned with conservation in the Cape Flats was the Cape Flats Nature Project run by the Seeds of Good Anthropocene (Cape Flats Nature Project, 2015). This project would be helpful as a partner as it aimed to reconnect people to nature in the South

African context to increase the availability of urban biodiversity (Cape Flats Nature Project, 2015). The project aligns directly with the ideologies of the dissertation linked to convivial and decolonial conservation (Cape Flats Nature Project, 2015). This project sadly ended in 2010 (Cape Flats Nature Project, 2015). However, Driftsands and the implemented plans could be an appropriate time to restart this initiative, and the interventions could act as a pilot project (Cape Flats Nature Project, 2015).

5.4.3 Monitoring and Evaluation

As seen in the case of Driftsands, a lot can change in a context over a short period. Therefore, every implementation process must have a system of benchmarks and evaluations to monitor and ensure the interventions are achieving what they intended (Seasons, 2003). Without this system, it would be difficult to assess if the interventions were achieving what they set out to, in this case, conservation and improved water management while promoting social justice. Monitoring and evaluation also allow plans to be edited and adapted to the changing contexts that naturally occur over time.

Therefore, the recommendation is to implement regular checks and assessments of the interventions at their different phases every three years as a part of the district plans review process. The assessments and benchmarks will be standardised on the spatial intentions set out in chapter four, namely Conserving Driftsands, Improving Water Management and Community Building and Social Justice and utilised as a part of the monitoring and evaluation framework for the district plan (Khayelitsha, Mitchells Plain & Greater Blue Downs District Plan, 2022). Under conserving Driftsands, the importance of moving towards creating this space into a promoted space that allows for the healing of the people-nature relationship. When assessing water management, the state of the river water quality, including the state of the wetlands, will be assessed as the number of WSUD adaptations that have been integrated into the new development. Lastly, the number of community members with access to services will be considered for community building and social justice. Therefore, the assessment will be able to determine if the interventions are moving towards achieving the intentions that were set out, and the plan can be adjusted accordingly.

5.5. Conclusion

The implementation chapter aims to be a direct continuation of the intervention chapter. This chapter aimed to outline clearly how the timelines for the various interventions for the site be implemented. Importantly the phasing table and description aimed to clarify how the various interventions and actions would be implemented on the site, how they fit together and the importance of the order for the interventions to be successful. The following section indicates the responsible and involved parties for each intervention and funding options for each of the three interventions. The goal of clarifying roles and responsibilities is to ensure the interventions have a clear driver and significant support. Lastly, recommendations to promote successful implementation were put forward, which included community participation, cooperation and monitoring. Notably, the community participation processes this plan suggests are introduced to ensure that the communities in and around Driftsands are consulted on the plan and urban park design. The following recommendation highlighted the importance of departments and invested parties working together to achieve the goals set out for this site. The last recommendation was focused on monitoring to ensure that the interventions are achieving the goals set out for the space and adjusted accordingly. This chapter aimed to clarify further the interventions suggested in chapter four and, importantly, outline strategies around funding and responsibilities for their implementation.

Chapter 6: Conclusion

6.1 Introduction

6.2 Main Research Findings

6.3 Contributions of the Research

6.4 Reflection on the Research Process

6.4.1 Data Collection

6.4.2 Researcher Positionality

6.4.3 Time Constraints

6.5 Recommendations for Future Research

6.6 Conclusion

6.1 Introduction

The conclusion chapter is the last of this dissertation. The aim of this chapter is to tie together the dissertation and discuss some key factors. The conclusion will begin with a summary of the main research findings linking back to the research questions that were put forward in the introduction. The next section will consist of a reflection on the research and research process. It will mainly consider the challenges and limitations that were faced during the process. The reflection will be split up into three sections. Firstly, the process of data collection will be discussed, and its challenges will be introduced. Mainly it will be the challenges around the availability of up-to-date data due to the ever-changing nature of the site and context. Secondly, researcher positionality and bias will be discussed. This topic was discussed in the introduction and will be revisited in this chapter. The last aspect of the reflection will be on the limitations of the research due to time constraints. The challenges discussed above will lead directly into section four which will clearly outline the recommendations for future research in this space, drawing from the challenges and gaps found during the research process.

