Living with water: An Ethnographic Study Relating to Water and Infrastructure Entanglements, in the Hout Bay Suburb of Cape Town, for a Water Sensitive Designed "Liveable" Neighbourhood.

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This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

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Abstract

Inclusive water management implies considering the diverse relationships different people have with water, other values that people assign to water, and the ecological impacts of employed strategies. Faced with increasing water scarcity and environmental degradation, it has become critical that we look for alternative ways of managing essential natural resources, including using different approaches to resource management. Water management is mainly dominated by technical and natural scientists, with designs motivated by water supply costs and benefits. This neglects to consider other dimensions associated with water use and access, such as social, cultural and histories that inform how people are situated at different resource allocation intervals. Moreover, how we relate to water affects our environment, from soils, plants and other non-human species, and this, in turn, affects our wellbeing as all the processes that are entangled with life making. For these reasons, social scientists must take part in all water management processes to bring forth other neglected aspects of people's relationship with water and ecologies that are usually overlooked by hard sciences.

My research forms part of the Liveable Neighbourhood project, which seeks to redesign the existing neighbourhood of Hangberg in Hout Bay using a Water Sensitive Design. Thus, my study's role is to provide ethnographic data to a field dominated by bureaucratic structures, engineers; urban planners; urban designers and architects; to add the ways of knowing and understand better the diverse relations various communities in Hout Bay have with water. This is essential to enable the formulation of Water Sensitive Designs (WSDs) that include residents' inputs in what they consider 'liveable'. Most interventions that do not consider context-specific needs and dynamics often fail to have relevance and end up unsustainable.

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List of Acronyms

AIME	An Inquiry into Modes of Existence
ANT	Actor-Network Theory
CoCT	City of Cape Town
CWS	Critical Water Studies.
DAFF	Department of Agriculture, Forestry and Fisheries
DWAF	Department of Water Affairs and Forestry
EPWP	Expanded Public Works Program
EOPs	Emerging Organic Pollutants
FBW	Free Basic Water
HiDA	Hangberg *in situ* Development Association
IY	Imizamo Yethu
LN	Liveable Neighbourhood
IWRM	Integrated Water Resource Management
MLRA	Marine Living Resources Act
NBS	Nature Based Solution
PMF	Peace and Mediation Forum
RDP	Reconstruction and Development Programme
RWH	Rain Water Harvesting
SanParks:	South African National Parks
SANCO:	South Africa National Civic Organisation
SDG	Sustainable Development Goals
SWH	Storm Water Harvesting
STEM	Science, Technology Engineering and Mathematics
SuDS	Sustainable (urban) Drainage Systems
UCT	University of Cape Town
WRC	Water Research Commission
WSD	Water Sensitive Design
WSuD	Water Sensitive urban Design
Woks	Ways of Knowing

Introduction

Background

Faced with increasing water scarcity due to climate change, poor water management and water pollution, we must find different ways to manage water by acknowledging the diverse meanings and values people place on water. The need for sustainable water management is critical in urban areas, characterised by informal settlements with poor or no sanitation facilities. Simultaneously, there is a considerable problem of Emerging Organic Pollutants (EOPs), which cause further pollution to groundwater facilities and water bodies[1]. The need for improved water governance, which ensures equitable access to sanitation services and water for all citizens despite socio-economic status, is evident in the Hout Bay suburb of Cape Town – particularly in the informal settlements of Imizamo Yethu and Hangberg. Hout Bay has been described as a microcosm of South Africa (Chavis, 2014). Community members coexist in stark polar differences regarding necessary service allocations, such as sewerage and refuse removal and others (Chavis, 2014). In addition to limited essential services, such as water reticulation for most residents in the suburb, the natural environment is highly contaminated (CSIR, 1988). Westby-Nunn's (2005) writing gives a gloomy account of the Hout Bay river (also known as Disa River); ecology, health and wellbeing are characterised by erosion and pollution.

In Hout Bay, natural resource degradation – such as the state of the Disa River – and poor service delivery in the informal settlements indicate structural deficiencies in urban management policy formulations (Reddy, 2016; Mcloughlin and Batley, 2012). This is as a result of the SA government neglecting the dynamic entanglements between the historical,

[1] Emerging organic pollutants (EOPs) are a large array of compounds which have been found in groundwater and surface water such as lakes, rivers and oceans. These pollutants are mainly from pharmaceuticals, detergents, agricultural chemicals causing diverse negative effects to the terrestrial and marine ecosystems (Jjemba, 2019). EOPs have become a big threat to the aquatic and terrestrial environment, causing a diverse range of damage such as endocrine disruptors of organisms and possibly altering ecosystem functions. (see Bolong et al., 2008; Xiao, 2017; Ojemaye and Petrik, 2019).

social, economic, cultural and environmental factors. However, these processes cannot be separated. According to McDonald (2002), inefficient service delivery in impoverished areas in South Africa is rooted in historical imbalances of past policies. This has many implications for environmental health and the wellbeing of communities, translating to the whole nation's wellbeing.

Water management strategies and policies that promote environmental and social justice are imperative in South Africa to achieve equitable access to resources. Considering the vast socio-economic, cultural and ethnic differences of residents in Hout Bay, it is necessary to investigate how people in different areas and neighbourhoods live with water. The various challenges they face amid climate change further complicate water availability. Evidence points to limited management and lack of long-term planning of water facilities in South Africa (Hedden and Cilliers, 2014; Ziervogel et al., 2009). Consequently, understanding people's relationships with water is crucial for sustainable planning and water management. Water management requires taking all possible strategies to extract and save as much water as possible since rainfall patterns have become unreliable and unpredictable in the context of changing climatic conditions. Such techniques have to consider different experiences, meanings, needs and values associated with water use.

Situating the research

The Liveable Neighbourhood (LN) is a transdisciplinary research project, which aims to redesign the existing neighbourhood of Hangberg in Hout Bay through a suitable Water Sensitive Design (WSD). The project collaborates with inputs from Architecture, Anthropology, Urban Planning, Urban Design, Information Systems in collaboration with relevant stakeholders and inputs from residents of Hangberg. This collaboration explores liveability, with water as central in these diverse perspectives, and in this project's case, by exploring residents' experiences and strategies to make their living spaces more habitable. The project aims to identify context-specific methods that consider social, economic and ecological aspects while safeguarding public health. Essentially, the LN project intends to formulate possible designs based on WSD principles. These include Storm Water Harvesting (SWH); Rain Water Harvesting (RWH), and Sustainable (urban) Drainage Systems (SuDS) to reduce reliance on municipal water and conserve water whilst creating safe living spaces.

Fletcher et al. (2014) cautions on how local and regional perspectives and understandings drive various water sectors terms. Other terms may be used for similar concepts and vice versa, which leads to confusion and contradictions of meaning and interpretation. For example, in the South African context, Carden et al. (2018) argued that Water Sensitive urban Design (WSuD) should drop the Urban to include water management of all settlements, regardless of locality, due to water access inequalities in the country. Fisher-Jeffes, Carden and Armitage (2017, p.3) also cautioned that existing guidelines from countries such as Australia are likely to be challenging to implement in South Africa because guidelines from resource rich contexts do not consider many complexities aligned with water and sanitation access in this country. The argument here is that most international literature on WSD employs concepts that do not fit local considerations, characterised by inequality and histories of settlement; thus, careful consideration is required on which ideas align with our realities in South Africa. This thesis aims to highlight what can be considered as possible WSDs in Hout Bay for liveability. It is also important to note that some parts of this thesis are extracts from my contributions to the Water Research Commission (WRC) deliverables, such as progress reports, that funded the Liveable Neighbourhood Project and this research.

Research Question

This study investigated *how residents in Hout Bay live with water? and asked what the appropriate WSD to meet the needs of this neighbourhood would be?* The aim was to explore and underline diverse experiences people have with water and consider different water management strategies for context-specific interventions with the resident's input.

Rationale

Outdated and rigid water policies impede equal access to water and sanitation in most communities previously disadvantaged under colonialism and apartheid, hence the need/necessity to decolonise water management strategies (van Koppen, 2016). To even begin accommodating diverse experiences, water management strategies must employ a holistic approach that considers the social, political, cultural, ecological and economic lives of water. As encounters with water are never the same, there is a need for water policies and management strategies that allows for this kind of fluidity. Due to the dominance of professionals such as scientists, engineers and politicians in water governance, water

management decisions sometimes fail to account for the multiple experiences people have with water, which has detrimental outcomes for beings living in these waterscapes (Abrams, 2019; Mollinga et al. 2008; Berry and Mollard, 2010). In South Africa, water management is still primarily informed by technical designs and scientific and economic analyses of water supply (Peters and Woodhouse, 2019; van Koppen and Schreiner, 2014). Although there has been a shift towards inclusive research globally, in South Africa, this shift has been slow due to significant investment in Science, Technology Engineering and Mathematics (STEM) subjects compared to the social sciences. However, although slow, there is an urgent call from different society levels for more inclusive water management processes and policies to bring multidimensional perspectives in formulation with context-specific and appropriate WSDs. Projects such as LN are examples of this radical experimentation to think across the disciplines and possibly address interlinking socio-technical challenges in the context of WSD.

Conceptual framework

This study employs Latour's (2015) An Inquiry into Modes of Existence (AIME) as a conceptual framework to outline the different multi-natures associated with water and the diverse relations to water. AIME is a revision of the Actor-Network Theory (ANT) (Latour, 2005), which aimed to place both actors and actants (object and subject) in the process of reorganising interactions in the system for more stability. Although ANT does not demonstrate the power dynamics within processes, it shows how every action is responsible for, and interlinked to the possible outcomes. Latour's (2015) AIME acknowledges the diversity of actors in any system or process. These actors engage through various means of existence, which should not be judged against the values of other modes. Still, each should be given a platform to exist according to its validation. Furthermore, AIME allows identifying the gaps in each method and connection of different paradigms in everyday lived experiences. The aim of using AIME as a conceptual framework for this research was to shed light on and enable discussion between the different modes and needs that residents in Hout Bay have when relating to water and thus makes it possible to imagine a context-appropriate WSD.

Chapter outline

This thesis is broken down into five main chapters and a conclusion. The first chapter is conceptual and draws upon the literature on different experiences and relations with water and water's multiple meanings. The aim here is to show the other ways of being that do not necessarily fit into the extractivist and capitalist framing of life. In doing so, it highlights that the current rigid water management strategies are not sustainable. Throughout this thesis, the aim is to show the plurality of water relations whilst bringing forth the human right to clean water and sanitation as indicated in the Sustainable Development Goal 6 (SDG 6) 2016. The actualisation of this goal is a big challenge for South Africa due to the inequitable access to resources in the country. Therefore, there is a tremendous and urgent need to employ different strategies.

Chapter two: *Researching Liveability* is a methodology chapter. It discusses research methods employed and challenges faced as well as specific ethical considerations. Researching Liveability explores various ways of thinking with and knowing what is liveable for diverse residents in Hout Bay to inform the formulation of WSDs in the area. This requires employing diverse and unconventional research techniques, shifting from traditional enquiry modes, which gives a platform for research participants to voice their experiences.

Chapter three: *A Story of Place* focuses on several stories and residents' experiences of living in Hout Bay. It explores water access and accompanying struggles and challenges and how such processes inform different ways of living. This chapter was inspired by the power of storytelling that demonstrates various ways of being, the diverse meanings and connections people have with their environment while simultaneously illustrating the complexity of managing urban water systems that cannot be accommodated nor resolved by a singular solution.

Chapter Four: *Alively Infrastructures* looks at the assemblages around human-made and natural infrastructure and how they are lively in encounters with residents, chemicals, objects and other living beings. These encounters bring a lot of risks, which may cause residents to make repairs highlighting ingenuity continually. It argues that the present infrastructures or lack thereof are deeply entangled in South Africa's histories of segregation, outlining the

always present but sometimes invisible violence of the past that is lived anew through ruined environments. Moreover, Alively Infrastructure discusses possible designs for liveability and Nature-Based Solutions, which could improve living conditions.

Chapter Five: *Fluid Relations* discusses this research's ethnographic findings and focuses on the diverse experiences relating to living in the Hangberg. This chapter grapples with the struggles of being, the dynamics of reality on the ground versus current policies and regulations. Fluid Relations aims to show that living with water is linked to every aspect of living, including housing, infrastructure, income and landscapes. Overall, it shows the need to take a holistic approach to what is considered liveable in Hangberg to close the gaps between lived experiences and regulations that leave many empty spaces. The final part is a conclusion, which gives a comprehensive discussion of the entire thesis.

Chapter 1- Living with Water – the literature

1. Introduction.

When thinking of the human body as an ecosystem and a water body, we begin to see overlaps between how our environment is constituted and our bodily functions (Yong, 2016). In this way, we can start seeing that water connects us to other non-human living beings. Water links humans, plants, microbes, and soil to facilitate ecosystems' health or failure due to how we relate and live with it. This chapter presents literature that highlights water management processes, which consider and acknowledge these dynamics. This thesis aims to highlight that current water governance techniques exclude or marginalise some ways of being, thus, there is a need for a flexible paradigm that is open to context-specific approaches and methods.

1.1Using AIME to explore other water management avenues

Different relations and ways of being also call for further interrogations and responses, which can only be made possible through a multidisciplinary engagement. As Van Dooren and Rose (2016) argued, ways of being are not formed and sustained in isolation as each is also a style or way of being and becoming that interacts with others and thereby are co-created. Analysing different modes of existence is a good starting point to explore various forms and experiences of what is 'liveable', thus allowing for the development of interventions that can make a difference.

Armitage et al. (2014, p.4) emphasise the importance of an integrated multidisciplinary approach in the formulation and implementation of a WSuD in South Africa, which contrasts with the currently fragmented silo-approach to water management. This means all stakeholders, communities, city planners, politicians, engineers, municipalities, architects, environmental scientists, health and social scientists should work together and form an integrative practice of urban design and planning. The challenge in this regard is how to achieve successful collaboration of professionals from various disciplines with different paradigms. As such, Latour's (2015) AIME is one way to enable an integrative approach to what may be considered liveable from multiple disciplines and by various actors in Hout Bay.

Several authors (Armstrong, 2009; Wagner, 2013; Krause and Strang, 2016) state that in asserting that water is not just a commodity, with technical and economic attributes, we imply that a financial or technical evaluation is not the sole judge of the issues of water management. For these reasons, there is a need for inclusive research in South Africa water management processes and policies to bring a multidimensional perspective in formulating context-specific and appropriate WSDs.

Latour's (2015) multidisciplinary concept becomes paramount in ensuring that we employ different ways of reaching many varied goals that different actors have. Acknowledging that those different needs and goals should not exclude or alienate other modes' importance is valuable when attempting to imagine and facilitate the possibility of an integrated approach to water management. At the core of a WSD are users since their values, needs, and aspirations define a context-specific strategy that is acceptable, they can manage, and is user-friendly. Therefore, this study's conceptual framework is centralised on the concept that pluralism of modes, including people's voices, ecology, and various sciences, have an equitable playing field in determining what makes a 'Liveable Neighbourhood'.

1.2 Strategies towards an integrative approach to managing water

Integrated Water Resource Management (IWRM) is one approach that aims to take a holistic sectoral approach in water management and governance. Orlove and Caton (2010) have described IWRM as a broad multisectoral approach, questioning the idea that techno-scientific processes are the only solutions for overcoming water challenges. In addition, the authors state that IWRM is an example of comprehensive expert knowledge on water policies, which is a crucial component of an anthropological understanding of water uses. They have categorised IWRM as a global water management regime, which falls under what they call water politics. Watuk (2008) has described IWRM as a process, a means to an end in using water sustainably without "compromising vital ecosystems" but still "maximising economic and social welfare", with most water managers in Southern Africa oriented towards technocentric beliefs.

Several researchers (see Mollinga, 2008; Molle et al., 2008 and Mcdonnell, 2008) have argued that IWRM is a flawed approach. It does not acknowledge the links between water

inequality and income inequality in the SADC region but focuses more on institutional, policy and legal frameworks. Moreover, they indicate how IWRM obscures the reality of complex trade-offs to be made in water management through giving precedence to state and donor-driven water reforms over mechanisms that seek to redress past injustices and unbalanced power relations in accessing water. Similarly, Sokile and Van Koppen (2004) have demonstrated how IWRM is biased towards formal state-based institutions, thus alienating the informal structures that guide day-to-day water-use interactions. Therefore, even though the IWRM approach improves previous sectoral water management and governance silos, there are limitations. It does not consider the other dimensions and realities aligned with water, which are found in the day-to-day dynamics of living with water. IWRM shortcomings leave gaps, making implementing initiatives difficult and, in other cases, imposes innovations that do not align with local people's values, thus rendering them ineffective.

For these reasons, it is helpful to consider other aspects or modalities of water relations and meanings. We face increased water scarcity and a widening gap in water access between the rich and poor, especially in Southern African cities. Essentially the importance of allowing people's needs to be heard in a field or paradigm that excludes the ordinary citizen, who is the beneficiary or intended user of the end product, is a critical reality of the Anthropocene epoch[2]. This exclusion of people's experiences has, in most cases, led to intended beneficiaries with no interest in the final product and hence the failure of most development initiatives. Stengers (2018, p.10) asserts that scientists need to earn the necessary support for different innovations. This can only be achieved if they start to hear and take seriously those questions and objections that are often dismissed as opinions of those who do not understand science. Therefore, employing approaches that consider diverse ways of being in water management is essential in outlining people's relationships with water and what they envision as a liveable neighbourhood to inform an appropriate Water Sensitive Design in Hout Bay.

[2] According to www.nationalgeographic.org, the Anthropocene epoch is used to describe the current geological time where human activities have significantly impacted the climate and ecosystems of the Earth.

1.3 How can AIME help in inclusive water governance strategies?

In response to the limitations of IWRM, several approaches have been put forward to enable better water management. These include attendance to local water ethics. A holistic ethic of relating to nature should be valued and preserved; the idea of water ethics is based on acknowledging the role of water as a source and requirement of all life and all forms of living material (Armstrong, 2009). Water ethics is an underlying principle that influences how we use, relate and value water. By exploring the diverse values that people place on water, we also see how some of our values will conflict, inspiring appropriate innovations. Furthermore, water ethics can contribute to water governance, including water rights, water justice and ethically informed decision-making related to a larger domain of human and nature interactions (Groenfeldt, 2017).

Recent propositions in line with rethinking water management include Critical Water Studies (CWS) (Mollinga, 2019). The approach considers water use, water management and governance from a broader social perspective, with an explicit relational stance that seeks to address equity, justice, sustainability and many other challenges in water situations. Mollinga (2019, p.790) states that CWS is a multidisciplinary scholarship that includes studies in water's political economy; institutional approaches; political ecology; critical historical and anthropological studies; urban metabolism and hydro politics.

