Overcoming water scarcity for good?:
Querying the adoption of desalination technology in the Knysna Local Municipality of South Africa

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Abstract

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Candidate: Suraya Scheba
Degree title: Doctor of Philosophy
Date: November 2014
Thesis title: Overcoming water scarcity for good?: Querying the adoption of desalination technology in the Knysna Local Municipality of South Africa

In this thesis I aim to query the Ecological Modernisation vision of green growth by focusing on the emblematic case of desalination technology as the solution to the threat of water scarcity. I focus the study on a drought crisis, which resulted in the adoption of desalination in the Eden District Municipality (EDM) of South Africa. Focusing on the towns of Sedgefield and Knysna, in the Knysna Local Municipality (KLM) of the EDM, I ask the questions of ‘what, how, by whom, why and to what end was desalination adopted?’ This interrogation is characterised by two movements, firstly tracing the process and mechanism through which this consensus was manufactured; and secondly countering this by examining the underlying metabolic relations constituting crisis and solution. The research was carried out over a period of 11 months, from October 2011 to August 2012, during which I undertook 91 semi-structured interviews, extensive document analysis and participant observation.

The theoretical strands drawn upon are a blending of post political theory, to inform an analysis of the techno-managerial orientation of consensus manufacture; and a Marxian relational ontology, to examine what is produced and foreclosed by the logic. This project is undertaken in five parts. Firstly, I show that the dominant representation of 'drought crisis' insisted upon the indisputability of drought as a threat posed by an externalised nature. Next, in examining the metabolism of drought I counter this narrative by showing the drought crisis to be a socio-natural assemblage, rather than an externalised threatening nature. This is a vital finding, showing that the support for the adoption of desalination technology as a necessary response to 'nature's crisis', pivoted on the maintenance of an ideological fiction, obscuring the relational 'becoming' of drought. In the third chapter, moving on to an examination of the solution, it emerges that an essential aspect of the solidification of consensus was the employment of exceptional disaster and environmental legislation which had the effect of neutralising drought as 'nature's crisis' and desalination as the indisputable solution. Enabling the urgent release of disaster funding to ensure water security for economic growth. This chapter also argues that the maintenance of the dominant crisis narrative produced an opportunity for the desalination industry, by treating 'nature' as a direct accumulation strategy. In the remaining two empirical chapters I evaluate the 'promise' of the desalination techno-fix. Through focusing on the conditionality placed on disaster funding and how this impacted on project assembly, resulting in problems and costs emerging out of the desalination solution from the outset. Fundamentally, it is argued that, rather than being external to, these problems are intrinsically connected to the mechanisms and logic through which consensus emerged in the first place. To clarify, through the preceding chapters it was shown that the basis for the 'disaster funding' release was an insistence on 'nature's crisis', as an ideological fiction. These remaining chapters show that this had the effect of placing limitations on what was spent on, when, and how much. Thereby informing project assembly, with these constraints resulting in problems emerging out of the solution. In sum, the thesis concludes that the adopted E.M. logic was a false promise that served to intensify the penetration of nature by capital, resulting in a deeper movement into crisis by moving the problems around as opposed to resolving them.
Declaration

I, Suraya Scheba, declare that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Acknowledgements

The development of this study would not have been possible without the support, encouragement and assistance of a number of people, in South Africa, the United Kingdom and Austria. I take this opportunity to offer my sincere appreciation to all of those who contributed to making it a reality.

I would like to begin by thanking the South African National Research Foundation (NRF), the Foundation for Urban and Regional Studies (FURS), and the French Institute of South Africa (IFAS Research) for their generous financial support.

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My supervisors Prof. Maria Kaika and Prof. Erik Swyngedouw have been central in guiding and informing the intellectual journey that I have taken over the last four years. I am appreciative of the wonderful opportunity to engage in stimulating discussion and receive guidance from two pioneers in my field of study. Beyond this, I am also grateful to Maria and Erik for their ongoing encouragement, even at times when my progress was slow at best. The second half of this journey was defined not only by data analysis and writing, but by a pregnancy, a baby, and an extended period of maternity leave. Maria and Erik's support, and willingness to look through meandering draft chapter submissions, was essential in helping me to keep going. Thank you for not giving up on me and helping me to believe that I would make it to the other end.
I would like to thank my family for their unwavering support. To my sisters in law, brothers in law and their children; Kathi, Michi, Gernot, Serge, Lionel, Marwin, Dorian, Magda and Hannah; Ich freue mich sehr euch meine Familie nennen zu dürfen und danke euch für eure Unterstützung in den letzten paar Jahren. To my parents in law, Vroni and Hans, I would like to say, Ohne eure Unterstützung wäre diese Lebensphase viel schwieriger gewesen. Ich möchte danke sagen für alles, das ihr für uns durch eure Unterstützung möglich gemacht habt. Wir sind sehr dankbar.

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Finally, to my husband Andreas, and son Samir. The two shining lights in my life. Andreas, thank you for making this moment possible. Having started this PhD journey together, you finished a few months ago. Since then you have taken the responsibility of caring for Samir, so that I would have the time and possibility to do the same. I am grateful to you for taking on this responsibility, and so impressed by the dedication, care, and commitment you have shown in doing so. I feel very lucky and thankful to have married a man with so many talents and yet so much humility. I love you. To Samir, you are only 15 months old and, unless you've been hiding something from me, I don't think you can read yet. But if you read this someday in the future, you should know that waking up to your bright beaming face makes everyday beautiful. I dedicate this thesis to you. I hope you will be a part of the movement for a brighter future for all. You have already started with your papa and I.
# List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AFS</td>
<td>Annual Financial Statements</td>
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<tr>
<td>BID</td>
<td>Background Information Document</td>
</tr>
<tr>
<td>BAR</td>
<td>Basic Assessment Report</td>
</tr>
<tr>
<td>BP</td>
<td>Comprehensive Water and Sanitation Business Plan for Greater Knysna Business Plan</td>
</tr>
<tr>
<td>m³</td>
<td>Cubic meters</td>
</tr>
<tr>
<td>CoCT</td>
<td>City of Cape Town</td>
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<tr>
<td>Cape EAPrac</td>
<td>Cape Environmental Assessment Practitioners</td>
</tr>
<tr>
<td>DWA</td>
<td>Department of Water Affairs</td>
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<tr>
<td>DWAF</td>
<td>Department of Water Affair and Forestry</td>
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<tr>
<td>CoGTA</td>
<td>Department of Cooperative Governance and Traditional Affairs</td>
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<td>DEADP</td>
<td>Department of Environmental Affairs and Development Planning</td>
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<td>DEAT</td>
<td>Department of Environmental Affairs and Tourism</td>
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<tr>
<td>DEA</td>
<td>Department of Environmental Affairs</td>
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<td>DBSA</td>
<td>Development Bank South Africa</td>
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<td>DMA</td>
<td>Disaster Management Act</td>
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<td>DSR</td>
<td>Draft Scoping Report</td>
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<tr>
<td>EDM</td>
<td>Eden District Municipality</td>
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<td>EDMC</td>
<td>Eden Disaster Management Centre</td>
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<td>E.M.</td>
<td>Ecological Modernisation</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>FSR</td>
<td>Final Scoping Report</td>
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<td>GHG</td>
<td>Green-house Gases</td>
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<td>HWC</td>
<td>Heritage Western Cape</td>
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<td>I&amp;AP</td>
<td>Interested and Affected Party</td>
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<td>IDP</td>
<td>Integrated Development Plan</td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<td>KLM</td>
<td>Knysna Local Municipality</td>
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<tr>
<td>KPH</td>
<td>Knysna-Plett Herald</td>
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<tr>
<td>kWh</td>
<td>kilo Watt hours</td>
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<tr>
<td>kV A</td>
<td>kilo Volt Amperes</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>kl</td>
<td>Kilo-litres</td>
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<tr>
<td>l</td>
<td>Litres</td>
</tr>
<tr>
<td>MI</td>
<td>Mega-litres</td>
</tr>
<tr>
<td>MSD</td>
<td>Mainstream Sustainable Development</td>
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<tr>
<td>MoD</td>
<td>Moratorium on Development</td>
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<tr>
<td>MFMA</td>
<td>Municipal Finance Management Act</td>
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<td>MIG</td>
<td>Municipal Infrastructure Grant</td>
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<tr>
<td>MM</td>
<td>Municipal Manager</td>
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<td>NDMC</td>
<td>National Disaster Management Centre</td>
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<td>NT</td>
<td>National Treasury</td>
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<td>NEMA</td>
<td>National Environmental Management Act</td>
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<td>NEMAA</td>
<td>National Environmental Management Amendment Act</td>
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<td>NS</td>
<td>Ninham Shand Consulting Engineers</td>
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<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
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<td>PE</td>
<td>Political Ecology</td>
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<td>PCF</td>
<td>Premier’s Coordinating Forum</td>
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<tr>
<td>PMU</td>
<td>Project Management Unit</td>
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<tr>
<td>PDMC</td>
<td>Provincial Disaster Management Centre</td>
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<tr>
<td>PR</td>
<td>Public Relations</td>
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<tr>
<td>RPVA</td>
<td>Ratepayers and Voters' Association</td>
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<tr>
<td>RBIG</td>
<td>Regional Bulk Infrastructure Grant</td>
</tr>
<tr>
<td>RO</td>
<td>Reverse Osmosis</td>
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<tr>
<td>RWTW</td>
<td>Ruigtevlei Water Treatment Works</td>
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<tr>
<td>SWTW</td>
<td>Sedgefield Water Treatment Works</td>
</tr>
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<td>SA</td>
<td>South Africa</td>
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<td>South African National Parks</td>
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<td>South African Weather Service</td>
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<td>SSI</td>
<td>Stewart Scott International</td>
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<td>TINA</td>
<td>'There is No Alternative'</td>
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<td>ToU</td>
<td>Time of Use</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<tr>
<td>UPE</td>
<td>Urban Political Ecology</td>
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<td>WWR</td>
<td>Waste Water Reclamation</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>WWTW</td>
<td>Waste Water Treatment Works</td>
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<tr>
<td>WTW</td>
<td>Water Treatment Works</td>
</tr>
<tr>
<td>WC</td>
<td>Western Cape</td>
</tr>
<tr>
<td>WLCMF</td>
<td>Wilderness Lake Catchment Management Forum</td>
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</table>
Chapter 1: Introduction

1.1 Introduction

In this thesis I explore the logic of Ecological Modernisation (E.M) as an approach that seeks to manage environmental problems through rational planning, technological innovation and scientific knowledge; whilst insisting on the compatibility between capitalist economic growth and ecological sustainability (Murphy, 1994; Hajer, 1996; Adams, 2009). This interrogation is grounded in an empirical study of a drought crisis which resulted in the adoption of desalination technology in the South Western coastal towns of South Africa. With very few desalination plants operational in South African municipalities before 2006\(^1\), the drought crisis in the Eden District Municipality (EDM), beginning in 2009, resulted in the rapid expansion of desalination adoption in the municipal sector (Frost & Sullivan, 2009, 2011). With the local municipalities of Knysna, Mossel Bay, George, and Plettenberg Bay (Bitou) all adopting the technology as the panacea\(^2\) to drought. This thesis aims to query this crisis-solution consensus in the EDM, focusing on the towns of Sedgefield and Knysna in the Knysna Local Municipality (KLM).

This reading of the logic of E.M., epitomised in the drought-desalination consensus, is informed by blending two theoretical strands. Firstly post political theory, and secondly a relational ontology – specifically Marxian inspired metabolism. Beginning with the former, the essence of the argument advanced by post-political theorists is that the current era is defined by a politics of consensus built around the non-negotiable inevitability of capitalist modernisation and contemporary forms of democracy, presented as conditions of necessity (Swyngedouw 2009: 609; Wilson et. al, 2014: 3-6; Blühdorn, 2014: 149). In mobilising this framework, Erik Swyngedouw has advanced a critique of contemporary ecological-politics as a fervent expression of this age of consensus, evidenced in the reduction of environmental crisis to a question of technomorphic-managerial innovations, consequently foreclosing the prospect of challenging the existing socio-economic and power relations underlying the problem (Swyngedouw

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\(^1\) Aside from a high number of pre-feasibility and pilot studies in the period between 2004 and 2007, only three small plants were operational at Robben Island, East London and Bitterfontein.