6.2 Main Research Findings

This dissertation aimed to rethink mainstream conservation. The underlying aim was to introduce a sub-district plan for Driftsands that moves away from thinking of conservation as a separation of nature and people but rather suggest a plan that allows for the needs of nature and people to be protected and addressed together in an integrated manner. Notably, the aim was to utilise Driftsands as a case study to investigate how convivial and decolonised conservation methods can be utilised in the urban context to promote the protection of the natural environment, with particular focus on water systems. The imminent loss of the reserve's status of protection allows planners to rethink the district plan for this space. The plan considered methods like the Kuils river buffer zone, the multi-use urban park and the relocation of settlements to alternative areas as tools which can help protect the Cape Flats Strandveld and the Kuils river system without separating nature and people. The suggestion of creating public space around the Kuils river moves towards a less mainstream way of considering conservation. By classing the whole 1:50-year flood zone as structured open space, it sets a precedent in a few distinct ways. Firstly, it encourages people to use the space but not for recreational purposes but rather for a multitude of activities. This allows the valuable land to be utilised for the communities wants and needs meaning the land does not go to waste but also protects and prevents people from living in the flood zone, which is a significant danger to their lives and health. Importantly, by having the flood zone classed as open space, the river system and remaining natural systems can be conserved and protected but in a manner that does not separate people from the space but instead includes communities into the space and, therefore, the conservation process. This practice moves towards creating spaces which are promoted, sacred and valued rather than the more commonly used protected spaces.

6.3 Contributions of the Research

While this dissertation focuses on the small-scale context of Driftsands, it provides a clear sub-district plan for the area. This sub-district plan forms a part of the district plan for Khayelitsha, Mitchell's Plain and Blue Downs. It is a combined Environmental Management Framework and Spatial Plan for the district, allowing for these aspects to be considered together and in an integrated manner. The dissertation has outlined a plan in which this sub-section of the district plan that could be used as an initial layer to develop further and adapt the sub-district plan for Driftsands to accommodate the current situation and rethink conservation and water management in this space.

While the above represents the more direct effect, the plan and considerations around the Driftsands case study can contribute towards research around alternative strategies to conservation and improved water management. There has been increased research and thinking around alternative conservation and a move away from protected areas. In a world where there has been a significant increase in the loss of protected areas to the need for land for human uses, research and case studies can contribute to and investigate methods for protecting natural systems in spaces without pushing people out of areas vital. The issue of flooding and water management has also been at the forefront of research and discussion, as the combination of climate change and urbanisation has led to many areas of conflict between people and water. Therefore, considering flood and water management methods that are effective in the urban context and allow for the natural flow of the river or water body to be protected while also ensuring people are safe is essential to consider. This is why the research and the planning suggestions around protecting the Kuils river by making it an urban open public space may contribute to research around flood plains as public spaces and how these can benefit both the water systems and people in the space. Overall, this research may, in a small way, contribute to broader research around the shift towards decolonial and convivial conservation methods and consider the potential to introduce these methods in a southern context. In addition, this research may be able to contribute to larger-scale research around how to transition from a loss of a protected area to methods to transform this space into a promoted or valued space using spatial planning as a tool.

6.4 Reflection on the Research Process

This section will consider some challenges and limitations that were faced during the research process and the duration of the writing of this dissertation. The list and challenges below are not exhaustive; however, the three sections below represent the main challenges faced during the writing of this dissertation.

6.4.1 Data Collection

The process of data collection faced various challenges. Firstly, various ethical approvals from the university and Cape Nature were needed. The ethical approvals both required documentation and a wait time for the two processes. While these are necessary, in a dissertation with limited time such as this one, it meant there was less time for data collection as the ethical processes needed to be approved before data collection could be conducted. The second challenge with data collection was that many reports and data about the state of the environment and settlements on the site were outdated. Therefore, the old reports were often inaccurate due to the rapid rate of encroachment faced in Driftsands meaning reports from 2021 or 2022 were needed to provide the closest possible data. Cape Nature was a great help in this aspect as they had access and kindly gave me, as a researcher, access to settlement numbers and locations from August 2022. However, there are gaps, as there is no recent data on the state of the environment. Nevertheless, the expert I interviewed had an understanding of the state of the environment. The recommendation from this is importantly to ensure accurate data on the state of the environment is developed to help support future plans and ensure they are based on the most recent data possible.

6.4.2 Researcher Positionality

As mentioned in the introduction, acknowledging my positionality as a researcher is vital to ensuring that I am avoiding bias. The framing of my research in terms of focusing on conservation and improved water management has been shaped by my academic and research interests in environmentalism and conservation. Therefore,

further research can be done in this context around this space with less focus on environmental concerns. However, as touched on throughout this dissertation, the focus on environmentalism and people as one is essential to ensure both are conserved and protected.