I understood CWS as a response to what Latour (2014) describes as critical zones, requiring a specific response involving attention, the capacity to feel, and the necessity to be cautious, careful, thoughtful, and informed differently. According to Richardson (2017), critical zones are surface areas where complex interactions between rocks, air, water and living organisms determine the availability of life-sustaining resources such as water quality and food production. Critical zones are essential in water management as they inform linkages between different land-use practices, water availability and atmospheric temperature. Latour (2014, p. 2) states that the critical zone engages all its inhabitants in a narrative of history, crisis, conflicts and transformations that differs totally from previous strategies. Green (2020, p.17) argues that to mobilise the environmental public in South Africa, environmental management strategies should centre the "critical zone" as one that connects humans, technologies and ways of doing politics. Given the current critical stages of water shortages, scarcity and water

inequalities in South Africa, CWS may bridge or cover the gaps where initiatives miss the vital strategies and engagements needed for sustainability.

1.4 Embracing diverse ways of knowing.

The water sector has particular dominant ways of knowing that inform practice and policy, such as economics and engineering. This thesis does not dismiss the apparent benefits of such disciplines. Still, I seek to underline that excluding other ways of knowing leaves many gaps between policy, regulations and lived realities, making implementing decisions with several shortcomings. This research aims to fill this gap by showing the diverse ways of relating to water, coping with water and sanitation challenges and connections that enable liveability in the various locales that I researched in this study.

Since many ways of knowing also imply a certain level of ambiguity or confusion, which can be a source of conflict, we should embrace this discomfort. Ambiguity is a call for diversity and reflects the multiplicity of interpretations and meanings. Ambiguity can also be a source of creativity, inspiration and innovation by triggering new thoughts. Brugnach (2017, p.45) notes that approaching ambiguity from a relational perspective invites solutions that can close the gaps between different ways of knowing by connecting different paradigms and limiting the exclusion of ideas and values. According to Brugnach and Ingram (2017), Ways of Knowing (WoKs) are a product of relationships, dialogue and attention between different actors. Many ways inform this research of knowing Hout Bay to inform better strategies that may enhance liveability.

One way of knowing water relations in Hout Bay was through stories, which informed me of its history and residents' experiences. I also got to know the area through my own experiences. I experienced what Roberts and Phillips (2018) refer to as water multiples, in which water is seen as a giver of life, joy, leisure, food and spiritual connection. In contrast, the lack of it or too much of it can destroy livelihoods and life. I realised all these variations within a few kilometres between neighbourhoods and sometimes within just a few hundred metres in the same area. Many of these experiences overlap between different seasons, as seen with flooding during the rainy winter season and sometimes limited water pressure in the hot summer, accompanied by shack fires. Hence in these instances, knowing what residents perceived as a WSD to make their area liveable was critical.

1.5 Interwoven water bodies

Nature and culture binaries are not practical. Humans and nature are linked, intertwined, and there is no one way of existing, given the diverse histories and outlooks that form many meanings and possibilities. The literature below highlights the entanglements between water, technology, all living beings and infrastructure, thus sounding the alarm that it is high time we start considering how water links both natural and human-made existence. There are many water relations, a lot of history and memories, as it picks up contaminants, bacteria, and other components of life, connecting us in different spaces and time. Water remembers and reminds us of our actions.

Bodies of Water (Neimanis, 2017), which speaks of how our bodies, the earth and living creatures are mostly made or dependent on water for survival. Thus, water connects us to other beings in many ways, through the different ways we imagine it. She proposes that we ask questions about our relationships with water to see how these relations interact –

> "If our bodies are mostly water, where does this water come from? Where does it go, and what does it make possible? How does our wateriness condition how we live as bodies, and how we become implicated in the bodies of others?" (Neimanis (2016, p.41).

To ask or answer this question, Neimanis proposes that we have to start thinking of bodies not just as humans but also consider other forms of bodies, imaginations, thoughts, and values. Neimanis (2016, p.22) notes that water is what we imagine it to be; it is in our ideas and our naming of matter that aligns to our worldview – this image we have of water is linked to our values. Sello (Forthcoming PhD) underscores the variance in understanding dammed water (a commodifiable resource) as opposed to free mountain river water in the Lesotho Highlands Water Project between rural communities, experts or government officials. They argue that meanings and signs attached to water in different contexts are lost when water becomes an extractable resource through taps and pipes or a means of job creation.

Through ethnographic studies in an Australian river catchment, Strang (2014) follows fluid relations to highlight that material and social processes are linked in human and non-human

engagements. Strang (2014) argues that while water provides a focus for thinking about meanings and material properties, it is also good to think with. How might thinking with water help us understand the various implications associated with water in Hout Bay? In Strang's research, respondents highlighted various water capacities by describing how water arouses diverse aesthetic, emotional, and spiritual responses. Thinking with water also helps us understand water's agency in multiple forms, qualities and quantities. Krause and Strang (2016) argue that thinking about relationships through water can enable designing appropriate water provision projects, as water is a generative co-constituent of associations and meanings in society.

Thus, while water meanings vary, when we think how dirty, contaminated water may cause illnesses, thinking with water here helps dissolve divides between abstract, processual and material views of entanglements between humans and other organisms. In response to Strang's ideas of thinking with water, Davis (2014) affirms the concept's usefulness as he argues thinking with water allows us to think across all scales. A liveable neighbourhood across all scales includes all aspects of living, such as housing, livelihood opportunity, food production and access to essential services. Since water is an integral element in sustaining biological and physical life, tracing relationalities of water between and within communities also capacitates the bridging of disciplinary boundaries and theoretical approaches. Thinking with water can be another way of knowing different meanings.

Strang (2004) describes how water quality can be detected by different human senses, such as through the way it tastes, looks or smells. People also have different experiences based on the water's temperature, thus being submerged in water can bring pleasure or be very unpleasant depending on how hot, warm or cold the water is. In this instance, relationships people have with water provide a range of perspectives on how people value water in different forms. It enables them to feel and be in touch with their various senses. In modern-day urban life, water is presented to humans through technology, allowing different uses such as irrigation or taking showers with minimum effort.

Linton (2010) discusses this idea as modern water, presented in technology, such as taps, pipes and canals, signifying its abstraction, scientific specification and alienation from society and the rest of non-human nature. Linton (2010, p.19) argues that this water

presentation enables us to survive without thinking of water and making our water use unsustainable. In this way, humans have lost touch with how natural water bodies are, making it easier for people to disconnect our actions from impacts on the environment. Most water technologies overshadow other water attributes and strip it of all its intricate relationships and meanings.

Wagner (2013, p.79) highlights gaps in the literature by focusing on the ways technology transforms human relationships to water in sensual, emotional and symbolic terms. They argue that while contributions to the collection of essays in "The Social Life of Water" show technology's and water infrastructure's role in using and accessing water, they do not focus on the ways technologies might support, undermine or generate emotively embodied relationships with water. For example, Veeravall (2013) discusses water storage tanks' role in constructing water inequalities in rural Kenya when wealthier families capture water in tanks and use more water for various activities than more impoverished families without storage facilities. In Chapter Four, I explore the multiple ways technology or lack thereof contributes to the quality of life and living with water in Hout Bay.

Water technologies were noted as a violent practice by Loftus (2006) (in Marcatelli and Buscher, 2019), through water meters with flow-restricting devices that dictate daily lives of poor residents in Durban by determining how much water they use to reduce costs associated with the provision of Free Basic Water (FBW). While the idea of water metres as a route to providing FBW is not violent per se and can help deliver the service, the approach is considered violent when implemented rigidly. For example, when implemented in a way that overlooks other dynamics such as the number of people in the household or any sick person requiring a lot of water. Showing water meters' liveliness, von Schnitzler (2016, p.7) describes water meters as instruments aimed at shaping behaviour, enforcing metrological scrutiny and lowering consumption. Hecht (2009; 2012 cited in von Schnitzler, 2016, p.10) links how the water meters shape social behaviour to techno-politics – where political action or policies are embedded within technical forms; the technology may shape political questions or policies aligned with the use of various technologies. In this regard, engineering and infrastructure projects are argued to act as vehicles of expression, forms of power or political goals. For these, and other reasons, it is essential to look at diverse situations and other relations when employing technology as a water management measure.

Rodina (2016) showed technologies and economic mechanisms used in implementing the human right to water in South Africa had caused several burdens to the marginalised populations through cut-offs after using up the allocated Free Basic water (also see Smith and Hanson, 2003; Mahlanza; Ziervolgel and Scott, 2016; Pereira, 2009). FBW was initially regulated as a minimum of 25 litres of water per person per day within 200 metres of the household or stipulated as six thousand litres per household per month (DWAF, 2002). However, implementation varies in different contexts, such as rural and urban areas, due to infrastructure availability, municipalities' financial and administrative capacity (Muller, 2008). Thus, Rodina (2016) argues that implementing the human right to water strategies requires changing from the short-sighted basic human needs framing towards a broader approach that accommodated livelihood needs and social justice. In my research, I explore how technology used in water delivery and management affects residents' living conditions in Hout Bay and how this may be improved through appropriate WSDs.

1.6 Water inequalities: A form of Slow violence or Biopower?

Building from the notion of slow violence (Galtung, 1969 and Nixon, 2011) - gradual, invisible violence that is dispersed across space and time, the violence of delayed destruction, an attritional violence that is typically not viewed as violence because of its slow and quiet nature - Marcatelli and Buscher (2019) focus on the invisible forms of violence embedded in water inequality between the rich and poor in South Africa. They argue that this violence informs many examples of structural and racialised inequality in water; and call this violence liquid violence, violence that has become a norm in South Africa, directed to South African citizens, mostly black and living in the poorest sections of townships or informal settlements and remote rural areas (ibid). Marcatelli and Buscher (2019) have argued that this risk exposure is an example of Foucault's (1976) notion of biopower due to the violent inaction of not improving water access for the poor. This type of violence represents the norm rather than the exception, though not directly killing people, but creating situations where their living conditions deteriorate. This is evident in Hout Bay, due to increased hazards from the deteriorating infrastructure and living conditions.

On a similar note, McDonald (2002) speaks of environmental racism as racial discrimination in policymaking, laws and regulations; the deliberate targeting of people of

colour in life-threatening toxic environments and exclusion of black people in ecological movements. Oelofse (2009) has also described the urban environmental risk as environmental racism - the unequal loading of environmental hazards on vulnerable communities, which results in cumulative impacts, a spiral of risk events and a further decline in living conditions for the urban poor. According to Oelofse (2009), Hout Bay provides an interesting variation in the spatial distribution of risk since this distribution is unequally allocated across a small geographical area. On this basis, it is necessary to employ water strategies that aim to bring spatial justice given the context of South Africa's history of segregation and marginalisation leading to present inequalities.

Rodina and Harris (2016) reported that residents in Khayelitsha, Cape Town allocated Reconstruction and Development Programme (RDP) houses, which enabled better access to sanitation and water services had a better sense of being included and recognised as citizens[3]. They noted that shack dwellers who lack adequate infrastructure and essential services indicated that they felt excluded as citizens. It is important to note that I realised that I was asking the wrong questions during my investigations, as I was often rebuked by residents when I spoke about water. They showed me that they could not live with water without proper housing. In this regard, inequalities are seen as emanating from the lack of decent, safe housing associated with sufficient water and sanitation services. We cannot talk of adequate water and sanitation and neglect the issue of enough housing as these issues are entangled.

1.7 Situating present environmental crisis in deep pasts and deep future temporalities

In the book- Rock Water Life, Green (2020, p.16) emphasises that we can no longer afford to reduce the ex-es of our time - (extinctions, expulsions, extractions, existence) as separate challenges to be addressed apart, as they emanate from interwoven sources (racism; inequalities; colonialism; environmental destruction and neoliberalism. Previous apartheid policies which marginalised non-white racial groups are still present and evident in Hout Bay and across South Africa. For example, the Valley in Hout Bay comprises mostly white

[3] RDP is a socioeconomic policy implemented by the South African ANC Government to address massive shortfalls in access to essential services and inequalities due to past segregation policies.

residents – about fifty per cent of the population on more than ninety per cent of the land (Chavis 2014). The rest of the population is cramped on less than ten percent of the occupied land in Hout Bay. The need for improved water governance, which ensures equitable access to sanitation services and water for all citizens despite socio-economic status, is evident in the Hout Bay suburb of Cape Town, particularly in the informal settlements.

Present structural inequalities between rural and urban areas and within cities are rooted in the history of segregation. They have created a variety of hazardous conditions for the urban poor with implications for environmental degradation. Solutions and interventions that deal with the current ecological crisis emanating from histories need to be sustainable by focusing on the big picture. According to Farrier (2019), deep pasts and futures flow in the present in surprising ways, and our past actions unfold in the future with unforeseen and unpredictable consequences. In this regard, all our interventions should be carefully considered to accommodate non-human others and how water flows as it facilitates thriving environments.

In the book, *A Billon Black Anthropocene's or None,* Yusoff (2018) argued that we could not talk of the current environmental crisis without tracing these events to past slavery and racism policies. People of colour have also been exposed to inhumane conditions since the initiation of colonialism, plantations and mining ventures, all of which have left devastating implications for billions of people worldwide. Furthermore, the people in marginalised areas carry the burden of environmental degradation due to limited resources such as floods, shack fires, and struggles aligned with inadequate essential services and infrastructure. Most urban slums are characterised by limited sanitation and failing sewage infrastructure, resulting in exposure to toxic contaminants for humans, soil and water. Water can infiltrate any material, carrying with it any present molecules and chemicals. What are the implications of such hazardous situations for the future? What pathogens are being created from such entanglements? Our current realities are a result of the past, while current interventions determine our future realities. As such, attempts to redesign marginalised areas such as the LN project should promote designs and strategies that contribute to spatial justice and multispecies environments.

Conclusion

This chapter shows strategies employed in water management and their limitations and advantages, water management challenges. The golden thread from the literature is that current water management strategies fall short when considering diverse water meanings but are more inclined and motivated by techno-scientific approaches that focus on economic productivity, technical efficiency, and scientific objectivity. Consequently, this renders water management approaches limited in coming up with fit-for-purpose interventions to deal with the current and future water crises whilst also addressing the historical inequities. The literature on relationships with water calls for different multidimensional and multidisciplinary approaches, which are context-specific and focused on local interventions aligning with local values, needs and how people relate to water.

The conceptual framework used in this study which is conceptualised on pluralism of modes of existence, is built on Latour's previous work on multi-natures. Consequently, it applies to considering different paradigms and diverse ways of living with water and interacting with ecology. It implies that all forms of existence should partake in the difficult learning requirement and attempt to speak to different modes in their language and veridiction principles. This study draws from the literature that speaks on other human existence with nature, impacts of human activities on the natural environment and sustainable ways of living with natural resources while outlining the diverse meanings of water. The literature informed considerations of creating a liveable neighbourhood and possible context-appropriate WSD, inclusive of users' needs.

Chapter 2: Researching Liveability: Methods, Reflexivity and Ethics

2.1 Introduction

Living with water requires us to live as bodies in common. Neimanis (2017) explained that Bodies in common refers to the relational process and circumstances that link all water bodies. In this research, I draw on this concept of commoning to explore relationships through water as the ultimate unifier for all the living - plants, critters; soils; rivers and seas in Hout Bay. For Neimanis (2017), water bodies have gestational potential, the potential to create something new, something different, as bodies-of-water are never stagnant, continually shifting and responding to relational contexts. My study formed part of a larger, Liveable Neighbourhoods Project, which seeks to rebuild an existing neighbourhood using a Water Sensitive Design. I imagined the possibilities and potential for the project to use this advantage to work with water to create something new, design a liveable neighbourhood suitable for residents' well-being, and enable multispecies worlds.

This chapter explores several ways of thinking about liveability in Hangberg and how this can be incorporated to develop water sensitive "Liveable Neighbourhoods." Tsing (2015, p.22) reminds us that humans can make multispecies worlds by shaping our living arrangements to make room for other beings and other ways of living. Multispecies worlds are liveable spaces where all beings can survive while enabling or facilitating others' continuous living. Liveability allows the thriving of various living beings or multi-natures, as different species contribute to what is liveable. Ultimately liveability is aligned with the well-being of the people and the environment around them. Neimanis (2017) highlights that when imagining how to live with water and see ourselves as connected and related to water, we connect to water's potential to create and gestate something new, original, and different. Neimanis' argument invites us to pay attention to linkages and shift from looking at liveability aspects in isolation. The greater transdisciplinary, Liveable Neighbourhood project also holds possibilities for co-creation of a Water Sensitive Design that may better suit the Hangberg context through different disciplines working together with residents.

Through the liveable neighbourhood project and my master's research, I carried out a baseline investigation in June/July 2019 to better understand residents' experiences and the modes

they employ to navigate challenges and inform what constitutes liveability in the area water sanitation use and access. My research employed grounded theory, described by Charmaz and Mitchell (2001, p.160), as a qualitative methodological approach that aims to derive ideas from an analysis of patterns and themes from collected data and lived experiences. In this case, I posed questions to residents and stakeholders relating to what makes a liveable neighbourhood regarding water use. Consequently, my research explored multiple experiences and viewpoints from diverse stakeholders by pursuing emerging themes from ongoing data analysis. Subsequently, I used themes from the baseline investigations to formulate follow up open-ended questions with stakeholders and focus groups during February/March 2020. This study also formed the beginning of the Liveable Neighbourhood project to help other student researchers within the project to think with Hangberg residents in redesigning the neighbourhood using Water Sensitive Design.