\(^2\) Other desalination projects currently in the early stages of development include Port Elizabeth, Lamberts Bay and Nelson Mandela Bay.
2010; Van Puymbroeck, 2014: 89; Foster et. al., 2010; Swyngedouw 2007; Kenis and Lievens, 2013: 3; Reynolds et. al, 2014: 49; Blühdorn, 2014: 149). This study is both informed by and aims to contribute to the above analysis, by examining the process, mechanisms and dimensions of crisis-solution consensus manufacture in the KLM.

At the same time, the study is concerned with countering the post-political environmental consensus, understood to be pivoting on a dualistic conception of 'society' and 'nature', through surfacing that which is simultaneously produced and foreclosed by this logic. This will be done through drawing on a relational ontology to examine the human and non-human actors engaged in the constitution of the environment. This mobilisation of a relational ontology within the study, premised on relations rather than ‘products’, will largely be informed by a Marxian historical-material analysis, as a strand of this post-dualistic approach that understands the contemporary matrix between human and non-human natures as distinct due to its basis in surplus accumulation (Smith, 1984; Smith & O’Keefe, 1980). In sum, it is argued that the value of this framework is to support, on the one end, an examination of the processes and mechanisms of contemporary depoliticisation, specifically the manufacture of consensus on environmental crisis and solution, and on the other end, an examination of the material production of crisis and solution as historically informed and contingent.

The specific contribution of this thesis, to the conceptual framework sketched above, is to offer a detailed and nuanced account of the dimensions of post politics and capitalist metabolism in the case of desalination technology, as a particular techno-fix in response to perceived threats to water security. Furthermore in blending these two theoretical strands, the study is able to trace the manufacture of consensus, and to counter this with a tracing of that which a post-political consensus serves to both foreclose and produce. In other words, this theoretical blending supports a more comprehensive analysis of processes of depoliticisation and enables an analytical repoliticisation in response. Thereby challenging externalised methods of problematisation and shows empirically the inner contradictions of capitalist metabolism, and how this functions to produce a perpetual, internally constituted, problem-solution cycle.
The study is also necessary and timely, due to its contribution to examining a largely un-researched technological-fix in South African municipal water governance. In other words, given the recent rapid growth of desalination adoption in the South African municipal sector, as a direct outcome of the EDM drought crisis, the research responds to a current dearth of research asking the critical questions of ‘what, how, by whom, why and to what end is the technological uptake expanding?’.

In the remainder of this chapter I contextualise this study. Beginning with a presentation of the essence of contemporary environmental politics, defined by a greening of capitalism through technical and procedural innovation. Thereafter I present the study interest in desalination technology as emblematic of this emphasis on 'win-win' reforms, as a pursuit of capitalist modernisation alongside environmental protection, through an emphasis on resource efficiency, infrastructure investment, and technological innovation (The Global Commission on the Economy and Climate, 2014). Finally, the chapter concludes with a presentation of the study aims and a synopsis of the chapter findings.

1.2 Contemporary environmental politics: Catalyzing Action toward a Green Economy

The quintessence of contemporary environmental politics can best be understood as the pursuit of 'sustainable development'. The genealogy of which spans more than 20 years, and can be traced at least to the 1992 Earth Summit in Rio de Janeiro, Brazil. Taking place at a time when questions on how to overcome the challenges of global environmental degradation became more pressing (Adams, 2009:24), the 1992 Summit, further emboldened by the work of the IPCC in 1988, supported a strong global scientific consensus that human action was indeed affecting global ecological

---

3 Infrastructure refers to the large interconnected physical networks – transport, communications, buildings, energy, water and waste management – that provide critical services to and raise the productivity of the economy as a whole. (The Global Commission on the Economy and Climate, 2014).

4 The reports conclusions were supported by the UN Secretary General, who declared that “Investing in economic growth and investing in preventing climate change are two sides of the same coin. These two agendas should be addressed simultaneously. Wise investment in climate change will surely help domestic economic growth. These go hand in hand” (17 September 2014, http://www.un.org/climatechange/summit/2014/09/report-reducing-climate-change-need-curtail-economic-growth).

5 This major UN meeting resulted in more than 150 governments signing the UN Framework Convention on Climate Change (UNFCCC)
patterns (Adams, 2009: 17). This was the beginning of what Adams (2010) terms Mainstream Sustainable Development (MSD), reflective of responsive efforts to find avenues to overcome the threat of global ecological crisis (Adams, 2009:19) in the time of the Anthropocene⁶, whilst at the same time retaining industrialisation and economic growth in the conceptualisation of sustainability solutions⁷.

Whilst climate change in particular has assumed centre stage in global environmental politics, the crisis extends beyond this singular marker. With the overwhelming majority of scientists agreeing that, in the more 20 years since the first Earth Summit, the impact of human activity on the environment continues to intensify to the extent that it could become an existential threat unless actions are taken soon (UNEP, 2012: ii). This bleak overall account, is supported by a United Nations Environment Programme (UNEP) 2012 publication⁸. Tracking environmental change in the 20 years since the 1992 Summit, the report presents an apocalyptic vision, predicting widespread intensification of; disasters, likely to increase in both frequency and magnitude with unchecked climate change; ocean acidification, aggravated by GHG emissions; the retreating and thinning of mountain glaciers, with severe consequences for human well-being, hazards, water supply, energy supply, and sea-level rise; the exploitation of global fish stocks; global energy consumption; and the decline of large areas of primary forest, intensifying biodiversity loss and global warming (UNEP, 2012).

In response to this foreboding chronicle, the predominant solution advocated in the UNEP (2012) report is a more potent cocktail of environmental protection with economic growth. In other words, in parallel to images of intensifying environmental change the supported solution is a further amplification of the MSD doctrine, by arguing for a transition toward a decoupling of natural resource consumption from

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⁶ The term Anthropocene was coined a decade ago by the Nobel-Prize winning atmospheric chemist Paul Crutzen to mark the arrival of a new epoch in geological time, around the time of the late eighteenth century, where humanity has become the main driver of rapid changes in the Earth System (Crutzen, 2002; Foster et. Al, 2010; Moore, 2014)

⁷ The Earth Summit of 1992 has since been followed by annual Congress of the Parties (COP) meetings with the Kyoto Protocol adopted at the 1997 COP in Japan, and entered into force on 16 February 2005. Committing participating developed nations to modest carbon emissions reductions during its first commitment period from 2008 to 2012. However, following the end of this period, a binding follow-up agreement on emissions reductions - deemed essential to support limiting the global temperature rise to 2°C - has yet to be reached.

⁸ Published in the run-up to the 2012 United Nations Conference on Sustainable Development, or Rio +20 Earth Summit , titled ‘Keeping Track’ and concerned with tracking this intensification in a range of environmental processes
economic growth, through technological innovation, and the adoption of new paradigms and solutions for progress towards a Green Economy (UNEP, 2012: 7, 33, 90). This emphasis on a green economy, the necessity of ‘decoupling’ and the related employment of innovation, including technological solutions, is echoed firstly in the language of the 2012 United Nations Conference on Sustainable Development, and secondly in the “Better Growth, Better Climate: New Climate Economy Report” report, released just recently on 16th September 2014, in the run up to the United Nations Climate Summit 2014, as the latest instalment in global climate change initiatives, held in New York on 23rd September. The former focused on the Green Economy in the context of sustainable development and poverty eradication, proceeding to adopt guidelines on green economy policies which emphasised the importance of technology as well as promoting innovation. With this approach once again reinforced in the latter, arguing that to reduce climate change need not come at the expense of economic growth, adding that there are many potential “win-win” reforms that can simultaneously energise development and grapple with climate risk (New Climate Economy Report, 2014). These “win-win” reforms should, according to the report, include resource efficiency; increased infrastructure investment, including in low-carbon systems; and innovation, including technological progress as by far the most important drivers in both growth and environmental sustainability (New Climate Economy Report, overview, 2014).

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9 Otherwise known as the Rio+20 Earth Summit
10 Developed by the The Global Commission on the Economy and Climate, which was established last year by a group of seven countries
12 The reports conclusions were supported by the UN Secretary General, who declared that “Investing in economic growth and investing in preventing climate change are two sides of the same coin. These two agendas should be addressed simultaneously. Wise investment in climate change will surely help domestic economic growth. These go hand in hand” (17 September 2014, http://www.un.org/climatechange/summit/2014/09/report-reducing-climate-change-need-curtail-economic-growth).
13 Infrastructure refers to the large interconnected physical networks – transport, communications, buildings, energy, water and waste management – that provide critical services to and raise the productivity of the economy as a whole. (The Global Commission on the Economy and Climate, 2014).
14 A broad definition of innovation includes not only cutting-edge research and development (R&D), but also deployment, diffusion and adoption of existing technologies, the latter being especially important in developing countries. It includes not only development of new products and production processes, but also institutional innovation and new methods of business organisation, marketing and distribution.
1.3 Ecological Modernisation as the predominant panacea

In other words, the path being charted in these latest global policy instalments is guided by the view that the world can ‘grow’ out of crisis by greening capitalism. As already suggested, this perspective is not ‘new’, with the Rio Conference in 1992 an important landmark in the burgeoning of this approach. However, a second element central to these reports is the conviction that ecological crisis can be overcome by technical and procedural innovation. It is this strand of thought, labelled ecological modernisation (EM), which MSD theorists argue constitutes a new development in the green growth approach, gaining ground in the last two decades, in both theory and policy (Mol, 1996; Hajer, 1996; York and Rosa, 2003; Foster, York and Rosa, 2010; Adams, 2009).

Having arisen in the 1980s as a challenge to the steady-state and zero-growth ideologies dominant in the 1960s and 1970s, and in opposition to the Club of Rome’s ‘limits to growth’ argument, EM theory has many strands and sub-divisions (Revell, 2007: 115). The main ways in which the concept is employed is as a synonym for environmental management; a way of depicting prevailing discourses of environmental policy; and as an identifiable phenomenon, occurring as institutions attempt to restructure in response to environmental risk (Mol; 1995, 1996, 1997). However these various meanings can best be reconciled by conceiving of EM as having both descriptive and prescriptive dimensions – it is both a theory of social change and a political programme of action (Revell, 2007: 116) – a core tenet of which is that the solution to environmental problems lies in the promotion of an ecological-economic “win-win” form of modernisation15 (Revell, 2007: 115; Jaenicke, 2007: 558). With ‘modernisation’ understood as inherent to capitalist market economies - driven by the increasing competition for innovation in industrialised countries (Jaenicke, 2008: 558) - the EM argument is that it is both possible and necessary to influence the direction of technological innovation to service the environment through competition, environmental regulation, partnerships between state and private enterprise; a stress on

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15 In economic terms, as the systematic, knowledge-based improvement of production processes and products (Jaenicke, 2007: 558).
good governance and rationality\textsuperscript{16} (Spaargen and Mol, 1992; Low and Gleeson, 1998; Gibbs, 2000; Adams, 2009: 126-127; Revell, 2007: 116).