6.4.3 Time Constraints

Due to the nature of the dissertation and the course length, the time to conduct the research and complete the dissertation was limited. Therefore, there were distinct limits to the depth and scope of the research conducted. Initially, when I was researching this topic, my interest was focused on investigating and conducting first-hand research with the communities to gain a more accurate and deep understanding of the communities living on the site. My interest was, in particular, their needs and priorities and their first-hand knowledge of the current state of the environment on the site. However, establishing a connection and rhetoric with communities in such a vulnerable space and situation was unrealistic due to time constraints. This led to the use of key informant interviews and desktop research. Another effect of the time constraint was the limit to the number of interviews, and site visits were done. The research needed to be completed in about six months, meaning there was only a certain amount of time available. This resulted in more desktop research being utilised than intended, where more expert interviews may have been helpful.

6.5 Recommendations for Future Research

Some recommendations will be made, which will tie in closely with the previous section around the challenges faced. Therefore, if similar research is conducted in the Driftsands context or elsewhere in a similar context, there are a few key recommendations to improve it. Firstly, if possible, conducting first-hand data collection and therefore setting aside more time or conducting a more prolonged study to collect first-hand interviews around the current state of the environment to ensure accurate and recent data. This leads nicely to the following recommendation: if research around this site or a site of this nature is done again, the study should be done over a more extended period. This is because gaining a clear and in-depth understanding of the area was possible in the length of time this study was conducted. However, the recommendation is to gain deeper insight, namely a first-hand account, and consult more involved parties directly. More first-hand data will ensure that the research is more detailed and nuanced. This will promote less reliance on reports and allow for different knowledge types to be included in the research, further decolonising the space. Lastly, I recommend that when the Driftsands site or site in a similar context are researched or considered, the needs and concerns around people and the environment are considered together to ensure that both are protected and considered in an integrated manner. Therefore, the recommendation is to move towards reclaiming pre-colonial conservation methods that acknowledge the inherent link and effect of nature on people.

6.6 Conclusion

Overall this dissertation has aimed to consider alternative conservation methods in the urban space, focusing on improving water management. The case study of Driftsands has been utilised due to the state of the area and the loss of protection status. This field of research is vital in a time with growing cities and limited natural resources, considering challenges such as the ones faced in Driftsands as opportunities for innovative ideas and reconceptualising of mainstream ideas will promote cities as catalytic and changing spaces. This initiative and opportunism will help support and ensure that development and planning do not stagnate in mainstream ideologies but rather push to change and challenge the current systems to adapt and accommodate the needs of the people and the environment.

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Annexures

Annexure 1: Consent Form Template



SCHOOL OF ARCHITECTURE, PLANNING AND GEOMATICS

University of Cape Town
 Private Bag x3, Rondebosch 7701
 Centlivres Building
 Email: Janine.Meyer@uct.ac.za Tel: 27 21 6502359

UNIVERSITY OF CAPE TOWN

June 2022

My name is Alexandra Winkler, and I am currently completing my Masters in City and Regional Planning at the University of Cape Town.

I am doing research on developing a District Spatial Development Framework with a focus on Water and Flooding Management in Driftsands Nature Reserve. The aim of my research is to find alternative methods to conserve nature and manage water in Driftsands which includes the interests and needs of people, while simultaneously ensuring that nature can be protected.

As part of my dissertation, I would like to ask you some questions to help me with my research.

Please indicate if you are comfortable with me:

- a. Including your Name (Yes/No)
- b. Including your Job Title (Yes/no)
- c. Voice recording this interview (Yes/No)

If you have indicated no for either or both of the above, I can promise that I will not record your name or job title and your personal details will not in any way be revealed in my dissertation or any publication I produce.

The questions I ask are only for research purpose and they cannot directly benefit you and there are no risks in participating.

Please be aware that if you want to end the interview at any point you are free to do so.


My Supervisor is Tania Katzschner and her contact details are:

Tania.katzschner@uct.ac.za
 or 021 6502381 (cell 0836347887)

 Signature and designation (interviewee)

Annexure 2: Interviewee 1 Consent Form

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SCHOOL OF ARCHITECTURE, PLANNING AND GEOMATICS
 University of Cape Town
 Private Bag x3, Rondebosch 7701
 Centlivres Building
 Email: Janine.Meyer@uct.ac.za Tel: 27 21 6502359

UNIVERSITY OF CAPE TOWN

June 2022

My name is Alexandra Winkler, and I am currently completing my Masters in City and Regional Planning at the University of Cape Town.