2.2. Research Site: Hout bay – Cape Town

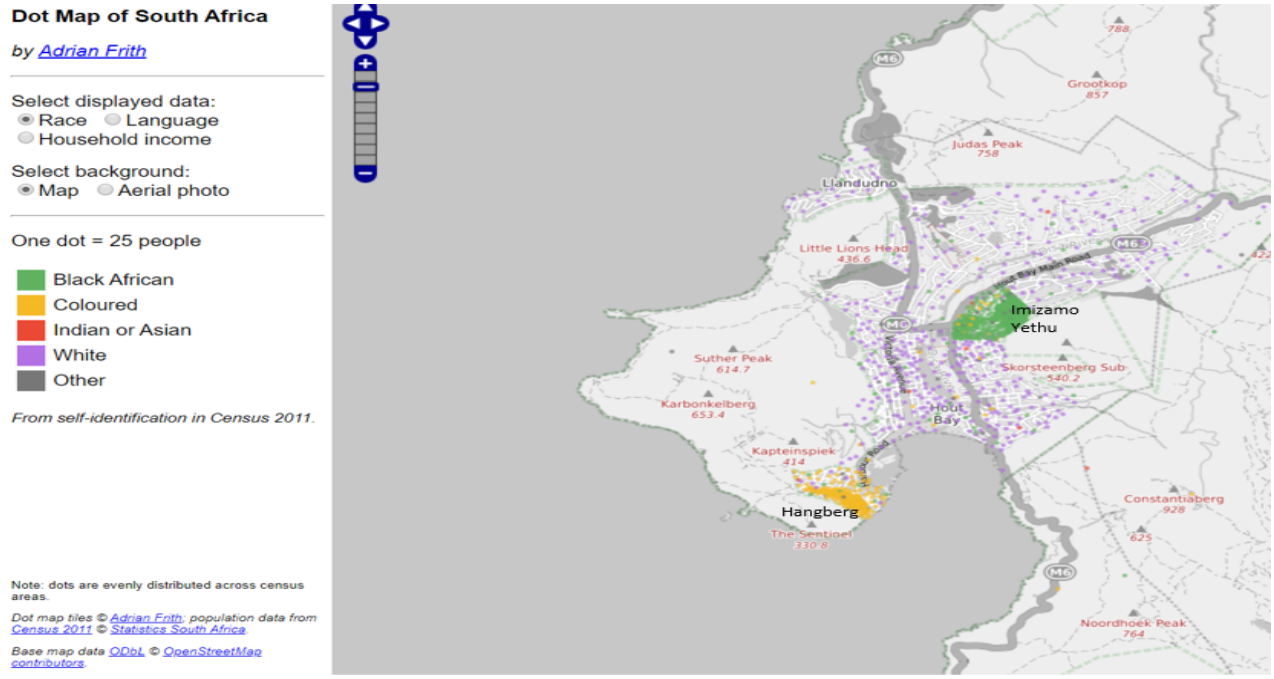


Figure 1: Map of Hout Bay

This research was based on the Cape Town suburb of Hout Bay, which comprises of three distinct sections described by Chavis (2014) as - The Valley, an affluent, wealthy area, with

mainly white residents; Hangberg has coloured residents and artisanal fishing communities; Imizamo Yethu is a black community and the most recent settlement in the area. According to Chavis (2014), the black and coloured communities are mostly poor and unemployed, while the racial tensions between the two groups are evident due to competition over the limited resources such as employment opportunities, healthcare and housing developments[4]. There are considerable differences in access to services between the diverse Hout Bay communities that live just a few metres adjacent to each other. Chavis (2014) notes that Hout Bay has been described as a microcosm of South Africa, as community members coexist in stark polar differences regarding basic services allocation. As seen in fig 2, residents in Imizamo Yethu live in a high-density area, with limited access to water and sanitation facilities and hardly any vegetation, high risk or fire disaster and flooding as compared to their wealthy neighbours, just a stone's throw away.

figure 2: Unequal Scene - Arial photograph showing spatial differences between Imizamo Yethu (right) and Tierbooskloof (left). Source (Miller, 2016). https://unequalscenes.com/hout-bay-imizamo-yethu

[4]There are about 1000 formal houses in Imizamo Yethu, 6000 households and an estimated 16 000 residents in the area (see STATS SA 2011). The white and wealthiest community which makes up about 50% of the population occupies 96% of the land, Blacks and Coloureds together occupy only 4%. The picturesque location makes the area highly sought after and the land prices very expensive. In addition, the entry of private property developers in Hout Bay led to an increase in the property value (Chavis, 2014p. 13).

2.2.1 Hangberg – Hout Bay

As required by the larger Liveable Neighbourhood project, I started my research in three different Hout Bay areas: Hangberg (the Harbour); Imizamo Yethu (Mandela Park) and Bokkemanskoolf estate. After these initial investigations, Hangberg was chosen by all project members as the most suitable area for the larger project. The baseline evaluation and site investigation revealed that Hangberg offered interesting features for detailed studies. These included a good rapport between researchers and residents; a mix of formal and informal housing; challenges associated with terrain and flooding in the wet winter; fires in the dry summer; and resourcefulness shown through residents' efforts to make the area liveable. Also, participants in Hangberg were more willing to engage in the research than residents of Imizamo Yethu. These aspects outlined diverse dynamics in one site and possibilities to generate ideas and imaginaries for a "Liveable Neighbourhood" using Water Sensitive Design principles. Accordingly, I conducted follow up investigations (focus groups and stakeholder interviews) in the Hangberg area. However, for this thesis, I also use the limited data collected in Imizamo Yethu and Bokkemanskoolf Estate for comparative purposes on some of the key emergent themes.

As indicated above, I conducted an in-depth study focused on the Hangberg area. Hangberg is an interesting community in terms of socioeconomic demographics, including stand-alone House owners, council rent payers in flats or houses, informal settlements and backyard dwellings. From interviews with residents, I learned that Hangberg was established in the early 1940s/50s through the Group Areas Act (1950) and allocated as a residential area for people classified as Coloured during apartheid time by fishing companies and the Council to accommodate the growing working population and their families[5]. (see fig 3 and Ehebrechet 2014). The area was used to house people – mostly in hostels - who worked in the lumber, farming and eventually fishing industries. According to SA History online (2015), there was a series of forced removals between 1950 to 1980 of people designated as Coloured from the Hout Bay Village and the Hout Bay Valley to Hangberg to ensure availability of labour force close to the fishing industries by the harbour.

[5] The term Coloureds largely refers to multiracial ethnic groups, native to Southern Africa with diverse ancestral heritage including Europeans, Khoi San, Xhosa etc.

One resident whose insights contribute to the story of Hangberg is Dina, a 71-year-old woman whom I met at the local recreational club, where pensioner's, mostly women, meet every Wednesday morning to have tea and socialise. Dina has lived all her life in the area, and she moved to a company flat owned by Oceana (where her father worked) when she was nineteen, just after her mother passed away and left her to take care of her sickly father and eight siblings aged between seventeen and two years. After her father passed on, the family was evicted from the flat and moved in with a relative.

> *We were a huge family in a tiny space with one bedroom: a living room and kitchen. We shared the toilet, which was outside, with other people. All my life, I have struggled to have a place I call home. About twenty years ago, I was allocated a council flat, which I shared with my sister and her grandkids. (*Dina, Hangberg - June 2019)

Dina's quote reveals some of the salient processes that have contributed to limited access to housing infrastructure capacity today. The area was not planned to provide sufficient housing for residents but to house workers close to the fishing industries. As seen in Dina's statement, her family had to find alternative accommodation when her father passed away. Suppose large families had tiny living spaces, and residents were already struggling with housing decades ago. In that case, it is understandable that due to population growth in the area, the informal site has dramatically expanded (see fig 3) to meet the demand for housing.

Figure 3: Spatial expansions in Hangberg. - Source Google Earth

Hangberg is a place in the margins in terms of its geographical location. The area is located on the Sentinel mountain slopes right on the edges of South African National Parks (SANParks) land, and the residents are considered socially and economically marginalised.

Residents whom I interacted with often mentioned that they are a forgotten and excluded community as the area has had very little assistance and development in terms of housing, water and infrastructure to improve living conditions for the growing population. Tsing (1994) argues that spaces on the margin often present a site to explore the imaginative quality of local/global formation specificity, where contradictory discourses overlap, discrepant meanings converge (Tsing 1994, p.279)[6]. Tsing (2012a) argues that in these margins, where there is the most diversity, most change is likely to happen, as they exist outside the confinements of mainstreams, giving them the advantage to be different and imagine possibilities innovative within limits. This is evident in Hangberg through a diversity of housing structures that meet different needs and strategies residents take to alleviate flooding and housing challenges. Hangberg is also on the edge of land under the control of the SANParks Protected Area - where the residents have built to make room for more housing structures. Residents were permitted to build more structures on the mountainside next to the council houses from the mid-1980s with the condition that they could only use non-permanent building materials such as zinc, wood and cardboard. However, due to flooding and landslides, residents have had to improvise and use more durable material like brick (Rubin, 2018; Ehebrecht, 2014) and discussions with residents).

Figure 4: Different building structures in Hangberg designed to deal with flooding in the informal settlement. Source – Fieldwork pictures.

[6] In this case, most residents' initiatives contradict the set regulations or even the CoCT preferred trajectories such as building with brick in the Informal settlement or connecting indoor facilities from the communal services. This is discussed in Chapter 5.

2.3 Methodology.

My research is an ethnographic study of living with water in Hout Bay. I employed ethnographic research techniques such as participant observation, face-to-face interviews with residents and relevant stakeholders, discussions with residents, and a focus group discussion to gain insights into the processes and diverse experiences that Hout Bay residents live with concerning water. These research techniques were essential to outline the different experiences people have with water in a field mostly dominated by the engineering, technical and economic aspects associated with water. Most of my data is from stories of different observations, experiences, including my own sensory experiences during fieldwork and various stakeholder engagements. Tsing (2014, p.30) notes that anthropologists learn about the social by being present; we learn about socialities by experiencing them and paying attention to life ways. Accordingly, my fieldwork was grounded on being present in the field sites to learn and pay attention to how residents live with water in the area.

2.3.1 Participant observation and interviews

Participant observation was one of my primary research methods; in this case it required that I live in the area and engage with various people to learn their different experiences of living in that space. I stayed in Hangberg for three nights and four days in the last week of June 2019 with Rachel, my research assistant and key informant, in the area. Rachel is a 51-year-old widowed mother of three and grandmother of eight children, who has lived in the area her whole life. Rachel is actively involved in many voluntary initiatives in the community and is part of a Non-Profit Organisation (NPO) called Fisherwomen For Change that focuses on children's needs. Walks with Rachel through Hangberg, stories of different experiences told by residents, and observations of the space, available infrastructure, and the environment, taught me a lot about everyday life in the area. Rachel's familiarity with the people in the area enabled the residents to engage in more in-depth conversations with me than if I was alone. It was a little difficult for residents to agree to record one-on-one interviews. Even though most residents speak Afrikaans in Hangberg, discussions were mostly in English and Rachel would translate or explain some comments made in Afrikaans for me to understand.

I also stayed in Imizamo Yethu for two nights and three days in July 2019. I lived with my research assistant in the area, a 62-year older woman affectionately known as Mama Noma.

Mama Noma does a lot of voluntary work in the community and is an organiser of the South Africa National Civic Organisation (SANCO). She was a beneficiary of a house from the Mellon Trust foundation in 2004. Mama Noma lives with her three daughters and six grandchildren in the three-bedroomed house (seventy-two square metres). Mama Noma is a very busy lady, occupied with various activities in the area such as visiting the sick, elderly residents and organising collection and delivery of food and clothing items to the needy. I followed her everywhere she went each time I visited Imizamo Yethu and got to know many areas and experiences.

She took me around and introduced me to residents in Imizamo Yethu. The air felt dry and cold between the rows of zinc structures; I could taste a mixture of sewage and dampness in the atmosphere. Using the shared toilets in Imizamo Yethu during fieldwork and hearing stories of struggles such as residents losing their children and loved ones due to fires was challenging for me, and I often had goosebumps and stomach cramps. The experiences of using these toilets, living in the damp spaces, and knowing the smells or tastes are the type of 'data' that participant observation as a method can offer, a perspective unique to this methods.

Some residents were not very keen to have discussions with me, even when I was walking with Mama Noma, who is well known in the area. From some comments, I realised that residents in the area might have what Clark (2008, p.956) describes as researcher fatigue. Individuals or groups may become tired of engaging with researchers, identified by reluctance or refusal to participate in further research.

> *"You come here and document our lives to get your degrees; what do you help us with? Nothing ever changes. I've been here since we got democracy, I have given many interviews from fire issues, service delivery and houses".* (Resident, Imizamo Yethu - July 2019).

The above statement is an example of many comments made by residents in IY who were not interested in participating in the research. Even with Mama Noma, whom they are familiar with by my side, I struggled to persuade many households to give me an interview, and even less likely was their acceptance of me audio recording the discussion. I felt very conflicted

when one respondent pointed out that researchers hardly ask what they needed but always come with research questions prepared. There I was, asking about water and sanitation issues and residents kept pointing out the need for adequate and safe housing and livelihood opportunities. In that instance, I realised the concept of liveability is not one dimensional. We could not begin formulating WSDs without considering other aspects of living in the area.

To avoid raising any expectations, I emphasised that my research aims were to understand their living experiences with water and what is liveable to them to help formulate a possible Water Sensitive Design. I often wondered to what end? How much change could the Liveable Neighbourhood Project achieve to improve living conditions in the area? Clark (2008) notes accounts of researcher fatigue were often due to a lack of meaningful change from previous engagements. Other authors (See Braithwaite et al., 2007; Moore, 1996; Tomlinson, Swartz, and Landman, 2006) have also suggested that participants may not be interested in further engagements following a history of researchers not meeting promises made. As a researcher, I felt it should be my objective to ensure I do not compromise future research projects by being honest with residents.

Living in these two areas was done to understand how people live with water and to be part of their daily experiences connected to space, including their needs and strategies employed to access water where there are limits. I also spent time walking with Rachel and Mama Noma, paying attention to the natural environment such as the vegetation, rocks, terrain, soil and the atmosphere, and built infrastructure – the type of structures, roads and open spaces to get a better sense of the area. I would stop and chat with residents who were curious to know who I was. These chats were very informative on various experiences such as challenges faced, where people originally came from, what they did for a living and the size of households. This study is based on a small sample of different experiences, some of which will be detailed in the section "Stories of Place" in Chapter three.

I also spent one day talking to a resident in an affluent neighbourhood (Bokkemanskoolf estate), observing how the household lives with water. The aim was to understand how people who have full access to water supply make use of water and choose to engage with water. While this particular resident's relationship with water does not describe how all the

other residents from the affluent neighbourhood of Hout bay live with water, I engaged with the participant to highlight another way of using water, possible for those who have the resources. Observing and participating with residents in their everyday lives and environment enabled me to understand the processes and difficulties residents face regarding living with water in the two different areas of Hangberg and Imizamo Yethu. At the same time, I cannot claim to understand those challenges fully, as I had the option to go back to my 'normal' life at any time. Therefore this thesis only explores partially, lived experiences of participants. However, participant observation and participation was an opportunity to learn about the space, history and optimism despite the challenges.

Figure 5: Picture showing sanitation facilities. Left - shared shower area in Imizamo Yethu; right – private shower area in Bokkemanskoolf Estate. Source- fieldwork pictures.

2.3.2 Ways of Knowing

I tried to look beyond the assumed parameters of extractivist relations where nature is seen as a resource for our consumption by using my human senses and intuition to connect with the environment. Wagner (2013, p.26) states that water is not merely a resource but a part of a relationship that emerges from particular experiences and interaction with the landscape. This statement has enabled me to explore different relationships people have with water during my fieldwork by linking various aspects of the landscape, both natural and human-made. I tried to connect the relationships between water use and place to enable different ways of being with and knowing water. The water sector has dominant ways of knowing, usually premised on technical designs and economic costs, focusing on risk, cost and benefit analysis, informing how policies are formulated. However, such approaches, while necessary for water

management practices, exclude other modes of knowing and experiences linked to water use, leading to variable and sometimes inconsistent water management techniques and policies that have unintended consequences for the communities they aim to assist (Molle et al., 2008; Mollinga, 2008).

Consequently, my investigations focused on how particular experiences, for instance, how burst sewage pipes shape the relationships between water (which carries the sewage), other species and people. I considered Hout Bay's unequal histories in terms of spatial distribution; how this alters the environment or landscape in high-density spaces. I contemplated this from learning about people's experiences and my own experiences during fieldwork[7]. For example, drawing from the praxis of Tsing (2012a; 2014) and Haraway (2008; 2016) on how the connections between multispecies have diverse and unplanned outcomes, my own experiences, feelings and sentiments and thoughts, (in addition to available literature) I began to know by experience the implications of raw sewage and dampness on the health of people.

As I am asthmatic, I could quickly tell there was a lot of dampness in an area from difficulties in breathing, and I could know there was a burst sewage pipe close by from the smell. In the essay – Bringing the body back into theory and methodology, Buchholz (2006) articulates, among other things such as embodiment, how corporality of the researcher may constitute an instrument of ethnographic inquiry. The reactions happening in my body in those moments and the body itself contributed to the research process. During fieldwork in Hout Bay in the rainy winter months, I observed how I struggled with breathing when inside wooden structures or felt very cold in zinc structures; such sensory experiences changed significantly during the hot, dry periods. Cerwonka and Malkki (2007, p.35) argue that we could greatly benefit from thinking about the researcher's body as a landscape for analytical insights on many issues. Following that argument, this indicated the relationship between materials used for structures and the effects I recognised from my bodily reactions. Likewise, other authors (see Farquhar and Lock, 2006; Ingold, 2000; 2011; Goody, 2002) have emphasised how senses, sensation and intuitions may contribute to the way we interact with our environment.

[7] While there is a significant amount of literature on health impacts of dampness and mould, experiencing this is a different way of knowing. I relied on my knowledge of this and my experiences in those moments to know why I felt and experienced certain symptoms.

The methodology employed in this study was inspired by Ways of Knowing (Fournillier, 2009; Brugnach and Ingram, 2017). For example, in trying to develop the story of place, I depended on residents' memories of how the area used to be compared to the present and narratives of different experiences. Our memories are not always a reliable source of information, as they are constructed every time we recall them depending on the specific circumstances during the narrative (Locke, 1971; Buzekova, 2006). What interested me in this way of knowing is how memories may shape meanings and relationships to the environment. While I used residents' narratives of various events and experiences to come up with the story of place, I also paid particular attention to the absences, who was no longer in this space, who and what was being silenced? While they may have been considered invisible and absent, I believe that these absences spoke volumes about what Tsing et al. (2017) refer to as 'ghosts' - landscapes haunted by the violence of modernity. I realised this absence is a story of ruins, which requires "arts of living on a damaged planet" (Tsing et al., 2017) to become liveable again. These arts, the authors alert us, are not a simple task and require moving beyond transdisciplinary prejudice to form transdisciplinary collaborations. (Tsing et al., 2017). They need employing many ways of knowing and inquiring into the different ways of being (Latour, 2015). The greater transdisciplinary 'Liveable Neighbourhood Project' is grounded on the above principles, through several research students from different disciplines working together with residents to develop a possible design of a "liveable neighbourhood".

With this in mind, I began to explore the history of Hangberg (the past 50 years), drawing from oral narratives of seniors who often congregate at the Hangberg community hall. The older women shared stories of how they came to live in the area, how big their families were and how people made a living back then. From these discussions, I realised that there had been a slow violence (Nixon, 2011), including the destruction and depletion of resources from the sea and, which was the main livelihood in Hangberg, and the land.[8]. Here I wondered how we might start a process of "Slow Disturbance" and "Slow disturbance Landscapes" described by Tsing (2012b, p.95) as anthropogenic ecosystems where many species can live, nurturing interspecies collaborations. How may the Liveable Neighbourhood project redesign the area to make it less hostile to other species and still more

[8] I unpack this further in chapter 3 under Stories of interspecies relations and disappearance of many species.

liveable for humans?. The relevance of these questions informed what questions I asked participants in follow up methods employed discussed below. Stories of both past and present experiences, my observation and experiences helped me understand and know what it is like to be in those spaces. Participant observation taught me that paying attention to more than water, for example housing, livelihoods, connections and social relations is important. This is reinforced in other methods as described below.

2.2.4 Focus Groups

I had one focus group with Hangberg residents. It was a challenge to plan and carry out a formal scheduled focus group discussion in the area. I would schedule a focus group discussion, and only one or two participants would show up as residents had to attend to various issues. Seeing that the neighbourhood has an informal setup, with people employed in different everyday activities that are not structured or timetabled, I decided to carry out an unplanned focus group. I went to the area and approached a few residents to join me for a focus group discussion. According to Cerwonka and Malkki (2007, p.6), fieldwork is always a critical theoretical practice, a deeply and unavoidably empirical practice; requiring a lot of improvisation. I should note this was a lesson learned the hard way as I had religiously tried *" how-to organise focus groups*" guidelines from qualitative research books without any progress.