In other words, according to the architects of the theory (Huber, 1985; Jänicke et al., 1989; Simmonis, 1989; Spaargaren and Mol, 1992; Mol and Spaargaren, 2000; Spaargaren et al., 1999; Mol and Spaargaren, 1993; Spaargaren, 1996; Mol, 1995, 1997) capitalism can solve environmental problems through technical innovation, and science and technology, allowing for greater resource efficiency and a decoupling of economic growth from environmental degradation (Jaenicke, 2008: 557). Best captured by the following quote (Huber, 1985, p. 20, in Mol, 1995, p. 37; Buttel, 2000: 58):

\begin{quote}
"The dirty and ugly industrial caterpillar will transform into a[n] ecological butterfly."
\end{quote}

This displacement of radical critique within the theory and practice of sustainable development by a belief in technological and managerial innovation, is emboldened by a widespread sense of an urgent global environmental threat necessitating collective action. Where “I would no longer have the luxury to engage in time-consuming conflicts and struggles that only hamper the cooperative action that is so needed now” (Kenis and Lievens, 2013: 3).

\subsection*{1.4 Solving the threat of global water scarcity: the growth of desalination}

Having traced the predominant path in global environmental policy, as a greening of capitalism through technical and procedural innovation, the principal aim of this study is to carry out an interrogation of the treatment of ecological crisis and solution within an EM logic by focusing on the adoption of desalination technology as a response to the threat of water scarcity\textsuperscript{17}. In other words, I wish to query the presentation of innovation

\textsuperscript{16} Raymond Murphy (1994) defines instrumental rationality as ‘conscious reasoning in which action is viewed as means to achieve particular ends and is oriented to anticipated and calculable consequences’ (Adams, 2009: 127).

\textsuperscript{17} Whilst not amongst the 'low carbon' technologies traditionally advocated by green growth campaigners, desalination technology continues to be supported as a technology of the future, offering the prospect of tapping into the infinite supply of water in the ocean, thereby ‘decoupling’ economic production from a reliance on depleting freshwater resources. At the same time, with energy costs making up more than half of the cost of producing potable water from the ocean, the desalination industry has sought to overcome this technological shortcoming by insisting that producers and users of the
and techno-managerial instruments as the panacea within the continued emphasis on economic growth. This will to be done through a fine-grained study of a drought crisis, which resulted in the adoption of desalination technology in the Knysna Local Municipality (KLM) of South Africa. In what follows I begin with a broader discussion of the global threat of water scarcity. This will be followed by a presentation of the desalination industry and in particular its growth in the South African municipal sector, with a focus on the KLM case study. The chapter will then conclude with a discussion of the research aims synopsis of the empirical chapters.

Conventional wisdom suggests that we live in an age of permanent scarcity, with the last few years having witnessed a growth in the sense of urgency within public discourse as well as in political debate (Mehta, 2010: 1). In the case of water, scarcity is presented as a threat to “human well-being and livelihoods, economic and agricultural production, as well as the threat of ‘water wars’ having both international and intranational dimensions” (Mehta, 2010:1). According to the United Nations fourth World Water Development Report (2012:18):

“The combination of growing populations, increasing demands for resources associated with improving standards of living, and various other external forces of change are increasing demand pressures on local and regional water supplies required for irrigation, energy production, industrial uses and domestic purposes. These forces are undergoing rapid, accelerating and often unpredictable change, creating new uncertainties for water managers and increasing risks to all developmental sectors … At the same time, climate change is creating new uncertainties with regard to freshwater supplies and to the main water use sectors such as agriculture and energy, which will in turn exacerbate uncertainties regarding future demands for water.”

These visions of scarcity are reinforced by statistics on water access and exclusion, where it is reported that an estimated 884 million people lack access to safe drinking water, more than 2.6 billion people lack access to basic sanitation, and an estimated 3
million people die prematurely from water-related diseases annually in developing countries\textsuperscript{18} (United Nations, 2010).

The contemporary water governance response to this threat of scarcity has mirrored that of the treatment of the environmental threat in general, through the enrolment of a variety of managerial and technological innovations including both conservation measures - metering, new tariff structures, consumer education campaigns - and augmentation technologies, with a growing interest in desalination technology (Bakker, 2010). The latter technology in particular, tapping into the infinite supply of water in the ocean, seems to offer a magical technological solution, ‘decoupling’ economic production from a reliance on depleting freshwater resources. In response to this promise, global interest in desalination technology is rising sharply and shows no sign of stopping. In 2005 approximately 10,000 desalination plants operated worldwide, producing more than 35,000 000 m\(^3\) of water per day. In the decade since, this number has risen to about 16,000 desalination plants operating in over 125 countries with a total capacity of more than 80 million m\(^3\) of water per day, with further growth in desalination capacity of 24 million m\(^3\) of water per day projected in the coming decade (Frost & Sullivan, 2009; WWF, 2007; IDA website, Zheng et. Al, 2014).

Whilst the Middle East currently represents approximately 50% of the world’s desalination market; countries across the world are transitioning toward desalination\textsuperscript{19} as the solution to growing water shortage issues\textsuperscript{20} (Frost & Sullivan, 2009; WWF, 2007, Zheng et. al, 2014). However, the desalination market is also expanding in countries that have previously not prioritised the technology as a water supply source. The South African municipal desalination market is especially emblematic of this trend. With very little activity before 2006\textsuperscript{21}, the municipal sector has since undergone a rapid expansion in the years since 2009 (Frost & Sullivan, 2009, 2011). This sharp growth is as a direct outcome of a drought crisis in the Eden District Municipality (EDM) in the Western Cape Province of South Africa, beginning in 2009 and described as the worst drought in a 132 year recorded history. The local municipalities of Knysna, Mossel Bay, George, 

\textsuperscript{18} The largest proportion of these deaths are among infants and young children, followed by women, from poor rural families who lack access to safe water and improved sanitation (United Nations, 2010).

\textsuperscript{19} Including Australia, China and India

\textsuperscript{20} Due to the disparity between water supply and demand

\textsuperscript{21} Aside from a high number of pre-feasibility and pilot studies in the period between 2004 and 2007, only three small plants were operational at Robben Island, East London and Bitterfontein
and Plettenberg Bay (Bitou) proceeded to adopt desalination technology as a direct response, as the necessary panacea. Other desalination projects currently in the early stages of development include Port Elizabeth, Lamberts Bay and Nelson Mandela Bay. In this study I focus on the case of the EDM drought crisis, specifically the towns of Sedgefield and Knysna in the Knysna Local Municipality (KLM).

1.5 Questioning the desalination panacea

1.5.1 Research Aims

This thesis is concerned with querying an Ecological Modernisation logic through focusing on the case of desalination technology as the proposed solution to the threat to water scarcity. Specifically, a case study approach is employed, performing a fine-grained analysis of a drought crisis, which resulted in the adoption of desalination technology in the Eden District Municipality (EDM) of South Africa. The study focuses on the towns of Sedgefield and Knysna in the Knysna Local Municipality (KLM) of the EDM, asking the critical questions of ‘what, how, by whom, why and to what end was desalination technology adopted?’ Posed so as to inform the broader aim of interrogating the apparently 'neutral' crisis-solution consensus, as reflective of an E.M. logic. Furthermore, this interrogation involves two central objectives firstly tracing the dimensions, instruments and process through which this consensus was manufactured, and secondly countering this apparent naturalisation through examining the underlying metabolic relations constituting both crisis and solutions.

The theoretical strands drawn upon in carrying out this thesis project are a blending of post political theory, drawn on to inform an analysis of the techno-managerial orientation of the crisis and solution adoption, including the process and dimensions of consensus manufacture; and a largely Marxian relational ontology, drawn on to examine that which is simultaneously produced and foreclosed by the logic. The empirical study was divided into five parts undertaking an examination of 1) the drought crisis narrative informing technological adoption; 2) the historical-material dimensions of drought emergence; 3) the process and mechanisms through which consensus was reached, including the ways desalination functions as both solution and opportunity for various stakeholders; and finally an evaluation of technology adoption.
in two parts, focusing on 4) the relationship between funding assembly and project assembly, and 5) the consequent problems emerging out of the solution implementation.

The ways in which each of the empirical chapters contributes to this overall thesis concern will be addressed in the chapter by chapter synopsis below.

1.5.2 Synopsis of Empirical Chapters

Chapter 4: The Representation of crisis
In this chapter, the first of the chapters focusing on the findings of the empirical study, the notion of the 'conceptual capture of nature' and the role it plays in restricting spaces for debate on the best response to a drought is taken up. Specifically the analysis focuses on the concepts of drought advanced and secondly pointing to the presence of actor relations and forces engaged in influencing the dominance of certain representations over others. This particular chapter, draws on post-political theory in mapping the process, actors and mechanisms engaged in the ideological neutralisation of drought as 'nature's crisis'.

In undertaking this mapping, the chapter argues that the act of ideological construction of a 'drought crisis' functions to foreclose contingency, by insisting upon the indisputability of drought as threat. Thereby reducing the challenge to a question of the best techno-managerial responses to be adopted, and obscuring the relational 'becoming' of drought.

Chapter 5: The Historical-Materiality of crisis
This chapter is focused on countering the dominant representation of drought by examining the metabolism of drought as a historical relational process. In locating the study in this way, the chapter draws on a fairly common tactic used by urban political ecologists (UPE) to question the naturalisation of notions of crisis and scarcity (Bakker, 2000, 2004; Castree, 1995; Castree and Braun, 2001; Kaika, 2003; Wisner, 2003; Swyngedouw, 2004; Linton, 2004; Murray, 2009; Mehta et.al, 2010). This questioning involves a tracing of the historical-materiality of drought crisis and is undertaken in three parts as follows: First the water governance period preceding the drought is examined; second the claim of drought as a sudden unexpected crisis is questioned; and
third the represented extent of crisis is brought into question through presenting rainfall and dam level data.

From this analysis, it is shown that there is an inconsistency between the dominant crisis narrative and the extent of crisis, suggested by an analysis of the rainfall and dam levels. Overall the chapter analysis of the metabolism of crisis shows the drought crisis to be a socio-natural assemblage, rather than an externalised threatening nature. The further significance of the chapter is bringing to light the existence of a representation-materiality gulf, thereby implying that the dominant risk narrative silenced the historical-materiality of drought crisis, and served to exaggerate the extent of crisis. With the corollary that this silence was essential in supporting the adoption of desalination technology as a necessary security solution against risk. This is a vital finding, showing that the crisis-solution consensus, supported as indisputable, pivoted on the maintenance of an ideological fiction

Chapter 6: The solidification of solution consensus

This chapter examines the movement from crisis to solution consensus. Reflecting on the narrative supporting the adoption of desalination technology, the mechanisms through which solution consensus was manufactured and finally the reasons why the portrayal of urgency was perpetuated in the crisis-solution narrative, that is as a denial of the historical-materiality of crisis. This examination aims to contribute still further to understandings of the dimensions of consensual politics in practice, exploring the how, whom, what and why of solution adoption.

The chapter shows that desalination technology was supported as essential, offering an insurance policy against the threat of nature and ensuring water supply for economic growth. Next in examining the process and mechanisms through which the solution consensus was solidified. The chapter examination shows that a complex web of negotiations, presentations, charts and calculations, involving a wide-range of human and non-human configurations, came together in supporting the established consensus on desalination technology adoption. However this took place within the established boundaries of sensibility, defined by the necessity of overcoming nature's threat to protect market growth. Insisting on the necessity of secure water supply for the tourist season, as essential for the economic lifeblood of the towns. In particular, it emerges
that an essential aspect of the solidification of consensus was the employment of exceptional disaster management and environmental legislation which had the combined effect of neutralising drought as 'nature's crisis' and desalination technology as the indisputable solution. Enabling the urgent release of disaster funding to secure the future of the status quo, as the perpetuation of ensuring water security for economic growth.

Finally in asking the question ‘Why was desalination technology adopted as essential?’, or in other words, 'why was the portrayal of urgency perpetuated despite the gulf between the crisis narrative and crisis materiality?'. In responding to this question, it was argued that in parallel to the transition from crisis to solution, a more fundamental transformation, from crisis into opportunity, was underway. That is, it is argued that the reason for the maintenance of the gulf, insisting on the indisputability of crisis and solution representations, was based on translating crisis into opportunity for the desalination industry and related private interests. Thereby treating 'nature' as a direct accumulation strategy\textsuperscript{22} in itself (Smith, Accumulation: 2, 5).