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As part of my dissertation, I would like to ask you some questions to help me with my research.

Please indicate if you are comfortable with me:

- a. Including your Name (Yes/No) Yes No
- b. Including your Job Title (Yes/No) Yes No
- c. Voice recording this interview (Yes/No) Yes No

If you have indicated no for either or both of the above, I can promise that I will not record your name or job title and your personal details will not in any way be revealed in my dissertation or any publication I produce.

The questions I ask are only for research purpose and they cannot directly benefit you and there are no risks in participating.

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My Supervisor is Tania Katzschner and her contact details are:
Tania.katzschner@uct.ac.za
 or 021 6502381 (cell 0836347887)

 Signature and designation (interviewee)

 Signature of student

Annexure 3: Interviewee 2 Consent Form

**SCHOOL OF ARCHITECTURE, PLANNING AND GEOMATICS**

University of Cape Town
 Private Bag x3, Rondebosch 7701
 Centlivres Building
 Email: Janine.Meyer@uct.ac.za Tel: 27 21 6502359

UNIVERSITY OF CAPE TOWN

June 2022

My name is Alexandra Winkler, and I am currently completing my Masters in City and Regional Planning at the University of Cape Town.

I am doing research on developing a District Spatial Development Framework with a focus on Water and Flooding Management in Driftsands Nature Reserve. The aim of my research is to find alternative methods to conserve nature and manage water in Driftsands which includes the interests and needs of people, while simultaneously ensuring that nature can be protected.

As part of my dissertation, I would like to ask you some questions to help me with my

research. Please indicate if you are comfortable with me:

- d. Including your Name (Yes/No)
- e. Including your Job Title (Yes/No)
- f. Voice recording this interview (Yes/No)

If you have indicated no for either or both of the above, I can promise that I will not record your name or job title and your personal details will not in any way be revealed in my dissertation or any publication I produce.

The questions I ask are only for research purpose and they cannot directly benefit you and there are no risks in participating.

Please be aware that if you want to end the interview at any point you are free to do so.

My Supervisor is Tania Katzschner and her contact details are:

Tania.katzschner@uct.ac.za
 or 021 6502381 (cell 0836347887)

{Signature was not included as to not give away the interviewee's identity as requested}

Annexure 4: UCT Ethical Approval

Application for Approval of Ethics in Research (EIR) Projects
Faculty of Engineering and the Built Environment, University of Cape Town

ETHICS APPLICATION FORM**Please Note:**

Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form **before** collecting or analysing data. The objective of submitting this application prior to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook** (available from the UCT EBE, Research Ethics website) prior to completing this application form: <http://www.ebe.uct.ac.za/ebe/research/ethics1>

APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		Alexandra Winkler
Department		School of Architecture, Planning and Geomatics
Preferred email address of applicant:		WINKALE001@myuct.ac.za
If Student	Your Degree: e.g., MSc, PhD, etc.	Masters in City and Regional Planning
	Credit Value of Research: e.g., 60/120/180/360 etc.	120
	Name of Supervisor (if supervised):	Tania Katzschner
If this is a research contract, indicate the source of funding/sponsorship		
Project Title		Re-evaluating Conservation: Developing a Local Area Development Plan with a focus on Water and Flooding Management in Gribbards Nature Reserve

I hereby undertake to carry out my research in such a way that:

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

APPLICATION BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	Text Alexandra Moly Winkler		10/06/2022
SUPPORTED BY	Full name	Signature	Date
Supervisor (where applicable)	Tania Katzschner		June 10th, 2022
APPROVED BY	Full name	Signature	Date
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section 1; and for all Undergraduate research (Including Honours).			
Chair: Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the questions in Section 1.	Prof. H. von Blottnitz		6 July 2022

Annexure 5: Cape Nature Ethical Approval

**BIODIVERSITY CAPABILITIES**

postal Private Bag X29 Gatesville 7766
physical PGWC Shared Services Centre
 cnr Bosduif & Volstruis Streets
 Bridgetown 7764
website www.capenature.co.za
enquiries Willem de Klerk
email wdelerk@capenature.co.za
reference 12/1/6/5/F6
date 29 September 2022

Ally Winkler
 University of Cape Town
 Private Bag X3
Rondebosch
 7701

Dear Miss Winkler

APPLICATION TO ENTER IN A NATURE RESERVE FOR SCIENTIFIC PURPOSES

I refer to your application to enter in a nature reserve for scientific purposes in the Western Cape Province.

Find attached permit **CN32-87-22555** to collect specimens in the Western Cape Province.