I sat down with seven residents. Two are homeowners who live in formal housing. Both work in the fishing industry; two residents who live in the informal settlement are unemployed; one resident lives in the Council rental flat Sea View works part-time in the Expanded Public Works Program (EPWP). Two of the participants currently stay in the community hall after being displaced by a fire in the informal area. One makes a living from juggling and selling at the Harbour, and the other is unemployed. We sat down in the community hall where the two displaced participants currently stay. Participants spoke of the struggle to acquire housing and adequate sanitation and water facilities; participants noted that they saw this as a result of the Western Cape Government not fulfilling promises of building housing and upgrading water infrastructure. While the research interest for this study is living with water, it is crucial to understand other concerns aligning with living in the area, such as livelihood opportunities and housing concerns. Paying attention to these concerns is another way of considering what

residents consider to be liveable. Findings from the focus groups will be discussed in chapter five, Fluid Relations.

2.2.5 Stakeholder interviews

In line with the conceptual framework for my research, Latour's (2015) work on *An Inquiry into Modes of Existence (AIME)*, which calls on us to acknowledge other ways of being and living in the world that exist outside of the narrow modernist, capitalist and neo-liberal framing of what it is to be human. With that in mind and the transdisciplinary Liveable Neighbourhood Project requirement, I conducted interviews with several stakeholders in Hangberg. This was done to understand multiple modes of living with water and inform WSD in Hangberg. In November 2019, I followed the CoCT research guidelines to interview relevant stakeholders who work in Hangberg. The process involved submitting my research outline, a description of methods to be used; ethics clearance for the Liveable Neighbourhood Project and my research; a list of details of what I required from the CoCT, and proof of registration to show I am a registered student. I obtained a letter of approval in December 2019 and started the interviews with the officials mentioned above in February 2020. Interviews with all these stakeholders were recorded and transcribed using NVivo software.

One of the most relevant stakeholders in Hangberg is the Peace and Mediation Forum (PMF), consisting of residents who are responsible for mediating between residents and City officials for the provision of services such as electricity connections. In September 2010, the Hangberg uprising, which was a conflict between the City of Cape Town (CoCT), Western Cape Government, SANParks and the community of Hangberg, started when the Sentinel (the mountain above Hangberg) was put on auction[9]. Residents were angry and insisted if SANParks were going to sell the mountain, they would stay there because there was a great need for housing in the area. There was a two-day conflict between the authorities and the community after the structures put up on the mountain were demolished, leading to the case going to court to find a way forward. The Judge recommended the need for mediation, leading to the Peace and Mediation Forum (PMF). All parties involved signed a Peace

[9] This information was obtained from interviews with PMF chairperson Mr. Jan Lewis; Hout Bay Councillor Mr. Robert Quintas and discussions with residents.

Accord, which talks about housing, service delivery, social plans, and education. The PMF is responsible for ensuring continuous engagement between the CoCT and Hangberg residents regarding this Peace Accord.

I was introduced to Mr Jan Lewis (PMF Chairman) by Rachel and had a face to face interview within August 2019 to understand the PMF functions in Hout Bay. Mr Lewis gave me details of some stakeholders that the PMF works with from the CoCT, including the Hout Bay Councillor, Mr Roberto Quintas. I emailed Mr Quintas soon after this meeting; an interview with him was scheduled by his secretary a month later in October 2020 at his office in Wale Street Cape Town. From the interview with Mr Lewis and Mr Quintas, I gathered details of relevant CoCT stakeholders who work specifically with Hangberg. Other stakeholders interviewed were Mr Waleed Adams, Head of Engineering Services (CoCT) and Mrs Susan Groenewald, Head of Informal settlement Planning CoCT, on the 10th of February 2020. The interview with Aldermen Xanthea Limberg, the MEC for Water and Sanitation, was conducted together with Mr Quintas as per the MEC's arrangement on the 27th of February 2020. Details and insights from these meetings are discussed in Chapter five – Fluid Relations.

2.2.6 Workshops

Paying closer attention to how we imagine, think about, interact with and use water, and attempting to forge alternatives to our dominant imaginaries is not just a thought experiment; it is a means for cultivating better ways of living with water Neimanis, (2016, p.26). I designed workshops employing decolonised facilitation techniques that focus on drawing from new knowledge systems and tapping into unconventional learning methods to challenge top-down approaches in the water sector. The workshops aimed to employ skills obtained from a ten-week facilitation course offered by the UCT Global Citizenship Programme[10]. Two workshops were planned, a design workshop and a validation workshop where I would present my research findings to residents and stakeholders to ensure I do not misrepresent or exclude facts and values from the research. The validation workshops are necessary to have a consensus between all parties involved on the problems and the set of actions required to move forward and form data triangulation. Since many residents in Hangberg have

[10] See globalcitizen.uct.ac.za/decolonisingcitizenship .

improvised and employed strategies to connect individual facilities from the communal taps and sanitation infrastructure, indicating they have particular designs that they envision their living spaces and neighbourhood to be, I planned a design workshop.

Although challenging, I choose this kind of engagement because it would have enabled the researchers in the larger transdisciplinary Liveable Neighbourhood Project to learn what the residents living under diverse circumstances consider as liveable considering the present challenges. Participants were to do a mapping exercise of the area as they know it now and draw a map of what they imagine for Hangberg to make it liveable. In these workshops, at least two representatives from different sections were to use blocks and drawing to show an outline of their site and possible action to improve the current conditions. The workshops were planned for March and April 2020, respectively. Amid developments and challenges associated with Covid-19, both workshops had to be suspended. As a result, due to time constraints, even though I may continue to engage in the planned workshops, data from the process will not be included in this thesis.

2.3 Ethical considerations and Reflexivity

To ensure I gained the community trust and willingness to participate in the study, I communicated the study's purposes and intentions from the onset to establish rapport and fair, honest relations with research participants. Babbie (2014, p.325) describes rapport as an open and trusting relationship between the researcher and research participants, built through genuine interest by the researcher in understanding participants' experiences. This study might raise community expectations on the provision of better water facilities and improved services. Therefore, my ethical mandate was to clarify that the research aims to determine the community's experiences regarding living with water. I gave participants all necessary details about the study, including the Larger Liveable Neighbourhood Project's aims and that other student researchers in the project may become involved in the various activities I carried out. My research ethics were reviewed and approved in multiple departments - the Anthropology department and Engineering and Built Environment for ethics approval for the LN project.

Participation in this study was voluntary, based on the understanding that there would be no payment for participating in the research. Secondly, participants were informed of their right

to anonymity and 1 used pseudonyms to give them privacy. In addition, I told participants the information obtained in this study might be published in scientific journals or presented at conferences or meetings pertinent to the area. Since I am a student researcher, the data collected belongs to the University of Cape Town (UCT). The information will be disseminated within academic space and probably be publicly available. On completion of my thesis, the data might be available in the library. The above was done both verbally and through the signing of informed consent forms.

During fieldwork, I considered my position as a UCT student researcher who lives in Rondebosch, an affluent neighbourhood in the Southern Suburbs of Cape Town. My position might influence interactions with research participants. Not denying that I currently hold a position of privilege in these circumstances, I live in a high-income area not lacking any essential services. However, my history of growing up in a high-density suburb, a low-income neighbourhood in a small town of Gweru in Zimbabwe, helped me relate to and understand many experiences in the area. Haraway (1988, p.592) informs us that all knowledge comes from the knower's positional perspectives or particular experiences through what she terms "Situated knowledge". Haraway (1988) further argues that it is plausible to produce knowledge with greater objectivity when one acknowledges and understands their position in the world than from claiming to be neutral observers. With my own previous experiences of limited water access, I did fieldwork and data analyses knowing that costs and economics aligned with water use should not be the only water management priority. I also understood the positive impacts of simple things such as a fruit tree or a small vegetable garden in elevating hunger in neighbourhoods.

> "To say that understanding is always a situated practice is not simply to acknowledge that we always bring personal "bias" (conceptual and personal fore-understandings and prejudgments) to our research. It is to say that we always understand through a set of priorities and questions that we bring to the phenomenon or object we are researching. While scholars might not acknowledge the elements that inform their research, the elements are nevertheless there, invisibly so. This point bears on the important question of how one's personhood is also a condition for knowledge claims, rather than a deterrent to understanding" (Cerwonka and Malkki 2007, p.28).

Through the journey of collecting data, I started remembering many similar experiences of limited or restricted access to water services due to lack of affordability or infrastructure. For example, when I was fourteen years old, I came home from boarding school to find water cut off by the municipality for lack of payment. I remember carrying buckets to the community hall to collect water to use. While I grew up in a space with land to grow vegetables or urban farming, water was often disconnected for lack of payment, limiting the means to ensure food security and even income from selling the vegetables. I observed no fruit trees in Hangberg and Imizamo Yethu and remembered growing up; there were several varieties of seasonal fruit trees that we could pick from, alleviating hunger while waiting for the next meal. I imagined how fruit trees could make Hangberg liveable for many children amid all challenges from my own experience[11]. As I write this chapter during the COVID 19, 35 days into lockdown in South Africa and Zimbabwe, I sometimes become numb from worry and fear that millions of marginalised people surviving from informal trade will die from hunger rather than the impacts of the virus. I think of Tony, one of my research participants who makes a living from juggling and selling by the Mariner's Wharf in the Hout Tay Harbour. In this instance, I can tell stories that show most actions for survival by residents in Hangberg, framed as illegal by authorities, are not only steps needed for survival but are issues to be critically considered for spatial justice and sustainable approaches.

Conclusion

This chapter gave a comprehensive discussion of the methods employed in my study and reasons. I provided a list of the research techniques undertaken and the importance of exploring many ways of knowing in my research. I also provided a detailed discussion of how I conducted the study, my fieldwork experiences, the stakeholders, and the study participants. Lastly, I gave an account of the ethical considerations and Reflexivity. Overall, when I was in the field, I tried to be present with my being, experiences, thoughts, and knowledge. The decision was informed by Stengers (2014, p.4) call for an "[u]rgency to think and feel", adding reality, rather than subtract from many experiences in the area. In those moments, I too became part of the research as I was truly present to the best of my

[11] I refer to Hangberg more as I speak a greater amount of time in the area after it was chosen as a research site for the Liveable Neighbourhood project.

ability. I tried to think from Hangberg as we can only stand from where we are sitting, and possible actions can only start with what we have. I might not be from Hangberg, but I could relate to the informality of livelihood opportunities, the precarity of not knowing when your next meal will come from, and the hope or aspirations that gives strength to make the situation better.

Chapter 3: Telling stories of Hout bay

3.1 Introduction

This chapter focuses on stories of place, based on different stories showing the diverse and multiple ways of existing in Hout Bay to add to the dominant conceptions of place presented by urban water systems planners and designers. Here I hope to offer diverse and multiple voices of my research participants and outline the things that matter to them. These stories may help understand the various residents who call Hout Bay home, differentiated by neighbourhoods, experiences and what they envision as liveability. These stories give insight into my research question: How do residents in Hout Bay live with water, and what may be an appropriate water Sensitive design to meet their needs?

These stories are not mutually exclusive but require us to see them from a relational perspective and interconnectedness aligned with creating spaces through different circumstances or events. I tell four stories: 1st - stories of relationships and social connections of residents; 2nd -stories of interspecies relations and disappearance of many species; 3rd - Multispecies Relations and Livelihoods and 4th – stories of living with water. These stories connect in showing how residents in the areas make lives liveable, which relations and connections matter to them and what is missing from these stories. The first story of social networks shows how survival is possible without adequate services. The second story outlines how people's hostile living conditions due to high density and planning have led to many species' disappearance over the years, affecting the areas' quality of life. The third story is about different ways of knowing and livelihoods through fishing and relationships to the harbour. Lastly, the final story relating to water describes the strategies taken and possibilities or alternatives of living with water. These stories illuminate diverse notions of liveability and ideas of what make an area habitable or not.

I situate this argument in Stengers (2010, 2011) notion of *Cosmopolitics* - proposing creating spaces that may enable dialogue between multiple worldviews to give value to different practices and reduce giving priority to technical disciplines in the water sector. Cosmopolitics is another way to consider and acknowledge what Latour (2015, p.371) calls different modes

of existing – the multiple sectors, disciplines, and ways of being, which may help us become capable of absorbing plurality of values. To begin seeing the constraints of relying on one particular mode, we also have to adopt an approach called “Ways of Knowing” (Fournillier, 2009; Brugnach and Ingram, 2017), which makes evident the diversity of worldviews. Viveiros de Castro (2013, p.32) argues that diversity has the same essence as life. Different forms of living allow the possibility of life on earth for all living beings; the diverse cultural, social or human modes of being is a manifestation of natural diversity. These stories also show that when one way of knowing is considered superior to others, it prevents diversity and makes invisible relations and flows that link people and nature.

3.2 Stories of place

Understanding how and why residents relate to water and their environment in specific ways is one way to determine what is liveable from their perspective and design appropriate WSDs that meet their needs. All the struggles, sorrows and strengths gathered from talking to residents helped tell the stories of place. While there can never be a big enough platform to share the different stories, I aim to outline some of the diverse circumstances that make the three areas what they are, what processes led to the way they are and what residents envision as a liveable area. These stories of place may help determine what makes a liveable neighbourhood, as it uses the residents' voices of what is liveable. This chapter is also inspired by Adichie’s (2009) reminder of "the danger of a single story", and motivation to tell many liberating, empowering and not definitive stories.

3.2.1 Stories of relation and connection

Rachel enabled me to get to know Hangberg. Her interactions with neighbours and other residents showed me how they rely on and help each other despite many difficulties. As Plumwood (1993, p.195) argues, frameworks that recognise our dependency on the earth as a fact of human life also show that in human society, the best examples of such mutually sustaining relationships are found in care, friendship and love. This is evidenced in social networks that allow residents to rely on others for childcare or watch out for their property in Hout Bay. Similarly, Staples (2007, p.13) notes that making livelihoods is more than just

achieving an income and may include different sets of strategies to respond and cope with marginalisation or social exclusion. In this case, I realised that through social networks such as relatives and neighbours, residents manage and make it possible to partake in other forms of work where there are no institutional structures available. During our many walks in the area, a resident would approach Rachel with a problem. We often just walked into people's houses without waiting to be invited in. Rachel would urge me to come in and sit as I hesitated by the door.

Hangberg residents are very resourceful, as evidenced in many attempts to improve their living conditions by developing the housing structures to make them more resilient to flooding. Calderia (2017) states that the interrelated modes of urban production are at work in creating low-income urban areas and operate within specific forms of agency and temporality. My point here is to elaborate on the relations people have in the area, not only to each other but also to space and place. I was usually told by Rachel during our walks when I asked how she knew so much about everyone that:

"We know everyone's business here; that's how we can quickly tell if someone is going through something deep. Because the walls are so thin, and the houses are very close, we know what our neighbours had for dinner, or if they didn't eat anything. You know, this is a nosy community but in a good way." (Rachel, Hangberg- June 2019)

Rachel's words above were interesting to me because while I felt there was very little privacy between the residents, what I thought of as a form of intrusion in other people's affairs made the area liveable for others. It meant that neighbours would know if one needed help and could help without being asked. Considering the literal instability of the landscapes where some residents lives are prone to landslides, floods, fire disasters and evictions, and the force of instability in people's livelihood, it seems, reflecting on Rachel's statement, that people seek stability through various social relations. In that case, we may see the disparity and gaps in governance and policy frameworks that exclude the processes of coping, that may offer some form of strength and support to residents living in precarious conditions as seen in the quotation below.

"One *cannot survive here without the support of neighbours and friends, we watch each other's children and property, there are some people who take chances and try to benefit when there is chaos, but if we catch you, we teach you a lesson"* (Mama Noma - Imizamo Yethu, July 2019).

There is a feeling of ownership and belonging, seen in the continuous improvement of living structures to make homes. Most residents have lived in the area for generations and know each other by name. They do not know of another home and do not dream of any other home but Hangberg. How then may we plan and create liveable areas by considering the relations to the space and values of the people who call that space home?

> "If we are to survive into a liveable future, we must take into our own hands the power to create, restore and explore different stories, with new main characters, better plots, and at least the possibility of some happy endings" Plumwood, (1993, p.196)

The above statement indicates that if we pay attention to how people live together, we may see that they have solutions to cope with challenges. As the main characters in their stories, they show what strategies work to make their places liveable. Like Hangberg, in Imizamo Yethu, residents stick together and watch out for each other despite many struggles. In both Hangberg and Imizamo Yethu, social networks are a very relevant aspect of liveability from a well-being perspective. We must consider how these relations and space contribute to a liveable area in planning and designing any services. An example Mama Noma explained to me is that while there is a lot of crime, such as robberies in the area, residents help protect their neighbours' properties, such as clothes on washing lines.

3.2.2 Stories of interspecies relations and the disappearance of many species

The concept of slow violence (Galtung, 1969 and Nixon, 2011), an invisible, progressive assault that usually affects those unseen, unheard or regarded as unnecessary, came to my mind when I heard stories about the disappearance of many species. This sort of violence is so continuous and only becomes evident when the victims have become wiped out or extinct. Most of my knowledge about Hangberg came from my conversations with Rachel, as she told me many stories about growing up in the community. She would point as we passed a park with kids chasing a ball and others playing on swings and slides.

"You see that park there; I played there as a child. We would spend the day eating berries from those bushes and chasing butterflies while our parents were working. We would just leave home having had porridge before school and go back in the evening. Now there are no more berries, and my grandkids do not even know a butterfly, imagine. There are no fruit trees here. You have to get every fruit and vegetable from the supermarket. There is just no land or space for a garden" (Rachel - Hangberg, June 2019).

Fosters (2000, p.155) writes on Marx's metabolic rift – an irreparable rift in the interdependent process of social metabolism, a metabolism prescribed by nature's natural laws. The disappearance of many species in Rachel's story signifies this rift, resulting in the extinction of others species, that used to be present only three decades ago. Rachel's quote also indicates that questions of liveability in Hangberg are deeply entangled with the environmental transformations over time. The slow violence has radically transformed multispecies assemblages. Tsing (2014, p.30) recommends that to understand beings that cannot speak to us, we have to pay attention to assemblages and observe bodily form. In some instances, we may see plants growing out of cracks on concrete, a crooked tree growing next to a building. If we look carefully, we may begin to notice which plants group together and how they climb on poles or other objects to keep growing and insects gathering around them. I argue that these assemblages and bodily forms are a response, a form of resilience similar to what we see in human relations that make survival possible. How may we use this resourcefulness and survival strategies in both human communities and nature to plan and design more liveable spaces?