**Chapter 7: Tracing funding assembly and project assembly: Part 1 in the evaluation of the solution**

This and the next empirical chapter, are developed in combination as an evaluation of the technology adoption. In combination they show that the basis of the funding release - that is as pivoting on the ideological fiction of an externalised crisis of 'nature' - consequently influenced the particularities and conditionality of funding release; which in turn informed project development and ultimately the challenges faced during and post project development. This chapter focuses specifically on the issue of funding assembly and its impact on project assembly. With the final empirical chapter considering the problems which emerged out of the solution.

Specifically this chapter is concerned with presenting the funding sources for the desalination plants in both Sedgefield and Knysna, and reflecting on the ways in which the complex avenues and logic through which funding was assembled came to influence the specificities of project assembly. It is argued that, far from being a ‘neutral’ enabler

\textsuperscript{22} Alongside the traditional treatment of 'nature' as a source to fuel industrial society or an obstacle to be overcome within capitalism
of project advancement, the motivations and mechanisms through which money was released had a direct bearing on the form of project ‘assembly’. With the consequence of directing what was spent on, when, and how much.

Chapter 8: The problems and costs of the solution: Part 2 in the evaluation of the solution

In this chapter I look at the problems faced with the operation of the desalination technology in both Sedgefield and Knysna. This presentation of the project problems, is followed by an examination of the ongoing operational and maintenance costs of desalination to the KLM, despite the in-operability of the technology. In this chapter, the argument of the preceding chapter is developed further, that the problems with the solution were not unrelated to, but instead a symptom of the nature of the solution emergence in itself.

In other words, the significance of this analysis, carried out here of the promise of the desalination technological-fix, is to show that the projects were problematic from the outset, and served to contribute to ongoing costs, despite their in-operability. Fundamentally, it is argued that, rather than being external to the solution consensus, these problems are intrinsically connected to the mechanisms and logic through which the crisis-solution consensus emerged in the first place.

Chapter 9: Conclusion

Overall, the thesis concludes, that instead of transforming the underlying metabolic relations, the crisis-solution consensus operated within and naturalised the dominant relations. Thereby producing artificial solutions that simply shifted the problems elsewhere, creating additional environmental concerns and compounding the overall problem (Clark & Foster, 2010: 147). Supporting Swyngedouw’s (2010) analysis of climate change governance, where he states;

“Post political climate governance does not solve problems, they are moved around.”
Chapter 2: Conceptual Framework

2.1 Introduction

In this thesis I take one emblematic technology - desalination – and use it to explore the logic of Ecological Modernisation, directed toward substituting technological progress for a historical material analysis. Departing from a study of a drought crisis which resulted in the adoption of desalination technology as the 'essential' solution, the thesis is concerned with interrogating this apparently 'neutral' crisis-solution consensus by firstly tracing the dimensions, instruments and process through which this consensus was manufactured, and secondly countering this apparent naturalisation through examining the underlying metabolic relations constituting both crisis and solutions. Therefore in this sense the thesis movement is twofold, firstly examining the dimensions of depoliticisation and secondly countering this with an 'analytical repoliticisation'. Whilst this movement is not an act of 'politics' in the sense that consensus is disrupted, it does aim to contribute to this project, through offering an analytical reflection on the political difference – understood as the difference between the institutionalisation of an ecological modernisation logic and the absent ground upon which this is constructed (the absence of a given foundation) - by firstly considering what is framed as indisputable, secondly examining the process of its solidification, and thirdly interrogating this naturalisation of both 'nature's crisis' and a capitalist growth logic centralising technological innovation in responding to 'crisis'. In performing this analysis the study shows instead that this logic produces a perpetual crisis – solution cycle, whilst at the same time denying this constitutive role through centralising a neutralised consensus on techno-managerial fixes to emergent crisis, with the latter framed as externalised phenomena. Thereby functioning in a space of dehistoricisation, naturalisation, and silencing the socio-natural relations engaged in crisis and solution production through emphasising techno-managerial responses. This is visualised in the diagram below, to be followed by a more detailed presentation of the theoretical strands that will be drawn upon in carrying out this thesis project.

By way of introduction, the reading of EM - as the approach informing the crisis-solution consensus - within this thesis is informed by blending two theoretical strands. Firstly post political theory, drawn on to inform an analysis of the techno-managerial
orientation of the E.M. Logic, including the process and dimensions of consensus manufacture. Secondly, a relational ontology – specifically Marxian inspired metabolism – drawn on to examine that which is simultaneously produced and foreclosed by the logic. That is, to examine what is both hidden from view and constituted through the naturalisation of existing modes of governance through emphasising technological innovation in the transformation from crisis to solution.

Figure 2.1: Transition from crisis to solution

In this chapter I lay the grounds for the empirical story by first setting out the theoretical resources I will draw upon. I begin firstly with an engagement with post political theory, as a framework that would support an analysis into how consensus on the E.M. Logic is constituted, and what this consensus is constitutive of. I focus the presentation on the differences between the key thinkers of the post political thesis Chantal Mouffe, Jacques Rancière, and Slavoj Žižek – and relate this to a discussion on the post political environmental condition, driven by narratives of techno-managerial progress. This review of post political theory, and its epitomisation in the treatment of ecological crisis, is followed by a presentation of a relational ontology, focusing on the Marxist notion of metabolism as a complex material relation between human beings and nature, an internal relation within a single totality (Foster et. Al, 2010: 229). This second strand, in contrast to dimensions of the post political, aims to overcome economistic and idealised approaches to nature, by arguing for a dialectical approach to conceiving of relations between humans and the rest of nature. Holding that ‘I have mixed our labor
with the earth, our forces with its forces too deeply to be able to draw back and separate either out’ (Williams, 1980: 83).

2.2 The post political condition of our times

A proliferating body of thought has since begun to interrogate the dynamics of contemporary forms of depoliticisation, termed post-politics. According to this literature, post-politics is defined by the displacement of contestation by institutionalized social management, in which debate is permitted and even encouraged through stakeholder participation and good governance, but within the confines of consensual agreement on the fundamentals of the existing state of the capitalist political-economic configuration (Kamat, 2014: 68, Wilson et.al, 2014: 5). Thereby reflective of a dualism where the democratic ethos is centralised while dissensus is simultaneously denied. The conceptualisation of this post-political condition is being advanced by a series of theorists - most notably Jacques Ranciere, Chantal Mouffe and Slavoj Zizek - who broadly argue that contemporary liberal democracies are increasingly reflective of arrangements (Swyngedouw, 2011) where contestation – termed the political - is increasingly foreclosed by consensual technocratic mechanisms, functioning within a naturalised framework of representative democracy and free market economics – variously termed politics or the police order (Wilson et.al, 2014).

This gap between 'politics' on one end and 'the political' on the other, is understood to have taken root especially in the final decade of the twentieth century following the fall of the Berlin Wall, prompting Francis Fukuyama’s proclamation of ‘the end of history’ (Fukayama 1992), implying the end of historical struggles between competing ideologies. This 'end' was accompanied by the declaration of a succession of other ' endings', including ‘the end of ideology’, ‘the end of politics’, and the 'end of nature' (Wilson et. al, 2014: 7; Reynolds et. al, 2014: 48). The displacement of historical ideological struggle by a centralisation of technological innovation was captured by Slavoj Žižek in coining the term 'post politics' (Van Puymbroeck et. al, 2014: 89). In addition, Žižek coined the term, ultra-politics. With both of these adding to conceptualisations of 'tactics of depoliticisation' already developed by Rancière, namely archi-, meta-, and parapolitics. Before delineating these conceptualisations, it is necessary to better understand the philosophical underpinnings of their analysis. Both
Žižek and Rancière, along with Mouffe, share a post-foundational ontology. By this it is meant that they begin from the position that all social orders are contingent, therefore there is no essential ground upon which they rest. With the corollary that all attempts at grounding the social order, at naturalising this order, should be understood as attempts to conceal its always absent ground (Reynolds et.al, 2014: 52), as depoliticisation. Hence, the earlier reference, to the ‘gap’ between politics and the political, is better defined as a political difference (Marchart 2007 in Van Puymbroeck et.al) as the attempt to ground a particular set of power relations – politics - and the always absent ground – the political (Marchart 2007: 169 in Van Puymbroeck et.al) (Wilson et. al, 2014: 10; Van Puymbroeck et.al, 2014: 88). In this respect, post-politics refers to a distinctive contemporary form of denying this absent ground, as part of a broader series of tactics of depoliticisation.

Before, discussing the theorists interpretation of the political difference in the case of post-political practice, I briefly present the various forms of depoliticisation developed by Rancière (1999; 2001) and Žižek (1999) respectively. Firstly, for Rancière depoliticisation functions as a means of institutionalising power relations that aim to postpone the possibility of a different society. He identifies three tactics of depoliticisation, as 1) Archi-politics which grounds the existing social order in the idea of a harmonious community, 2) Para-politics which reduces societal tensions to differences in opinions, and 3) Meta politics which explains all inequalities as emanating from a single source. Žižek's (1999a; 1999b; 2004) addition of Ultra-politics refers to a form of depoliticisation which holds the existing social order in place by constructing a radical other/ enemy that functions outside of any reasonable spaces for engagement (Žižek 1998: 70) (Wilson et. al, 2014: 3; Puymbroeck et.al, 2014: 95-99). Finally his insertion of post-politics should be understood as a reference to a particular historic form of depoliticisation, as distinctive due to the foreclosure of political disagreement. In other words an exaggerated denial of ‘the absent ground’ of the particular twenty-first century institutionalisation of society (Marchart 2007) (Van Puymbroeck et.al, 2014: 95-99).

The addition and treatment of 'post-politics' as the contemporary form of depoliticisation has lead some analysts to argue against its centralisation in the analysis of practices of depoliticisation. Proposing instead that a more useful form of interpreting
the political difference would be to develop an analytical framework, incorporating these five conceptualisations, so as to better support the disentanglement of actually existing forms of depoliticisation (Van Puymbroeck et.al, 2014: 87-88). They argue for an analysis which sees the current period as reflective of an increasingly effective interplay between these various forms of depoliticisation. Thereby preferring Rancière's (2004), notion of ‘post-democracy’ instead of ‘post-politics’ (Van Puymbroeck et.al, 2014: 95). The analysis carried out within this thesis, leans toward this position in that it attempts an analysis of depoliticisation which is more productive in empirical terms, by adopting an approach that is concerned with capturing the manifold ways in which the political difference can play out in actually existing social formations (Van Puymbroeck et al., 87-88). However, at the same time it is maintained that the post-political form is a significant and distinctive insertion into the current order, reflective of as an advanced form of consensual politics. Hence in the discussion that follows the focus continues to be placed on presenting interpretations of the post-political, and thereafter how it is epitomised in the treatment of ‘ecological crisis’

2.2.1 Conceptualising the post political as political difference

I have already established that post-political theorists share a post-foundational ontology in examining the evacuation of the political. However, their individual conceptualisations of the political difference set them apart and inform their visions of an emancipatory politics. In what follows I will present these distinctive views on the articulation between politics and the political, in continuing to lay the conceptual blocks for the empirical analysis (Wilson et. al, 2014: 11; Puymbroeck et.al, 2014: 89).

Firstly for Chantal Mouffe, the political involves the recognition and legitimation of antagonism as essential to democratic process, where “a well functioning democracy calls for a confrontation between democratic political positions, and this requires a real debate about possible alternatives” (Mouffe, 2005: 113). Politics, on the other hand, is the set of practices through which antagonism is concealed in efforts to construct hegemony (Mouffe 2005: 9). Therefore the post-political condition refers to the repression of antagonism from the domain of democratic contestation (Mouffe 2005: 18 in Wilson et. al, 2014: 11-12). However, Mouffe argues that this results in the emergence of forms of extremism, to give form to the otherwise concealed antagonism
In contrast democracy, refers to an institutional arrangement in which antagonistic confrontation between enemies is replaced by agonistic engagement between adversaries (Mouffe 2009: 551 in Wilson et. al, 2014: 11-12). The implications of Mouffe's concern with reviving agonistic engagement is that she is concerned with the full realisation of the potential of liberal democracy as opposed to its overthrow (Mouffe 2005: 51–3; Wilson et. al, 2014: 11-12; Van Puymbroeck et.al, 2014: 92). In other words she is concerned with institutionalising the ultimate absent ground (Van Puymbroeck et.al, 2014: 93).