- **Please take special note of the standard conditions and special conditions attached to the permit.**

No deviation is allowed from the fore-mentioned conditions without the prior written approval of the Chief Executive Officer: Western Cape Nature Conservation Board.

Also take note of the *pro forma* (copy attached), which must please be used when submitting your collection / distribution records to CapeNature as per the conditions to your permit. Please feel free to add columns for extra data to the *pro forma* but no columns should be deleted. This *pro forma* is also available electronically from CapeNature.

Should you have any queries please do not hesitate to contact this office.

Yours faithfully,

Willem de Klerk

;

pp. CHIEF EXECUTIVE OFFICER

Western Cape Province

Telephone No: (027) 021 483 0000
 E-mail: permits.fax@capenature.co.za
 PGWC Shared Services Centre
 cnr Bosduif and Volstruis Streets
 Bridgetown
 7764



Facsimile No: (027) 086567734
 Internet: www.capenature.co.za
 Private Bag X29
 Gatesville
 7766

**PERMIT TO
 ENTER IN A NATURE RESERVE FOR SCIENTIFIC PURPOSES**

Issued in terms of the provisions of the Nature Conservation Regulations no. 955 of 1975
 Not Transferable

HOLDER			
Full Name:	Miss Alexandra Molly Winkler	Identity No:	9808010044086
Trade Name:	University of Cape Town	Registration No:	
Postal Address:	Woolsack Drive	Physical Address:	Woolsack Drive
City / Town:	Rondebosch	City / Town:	Rondebosch
Province / State:	Western Cape	Province / State:	Western Cape
Country:	South Africa	Country:	South Africa
Postal / Zip Code:	7700	Longitude:	
		Latitude:	

In terms of and to the provisions of the abovementioned Regulations framed thereunder, the holder of this permit and persons specified on the attached addendum is authorised to enter or to enter and remain in a nature reserve or any portion thereof for scientific purposes. See conditions on last page.

DETAILS	
Permit / License No:	CN32-87-22555
Expiry Date:	30/04/2023
Date Issued:	29/09/2022
Amount Paid:	R 0.00
Reference:	No Charge
File Code:	1/2/1/6/5/F6
Stamp:	

DESCRIPTION	PROPERTY
Organization:	University of Cape Town
Full Name:	Miss Alexandra Molly Winkler
Identity Number:	9808010044086
Postal Address:	Driftsands Nature Reserve, Buckwheat St, Blue Downs
City / Town:	Cape Town
Province / State:	Western Cape
Country:	South Africa
Postal / Zip Code:	7525
Longitude:	
Latitude:	

SPECIES (SCIENTIFIC NAME)	QTY	NOTE
Note.	0	Conditions apply Note special conditions.

W. De Klerk

29/09/2022

Issued By:

Willem De Klerk

Approved on Behalf CEO

Western CapeNature Conservation Board

Effective Date:

Signature of Holder:

I acknowledge, accept and understand fully the permit conditions as described.

STANDARD CONDITIONS

1. The holder of this permit shall return it together with a full report of all activities, findings and observations made while on the nature reserve to the Chief Executive Officer, Western Cape Nature Conservation Board, Private Bag X29, Gatesville, 7766, within fourteen days from the date of expiry thereof.
2. THIS PERMIT IS SUBJECT TO SPECIAL CONDITIONS.

SPECIAL CONDITIONS**PROJECT TITLE:**

Reconceptualising Conservation: Developing a District Spatial Development Framework with a focus on Conservation and Flooding Management in the Driftsands Nature Reserve.

PERSONS INVOLVED:

Ally Winkler, Researcher | ID: 9808010044086 | email: WNKALE001@myuct.ac.za

This permit is subject to the following special conditions:

1. The permit holder must contact the relevant Conservation Manager (CM) at least two weeks in advance to arrange access requirements. This includes visiting dates, resource requirements, staff assistance, etc.
2. All researchers must sign the research register at the protected area office.
3. The CM may deny access for reasons including:
 - a.) The reserve being closed due to a fire.
 - b.) Due to an event/ tourism function.
 - c.) Due to operational reasons.
4. The Conservation Manager may request that field staff accompany the permit holder as a learning opportunity.
5. Copies of all reports or publications resulting from this research must be forwarded to CapeNature for internal dissemination to relevant staff.
6. The permit holder may be requested to give a presentation on the project to CapeNature staff to build knowledge capacity within the organisation.
7. All standard conditions apply.

p.p. CHIEF EXECUTIVE OFFICER