Tsing (2012b, p.95) speaks of contaminated diversity, a collaborative, creative becoming and adaptation of natural systems to the human-disturbed ecosystem. This contaminated diversity is not pretty, but it is what we have available at this moment to create liveable earth (ibid). Contaminated diversity is very relevant when I think of Hangberg, where there is a lot of diversity in terms of housing structures and organisation of infrastructure, enabling better living despite the challenges. A planning approach that legitimises unplanned neighbourhoods as a solution to many backlogs (as a start and then incrementally upgrade

these responses), including adaptive responses of residents, as we see in Hangberg, bungalows are built on stilts so that homes do not get flooded is essential[12].

Similar to Hangberg, as I walked about in IY, I could not help but lookout for any form of life, such as insects, plants and trees. What does the absence of these other living beings represent? Stories of many and frequent fire disasters in this area and how people from other impoverished areas continue to come to IY looking for a better life gives insights into the reasons for high human density in the area leading to little or no vegetation. Therefore, these stories speak of ruins; to make liveability a possibility. We have to make room for multispecies resurgence, Tsing (2017), where we start creating spaces liveable for humans and our partners in living, the non-human others. There is a need to begin planning areas that Tsing (2012b, p.95) describes as "slow disturbance landscapes" where humans' developments also encourage multispecies collaboration.

Todes et al. (2010) argue that spatial planning in South Africa is still underpinned mainly by economic growth, which is assumed, will lead to social upliftment and better livelihoods. For instance, the CoCT favours neoliberal approaches to economic growth and service provision, catering for those who afford to pay; causing further spatial inequalities (see McDonald and Smith, 2004; Morange, 2011; Brown-Luthango, 2020). Spatial planning in South Africa still focuses on infrastructure and roads, connecting residential areas to central economic hubs. However, this infrastructure limits multispecies engagements. du Plessis and Cole (2011, p. 437) call for a paradigm shift in urban planning from the current one framed by mechanist worldviews to one informed by a holistic living system worldview that includes all stakeholders' values and practices. They (ibid, p.443) further note that stakeholder definitions need to be expanded to include the natural environment in creating the built environment. Here the story of place, understanding the space, and that histories of extraction, displacement and segregation created present circumstances and what is liveable in that context becomes imperative in planning for multispecies liveability.

[12] Here I was thinking of Hangberg, with different structures and various building material. How do we realistically redesign or plan infrastructure in such spaces?. This part also speak to the discussion on planning below.

According to Cole (2012, p.4), regenerative design and development thinking and aspirations are increasingly of interest. Nevertheless, it remains unclear how the notion of 'place' and the regenerative approach might accommodate densely urban settings with more complex and diversified communities without obliterating natural environments. I argue again that Tsing's (2012b) concept of contaminated diversity may be a more practical approach, as ideas of redesigning neighbourhoods in low-income areas to look like other neighbourhoods may prove too challenging. What needs to be done is to work with what we have and local strategies that make the spaces liveable.

> "If we are looking for collaborative partners for a liveable earth, we must consider contaminated diversity and slow disturbance. This means telling histories of the cultural and biological synergies through which diversity continues to emerge, even in ruins".
> (Tsing 2012b, p.95)

As discussed above, diverse spaces may not always align with the modern idea of development or progress presented by orderly arrangements. The modern concept of urban planning, and urban design, which follows neat grids and similar structures in straight rows or columns, also has limits for multispecies environments. Plumwood (1993, p.193) states that the rational economy aligned with modernity as the rational cosmos is smoothly surfaced and intersected by straight lines – is orderly but hostile to living things. Moreover, modern living ideas are linked to drains and pipes, where we never see our waste and sewage, forgetting what flows down or drains end up in the ocean, our rivers and eventually back to use through natural flows.

3.2.3 Multispecies Relations and Livelihoods

Hangberg is a fishing community right next to the harbour where most people are dependent on the fishing industries for survival. The multispecies relationship between people and the ocean's habitats becomes imperative when considering the emerging organic contaminants and how they change the ecosystem in oceans. From discussions with residents, I noted how the fishing industry's closure and the regulation of fishing permits have significantly altered residents' livelihood opportunities. Many fishing companies' closure has been attributed to several factors, including the declining fish stocks and increased number of fishing rights owners, further putting pressure on the natural resource base (see Parliamentary Monitoring

Group, 2012). For example, Hangberg residents highlighted that increased complaints on the odour associated with Oceana fishmeal and fish oil production caused a reduction in the fish factories' productivity, leading to a loss of many jobs. Moreover, illegal overfishing of some international export species may cause an imbalance in the oceans' ecosystem. For example, Blumenfeld (2002) reported that the Hout Bay fishing Company was found guilty of overfishing the west coast rock lobster and hake for export to the United States and bribing fisheries inspectors.

I gathered from different narratives how the closure of most fishing industries, the primary employment sector for most residents, has left many unemployed people and limited livelihood opportunities. One woman explained that people were never hungry back in the day as fish factories always gave away fish offcuts to those who wanted. Those working in the harbour always brought fish home from work. Catering for the global market in unsustainable ways may have led to decreased fish and seafood in the harbour, a perspective held by some Hangberg residents:
"*The ocean was full of food, now fishing quotas restrict fishing activities, and our sons lose their lives while trying to make a living from poaching in the harsh conditions at sea",* lamented JoAnne (Hangberg, July 2019), a woman in her 80s who lost two grandsons from drowning while fishing illegally.

The erasure of human-nonhuman entanglements and transformations of multispecies relations dramatically affect liveability for people in Hangberg, as seen through struggles to make a living due to policy changes that misalign with lived realities. According to Anderson (2015, p.319), the Department of Forestry and Fishery (DAFF) adopted a resource-oriented approach through the Marine Living Resources Act (MLRA) of 1998, which aimed to transform the fishing sector. However, this act seems to be benefiting the big players in the industry as opposed to the small scale fishers as it was intended. Several writers have outlined that new policies restrict small scale fishers' experiences and silence their ways of knowing the trade through regulated use of logbooks, issuing permits that impose fishing times and species, areas to fish, and size of the catch (see Marine Policy Vol 60). Research on the use of logbooks by small fishers in South Africa – for example see Rogerson (2015, p. 326) - suggests that fisheries policy in South Africa is based on the assumption that fishers

are economic beings who will overfish for financial gains and therefore require regulations based on science and economics. This approach does not reflect fishers knowledge which is difficult to document on logbooks, thus silencing the traditional knowledge and lived experiences of small scale fishers. The modernist separation of nature and people requires increased surveillance to ensure compliance. Norton and Jarre (2019) have shown that in terms of illegal fishing practices, the decisions taken by fishers' are not sorely for economic gains. They may be choosing food security, and in other cases, they may not agree with the legitimacy of the illegal categories. Therefore, the duties of marine compliance inspectors do not consider the realities experienced on the ground - by both the fishers and the inspectors making enforcement of regulations difficult.

In their research detailing defiance and disobedience of fishing regulations in St Helena's Bay, Schultz (2015) notes that many study participants argued MLRA of 1998 strengthens existing imbalances and further undermined the livelihood of "real fishers"[13]. This resulted in increased defiance and non-compliance, arising from small scale fishers' socio-economic needs and powerful moral motivations including a sense of pride in denying the regulations that restrict their rights. Therefore, Schultz (2015, p. 336) argues the militarised enforcement of compliance is bound to be counterproductive as it overlooks the moral dimension, connections to the ocean as a cultural identity and multiple ways of knowing that are not aligned with science and economics. We can see this in Hangberg, where many have lost their lives trying to make a living in the multi-generational trade of fishing, which is now criminalised as one dimension of being is given precedence. Due to many complex regulations in the fishing sector, most fishers have to resort to poaching, which is often possible at night and dangerous conditions. Some participants explained that apart from the limited livelihood opportunities, they choose to make a living through fishing as it is "in their blood and their right", and they are instinctively drawn to the trade.

[13] According to Schultz (2015, p.333) a "real fisher" is someone for whom fishing is central to their economic wellbeing and cultural identity. Claims to being a real fisher are justified due to reference of multigenerational relationships with the area and fishing industry, thus the socio-economic and ecological dynamics are deeply interlinked

3.2.4 Stories of cosmologies

In trying to ascertain a story of Imizamo Yethu, I asked many people how they came to live in the area and what differences they could tell me from back then and today. Most people responded that nothing had changed; they have always struggled since they came to the area; things are only getting worse. I noted the relationship between cosmos, worldviews, need and fire disasters from Zuki's story.

When I came here 20 years ago from emaxhoseni (Eastern Cape), my sister had organised a job for me where she works as a maid. I would stand-in for her while she was on maternity leave then take care of the baby when she was ready to go back to work. I hoped for a better life, but it's hard. My shack was burnt, and my 2-year-old daughter died. I thought I was being punished for refusing my nieces to come here after they finished grade 10, but what could I do? I did not have enough space. (Zuki Imizamo Yethu, July 2019.)

Zuki's comment tells us several stories, including the need for people to move to one area for livelihood opportunities, demand for housing, cultural beliefs that may lead to relatives allowing their kin to come to stay with them even when they may not have enough resources to accommodate them. Zuki believes that her child died in the fire because her ancestors were punishing her for not helping her nieces. Zuki explained in her Xhosa culture, it is thought that if you do not support your relatives, you upset the ancestors, and tragedy will follow you. Hence another reason why many people quickly accept their extended family members who come to Cape Town looking for better opportunities even though their living conditions are not suitable, causing an influx of more people in the area. The proposal here is to slow down reasoning, and give rise to the kind of thinking that may enable unlearning the single ontology governance and policy formulation (de la Cadena, 2010). A one-dimensional worldview based on economics and scientific calculations to fit the modern idea of rationality as seen in the fishing policies that do not align with fisher's worldviews has proved ineffective. *S*tengers (2010) warns us to be cautious of political alliances based on science and make political decisions rationalised on science's superiority over mystic and occult worldviews. Stengers (2014) further argues that another science is possible, which considers lived experiences and questions that are often discarded as opinions that interfere with scientific progress.

Imizamo Yethu and Hangberg link people to their histories as many generations have lived there, represent substantial social capital for residents and offer livelihood opportunities that enable many people to survive. For example, most people in Hangberg make a living from various activities associated with the harbour, such as fishing and working in fish processing industries. At the same time, most residents in Imizamo Yethu are employed in the nearby affluent areas as domestic workers, child-minders/carers or gardeners. How may we better understand the space from a well-being perspective if we consider people's beliefs and culture through what we learn in these stories as proposed by Stengers (2010) in *Cosmopolitics?* From the different stories told by residents, it is most probable that many people in the areas are happy staying close to work and to people whom they depend on for social support.

There are diverse cultural and religious identities in Hout Bay, including residents who identify as Rastas, mixed African religion, Apostolic church, Zionist, Muslims, and Christians. This study also aims to outline the different water needs and uses arising from other belief systems. Some residents are required by their religious beliefs to worship near natural water bodies such as rivers but are restricted as the river is contaminated mainly due to limited sanitation in the informal settlements. Therefore, since my work informs student researchers within the greater Liveable Neighbourhood project from diverse disciplines such as architecture, urban design and urban planning, my research aims to bring these diverse needs of residents together for more inclusive planning and water management. I hope by telling these stories I can show how such dynamics are entangled with how people use water and why they choose to settle in particular places.

Robbert and Mickey (2013) suggest multiple perspectives reveal multiple worlds linked and made possible by different sets of practices. Therefore, cosmopolitics is a proposal to speak through collective histories where social and cosmic histories are entangled in multispecies ecologies that include built environment, technologies, beliefs, histories, values and knowledge. Haraway (2008) alerts us that earthly becoming does not happen in isolation but results from relational processes. Every action, belief, and value is entangled to form an event or action. These becoming may prove more beneficial in a world that accepts plural ways of being, rather than a good life's rigid idea. Escobar (2018); de la Cadena and Blaser (2018, p.6) call this idea a pluriverse – a world of many worlds, based on the presumption of

divergent wordings always coming about through negotiations, enmeshment, crossings, and interruptions. This idea requires encounters of different knowers to come up with new concepts of re-making the world.

3.2.4 Stories of living with water

My storying process meant to outline experiences and glimpse the possibilities envisioned by the residents as liveable. While investigating three different areas of Hout Bay, one of my research participants was Craig, whom I was introduced to by a colleague. What interested me most about Craig is his desire to live sustainably with nature. Craig's story outlines another way of relating to water that is different from the urban norm of relying on municipal water. Craig lives with his wife and two sons in the Hout Bay neighbourhood of Bokkemanskoolf on a property on 1000 square metres of land. Craig uses several ecologically sensitive techniques such as an eco-pool which is chemical-free. The pool can be filled up by rainwater and employs different water filtration plants with an energy-efficient pump.

"One of the advantages of using a chemical-free pool is the health benefits; for example, my son, who has terrible eczema, can now swim without problems as there is no chlorine. This water is so clear and clean you could even drink it." (Craig, Bokkemanskoolf Estate - July 2019)

Craig also has a water-saving system that utilises and collects greywater from household uses such as laundry, bathes and dishes. The system makes use of a natural filtration system assisted by plants to water the vegetable patch, the fruit trees and lawn. Rainwater and greywater from the household are captured and stored in tanks for reuse. According to Craig, the water-saving strategies were motivated by his love for nature and the maintenance of biodiversity. For example, the natural swimming pool mimics rivers' natural ecosystems and attracts many species such as birds and frogs who can benefit from the pool. Tsing (2017) argues that sustainability is a multispecies affair, requiring multispecies resurgence and the making of liveable landscapes through many organisms.

"*I think it's two things I've always had a very strong environmental consciousness, so the idea of saving water generally inspired this system. I think we kind of had this idea of being off the*

grid and being self-sufficient, saving water, and obviously, the drought was coming and caused panic, which led me to start the process". (Craig, Bokkemanskoolf - July 2019) responding to what motivated the water-saving strategies.

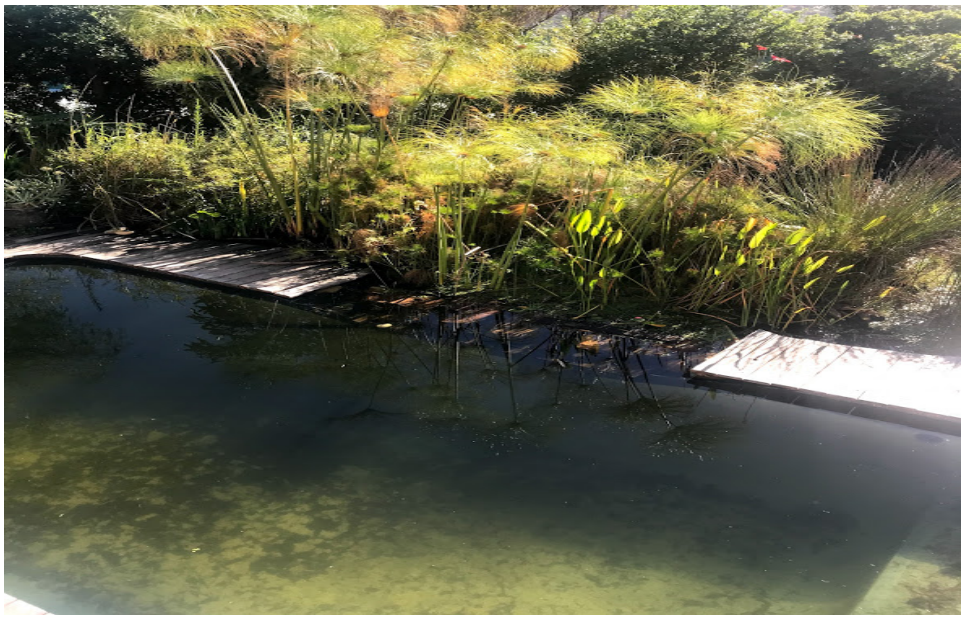


Figure 6: Craig's Eco-Pool – source: Fieldwork Pictures.

While Craig in Bokkemanskoolf showed initiatives to store and use greywater, mainly motivated by the impending day zero that threatened the CoCT, residents in Hangberg and Imizamo Yethu experience what middle-class citizens would have faced if rains had not alleviated the drought in the rainy season of 2018[14]. Their need to store rainwater and greywater is an everyday reality that arises from insufficient water pressure, limited water supply, and some high cost water bills - highlighting social inequalities and stark polar differences in access to resources and services. Also, Craig's water-saving strategies comes with high costs and require massive investments by users. People's relationships and experiences with water are connected to different histories, such as spatial inequalities resulting from past segregative policies. They are also linked to imaginations and privileges, as seen in Craig's story, who envisions and values an ecologically friendly approach and can afford to set up such a system.

[14] Day Zero refers to an anticipated day during the 2018 Cape Town drought where residents' taps would have run dry and the residents would have to collect daily water rations of about 25 litres per person per day.

Therefore, we see that experiences of living with water for residents of Hout Bay, who live just a few kilometres apart, differ significantly. In Imizamo Yethu, Mama Noma took me to a house with water coming from underground. The area residents refer to it as *emthonjeni* (Xhosa word meaning well, spring or source). The house owner refused an interview with me and stated that many people have come to speak about this, but nothing has been done.

"*This place used to be a nursery before the Irish build houses for us,*" *that well must have been buried underneath, but the water refuses to give up*. (Mama Noma - Imizamo Yethu July 2019).

In Hangberg, water flows from the mountain every day in the rainy season, and residents stated that this had been the case for many years. I saw two houses in the informal settlement of Hangberg where water comes out of the ground, breaking through the cement floor every rainy season.

Figure 7: Water coming out of the ground in a shack in Hangberg. Source - Fieldwork pictures

"It has been like this since I came to this area in 2004. I have never seen this place dry. It gets worse when it rains, sometimes it looks like a little stream". (Tony, Hangberg resident - June 2019).

Here, we also see examples of nature refusing to give up, as discussed above, on paying attention to bodily forms. The water that breaks concrete floors says something, how can we turn this from inconvenient to something useful for residents? My point here is to interrogate how these water points may be usable water sources to limit reliance on municipal water in the area, reduce flooding problems during the rainy season, and limit water wastage when we should be storing and reusing as much water as possible. Some residents who participated in the research in both areas mentioned that it could be worthwhile to find ways to capture water from these various sources. In the next chapter, I will discuss several strategies to reduce flooding using Nature-Based Solutions.

Conclusion

In this chapter, I presented different stories of the place Hout Bay to highlight residents' diverse experiences and needs, to show that a monolithic approach based on the technical, scientific and economic logic of water management is not adequate. As such, water management strategies should consider people-centred methods. Firstly, I described relations that residents in Hangberg and Imizamo Yethu have with each other and their role in making the areas more liveable amidst the limited facilities. I then presented stories of multispecies relations, the disappearances of many species in the area, and how this impedes many residents' liveability and livelihoods. I also outlined how strategies linked to marine management focus on one way of knowing to restrict the livelihoods of the people in Hangberg who depend on the harbour for survival. I argued that an inclusive urban planning approach grounded in residents' needs is required. Lastly, this chapter showed possible or alternative ways of relating to water for those with resources through the example of Craig's relationship to water and his water-saving strategies. Also, I discussed possible water sources pointed out by residents that may be utilised for diverse needs that do not require potable water.