As already discussed, Slavoj Žižek’s (2000) notion of post-politics augments the forms of depoliticisation outlined by Rancière (Wilson et. al, 2014: 13-14; Van Puymbroeck et.al, 2014: 93-96), in emphasising the contemporary concern with consensus manufacture through institutional engagement and negotiation between technocrats, with the result that exclusions generated in the grounding of the social order are denied (Kenis et. Al, 2014: 9). This articulation continues in his framing of the political difference, where he adopts Rancière's terminology of a tripartite division between the political (le politique), politics (la politique), and the police (la police) (Wilson et. al, 2014: 12). The Rancièrean relationship between ‘the political’ and ‘the police’ is equivalent to Mouffe's distinction between the political and politics (Wilson et. al, 2014: 12). However, Rancière (and Žižek) use the word ‘politics’ to denote ‘the meeting ground’ between the political and the police. Žižek also differs from Mouffe, in identifying historically specific class struggle, as opposed to transhistorical antagonism, as the political (Žižek 1991: 100 in Wilson et. al, 2014: 13-14). It is this class struggle that Žižek argues is 'foreclosed' in the post political condition. In other words, where Mouffe defines the post-political as the repression of antagonism, Žižek defines postpolitics as distinctive from other forms of depoliticisation on the basis that it operates through the foreclosure of class struggle. The implications of Žižek's concern with historical class struggle is that, unlike the institutionalising vision of Mouffe, he wants to overcome the current post political condition by replacing it with a political society, thus undoing the political difference (Van Puymbroeck et.al, 2014: 93).

Finally Jacques Ranciere's notion of post-democracy involves a specific synthesis of his three forms of depoliticisation – archi, meta, and para-politics - under the banner of absolute consensus (Wilson et. al, 2014: 13; Kamat, 2014: 79). Whilst for Mouffe the
post-political is the repression of antagonism, and for Žižek it operates through the foreclosure of class struggle, Ranciere understands post-democracy as a specific form of the disavowal of equality, with the latter understood as the absent ground. This disavowal of the absent ground, the political, is achieved through the ‘partition of the sensible’ – as the systematic naturalisation of inequality as common sense – by the police order. He argues that the outcome of this condition, that ‘insists on the “democratic” inclusion of all, is the eradication of democracy in the name of democracy itself (Rancière 1999: 61–93; Wilson et. al, 2014: 13; Kamat, 2014: 79). In contrast, proper democracy, which for Rancière is another word for politics, is staged whenever a part of those who have no part asserts its presence, and attempts to carve out a new partition of the sensible through working on the police order (Rancière 1999: 99–10 in Wilson et. al, 2014: 12). In other words, politics, for Rancière is the confrontation of equality - as the political - with the logic of the police (Swyngedouw, 2014; Deranty 2003, Ruez, 2012, Van Puymbroeck et.al, 2014: 94). The implication of Rancière’s interpretation of the political difference is that it enables examination of the varied ways in which the tension between the political and police is articulated and can potentially be opened up through politics. Thus providing useful conceptual tools for an empirical study of the operation of the political difference (Van Puymbroeck et.al, 2014: 93).

2.2.2 Mainstream Environmental Governance: Epitomising the Post Political condition

Whilst each of the three scholars, discussed above, advance distinct interpretations of the political difference, they share the view that the current era is defined by a politics of consensus and an exaggerated denial of ‘the absent ground’ of the particular twenty-first century institutionalisation of society (Marchart 2007) (Van Puymbroeck et.al, 2014: 99). Where, in particular, a consensus has been built around the non-negotiable inevitability of capitalism and contemporary forms of democracy, that is the naturalisation of these as conditions of necessity (Žižek 2009; Swyngedouw 2009: 609; Wilson et. al, 2014: 3-6; Blühdorn, 2014: 149). Achieved through the displacement of contestation by consensual mechanisms of techno-managerial planning, administration, science, expert knowledge, stakeholder participation and good governance, presented as neutral and inevitable responses to all sorts of recognised problems and crisis, in which the scope of possible outcomes is narrowly defined in advance (Swyngedouw 2010: 225; Swyngedouw 2011: 371–2; Wilson et. al, 2014: 3-6; Reynolds et. al, 2014: 51-52).
In other words, for these theorists, the post political condition functions simultaneously as the age of crises and the age of neutralisations, where liberal democracy and the market economy are naturalised as the basis for social organisation and the essential response to managing contemporary challenges (Wilson et. al, 2014: 7, 10; Reynolds et. al, 2014: 48).

Drawing on the above post-political argument, Erik Swyngedouw has critiqued contemporary ecological-politics as a fervent expression of this age of crisis and neutralisation, evidenced in the reduction of environmental crisis to a question of techno-managerial and behavioural innovations (Swyngedouw 2009: 604; 2007: 18; Swyngedouw, 2010a: 225; Reynolds et. al, 2014: 49; Blühdorn, 2014: 149). Drawing on the Rancièrean terminology of the political difference, as a tripartite division, Swyngedouw argues that the consequence of reducing the ecological crisis to techno-managerial decision-making and consensus manufacture is to foreclose the prospect of challenging the existing socio-economic and power relations underlying the problem (Swyngedouw 2010; Van Puymbroeck, 2014: 89; Foster et. Al, 2010; Swyngedouw 2007; Kenis and Lievens, 2013: 3). In other words, in upholding capitalist modernisation as indisputable in the conceptualisation of solutions, the space for debate is restricted to techno-managerial dimensions - including the technologies of management, the timing of their implementation, the arrangements of policing, and the interests of those whose stake is already acknowledged. Hence whilst technologically radical, contemporary ecological governance – encapsulated in the logic of ecological modernisation (E.M) - functions as politically impotent, contained within ‘the partitions of the sensible’ of the existing police order (Swyngedouw, 2007a; Swyngedouw, 2010; Swyngedouw, 2011).

Put differently, Swyngedouw critiques E.M for staging the ecological challenge as external to the logic of the system, by naturalising and putting a green veneer on capitalist modernisation, whilst legitimising ‘business as usual’ (Revell, 2007: 116), thereby ensuring nothing fundamentally changes in the socio-ecological structuring of the Anthropocene (Swyngedouw, 2011; Adams, 2009; York and Rosa, 2003; Foster, Clark, York, 2010; Van Puymbroeck, 2014: 89). Alongside identifying the neutralisation of the institutions of modernity- including the market, industrialism and technology (Foster et. al, 2010: 253-254) –, Swyngedouw argues that another
fundamental foreclosure, upholding the post-political environmental condition, is the ideological neutralisation of ‘the natural’ (Williams 1980). The roots of this neutralisation precede the post-political era, extending back into the history of Western thought, with a stream of meanings located within the fabric of nature. Raymond Williams (1983:219) distinguishes three specific, yet interlaced meanings. First as the essence or essential quality, that is deemed as necessary in defining something; second as a ‘universal’ nature, a force which directs the world or human beings or both; and third as the material, external world itself. In accordance with Williams (1983), Smith (1984, 2010:13) distils out two historical modes of conceptualising nature – scientific and poetic - in what he terms the bourgeois ideology of nature. The result is an inherently unstable concept pivoting on a discursive dualism between 'nature' and 'society'. With this conceptual instability and discursive dualism both foreclosed and mobilised within contemporary environmental governance in significant ways.

Firstly, the stream of meanings and unending list of 'things' located within the fabric of nature implies that contemporary attempts at capturing its meaning necessarily involve a denial of its empty core and operate through relations of power. Therefore, these efforts to stabilise an inherently unstable concept, through the inscription of certain meanings over others, far from being a neutral gesture, is the 'par excellence of de-politicisation', of placing nature outside the field of contestation and disagreement by denying its contingency (Swyngedouw, 2010: 301; Swyngedouw, 2011). Furthermore, this denial is buttressed by the maintenance of a conceptual dualism. The implications of the latter for the treatment of contemporary ecological crisis is that it dramatically restricts discussion on the root causes of the environmental crisis, and on effective

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23 With the origins of modern science traced back to the early seventeenth century, he distinguishes a treatment of nature firstly as external, abstracting, both the phenomenon being examined and the scientific practice, from the social context. Secondly, as much as modern science positions nature as external to society, it retains a conception of nature as universal and containing an essence. In this sense nature is treated as law-like and somehow both external to humans and includes humans.

24 Firstly, nineteenth-century literature of conquest treats nature as wild, where “the wilderness and the savage were as one; they were obstacles to be overcome in the march of progress and civilisation” (Smith, 2010: 20). However, as nature was increasingly tamed, fear of a hostile nature was replaced by a fascination with a humanised nature, championed by the ‘back to nature’ movement of the late nineteenth century. Significantly this ‘back to nature’ movement has its roots in the cities, where, beginning with the middle class, nature worship became a staple and “vacations into the wilderness became fashionable” (Smith, 2010: 21). However in both these cases, whether as a hostile obstacle or a place to cherish and return to, nature was conceived of as external. It was in the romantic tradition of the late nineteenth century that the universality rather than the externality of nature came to be conveyed.

25 Meaning that human activity is located in one box, and the rest of nature in another. Whilst acknowledging interaction and influence, the spheres are not understood to be operating within a single totality (Moore, 2014b: 3-4).
solutions, supporting the neutralisation of 'nature', as both a 'fixed' entity, and as ontologically independent of 'society'. Thereby denying the relational production of the ecological crisis (Kenis et. al, 2014), as a socio-natural relation. Opting instead for a vision of the contemporary Anthropocene as “human activity plus significant biospheric change” (Moore, 2014b: 3-4), as the coming together of two ontologically independent spheres.

This argument on the dualistic treatment of socio-natural relations and its consequences, has been extended by Neil Smith (2010), whom - in developing a critique of the contemporary instrumentalist approach to socio-ecological crisis - coined the term ‘Nature Washing’. Referring to “a process by which social transformations of nature are well enough acknowledged, but in which that socially changed nature becomes a new super determinant of our social fate. It might well be society’s fault for changing nature, but it is the consequent power of that nature that brings on the apocalypse. The causal power of nature is not compromised but would seem to be augmented by social injections into that nature” (Swyngedouw, 2011). Hence, in this analysis, whilst the notion of the Anthropocene reflects a widespread recognition of human-induced environmental change the dominant response continues to focus on a re-engineering of ‘nature’s threat’ as opposed to a re-envisioning of contemporary metabolism. Thereby still maintaining a denial of the relational production of the ecological crisis.

In sum, the post-politicisation of EM involves the neutralisation of capitalist modernisation, treated as an inevitable political economic order, and of the 'natural'. With the two primary consequences of this neutralisation being firstly that the ontological contingency of both 'capitalism' and 'nature' are foreclosed, and secondly that notions of 'crisis' and 'scarcity' are separated from existing relations of capitalism, depositing these into the container “nature” instead, presented as ontologically independent of these relations (Moore, 2014b: 3). In other words the post-political obscures the actually existing relations through which the environment emerges.