Chapter Four: Alively Infrastructures

4.1 Introduction

This chapter aims to show the connections between the quality of life, the quality of infrastructure available, and liveability in three diverse Hout Bay suburbs[15]. This is done by exploring the visible and invisible encounters residents have with the infrastructures in the area. Borrowing three themes - Ruin, Retrofit and Risk from Howe et al. (2016), which outline the contradictory characteristics of infrastructure, I aim to show how the infrastructure is seen and unseen in the making impediment of life in Hout Bay through actions that are meant to improve living conditions, which may in turn cause more complications for residents. For this thesis, I refer to infrastructural ruin as inadequate, broken down facilities and services; retrofit as the constant attempts to fix, repair or upgrade or act in improving, modifying infrastructures; and risk as to the cumulative hazards from exposure to contaminants, fire and flooding disasters as a result of insufficient services. I also argue the infrastructure is lively as residents are continually focusing on making it work better, thus taking a lot of their time and resources. Lively infrastructure in this regard needs constant care and attention and requires action to be viable. Therefore, the interrelations between liveability and infrastructure – thus, the "*aliveliness"* of infrastructure – is emphasised in times of protests resulting from infrastructural breakdown, insufficient provisions or services employed by infrastructures that are not affordable. More so, the liveliness I refer to is highlighted in moments where infrastructure (or the lack thereof) pushes residents to employ different strategies that enable them access to necessary services[16].

15

Alively infrastructures – This chapter's title is a creation of one word through the combination of multiple, in this case: Alive + lively infrastructures (+ lives). In the English language, this is called a portmanteau word – or a blend – and is defined as a word that results from combining two or more words, or parts of words, such that the blend expresses some meaning through the combination of its elements. In the case of Hout Bay's lively infrastructures and its active relationships and agency in the lives of residents, this combination and play of 'alive' and lively infrastructures thus express how infrastructure, in this case, has agency and acts (alive), in the context of what I refer to as lively infrastructures and the expressive aliveness in the social lives of participants. Infrastructure is combined with alive + lively to illustrate how these two inform and make meaning between each other.

16 Notably, I acknowledge Ash Amin's (2014) argument of 'lively infrastructures', which in my understanding is centred on the agency and attention given to co-construction of infrastructures; as a result of powerful systems and decisions that force designs on residents, altering their living conditions. However, I am not

As the larger Liveable Neighbourhood project seeks to co-create possible designs that make liveability better for residents, the infrastructure should be considered equally lively agents to residents. Infrastructure shapes residents' everyday living arrangements and workloads, access to services, risks, or microbes' exposure, amongst other threats. *The Banality of Infrastructure* (Anand, 2017, p.2) alerts us that while infrastructure disrepair and breakdown events seem to be everyday conditions of the political present, they also reveal how infrastructures operate with multiple temporalities that distribute life and harm. The current state of infrastructure in low-income areas such as Hangberg and Imizamo Yethu further shows how histories of injustice are remade. This chapter advances arguments on the social life of infrastructure, drawing on Howe, 2016; Anand, 2017; Anand et al., 2018; Barry, 2020; Lancione and McFarlane, 2015; von Schnitzler, 2016 and Wagner, 2013, while using empirical data from the Hout Bay area in Cape Town, South Africa to support claims made.

4.2 Stories of infrastructure Ruin

During fieldwork, I encountered water flows in the streets – sometimes clean, other times polluted with raw sewage. Most residents indicated that this was a huge problem and would significantly improve if pipes were replaced. Water leakage is wasted water that could be used by the residents if adequately managed. I often felt conflicted seeing clean water being wasted, through leaks and burst pipes while residents struggled to get enough water pressure for domestic needs. The bursting of pipes outlines a problem with material and theoretical implications. At the same time, it highlights that these pipes and systems (sociotechnical assemblages) are overwhelmed, misplaced, or old, requiring attention and money for fixing.

The discussions in earlier chapters about the multiple generational households highlight the biographical temporalities; connecting such temporalities to space and infrastructure in how the neighbourhood expanded through shacks to accommodate new or expanding families. However, facilities such as sewage works that did not expand to match the growing population started getting more pressure[17]. Anand (2017, p.3) states that people are thrown

pursuing the same argument in this chapter. By liveliness in the Hout bay context, I mean the infrastructure needs so much attention and constant care. In this regard, it is visible only because it does not function well or inadequate

[17] Ironically, in the Hout bay area, the sewage system was updated to accommodate population growth and the new sewage treatment plant was built at the bottom of the Sentinel (in Hangberg). Although positioned right next to, or amongst, some houses in this area, the updated infrastructural system provides inadequate

into worlds already structured by infrastructures designed in ways that reproduce political relationships in times in which they were constructed. As such, we see in most townships that residents continue to struggle with access to housing and other essential services as designed by previous policies before democracy. This point is necessary when thinking of possible future designs for liveability since it highlights the fact that design and implementation should not be trapped in the present conditions but consider multiple temporalities and how they frame futurity. According to Howe et al. (2016, p.551), we need to distinguish between infrastructures that have gone to ruin and infrastructure that was never present. In Hangberg, the infrastructural problems are enmeshment of both, causing residents to repair what has been ruined or improvise what was never there. Figs 8 - 10 below shows the ruin of the main road and burst sewage pipes.

Figure 8: Picture showing sewage leaks and bursting pipes in Hangberg. Source - Fieldwork pictures

Figure 9: Showing Infrastructural decay. – Source Fieldwork pictures

services to Hangberg residents, but serves the larger Hout Bay affluent area. The choice of where, and for whom, this sewage plant was built and whether it adequately services the area of its location is thus very informative in the context of historical forced dispossessions and removals and (re)zoning practices and policies and present inadequate service delivery.

Figure 10: Pictures showing examples of connections residents in Hangberg have made to connect water and sanitation services from communal services into their homes. *Source- Fieldwork Pictures*

Robbert and Mickey (2013) note that all kinds of technologies are dynamic and embody lively agencies– bringing forth a series of unpredictable constraints, requirements, and possibilities that cannot be theorised in terms of human usefulness alone. Instead, they tell other stories linked with histories and relations between the technical and political futures, including limited access to resources. The conditions in the pictures above are a manifestation of inadequate and ageing infrastructure that has been improvised to improve services but still does not meet the capacity, which causes bursting due to lack of repairs[18]. Moreover, the infrastructural ruin poses further dangers such as environmental contamination, leading hazardous risks described below.

4.3 Retrofit, tinkering and repair

In the book *The Promise of Infrastructure*, Anand et al. (2018) point out that infrastructure or their absence may also act as dream worlds of pledges that are actively desired and called upon by marginalised groups. Simultaneously, they tell us stories of residents' imaginations for possibilities and how they envision their living spaces. For example, in Hangberg, residents have connected to the communal water and sanitation service to have indoor facilities.

[18] This thesis describes various conditions of environmental degradation, contamination from sewage, dampness, mould and broken down infrastructure from the inception. Fig 8 to 10 show those conditions.

Barry (2020, p3) suggests that infrastructural materials are subject to corrosion, fatigue; decay; wear and tear; and processes exacerbated by neglect, theft, overuse, sabotage, hacking or environmental changes. Their endurance is a process of socio-material transformations and an outcome of evolution, relying on both users and professionals. In Hangberg, we see much transformation and upgrades by users, but very little or no upgrades from the responsible authorities; this puts more pressure on the limited available resources. An example of this is highlighted by Clara- who lives in the informal settlement in Hangberg:

> *"I was born here in Hangberg. When I got married, my husband and I started our family in a zinc structure – we used the shared toilets. After three years, we built a wooden bungalow. It is always flooding every year, so we saved up until we slowly built this brick, three-roomed house. We own this house; we built it ourselves, 16, 17 years ago. Only one room (the bedroom), a kitchen and this room (Living area and a toilet). This house we built with bricks by ourselves. Now we always struggle with water pressure – so I still have to store water in containers to use. Sometimes I do laundry in the odd hours of the nights because the tap is usually only dripping during the day."* (Clara, Hangberg -June 2019).

From the above statement, we see that Clara and her family have improved their dwelling and even installed indoor sanitation and water facilities. However, the household is still constrained by limited infrastructural capacity causing limited water pressure. In other cases, residents devise strategies to keep the water available to everyone through using the public services available and services on individual households from the neighbours and sometimes by breaking into their neighbours' toilets[19]. However, this approach transfers the costs of water, maintenance and repairs to the toilets' owners. The bypassing of electricity or electricity theft shows another example of retrofitting, creating a significant fire hazard in many informal settlements.

4.4 Lively and Risky Infrastructure

Carse (2012) explores the notion of nature as infrastructure; they argue while nature typically signifies the absence of built infrastructure, it is required to achieve desired objectives. Nature is, in consequence, infrastructure - when organised to deliver certain services such as

[19] Some toilets are outside on individual properties. The owners keep them locked because there are insufficient communal services to cater to all people in backyard dwellings or the informal settlements of Imizamo Yethu, leading to people breaking onto those locked toilets to use.

flood alleviation, food production, or situate building structures (ibid, p. 540). Therefore, the natural environment as infrastructure may aid in providing services or impeding some functions depending on the suitability for such operations. Infrastructural problems also get weaved with other environmental and social processes in complex ways, further adding challenges and risks for residents. For example, during the rainy season, flooding in Hangberg is exacerbated by water from the mountain, while limited water pressure results from the terrain and attempts to connect indoor facilities (-see Fig10 above). The statement below made by one of my research participants who was displaced by a fire disaster and now lives in the community hall highlight s the liveliness of unsuitable natural infrastructure.

> *"We used to live up on the edges of the mountain, all four families here were neighbours. Our structures were comfortable, big enough for most of our needs. We incrementally expanded as we needed and did what we could afford. It was really hard living up there. In winter there was a risk of flooding and mudslides, which forced us to build with brick when possible. windy days were the worst, it was like living outside, so much sand and dust in the houses. I used to cough a lot up there. The hall doesn't have privacy but at least its dry and clean".* (Viola, Hangberg - February 2020).

In Hangberg, residents have had to build on land prone to landslides and flooding, rendering them at risk of natural disasters year after year as seen in the above statement. Here, the liveliness of natural infrastructure and hazards from unsuitable land and the types of housing structures in the areas is visible in the unstable ground and unsuitable building structures - which lack foundations and drainages that may reduce the risk of natural disasters associated with the landscape. Showing that landscapes, pipes, building structures are lively agencies, that shape living conditions.

In contrast, higher-income areas in Hout Bay built on similar terrain do not experience flooding and water pressure challenges because they have sufficient technologies to provide the required services or the funds to remediate problems themselves (as with Craig). Some Hangberg residents have also raised concerns about dampness from the flooding and exposure to sewage, a health hazard (also see chapter two on bodily reactions I experienced during fieldwork). This means that residents are always worried about their health or when the next disaster might strike. As a result of limited services, residents live in precarious

conditions, where several assemblages of the terrain, building materials, and old pipes become lively, leading to various threats.

The liveliness of absent or inadequate infrastructure can also be seen in Malibongwe's story, where he is burdened with the social responsibility of cleaning community toilets in Imizamo Yethu. Malibongwe and his wife live right next to the community's toilets and two water taps. The couple, in their 60s, raised six children in their shack after failing to get a formal house. As the area's population increases, the couple is burdened with cleaning the toilets to avoid the smell as the toilets are less than 10 metres from their door. His story showed the burden of carrying social costs by individuals due to location or the space they occupy in the area.

> "*I clean these toilets every day. I wake up at 4 am to clean; they are right on my door; the smell is unbearable. I have approached the council to give me a contract and some cleaning material to make things better, but they don't help. The paid cleaners come only once a week, can you believe it so many people using these few toilets and they come only once! I also buy toilet paper with my money because people use the wrong paper, which causes blockages and gives me more problems. I do all this mostly from my pocket; some neighbours also leave some coins in that container there to buy cleaning chemicals. I even put lights and change globes so people can see at night and not mess. My life is tough here, but I have no choice".*
> (Malibongwe, Imizamo Yethu - July 2019)

Here we see how Malibongwe seeks to make life more liveable for his household. We also know how the low allocation of bureaucratic time and resources to clean the public toilets end up taking up time and resources from Malibongwe in his attempts to have a liveable environment. The costs of doing so are beyond household time and resource reallocation. Malibongwe has also struggled with different skin conditions resulting from his skin reacting to harsh cleaning chemicals. These toilets are assemblages of microbial worlds and toxic chemicals that make people sick and become lively in their encounters with the infrastructure that elevates or subdues them.

The stories above show us that the use of water technologies, their capacity, usefulness and restrictions may contribute to the creation of pleasant, equal and liveable spaces or not. Due to ruined, inadequate facilities, residents have had to improvise and upgrade the services. These upgrades also bring a variety of risks and hazards, either from insufficient

technological support or natural events and microbes in the environment. Albeit, the same strategies that are employed to improve liveability poses several dangers and further challenges for the users.

4.5 Residents' Planning and Designing infrastructure for liveability.

The situation of infrastructure decay and hazards discussed above needs urgent interventions. Techniques discussed in the previous sections currently used by residents to make the area more liveable should be mainstreamed into WSDs that meet the South African complex material and social conditions. Policy strategies and water managers should include the residents' innovative responses, arguably developing their living spaces to cope with various challenges. For these reasons, I argue that in South Africa, water-sensitive practices already exist – as evidenced by residents' ingenuity to design and develop water-sensitive ways to survive. Affluent neighbourhoods have pipes installed, and proper stormwater drainage systems, which disconnect them from the impacts of extreme water events like flooding and do not require proactive responses. Proactive Water Sensitive responses happen when water threats are experienced, as seen in Hangberg, where some of the homes are purposefully designed in such a way to mitigate the effects of flooding, for example, the houses on stilts. It is also essential for policymakers, urban designers, and planners to consider who the housing infrastructure is for and their values, why they are in that area, and what kind of accommodation they need? This takes us to the following discussion point related to design for purpose, meaning that housing structures and water and transport infrastructures have to align with users' needs in that area.

4.5.1 Designs for Purpose - Rental options as opposed to possible ownership?

Combrinck (2018, p.212) argues that it has increasingly become imperative to balance the architectural domain's design process with grounded knowledge that responds to users' daily needs. This includes flexible designs that allow users to adapt the building to their needs. An example in this regard is Habraken's (1961) open building concept – "a multi-faceted concept, with technical, organisational and financial solutions for a built environment that can adapt to changing needs" Cuperus, (2001). In the South African context, Toffa, Amira and Bennet (2015, p.287) state that the open building concept strongly resonates with post-

Apartheid principles in the National Development Plan and Vision 2030. Therefore, the open building concept is one valuable strategy that may give residents flexibility to design their structures to meet specific needs.

Residents interviewed in the focus groups raised a concern that when the City builds new flats, the rooms are either very small or some facilities do not work. They indicated that the structures that they make themselves are usually more spacious and match their needs. Also, they argued that Council flats did not come with a title deed as options are only to rent. Participants discussed that it is better to build their houses in the informal settlement where they do not pay rent and have a possibility of ownership of their structures. Some participants also stated that they are happy to build their own homes that meet their requirements if given land rights that ensure no one will demolish their structures. What they needed from the City is an infrastructure upgrade to improve infrastructural capacity to reduce problems associated with water and sanitation. Osman and Musonda (2017, p.224) point out that people build for diverse reasons beyond the need for shelter – causing a layering of meanings that ensure every building is a deliberate act, representing meanings and shaping the identity of owners. This highlights interesting tensions aligned with a sense of ownership in a home that one designs to meet their purpose and aspirations of possible ownership or right to tenure instead of merely renting.

Figure 11: Different structures in Hangberg: Left structures built by residents in the informal area to meet their needs, Right structures constructed by the City of Cape Town. Source – Fieldwork pictures.

Units for rentals provided by the CoCT in Hangberg exclude many people's needs. There is a set criterion for qualifying for a rental unit and may worsen backyard dwelling and expand the informal area. Thus, further exacerbating water and sanitation capacity challenges, risks of flooding and fire disasters in the area. Again, here we see the liveliness of buildings structures that are not adequate to meet the needs of residents they are meant for. Formal housing in Hangberg are mostly flats constructed at the beginning of the Neighbourhood for use as hostels and rental units for workers. Considering that the area has changed over the decades to become home for many generations, most residents are not formally employed and without fixed incomes to pay rentals and rates to the City.

White (2019) advocates for "just design transitions". These designs have to be imagined and created to be realised through investments in sustainable public housing, climate-smart infrastructure to meet the pressing current needs and future challenges. Consequently, the WSDs must meet the present and possible future scenarios such as water scarcity, income insecurities, climate change and implications of natural disasters and health pandemics such as the current COVID 19[20]. Including sustainable water use, urban food production and safe, habitable spaces for both humans and different species, making areas liveable. As such, WSDs should take a holistic approach that encompasses residents' wellbeing and their environment in the present and the future while limiting reliance on municipal water systems. The following section discusses the importance of rethinking materials, designs, and strategies to make urban living areas habitable for both humans and natural systems' wellbeing.

4.5.2 Integrating Nature-Based Solutions and Liveability

Hetherington (2019) argues for reimagining the materials we use for infrastructure regarding their lifespan and reactivity when exposed to temperature changes and other materials, as evidenced in Fig 11. This is particularly important in South Africa's low-income areas with a backlog of housing infrastructure and collapsing infrastructure. According to Dushkova and

[20] According to the award-winning water pollution, sanitation and water-related diseases researcher and epidemiologist Dr Jo Barnes, the next epidemic in South Africa could most likely be water borne as most water bodies are highly contaminated with effluent - residents near them are increasingly reporting of water-borne diseases (see Noseweek, 2020).

Haase (2020, p.1), the concept of Nature-Based Solutions (NBS) was developed to operationalise an ecosystem services approach within spatial planning policies and practices to accommodate the ecological dimension and, simultaneously to address current societal challenges. Here we have to consider the diverse needs of residents again, informing the appropriate nature-based solutions for that specific area. For example, more fruit trees and vegetation could be planted to provide free fruits, reduce flooding while cooling the environment. Nature-based solutions require reimaging how urban neighbourhoods should look, the type of water and sanitation infrastructure and building materials used.

Mainstreaming ecological processes and natural elements into the urban environment as part of the infrastructure offers opportunities for the regeneration of ecosystems services, including biodiversity, healthy soils, recharging of groundwater tables. Such processes do not necessarily have to be expensive but require necessary planning, which includes nature as valuable infrastructure in urban spaces with equal priority to the human-made infrastructure when upgrading or planning low-income areas[21]. Scott et al. (2016, p.268) caution that enhanced nature within spaces may easily be appropriated as part of a neoliberal planning discourse used for private development schemes, leading to new social exclusion processes through gentrification and displacement of the urban poor as property prices rise. According to the International Union for Conservation of Nature (IUCN) (2020, p.4), to differentiate the use of NBS for only conservation, at least one societal challenge must be addressed by the intervention (see figure 12). As such, the integration of Nature-Based Solutions in urban planning should be an opportunity to create equal places through working with residents to plan possible strategies and identify high problem areas in need of more vegetation.

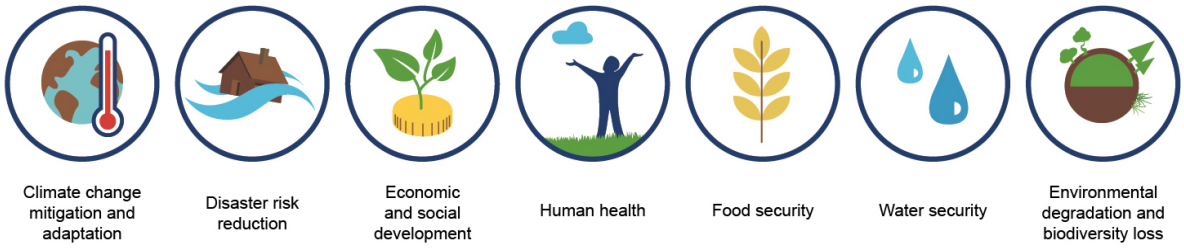


Figure 12: Societal Changes that NBS may address. Source: IUNC 2020

[21] An example is the Green Belt Movement mobilised by Wangari Maathai to plant trees in rural Kenya, which brought many positive ecological and social impacts (see Michaelson, 1994)

One possible strategy is the use of Blue/Green Infrastructure which utilises natural and human-made management practices, such as green roofs, trees, rain gardens and permeable pavements, that can capture and infiltrate rain where it falls, thus reducing stormwater runoff and improving the health of the surrounding environment (Fletcher, 2014; Carden et al. 2007; Armitage et al., 2013). Such strategies are required in areas prone to flooding, such as Hangberg. According to Harding, Chivavava and Lewis (2020, p.267), a water-scarce country such as South Africa has to consider wastewater as a resource since it is valuable in salts, minerals, metals or energy, which can be harnessed with suitable technologies. In addition to the challenge of overburdened sewage systems, not only in low-income areas but also in adverse impacts of flushing raw sewage in water bodies as done in Cape Town, the need to decentralise sewage systems cannot be overemphasised. Therefore, technologies that extract nutrients from sewage to be used in agriculture may significantly reduce the overburdened urban sewage systems while creating livelihood opportunities and food security for residents. This requires rethinking how to manage human waste differently from simply flushing down the toilet in culturally acceptable ways. Strategies such as compost toilets and urine-diverting toilets may be optimised with design and implementation inputs from the users to decentralise sewage systems when upgrading neighbourhoods instead of supplying more communal shared flush toilets in informal settlements upgrades in South Africa. Nutrients may then be used for urban agriculture to improve food production without using chemicals that further pollute groundwater sources (Mkhize et al., 2017; Ashipala et al., 2011).

Repurposing materials that may end up in landfills such as car tyres to support building structures done by residents in Hangberg instead of using concrete for the same purpose should also be incorporated in official designs. Tsing (2017) reminds us that sustainability can only be achieved through many organisms' actions. This requires employing basic strategies known to alleviate disasters such as flooding, high temperatures while capturing rainwater by planting a lot of vegetation in the neighbourhood to make multispecies worlds.

Conclusion

Urban living on the margins is made possible by sociotechnical assemblages – residents and pipes-and other water bodies coming together to make life possible. Haraway (2010) terms this connectivity "becoming with" embedded in encounters between different species and materials. In this sense, margins imply exclusion or physical location and sites presenting contradictions to the set norms to articulate the historical, social, and cultural processes that these actions are made necessary (Tsing, 1994; Lancione, 2016). These contradictions are seen in this chapter by revealing how infrastructure contributes to making living areas unpleasant or habitable and may move residents to act and make their living areas more liveable (as seen in Malibongwe's story), outlining the liveliness or agency of inadequate infrastructures.

Insufficient infrastructure also reveals how past injustices continue to be experienced today as residents in low-income areas still carry the burden of living with limited services and ruined landscapes. Conditions discussed above, which are realities of most low-income areas, dictate how residents use their time and resources in constant actions of repairing and tinkering. We may see futures, imaginaries, and innovative strategies taken daily in low-income areas to adapt and manage within limits through this tinkering. We see this in how infrastructures such as housing and water and sanitation facilities are experienced across different spaces and times and the other needs. Since the area of Hangberg was not designed for growing families but workers, present generations continue to bear the burden of the past deficient designs. Moreover, residents' strategies where infrastructure is lacking also shows how residents envision their living areas as seen through Clara’s story – has developed the family's dwelling from zinc to wooden and finally brick and installed indoor facilities from the communal services. As such, WSDs should include residents' initiatives and NBSs, in housing, sanitation and water services designs to promote thriving living environments.

Chapter 5: Fluid Relations

5.1 Introduction.

In chapter three and four, I describe diverse ways of living with water in Hout bay. Firstly, by providing different stories from the three locales' which I conducted research. Secondly, I showed different ways in which both natural and human-made infrastructure is experienced and may contribute to making areas liveable or not. The point was to highlight challenges currently experienced through city planning, governance and water management in South African cities, firmly established on a rigid economic, scientific and technical logic. Green (2015) describes this logic as the three gods/goddesses of reason whereby three giants - technical efficiency, economic profitability and scientific objectivity dominate the knowledge economy. This logic evidenced in current ideas around property boundaries and property ownership, which influence housing, natural resources and sanitation services.

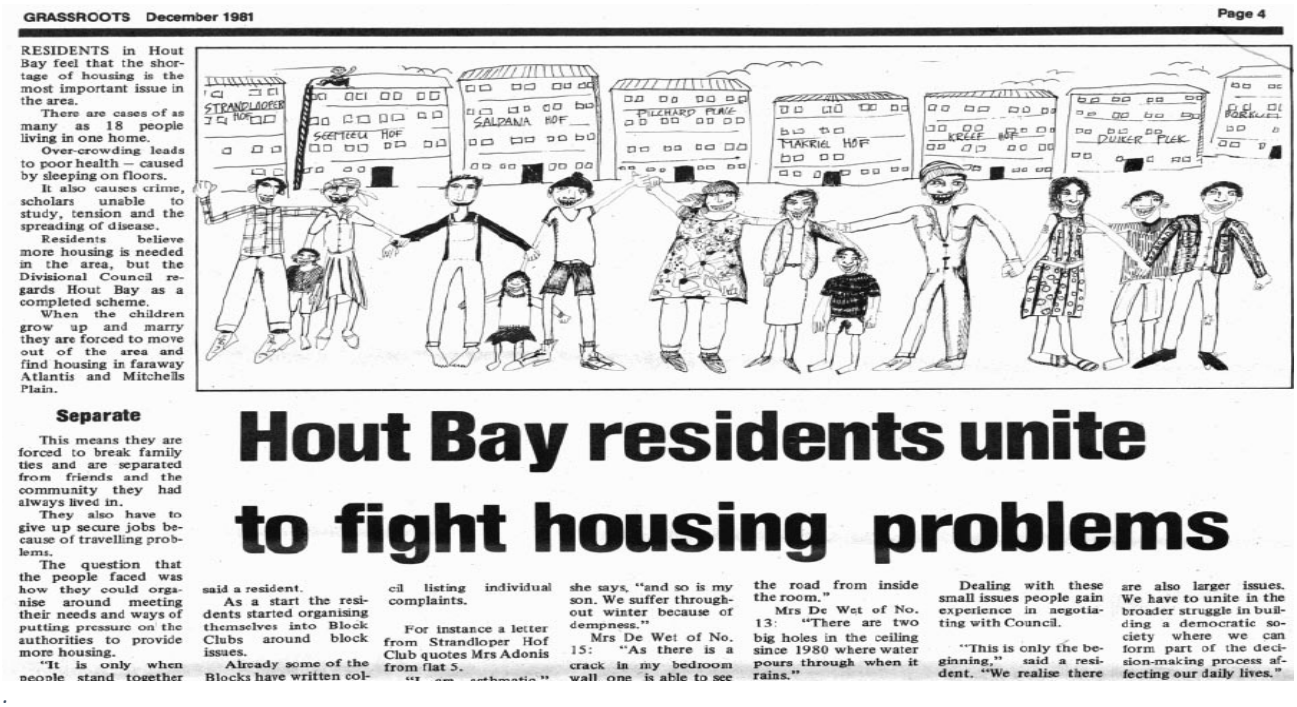
Fluid relations argues that life is made of flows, links and connections, which brings challenges when water governance ignores lived realities. Here, I will discuss several themes from the research findings to show for the area to be liveable, several issues have to be considered holistically, including policy on development, land ownership, protected areas and spatial justice. Therefore, this chapter is a synthesis of the previous chapters that explores multiple modes of existence through Latour (2015)'s work advocating for inclusivity and plural ways of being in Hangberg. In this chapter, I analyse and discuss residents' lived experiences and needs in response to CoCT interventions and plans to deal with the challenges in the area that do not correspond but leave many gaps, making it challenging to develop effective plans of action. I draw from Latour (2015), who proposes alternative accounts of evidence and truth, whose facts do not rely on a disconnected logic where the notion of rationality is only captured by one view. I argue that these problems are not new but a result of previous policies.

5.2 Challenges to getting a liveable neighbourhood

As noted in chapter three, residents in Hangberg are attached, have pride in the area and consider it their home as most of them have lived in the area for generations. Therefore, many residents strive to make comfortable spaces aligning with their ideal home. For most of us, home is a place of safety, warmth, comfort and should accommodate our loved ones.

Considering several factors such as population growth which leads to limited housing, residents have had to develop strategies that improve their living conditions. Some of these strategies are not in line with the CoCT regulations and are often considered illegal. These strategies include building with brick, as brick is a permanent structure and costs more to construct, causing conflicts when the City demolishes brick structures. Building over the firebreak, which is SANParks land, is also considered illegal. Participants argued that following these rules has not helped them as there has been no progress in getting them permanent homes or tenure rights.

The newspaper clipping below from December 1981 shows the housing struggle in Hout Bay has been going on for decades. The news article also reiterates residents' arguments that there is a generational need for sufficient housing for their families as accommodation provided before democracy was inadequate. This backlog has been building up since residents were moved to Hangberg in the 1950s during the Group Areas Act. The struggles over housing are not independent of water use and access but are part of a more significant accumulative structural deficiency in the planning and governance of Cape Town.



GRASSROOTS December 1981 Page 4

RESIDENTS in Hout Bay feel that the shortage of housing is the most important issue in the area.

There are cases of as many as 18 people living in one home.

Over-crowding leads to poor health – caused by sleeping on floors.

It also causes crime, scholars unable to study, tension and the spreading of disease.

Residents believe more housing is needed in the area, but the Divisional Council regards Hout Bay as a completed scheme.

When the children grow up and marry they are forced to move out of the area and find housing in faraway Atlantis and Mitchells Plain.

Separate

This means they are forced to break family ties and are separated from friends and the community they had always lived in.

They also have to give up secure jobs because of travelling problems.

The question that the people faced was how they could organise around meeting their needs and ways of putting pressure on the authorities to provide more housing.

"It is only when people stand together

STRANDLOPER HOF SEEFEEU HOF SALDANA HOF PILZHARD PLAIN MAKRIEL HOF KREEF HOF DUIKER PLEK

Hout Bay residents unite to fight housing problems

said a resident.

As a start the residents started organising themselves into Block Clubs around block issues.

Already some of the Blocks have written council listing individual complaints.

For instance a letter from Strandloper Hof Club quotes Mrs Adonis from flat 5.

she says, "and so is my son. We suffer throughout winter because of dempness."

Mrs De Wet of No. 15: "As there is a crack in my bedroom wall one is able to see the road from inside the room."

Mrs De Wet of No. 13: "There are two big holes in the ceiling since 1980 where water pours through when it rains."

Dealing with these small issues people gain experience in negotiating with Council.

"This is only the beginning," said a resident. "We realise there are also larger issues. We have to unite in the broader struggle in building a democratic society where we can form part of the decision-making process affecting our daily lives."

Figure 13: Newspaper article from December 1981 showing housing struggles in Hout Bay. Source: sahistory.org.za.

5.2.1Population growth and a need for housing

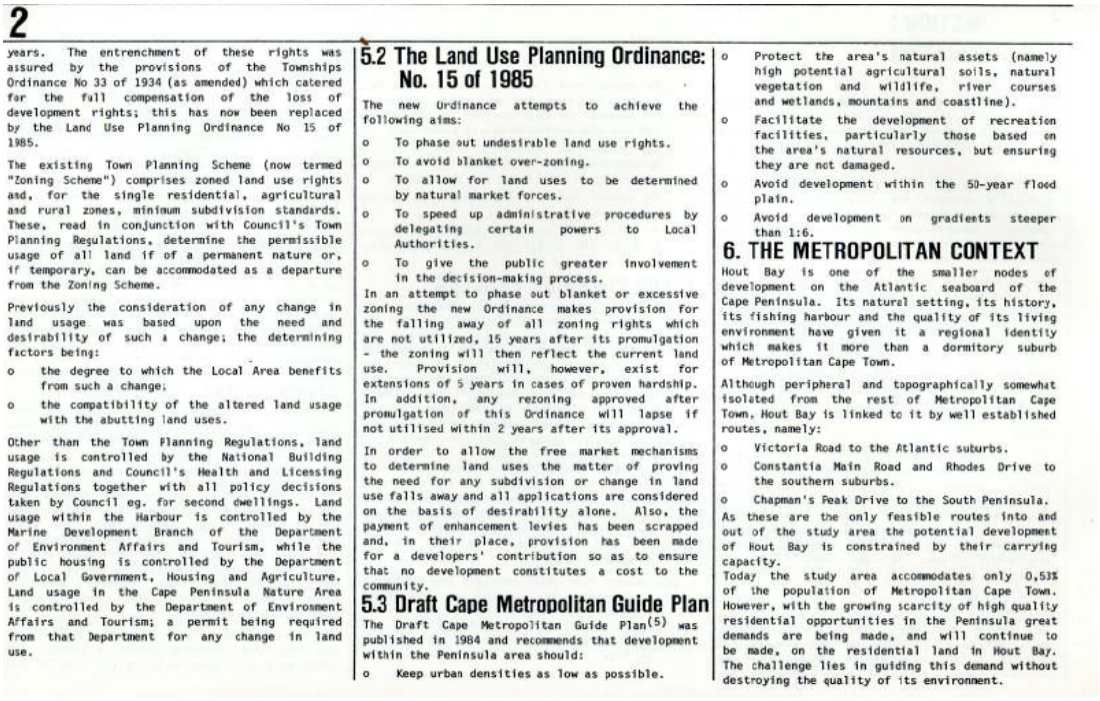
As discussed in previous chapters, natural population growth and an influx of people from other areas is a big challenge leading to a need for more housing and land to accommodate the growing population. The site's planning did not consider future population growth; thus, there is no land for possible expansion for the area. According to the Hout Bay Councillor, natural population growth is manageable, but the challenge is in the unregulated building of shacks, causing the informal area's rapid sprawling. There are people with a vested interest because they receive rent from shack farming which causes further expansion of the informal settlement. The Councillor, City Officials and some the residents interviewed cited shack farming as one of the issues causing delays in the Hangberg *in situ* Development Association (HiDA) project. Mr Adams (head of Engineering CoCT) explained that challenges causing delays in the HiDA project could only be resolved if community members stop constructing new shacks to avoid developing new plans that accommodate the newly built structures. I argue that shack farming could be reduced if there were meaningful initiatives to improve the area's housing problem. Also, shack farming is a new challenge that emanated from inadequate housing struggles experienced for decades.

5.2.2 Ownership and availability of land

As a result of the challenges discussed above, residents have built on SANParks land, over which the CoCT has no authority. City officials interviewed stated that SANParks ownership of land is a big challenge regarding upgrading the area, especially for the residents who have built over the fire break. The City has been in consultation with SANParks to access the land through power of attorney to enable road access to the HiDA area. However, there has not been any progress in this regard. According to City officials interviewed, there is no suitable land for another building project. The previously allocated free land was deemed unfit for human settlement because of smell due to fish factories' proximity, leaving residents with only SANParks land as an option.

The picture below is an extract from the Hout Bay Proposed Structure Plan (1986). It shows that land use will be determined by the market force and sold to the highest bidder, which seems to be the same trajectories in post-apartheid South Africa for land allocation. We can

see that the law which governs land ownership or property rights disregards the fundamental human needs of Hangberg residents, and the availability of land for development is only possible for high-income private developments and not for social housing.



2

years. The entrenchment of these rights was assured by the provisions of the Townships Ordinance No 33 of 1934 (as amended) which catered for the full compensation of the loss of development rights; this has now been replaced by the Land Use Planning Ordinance No 15 of 1985.

The existing Town Planning Scheme (now termed "Zoning Scheme") comprises zoned land use rights and, for the single residential, agricultural and rural zones, minimum subdivision standards. These, read in conjunction with Council's Town Planning Regulations, determine the permissible usage of all land if of a permanent nature or, if temporary, can be accommodated as a departure from the Zoning Scheme.

Previously the consideration of any change in land usage was based upon the need and desirability of such a change; the determining factors being:

- the degree to which the Local Area benefits from such a change;
- the compatibility of the altered land usage with the abutting land uses.

Other than the Town Planning Regulations, land usage is controlled by the National Building Regulations and Council's Health and Licensing Regulations together with all policy decisions taken by Council eg. for second dwellings. Land usage within the Harbour is controlled by the Marine Development Branch of the Department of Environment Affairs and Tourism, while the public housing is controlled by the Department of Local Government, Housing and Agriculture. Land usage in the Cape Peninsula Nature Area is controlled by the Department of Environment Affairs and Tourism; a permit being required from that Department for any change in land use.

5.2 The Land Use Planning Ordinance: No. 15 of 1985

The new Ordinance attempts to achieve the following aims:

- To phase out undesirable land use rights.
- To avoid blanket over-zoning.
- To allow for land uses to be determined by natural market forces.
- To speed up administrative procedures by delegating certain powers to Local Authorities.
- To give the public greater involvement in the decision-making process.

In an attempt to phase out blanket or excessive zoning the new Ordinance makes provision for the falling away of all zoning rights which are not utilized, 15 years after its promulgation - the zoning will then reflect the current land use. Provision will, however, exist for extensions of 5 years in cases of proven hardship. In addition, any rezoning approved after promulgation of this Ordinance will lapse if not utilised within 2 years after its approval.

In order to allow the free market mechanisms to determine land uses the matter of proving the need for any subdivision or change in land use falls away and all applications are considered on the basis of desirability alone. Also, the payment of enhancement levies has been scrapped and, in their place, provision has been made for a developers' contribution so as to ensure that no development constitutes a cost to the community.

5.3 Draft Cape Metropolitan Guide Plan

The Draft Cape Metropolitan Guide Plan(5) was published in 1984 and recommends that development within the Peninsula area should:

- Keep urban densities as low as possible.
- Protect the area's natural assets (namely high potential agricultural soils, natural vegetation and wildlife, river courses and wetlands, mountains and coastline).
- Facilitate the development of recreation facilities, particularly those based on the area's natural resources, but ensuring they are not damaged.
- Avoid development within the 50-year flood plain.
- Avoid development on gradients steeper than 1:6.