Following this assessment of the consequences of post-politicisation obscuring the historical-material dimensions of the problem - it is argued that a relational ontology

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26 despite locating ‘the environment’ at the centre of political discussion
would function as a valuable response and counter to contemporary depoliticisation and compliment the analytical insights offered by post-political theory. Firstly by replacing ontological dualism with a relational conception of ‘socio-nature’, thereby challenging attempts at denying contingency. And secondly by enabling an analytical repoliticisation of environmental crisis by supporting a historical material analysis of the dimensions producing the problem. Deemed essential as conceptualizations of a problem and efforts to resolve that problem are always tightly connected. As are the ways these inform possible solutions (Moore, 2014b: 4). The empirical value of blending post political theory with a relational ontology is that it supports on the one end an examination of the processes and mechanisms of contemporary depoliticisation, specifically the manufacture of consensus on environmental crisis and solution, and on the other an examination of the material production of crisis and solution as historically informed and contingent. This argument in support of a relational ontology will be clarified below, as the second strand of this chapter.

2.3 Moving from dualism to dialectics - capitalism in co-producing the web of life

“To politicise is to open up a space for what can be said, seen and thought otherwise” (Diken, 2014: 128).

Within this thesis, a relational ontology will be mobilised to undertake an analytical repoliticisation of the tendency toward depoliticisation operating in the contemporary treatment of ecological crisis and solution. The essence of the ontology is to critique dualism as that which confuses and obscures the historical relations between humans and the rest of nature. Countering this with an approach premised on relations rather than ‘products’. Thereby demolishing the neutralisations of the existing order as inscribed fictions to be replaced by more complex analysis and interpretation of the emergent environment. This relational approach begins with the premise that all social projects are ecological projects and vice-versa (Moore, 2011b: 3). Succinctly captured by David Harvey (1993) in the statement, "in the final analysis (there is) nothing unnatural about New York City" (Harvey, 1993: 28). This is a provocative statement, designed to fundamentally unsettle dualistic thought, as a necessary step toward politicization.
Indeed, the common element amongst those advancing a relational ontology is the insistence that constructed dualisms need to be abandoned in order to more explicitly examine the politics of nature and the extent to which politics is filled with nature. As expressed by Braun (2010) “Once dualism is abandoned it seems that nature becomes political, and politics finds itself filled to the brim with nature, which it never really had left behind”. Further supporting efforts to examine how and why natures are produced, and how future socio natural interactions may potentially be organised. At least three post-dualistic strands are discernible, namely the discursive construction of nature, new materialism, and Marxian dialectics. In the presentation to follow, I will begin by presenting a cursory review of the essence of each of these strands, taken in turn, and then proceed to focus more deeply on the latter strand.

2.3.1 The co-production of socio-nature

Firstly a ‘discursive construction of nature’ approach - influenced by the work of post-structuralist writers such as Jacques Derrida and Michel Foucault - argues that ideas and images are generative in their own right, emphasising the role of language in the construction of social reality (Demeritt, 2002:774-775). In other words, in understanding language as a cage which 'knowledge claims' cannot exist outside of, this strand is concerned with firstly revealing the social construction of our concepts of nature, secondly pointing to the presence of power asymmetries in influencing the dominance of certain representations over others, and finally in emphasising the material impacts that stem from discursive constructions. In this sense, the project aims to challenge beliefs in the certainty of scientific knowledge as well as the dominance of certain conceptions by revealing them as constructed as opposed to ontological givens (Demeritt, 2002: 778). Importantly the argument is not necessarily antithetical to a materialist construction approach, as advanced by both 'new materialism' and 'dialectical Marxism'. In fact, Castree (1995) calls for a greater self-reflexivity amongst scholars examining the material construction of nature, developed as a counter to 'ideologies of nature'. Arguing that these efforts should necessarily include a recognition of the representational status and limitations of language as signifier, avoiding claims

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27 This term is used to refer both to theorists who self identify as Actor Network Theorists (ANT) as well as those who do not, but hold a materialist position, which is not located within a Marxist historical materialist approach
that the 'real of nature' can be revealed, whilst at the same time not denying the existence of real phenomena which urgently require explanation.

The second relational strand of 'new materialism'\(^{28}\) argues against separations of “nature” and “society” as imposed concepts that never existed in neat categories within the world (Latour 1993; Descola and Palsson 1996; Latour, 2000:117). Positing a relational materialism as a counter, replacing the notion of static ‘things in themselves’ with ‘things as an assembly’ (Latour, 2000:117). Bruno Latour, a widely influential spokesperson within this field, argues that an abandonment of the ‘bifurcation of nature’ (Whitehead, 1920) offers the potential to bring ‘things’ back to what they pertain, that is quasi-objects or assemblages in charge of the common world (Latour, 2000:119). 'New Materialist' theorists have been remarkably successful in getting this perspective across and showing how the ‘nature of things’ is a thoroughly relational and densely mediated achievement, its substance thickened by the inclusion of machines, texts, animals and microbes, and many other nonhuman actors (Kirsch & Mitchell, 2004:688). The philosophical distinctions of this approach are twofold. Firstly, by centralising the ‘principle of symmetry’, no distinctions are made between human and nonhuman actors thereby aiming to avert the dangers of both anthropocentrism and ecocentrism. Secondly the thesis refuses to take recourse to any transcendental cause - whether this be God, Capital, Spirit or History (Braun, 2009) – in informing a re-envisioning of power geometries. Insisting instead that power is a shared capacity, involving myriad actants thoroughly decentred in different networks (Castree, 2002:121).

Another central element to this approach is to place an emphasis on notions of becoming and the openness of the future, thereby challenging visions of a balanced nature that has been disrupted and needs to be restored (Bogue, 2009; Braun, 2006; Deleuze and Guattari). Allowing for the possibility of the earth and people becoming otherwise, always in the making, always an effect of the forces and practices that constitute it. “In other words, it presents the future as open rather than closed, and thus brings us face to face not with the essence of things, with questions of power, ethics and politics” (Braun, 2006:206). This position on ‘becomings’ parallels that of Marxian dialectics, as the third relational strand, where the future is imagined as open, insisting

\(^{28}\) Scholars working within this field include Bruno Latour, Sarah Whatmore, Nick Bingham, Steve Hinchcliffe, Gail Davies and Donna Haraway.
on restructuring our thinking about reality by replacing our common sense notions of 'thing' with notions of internal relations and process (Ollman, 2003). However, these close parallels should not be taken to imply a lack of points of contention. In what follows the Marxian approach will be considered more carefully, and will include an engagement with the fundamental points of critique, emanating most notably from advocates of a ‘new materialism’. Considered so as to support the advancement and employment within this thesis of a more robust relational ontology, as an instrument of repoliticisation.

2.3.2 Capitalism as an ecological regime

As mentioned above, dialectics is central as a philosophy and tool within Marxism, in studying the transformation of the modern world. As a mode of thought, dialectics challenges an externalised method of problematisation, locating responsibility for change within internal systemic relations. The implications of this philosophy, for Marxian interpretations of socio-ecological crisis within contemporary (capitalist) society, is to understand these problems as internally constituted and therefore as emerging from the inner contradictions of the system. In other words, “Capitalism’s fate ... is sealed by its own problems, problems that are internal manifestations of what it is and how it works and are often parts of the very achievements of capitalism, worsening as these achievements grow and spread” (Ollman, 2003:18). It's apparent, from the above explication, how this approach - locating the problem internally - serves as a counter to post-political neutralisations that advocate technological modernisation and the continuation of capitalist modernisation as the necessary response to crisis.

More specifically a dialectical understanding of human and non-human relations was defined by Marx as a complex metabolic interaction, mobilised by the labour process; using the concept of metabolism to describe this relation as follows,

“Labour is, first of all, a process between man and nature, a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature … It [the labour process] is the universal condition for the metabolic interaction [Stoffwechsel] between man and nature, the everlasting nature imposed condition of human existence” (Marx in Foster, 2000: 157).
Drawing on this concept of metabolism, geographer Neil Smith (1984) has been particularly influential in deriving an alternative conception of nature out of ‘Marx’s Ecology’ (Smith, 2010:31). Identifying within ‘metabolism’ a strong ontological challenge to politically paralysing beliefs in the existence of a naturally pre-ordained state of things - which he termed the ‘ideology of nature’ - , Smith (1984) advanced the ‘production of nature’ thesis. Suggesting that Nature does not exist a-historically and instead that its history is being ‘written’. In the development of this thesis Smith (1984) was particularly concerned with advancing an understanding of nature consistent with the tenets of historical materialism\(^{29}\), and examining contemporary capitalist metabolism. Which he understood as distinct due to capitalist class relations – with a class that possesses the means of production, and yet do no labour, on the one side; and a class that possesses only their own labor power, which they must sell to survive, on the other - and the centrality of the realisation of exchange value due to capitalism’s basis in surplus accumulation (Smith, 1984; Smith & O’Keefe, 1980). In sum, Smith (1984) argues that due to the ‘need’ to fulfil profit as the basis of the system capitalist production denotes a distinctive form of metabolism, with specific implications for the form of contemporary life (Smith, 1984; Smith & O’Keefe, 1980).

2.3.3. Engaging critique of Marxian dialectics

Through its philosophy of internal relations, Marxism, appears to avert the danger of positing a ‘natural limits’ argument, and to serve as a potent challenge to treatments of nature as universal and external. Despite this contribution to a relational project, the thesis has not evaded critique, stemming mainly from alternative ‘relational theses’, most notably branches of New Materialism. These critiques will be presented and engaged with below so as to contribute to the advancement of a more robust relational ontology to inform the empirical analysis to follow in this thesis.

2.3.3.1. Moving beyond Anthropocentricism

Smith’s (1984) ‘production of nature’ thesis has been critiqued for retaining a subject object dichotomy, consequently collapsing nature into society and risking losing sight of the materiality of nature (Castree, 1995; Castree, 2002; Braun, 2009). However,

\(^{29}\) The term is generally used to refer to Marx’s central project outlining a theory of capitalist society; developed as a historical explanation of capitalist processes and relations, focusing on their material basis.
recent Marxist work\textsuperscript{30} has increasingly sought to respond to this critique, both theoretically and empirically, by incorporating a recognition and examination of the materiality and agency of natures, understanding these as both produced by and producing capitalism. In other words, whilst retaining the basic tenets of Smith’s thesis, this project has aimed to uphold a more complete form of dialectic analysis (Ollman, 2003) of capitalist metabolism. By arguing for a complete transcendence of dualistic interpretations of 'capitalism and nature' in favour of 'capitalism-in-nature' (Denoting human and non-human nature) (Moore, 2011b:2). In other words, Capitalism is understood here as not acting upon, but actively producing and produced by contemporary ecological crisis (Moore, 2011b:2). That is, not as having an ecological regime but as a distinctive ecological regime, at once, producer and product of the web of life (Moore, 2011: 2; Moore, 2014b: 6). Contributing to understandings of the materiality of non human nature as both a potential problem and opportunity for circuits of capital.

Hence, in contrast to the anthropocentric critique (Castree, 2002; Holifield, 2009; Braun, 2006; Braun, 2010), it is argued that the recent renovations of Smith’s seminal work lead to a relational ontology which takes matter seriously as an agent of change and is therefore neither anthropocentric nor ecocentric. However, Marxian dialectics continues to be distinct from new Materialism in that this advancement has not been coupled with a re-envisioning of power geometries which envisages all actors as operating within a flat power network (Braun, 2009).

2.3.3.2. Economic determinism in conceptualising power relations

Marxists understand capitalist metabolism to be historically distinctive because relations between humans and non humans is an exchange value relation above all else, due to capitalism’s basis in surplus accumulation (Smith, 1984; Smith & O’Keefe, 1980). In direct contrast, new Materialists aim to re-envision power geometries by refusing to take recourse to any transcendental cause, including Capital and History. In assessing each of these positions, the position taken within this thesis is that the implications of the New Materialist approach - to the mobilisation of the concepts of networks and

\textsuperscript{30} advanced especially by geographers working within this school, including David Harvey, Erik Swyngedouw George Henderson, Scott Prudham, Noel Castree, Karen Bakker, Gavin Bridge, James McCarthy, Becky Mansfield, and Mathew Gandy
assemblages - is to mute the logic and consequences of contemporary metabolic relations, as capitalist, thereby erasing the political potency of the approach. This is because to theorise “society–nature relations in abstraction from processes of capitalist accumulation is to miss a vital aspect of their logic and consequences” (Castree, 2002:123). Hence, while the New Materialist framework is radical in its vision of networks and assemblages, it becomes simultaneously politically neutral through insisting on an absolute principle of symmetry, and countering what is understood as ‘economic determinism’ with an insistence on immanence. The consequences of which are firstly to neglect the impact of power geometries within social relations on the emergent form of metabolic relations, and to pay insufficient attention to the contested making of these networks. These charges have significant political consequences and can serve to reinforce de-politicisation processes.

Hence the concepts posited within New Materialism, of network and assemblage, are recognised as heuristically valuable in supporting relational thinking. These concepts will be employed in analysing the thesis findings. However this will be done without a mobilisation of these concepts as employed in new materialism, as a call for a principle of symmetry, as this is understood as a disavowal of power geometries.

2.3.3.3 The relational sufficiency of the Dialectic

Critics have argued that the dialectical, historical materialist approach might not be materialist enough. This final charge has been made due to what is understood as a conflict between the expressed commitment of relational Marxists to a philosophy of generalised relationality (as articulated through the philosophy of internal relations), and a related desire to find foundational concepts and locate generative processes, which is understood as an economic determinism (Braun, 2006). Based on the above, it should be noted that this critique of the tensions of the dialectic pivots on the broader critique of economic determinism. This critique has already been partially addressed in the preceding point. However, requires further reflection.

In responding, it is recognised that certain mobilisations of the concept of metabolism have on the one hand cultivated complex theoretical arguments of Marx' Ecology, viewing nature and society as a dialectical whole. While on the other hand invoked
visions of “natural necessity” and “absolute limits” (Foster et. al; 2010). Arguing that an ecological/metabolic rift has arisen between human beings and the earth, with the planet dominated by an alienated humanity, alienated from both nature and itself (Foster et. al, 2010: 14). Hence by suggesting a 'rift' this approach is problematic, blunting the analytical value of the dialectic in empirical study, returning instead to the ‘singular abstractions’ preferred by dualism. However, whilst acknowledging the shortcomings and dangers of a 'rift' argument - suggesting a separation between agents and environmental effects, thereby perpetuating the dualism it seeks to transcend - it is held that this problematic usage of the concept, should not be taken to imply the insufficiency of dialectics in itself (Moore, 2011:3)

Instead what is needed is a more authentic usage of this philosophy, as the totality of relations. To quote Bertell Ollman:

“Dialectics restructures our thinking about reality, by replacing the common-sense notion of 'thing', as something that has a history and has external connections with other things, with notions of 'process', which contains its history and possible futures, and 'relation', which contains as part of what it is its parts with other relations” (Ollman, 2003:11).

Hence in adopting a more authentic form of the dialectical method, both theoretically and empirically, the alternative is to conceive of a capitalism that develops through human and non-human natures (Moore, 2011: 4). It is the difference between the ‘capitalism and nature’ argument of the metabolic rift perspective and the theory of capitalism-in-nature (Moore,2011:6). Understanding capitalism as a 'matrix of human- and non-human nature, premised on surplus accumulation' (Moore, 2011b: 8).The implication of this reading of capitalist metabolism is to view the problem with capitalism not as the “separation” of humans from non-human nature, facing absolute natural limits; but instead as the forms in which these are relationally engaged, recognising limits as emerging through this internal process (Moore, 2011b. 17). A further implication is to reinforce Harvey's statement about New York (1993), making clear that this mutually-constitutive dialectic extends far beyond the 'nature' of energy, ocean pollution, CO2 emissions and so on; to include the issues of slums, and financial market crashes amongst others.
Furthermore, in carrying out the study of capitalist metabolism, technology is taken as a point of entry, as:

“Technology reveals the active relation of man to nature, the direct process of the production of his life, and thereby it also lays bare the process of the production of the social relations of his life, and of the mental conceptions that flow from these relations” (Marx in Harvey, 2010a:192).

In this sense technology and technological choices can be understood to reveal or disclose contemporary metabolism. This is not to suggest a form of technological determinism but to say that socio-natural relations can be understood through an examination of technology and choices of technology as both mediators of and the materialised expression of these unfolding relations (Harvey, 2010b:88)\(^{31}\).

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\(^{31}\) This academic study of (the history of) technology, undertaken as a theoretical engagement with processes of social transformation, was arguably pioneered by Marx (Harvey, 2010a), theorising the forces driving technological choices and why capitalists fetishise technologies (machinery in particular) and new organisational forms as the ‘fix’ to emergent problems (Harvey, 2010b:88).
2.4 Conclusion

To summarise, the central elements of the conceptual framework to be taken forward in undertaking the empirical examination, are as follows. Firstly, in tracing the processes of depoliticisation, the study will focus centrally on outlining post political logics and mechanisms. As it is maintained that this form of depoliticisation is a significant and distinctive insertion into the current order, reflective of as an advanced form of consensual politics. However, the analysis will continue to be concerned with capturing the manifold ways in which the political difference can play out in actually existing social formations (Van Puymbroeck et al., 87-88), so as to ensure empirical potency. Furthermore, the analysis will adopt a Rancierian conception of the political difference, as a tripartite division, as this interpretation enables examination of the varied ways in which the tension between the political and police is articulated. Thus providing more nuanced and useful conceptual tools for an empirical study of the operation of the political difference.

Secondly, in undertaking an analytical repoliticisation, the relational ontology mobilised within this thesis relies predominantly on Marxian dialectics - selectively supplementing this with elements of both a New Materialism and Discursive Construction argument (understood to not be antithetical to a materialist argument) - as the approach that offers the best means of understanding contemporary metabolism. This is because a Marxian analysis understands capitalism to be historically distinctive because relations between humans and non humans is an exchange value relation above all else, due to capitalism’s basis in surplus accumulation (Smith, 1984; Smith & O’Keefe, 1980). Therefore, arguing that to theorise “society –nature relations in abstraction from processes of capitalist accumulation is to miss a vital aspect of their logic and consequences” (Castree, 2002:123).

Having constructed and presented the conceptual framework underpinning this thesis, I proceed in the remainder of this thesis to bring this framework into conversation with the findings of the empirical study focusing on the drought-desalination consensus in the KLM. In so doing, the framework is treated both as a cognitive map and as an incomplete representation, open to amendment through this engagement. To recap, the study is designed to interrogate the apparent 'neutrality' of this crisis-solution consensus,
as reflective of a Ecological Modernisation logic, by firstly tracing the dimensions, instruments and process through which this consensus was manufactured, and secondly countering this apparent naturalisation through examining the underlying metabolic relations constituting both crisis and solutions. Thereby offering an analytical reflection on the political difference – understood as the difference between the institutionalisation of an ecological modernisation logic and the absent ground upon which this is constructed (the absence of a given foundation). This will be done through focusing on the case of a drought in the Knysna Local Municipality (KLM)\textsuperscript{32}, which began in 2009 and resulted in the adoption of desalination technology in the towns of Sedgefield and Knysna. Specifically, the empirical study is divided into five parts, each to be examined in independent chapters, undertaking an examination of 1) the drought crisis narrative informing technological adoption; 2) the historical-material dimensions of drought emergence; 3) the process and mechanisms through which consensus was reached, including the ways desalination functions as both solution and opportunity for various stakeholders; and finally an evaluation of technology adoption in two parts, focusing on 4) the relationship between funding assembly and project assembly, and 5) the consequent problems emerging out of the solution implementation. However, before entering into this tracing of the drought crisis-desalination solution consensus in the KLM, in the next chapter, I first lay out the methodological framework which informed this study.

\textsuperscript{32} within the Western Cape Province of South Africa
Chapter 3: Methods

3.1 Introduction

The function of this chapter is twofold. Firstly to present the methods used to collect and analyse data for this study. Secondly to present the research site with a focus on the water infrastructure within the KLM, and the drought crisis emergence, so as to contextualise the analysis to come. This will be carried out as follows.

The first section presents the overall research design, which includes a reflection on the ontological and epistemological considerations informing this thesis, as well as the reasoning behind the case study selection. This is followed by a presentation of the Knysna Local Municipality (KLM), as the geographic location of the research, and includes a brief discussion of the historic state of the water infrastructure in both Sedgefield and Knysna. Followed by a synopsis of the drought crisis emergence in both towns. Thereafter I outline the employment of the, predominantly qualitative, methods used to collect the data for this study. This is followed by a presentation of the data analysis and reporting approach adopted. Finally, the chapter concludes with a reflection on my own positionality within the research environment as well as ethical considerations.

3.2 Research Approach

3.2.1 Ontological & Epistemological Assumptions

This research adopts a critical realist philosophical perspective in carrying out a study of the drought in the KLM. This means that I adopt the view that there is a reality ‘out there’, however, it is impossible to fully apprehend. This limitation results as “our knowledge of the world is always mediated by the discourses available to us” (Sayer, 2004). According to Bhaskar (1978), in developing this understanding of reality and the limitations for its capture, three modes of reality can be distinguished, namely the empirical, the actual and the real. Referring respectively to 1) those aspects of reality that can be experienced; 2) those aspects that occur but may not be experienced; and 3) those mechanisms that generate phenomena that cannot be directly apprehended, but
inferred through a combination of empirical study - of those aspects of the world that are accessible - and theoretical construction (Bhaskar, 2978; Sayer, 2004).

This philosophical underpinning is given form through the adoption of the ‘logic of retroduction’; essentially concerned with moving from the level of the observed, toward extricating the underlying mechanisms informing the emergent phenomena. It is this mode of analysis that is mobilised throughout the thesis, concerned with asking the questions of what, how, when, who and why of the emergent drought crisis and desalination solution adoption. In short, the research is concerned with advancing a deeper explanation and understanding of the immediately observable phenomenon under study (McCoy & Richards, 2006; Olsen & Morgan, 2004). In this pursuit, it is also significant that, in contrast to a social constructivist approach, critical realism does not view all interpretations as equally true representations of ‘the real’ or ‘the actual’. Instead one statement can be ‘truer’ than another, with the researcher’s role to critically examine the representations of reality and conduct an ‘understudy’ in bringing forth the factors such as power, structure and socio-natural relations informing them (Sayer, 2000). This concern with firstly reflecting on the ‘representation’ of both the drought phenomenon and the technology selection; followed by a retroductive analysis to draw out the mechanisms behind the phenomena; is at the heart of this thesis.

3.2.2 Ethnographic Approach

Following a critical realist philosophy, supports my decision to adopt a broadly ethnographic approach, employing qualitative methods for data collection (McCoy and Richards, 2006). Whilst historically the approach refers to Fieldwork, requiring living with a group of people for extended periods of time, in order to document and interpret their distinctive way of life (Hammersley & Atkinson, 2007). Ethnography has continued to be remoulded and shaped over time, so that it is no longer restricted to this traditional definition, but belongs to open ended ways of approaching the world and producing predominantly qualitative data (Cresswell, 2008; Hammersley & Atkinson, 2007; Porter, 1993). It is in this latter broader sense that this research is reflective of an ethnographic approach. To be unpacked below, beginning with a presentation of the case study strategy employed, including a presentation of the case study sites. This will
be followed with a discussion of the largely qualitative data collection methods used in this study.

### 3.2.3 Case Study Strategy

A case study strategy was adopted in this study to contribute to an analytically deep understanding of the crisis-solution consensus being studied (Denscombe, 2007; Mabry, 2008). This was supported by this strategy's use of multiple research methods and data sources as a means to capture complexity and facilitate the validation of data through triangulation”\(^{33}\) Denscombe, 2007:46). In doing so, however, the critiques levelled at this approach were acknowledged. Most notably that the focus on particularity has resulted in a scepticism regarding the generalisability of the research findings. However, in pursuing this strategy it was felt that “although each case is in some respects unique, it is also a single example of a broader class of things” (Denscombe, 2007:43).