6. THE METROPOLITAN CONTEXT

Hout Bay is one of the smaller nodes of development on the Atlantic seaboard of the Cape Peninsula. Its natural setting, its history, its fishing harbour and the quality of its living environment have given it a regional identity which makes it more then a dormitory suburb of Metropolitan Cape Town.

Although peripheral and topographically somewhat isolated from the rest of Metropolitan Cape Town, Hout Bay is linked to it by well established routes, namely:

- Victoria Road to the Atlantic suburbs.
- Constantia Main Road and Rhodes Drive to the southern suburbs.
- Chapman's Peak Drive to the South Peninsula.

As these are the only feasible routes into and out of the study area the potential development of Hout Bay is constrained by their carrying capacity.
Today the study area accommodates only 0,53% of the population of Metropolitan Cape Town. However, with the growing scarcity of high quality residential opportunities in the Peninsula great demands are being made, and will continue to be made, on the residential land in Hout Bay. The challenge lies in guiding this demand without destroying the quality of its environment.

Figure 14: Extract from Hout Bay Proposed Structure Plan (1986). Source: Clark (1986)

5.3.2 Interspecies engagements and water availability.

The changing of seasons brings forth many challenges of interspecies relationships as water forms these connections or shapes interactions. For example, dampness and mould create a breeding ground for bacteria that is a health hazard, which is usually common in the wet rainy season. When water is limited in hot summers, dryness and wind might cause increased spreading of fires in the informal settlement due to the material used. According to residents interviewed, the summer season also brings other challenges, such as snakes coming down from the mountain looking for water. During the focus group, I was aware that there are many snakes in Hangberg during the summer season. While residents in the area have learnt how to live with snakes, they are worried about the possible danger snakes may pose to young children or their pets.

Here, the only option residents currently have for housing is to build over the fire break. The City is relying on a power of attorney to make use of the land in the Protected Area legally shows us that land rights issues are more profound than a power of attorney. There are also powerful multispecies implications if residents are not allowed to coexist with nature due to arbitrary boundaries of ownership and control. How do we justify protecting one part of the environment in SANParks land while degrading the other position where residents occupy just a few meters apart? Houston et al. (2018, p.202) advocates for the need to rethink the City-nature nexus in planning theory and practice that reinforces separated categories of nature and society reflected in land use planning and conservation planning. The idea of fencing off parcels of land from people in the name of protection might not be a sustainable way of protecting biodiversity. In this case, residents continue to build in SANParks land without permission due to the need for housing.

5.2.3 The challenge of the terrain

A third challenge in upgrading the Hangberg area is the terrain (-see fig 13). The land is too steep and unstable (i.e., rocky access points are difficult for machinery). Without access, everything has to be carried by hand, which is plan B of the HiDA project. Mrs Groenewald (Head of Informal settlement Planning at CoCT) stated that apart from the terrain, (-see fig 15) it is difficult to provide services in a mountain that is already occupied and challenging to break rocks in between people's houses. The City officials interviewed stated that plans have to be changed every time residents erect more structures on the previously vacant land.

While other stakeholders noted terrain as a challenge, Mr Adams (Head of Engineering Informal Settlement CoCT) explained that Hagberg's physical aspects are not a challenge for the HiDA project as they are engineering solutions to deal with that. The problem is in heavy machinery accessing the area, requiring construction of road access on SANParks land. In chapter four, I discuss how the landscape (terrain) in Hangberg is lively natural infrastructure, which leads to several challenges for residents on the Sentinel Mountain due to limited technologies that enable efficient functioning of services such as sewage and water pressure. I further substantiated the argument that the natural landscape impedes upgrades in an area with structures built already.

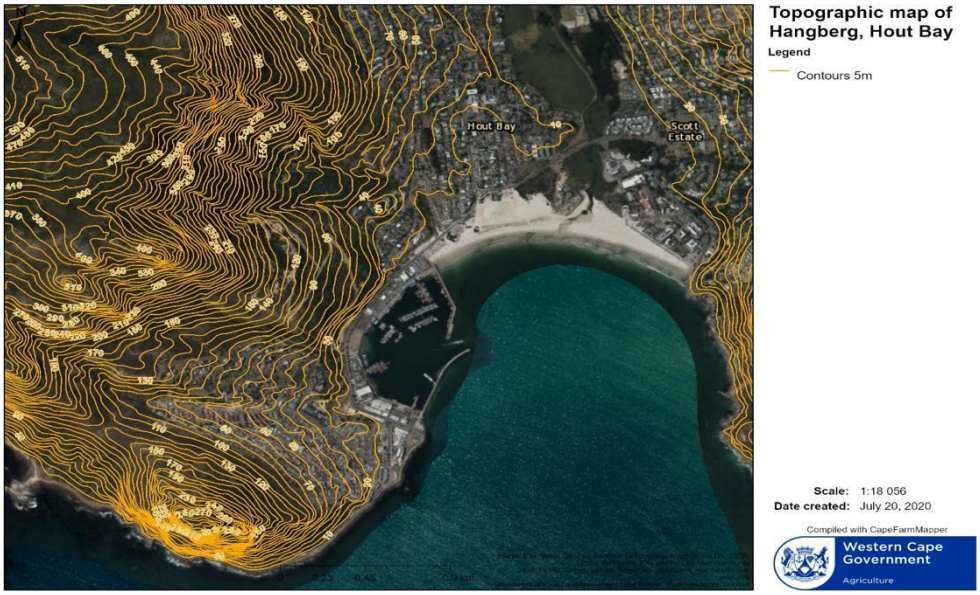


Figure 15: 5m Interval contour/relief lines for the area of Hangberg in Hout Bay. Showing the relative steepness of the landscape. Hangberg is situated on a steep slope of the Sentinel mountain in Hout Bay (source: CFM, Department of Agriculture, Western Cape Government 2020)

5.2.4 Limited communication

Participants also highlighted limited communication between City Officials and residents. Some stated that those who have connections to people in power get preferential treatment and access to Expanded Public Works Program (EPWP) jobs, and privileged access to information. From interviews and the focus group, most participants showed a strong sense of mistrust between residents and authorities, including those supposed to represent residents, such as the Peace and Mediation Forum (PMF). Residents explained that there would be more progress if the City did not take the whole Hangberg area as singular, as residents have different experiences. A one size fits all approach to dealing with many issues in Hangberg will not work. Therefore a possible strategy is consulting blocks or small areas to implement various initiatives.

The research findings indicated that while there are livelihood opportunities created from the EPWP, they benefit better-off residents, who have connections as information disseminated by the PMF only targets a few who support the forum. Furthermore, while the City has built units for rentals, there were not enough to accommodate all residents. They are for particular criteria, i.e. employed residents who can afford monthly rentals. Considering that most

residents are not employed formally, these initiatives are limited in capacity and not inclusive of all people. It is important to note that in Hangberg, the need for housing and infrastructure upgrade is not only in the informal area but also in the whole neighbourhood. Residents in old council flats complain about the old buildings' dilapidated state, and backyard dwellers need services with enough capacity to limit burst water and sewage. At the same time, homeowners are affected by turnaround times to attend to these problems.

Residents interviewed also highlighted the need for proper community engagements and consultation with community members for new initiatives such as water meters installations. Participants pointed out that the City authorities should communicate appropriately with all affected parties instead of giving out flyers which causes miscommunication. Residents interviewed stated that most protests arise due to misunderstanding emanating from limited communication between City authorities and residents. Not all community members agree with the conditions in the Peace Accord. Therefore, they do not trust information from the PMF. Even though the City meets regularly with the PMF members, residents suggest that not all parties or interests in Hangberg are being considered.

5.2.5 Timelines for planning applications and approvals of tenders

Project timelines take time from the drawing and approval of plans, budgets and awarding of construction tenders. According to Mr Adams, the challenge in this is by the time the project is ready to commence, the vacant land the plan for installing infrastructure would have been occupied by residents. In some cases, the vacant land allocated for settling residents during construction also gets occupied. This challenge leads to no progress, as planners have to go back to the drawing board and devise new plans. It also costs a lot of money to keep repeating the same processes. According to City officials interviewed, three methods have been drawn up for the HIDA project because residents do not agree to stop further construction. City officials suggest the problem is complicated as, even when people were allocated new housing in the Sea View building area – to create space in the informal area - they did not demolish their existing structures as per the agreement. Some sold their dwellings in the informal settlement, while others gave them to their family members.

In response to this, residents explained that only a few units were made available for rental and did not meet the number of residents in need of housing. Most people in the area are not employed full time and do not qualify to receive rental units. Therefore, several approaches are required to deal with the Hangberg housing issues. Inclusive measures are necessary, including rental housing, giving residents who can afford to build their homes land rights and accessible housing for those who qualify.

5.2.6 Flooding, fires and landslides.

As a result of the terrain, there is a lot of water coming from the mountain, causing flooding during the rainy season. Some parts of the area are also prone to landslides due to the quick-moving sand. The fire break serves two purposes in the area. It prevents the spread of fires and works as a channel for storm water runoff. Mrs Groenewald stated that since the fire break has been disturbed by buildings and the speed at which water comes from the mountain is difficult to stop flooding due to the terrain. There is also a need to clear the fire break/sloot of the overgrown vegetation to prevent flooding.

Mr Adams stated that current plans for upgrades in Hangberg include reconstruction and clearing the sloot/fire break to ease the runoff, however, these plans do not have any capturing/storing of the rain runoff for reuse. I noted a need to collect the water from the mountain for non-potable water uses to respond to limited water pressure in the area from engagements with residents. The Water Strategy (2020) includes harvesting water from diverse sources to limit reliance on municipal water, amongst other initiatives. Plans to upgrade the site must adopt strategies that consider residents' current precarious conditions and the environment to improve liveability. However, a challenge to capturing the water from the mountain during the rainy season is that of SANParks owning the land where the water originates from, as capturing water from the original point would be a more effective initiative.

5.3 Contradictions between community realities, City Perspectives and Legislation

According to the stakeholders interviewed, the challenges noted above can only be resolved if community members stop constructing new shacks or building illegally. Building legally

includes not building with brick, building in the legal areas (over the fire break) and not too close to each other. On the other hand, what the authorities deem to be illegal, is a valid need for residents and shows the residents' efforts to make the area more liveable. Rigid regulations erase many experiences, capabilities and potential outcomes from such processes. Latour (2015, p.190) asks how we may bring out an experience that the official and accepted accounts succeed only in suppressing? Can we provide an alternative version that does not rely on a disconnect between theory and practice? To achieve this, Latour proposes that we have to go back to the basics where existence has been cut along the way, leaving gaps or a hiatus that makes it difficult to follow our simplest and shared experiences. The data showed many gaps between residents' experiences and legislation; in this case, the legislation is one piece of the puzzle giving only a single story. Residents gave valid reasons and needs for building with brick, which is that residents improve their structures from wood or zinc to a permanent brick structure to deal with harsh climatic conditions, especially in winter, where dwellings are prone to flooding or windy conditions.

A second concern is the expansion of structures or building in illegal areas, i.e. above the fire break, as a result of population growth and lifestyle changes where young couples want to live in their households but, within proximity of the extended families, this is a reality that will continue to happen. Considering that the residents were moved to that particular area through the Group Areas Act (1950), would it be logical or just to expect them to go somewhere else? If the Sentinel Mountain was put on auction for private development in 2010 when the Hangberg Uprising took place (see Chapter Two), why is it not available for public housing development? Interviewed City officials stated that progress in upgrading Hangberg infrastructure had been stalled due to CoCT and SANParks not reaching an agreement to transfer land rights to enable upgrades. This fact will not erase the realities and housing needs of the residents. Therefore, there is a great need for collaboration between National Government departments and local Municipalities to implement various initiatives while considering other species' enormous trade-offs. Another challenge stated by City officials interviewed is that residents in Hangberg are not willing to share amenities and therefore tap into the primary connections to provide services in their private household. Perhaps we should accept that every person, where possible, would prefer individual connections to water and sanitation facilities. If residents already use their resources to

provide separate household water and sanitation services, this is a community strength rather than a challenge.

Noteworthy, regarding the gap between a resident's lived realities, and the City's initiatives, are the current rudimental plans mentioned by Mr Adams for the HIDA project, which will provide communal shared services for the residents. It is interesting to note that even when City officials know that Hangberg residents prefer to use individual household water and sanitation services, plans to upgrade the infrastructure provide shared facilities. How will authorities ensure that residents will not connect to the provided infrastructure to put services in their homes? Imposing solutions that are known not to work in that area without consultation with residents is not sustainable. These kinds of responses or initiatives lack what Haraway (2012) refers to as response-ability, the ability to respond in a way that suits the context and might cause protests or the same infrastructure capacity problems currently experienced.

Mouffe (2013) notes that social orders express a particular configuration of power relations. She argues that authoritarian solutions are not necessarily always logical as in the Hangberg conflict; thus, she proposes distinguishing between antagonism and agonism, making it possible to visualise a form of democracy that does not deny radical negativity. Mouffe's argument implies that people are not only diverse and multiple but may also be divided. Taking us back to explore another challenge noted by community members and stakeholders who participated in the study was division, as residents are divided on what measures needs to be taken. Perhaps the division results from diverse experiences and needs, showing no one solution to everyone's problems.

Anciano (2017) unpacks the connections between clientelism, civil society and democracy using Hangberg and PMF as a case study. They state that their research showed that the PMF is the only recognised legal entity through which residents can engage with CoCT, SANParks and Western Cape Provincial Government. While the PMF was formed through democratic elections, the process was not inclusive of all members, as the meetings were held in small venues. "Many residents felt excluded from discussions because they could not see what was taking place from outside; or they implicitly felt unwanted" Anciano, (2017, p.17). Such

circumstances raise questions; Who has access to relevant information or opportunities in the area? Who is excluded; what is invisible in all these processes; and at what costs? Therefore, does communication between those in authority and one entity in a diverse area like Hangberg represent a democratic and inclusive process?

As the PMF is a Peace Accord product through a court judgement during the Hangberg conflict, some may argue that residents should follow the laws and rulings passed. However, Latour (2015) argues that the law is only one mode of existing, which simply defines legal from its logic. Hangberg peace accord is a perfect example of a legal document that gives precedence to some forms of experience and knowledge while excluding others. The point of this discussion is not favouring people breaking the law but calls on the reader to appreciate other modes missing from this picture beyond the limits of the court order and its conditions. These limits cause us to identify the law's superficial and formal aspects, informing rights and governance while excluding lived realities (Ibid). Evidenced in Hangberg through recent calls by community activists for a review for the Peace Accord, they argue it has worsened the area's situation (Cape Times, 2019).

Conclusion

This chapter combined various themes throughout the thesis to highlight that living with water is connected to other networks, such as access to land, livelihood opportunities, adequate housing, sufficient infrastructures, multispecies relations and suitable landscapes. These networks connect and transform how neighbourhoods are experienced through regulations and policy frameworks that may enable habitable or hostile living spaces. In the context of Hangberg, this chapter argued there are gaps between residents' lived experiences, regulations and legal frameworks. Therefore, a holistic approach to what makes a Liveable Neighbourhood is needed, as all factors noted above are essential for sustainable neighbourhoods. All values involving environmental concerns and residents' well-being are paramount to appropriate initiatives' living in Hangberg and must be considered in the regulations and possible WSDs. Inclusion essentially limits the circulation of one value and its ability to make others disappear entirely in the debate of living with water. All the requirements can start circulating on a level playing field, including the needs of those who

disagree with the PMF and conditions of the Peace Accord as they are valid reasons for strategies employed.

Conclusion

This thesis argued that water management strategies require valuing many ways of being because one way is restrictive of diversity, limiting other methods that may make places liveable. Neimanis (2016, p.12) asserts that being bodies of water insists that if we do live as bodies' in common,' this commonality needs to extend beyond the human, into an uninhibited sense of 'we' that acknowledges the different connections we have through the water. Therefore, this thesis aimed to add other ways of relating and living with water, apart from the dominant technical and economic forms, which, while necessary may exclude many experiences and realities, leading water management practices that have unintended outcomes.

Chapter one discussed literature on various water relations, water meanings and water management strategies and technologies to show a great need to include other ways of knowing in the water sector. This is because rigid and biased approaches may fail to account for the various aspects of living with water, such as inequalities, histories, power relations and informal structures that guide day to day water use. Chapter two gave a detailed discussion on the methods employed in this study and the reasons thereof. I described my sensory experiences, thoughts, and sentiments to add reality to how residents know and experience the spaces and places. I also discussed the ethical considerations and reflexivity during the research process. The chosen research techniques were essential to outline diverse ways of living that conventional research methods may overlook. Chapter three is based on stories of place. Telling water stories in Hout Bay is a story of relationships and connections between water, insects, soil, the harbour, food, people, myths and life. These stories were crucial to show how residents make the area habitable, their values, challenges and aspirations.

Chapter four discussed how infrastructure or lack thereof is experienced in multiple ways and is lively through encounters with other beings. This chapter highlighted the liveliness of broken pipes, ill-functioning toilets and sewage systems as they frequently require attention and from residents. Chapter four objective was to show the role infrastructure may play in enhancing or restricting liveability. Chapter five connected the themes outlined in the thesis

to show the gaps between lived realities and many strategies based on regulations to improve living conditions in Hangberg. When paying attention to empty spaces in the Hangberg, what became visible is the need for housing, access to land, improved water and sanitation, and livelihood opportunities, all of which are essential aspects to the liveability and well-being of both people and the environment.

Suppose we can accept that legal requirements for any project will differ from technical requirements. In that case, we should also accept the social realities that have led to certain circumstances will vary or might not align with legal and technical requirements. Laws are not always enough to change social behaviour. Thus, social actions are not necessarily modified to set regulations or court orders (Trubek and Galanter, 1974). Understanding this will help us get a complete picture and thus enable us to find the missing link or piece of the puzzle in the Hangberg Peace Accord, as many efforts do not seem to align with residents' needs. Hangberg residents, in this case, act as Critical Planning Agencies (de Souza, 2006) by initiatives to improve their living environment. Therefore, illustrating possible alternative urban development trajectories, apart from those currently employed in low-income areas, such as uniform RDP housing and communal water and sanitation services.

In conclusion, I argue we must consider the appropriate Water Sensitive Designs within the South African context of widespread poverty and inequality and devise legislation in urban planning that protects resident's-initiated developments, natural heritage and spatial justice for the landless. Speaking of inequalities born and bred from histories of segregation, especially in areas with polar differences to access to resources such as Hout Bay without any action for redress is a continuation of unjust practices. Water Sensitive Designs that meet the South Africa context are not a one size fits all approach. They should be formulated and developed using several strategies that residents' already employ and their visions to make their living spaces more habitable with their limited resources. Through this thesis and the Liveable Neighbourhood Project, I hope to co-create with others and Hangberg residents' liveable spaces through different ways of knowing that may inform policy changes.

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