In this research I focus on two case study sites, namely Sedgefield and Knysna, both within the Knysna Local Municipality (KLM). Whilst a number of towns within the Eden District Municipality (EDM) were declared Local Disaster Areas in November 2009, resulting in the release of disaster funding and the predominant adoption of desalination/reverse osmosis technology, the study was limited to these two towns to enable a deeper inquiry. This is supported by a selection of primarily qualitative methods for data collection and interpretation. These methods are deemed appropriate as they enable an unpacking of the meanings and consequences of technological development, locating the research within fine-grained investigations of human nature/non-human nature/technology interaction (Guy and Raikkonen, 2011:9). The particular methods employed included semi-structured depth interviews, document analysis, and participant observation. In the remainder of the chapter I proceed to discuss the ways in which this strategy was adopted in this study, clarifying what was studied, its wider relevance, and how it was studied (Brinkmann, 2013:49).

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\(^{33}\) The research makes use of triangulation to be understood as the practice of viewing things from more than one perspective (Denscombe, 2007:134), allowing the findings from one method to be compared and contrasted to another. Using different sources of information also allows for the validity of the findings to be checked (Denscombe, 2007:135-137).
3.2.3.1 Selection of case study sites

The EDM drought crisis; beginning in Sedgefield in 2009; was identified as an interesting case study firstly as the South African municipal desalination market underwent a rapid expansion in the years since 2009 (Frost & Sullivan, 2009, 2011), in response to the drought crisis. The case of the EDM drought crisis was selected for offering an opportunity to de-naturalise universal portrayals of scarcity by examining the dimensions producing the drought, beyond a reference to ‘nature’ as the dominant explanatory factor (Mehta et. Al, 2010: 1). Furthermore, the case offered a chance to examine the current climate of environmental governance, where “science and technology or innovation are usually evoked as the appropriate ‘solutions’ to overcome scarcity” (Mehta, 2010: 2).

The decision to focus specifically on the local municipality of Knysna – which includes the towns of Sedgefield and Knysna – was informed by the following reasons. Beginning with Sedgefield, the town was the first within the region to face a water crisis, resulting in the adoption of desalination as an emergency technology, and the utilisation of exceptional environmental and disaster management legislation as mechanisms to enable funding and environmental approval. The above technological and legislative route consequently came to inform the drought response in the other affected areas. In other words, the drought began in Sedgefield and the town was a pioneer in the development of the dominant drought response. It was therefore valuable for this study to include Sedgefield as one of the case study sites examined. In the case of the town of Knysna, the selection was guided by two reasons. Firstly, it was the first to follow in the footsteps of Sedgefield, making it an interesting case in examining the process of consensus manufacture. Secondly, the drought response was overseen by the same key decision-makers in both towns, as a result of being within the same local municipality, thus making the development of a comparative study between the two towns a sensible approach, that contributed depth and deeper insights to the analysis undertaken- showing both convergences and divergences between the two towns. The decision to then limit the study to these two, and not include a third town, was based largely on logistical and resource constraints.

34 Significantly this is not to deny biophysical limits to natural resources
The two case study towns – Sedgefield and Knysna – are both located within the Knysna Local Municipality (KLM), within the Eden District Municipality. The discussion below begins with locating the towns within the EDM and proceeds to focus on the KLM. Providing details about the water network within each of the towns, and an introduction to the drought crisis emergence, as a way of contextualising the empirical chapters to follow35.

3.2.3.2 Locating the case study sites

The towns of Sedgefield and Knysna are both located within the Knysna Local Municipality (KLM) of the Eden District Municipality (EDM)36. The EDM is situated in the Southern Cape, approximately 500km East of Cape Town37, and along the Garden Route, which is a popular tourist destination within South Africa. This is in part due to the landscape and beauty of the area and the mild climate, with an average annual rainfall of 750mm and temperatures ranging from 8 degrees Celsius to 28 degrees Celsius.

The map below indicates the 7 (seven) local municipalities and the District Management Area in the Eden District38.

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35 A brief demographic profile of the KLM is provided in Appendix 1
36 As a Distinct (Category C) Municipality, the EDM comprises seven Local (category B) municipalities, of which the Knysna Local Municipality is one.
37 The EDM is the third largest district in the Western Cape and shares borders with four other district municipalities: Cape Winelands, Overberg, Central Karoo in the Western Cape and Cacadu District Municipality situated in the Eastern Cape.
38 The entire Eden District comprises an area of approximately 1 903 301 ha. In total 1 per cent of this geographic land is urban and the remaining 99 per cent rural land. In 2009 the Eden District Municipality population was estimated at 537 431, comprising 10.6% of the Western Cape’s total estimated population of 5 059 893.
As can be seen from the above map, the Knysna Local Municipality (KLM) falls to the east of the EDM. The local municipality covers a total surface area of 1,059 km². It stretches from the Swartlvlei in the West to Harkerville in the East. The town of Knysna is located along the Northern shores of the Knysna Lagoon. The Municipal area includes Sedgefield, Brenton, Belvedere, Rheenendal, Karatara, Knoetzie and Buffel’s Bay; although the main municipal activities take place within the town of Knysna. The Municipal Area is bordered by the Outeniqua Mountains to the North and the Indian Ocean to the South. The map below provides a more detailed representation of the municipal area.
In what follows, the water infrastructure, pre-crisis in Knysna and Sedgefield will be briefly described, followed by a summary of the crisis emergence, before moving onto the next section on data collection.

### 3.2.3.3 Bulk water Infrastructure in the KLM

**Bulk Supply to Knysna pre drought crisis**

Prior to the drought crisis the bulk water supply scheme in the town of Knysna composed of the following main elements\(^{39}\):

1. Charlesford pump station on the Knysna River in conjunction with a booster pump station at the Eastford pump station; Pipelines from Charlesford via Eastford to the Balancing Dam near the Water treatment Works (WTW)\(^ {40}\).
2. Gouna pump station on the Gouna River and pipeline to the Balancing Dam\(^ {41}\).

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\(^{39}\) The bulk water supply system also includes the Bigai Springs pump station, and boreholes in Belvidere and Brenton. However these are marginal components of the system.

\(^{40}\) The Knysna River at Charlesford is the main water source for the town. The Charlesford Pump Station is capable of abstracting up to 105 l/s from the river, and supplying this via the Eastford Booster Pump Station to the 6 Ml Balancing Dam near the WTW. The scheme is largely run-of-river, but also pumps surplus water to Akkerkloof Dam in the wet months, for use in the dry months. The assured yield from this source is 3 Mm3/a.
3. Off-channel Akkerkloof Storage Dam (800ML)\textsuperscript{42} Glebe Dam on the Grootkops River, a canal, Arch Dam/weir, pump station and pipeline to Akkerkloof Dam\textsuperscript{43} (SSI, 2009).

Figure 3.3 below shows the Knysna bulk supply system, including the location of the Desalination Plant, which is discussed in greater detail in the section to follow.

Figure 3.3: Map indicating the location of this Knysna bulk supply system and desalination plant

\textbf{Source: Cartographic Unit, University of Manchester}

\textsuperscript{41} The Gouna pump station abstracts water from the Gouna river and pumps it over the divide to the Balancing Dam near the WTW. Similar to the Charlesford/Eastford system the Gouna scheme is operated on a run-of-river basis, with surplus supply to the Balancing Dam being pumped up to Akkerkloof Dam for storage. This scheme adds 0.9 Mm\textsuperscript{3}/a to the assured yield.

\textsuperscript{42} The existing Akkerkloof Dam is located 5 km north-east of Knysna. It has a very small catchment, and is therefore effectively an off-channel storage dam. Flow into Akkerkloof Dam comes mainly from the Balancing Dam, when there is surplus inflow from the Knysna and Gouna River pump stations (Charlesford, Eastford and Gouna). Water from Akkerkloof Dam can then be supplied via the same pipeline to the Balancing Dam. With the effect that the supply to the WTW from the Balancing Dam can be supplemented from Akkerkloof Dam during the summer peak period and other periods of low flows in the Knysna and Gouna Rivers.

\textsuperscript{43} The Glebe Dam is situated approximately 6 km north-east of Knysna. It has a storage capacity of 150 000 m\textsuperscript{3}. This small capacity allows the dam to harness only a fraction of the estimated mean annual run-off (MAR) of 1.4 Mm\textsuperscript{3}/a. Glebe Dam supplies water to the existing Arch Dam. From there the water is pumped over a ridge to Akkerkloof Dam. At the time, pre-crisis a bulk water supply plan study (2007) suggested that the canal and pump station were able to operate continuously throughout the year, they would be able to deliver up to 0.5 Mm\textsuperscript{3}/a (Ninham Shand, 2007).
**Bulk Supply to Sedgefield pre drought crisis**

Prior to the drought crisis, the town of Sedgefield relied almost exclusively on the in-stream flow of the Karatara River. The river water was extracted at the Ruigtevlei water treatment works (RWTW) located on the river, to the North of Sedgefield town. This water was consequently pumped to the Cloud-nine Reservoir, on the Cloud Nine hill, located between the RWTW, and the town. From the cloud-nine reservoir, the water was then pumped to two smaller reservoirs further to the East of the town on the Blombosnek hill. It was then distributed through the water network. This bulk water system is depicted in the flow diagram below.
3.2.3.4. The emergence of drought in the KLM

The onset of the January 2009 Sedgefield crisis, is widely cited as the first indicator of an impending drought in the entire EDM region. On January 18 2009, it was reported that the Karatara River, Sedgefield’s main water source, had ceased to flow resulting in,
a water shortage within the town. An immediate response was the tanking in of water from the neighbouring town of Wilderness (within the George Municipality) 24 hours a day. This measure was followed by a 2.5km temporary emergency pipeline from the Hoogekraal River to the town Water Treatment Plant on the Karatara River, operational by Wednesday 28 January 2009 (Civil Engineering, June 2010: 16-20). At the same time, the KLM appointed engineering consultants to investigate and recommend a scheme, with the objective that it would “both increase water supply and assurance” (Cape Environmental Assessment Practitioners, 2010). In response, the contract for a 1.5ML desalination plant was signed on October 1 2009, with the plant commissioned 6 weeks later by December 2009 (SSI, 2009). The technology was supported as providing an “innovative … solution to reduce the risk and increase the reliability of supply” (Civil Engineering, June 2010: 16-20). The photograph below depicts the Sedgefield water supply system, and the location of the desalination plant at the Myoli Beach parking-lot.

Figure 3.5: Map of Sedgefield, marking desalination sites

The Sedgefield plant was the first desalination plant to be commissioned in the region, by December 2009. This was followed respectively in August and October 2010 by a 2ML plant in Knysna and 15ML installation in Mossel Bay. The 2ML Bitou plant came on-line later. When fully operational, the four desalination plants potentially generate a cumulative yield of 20.5 ML/day, of which 75% is attributed to the Mossel Bay facility. All four plants came on-line between December 2009 and December 2010/11, although winter rainfall in 2010 and the June 2011 cut-off low had already eased the coastal municipalities’ acute water shortages. At the time of writing this report, none of the plants was in operation. The total cost of establishing the four plants was R 272,962,072, with the Mossel Bay installation constituting 72.5% of all expenditure, due to its significant 15ML daily capacity. PetroSA and the Mossel Bay Municipality jointly contributed R 105.8m to this R 197.8m installation (Stell Report).
With the above measures having been developed and implemented within Sedgefield, the water supply situation within the town of Knysna was also reported as insecure, with the Knysna Municipal Manager at the time, declaring “I're in a disaster period now” (KPH, January 21 2009). The claim was supported by low rainfall levels coupled with low levels at the Akkerkloof Storage Dam, reported as 25% of total capacity at the time of the declaration. To respond to this perceived water insecurity, the KLM succeeded in securing grant funding totalling R 40,1 million, from the National Treasury, over a two year period from 2009 to 2011. The funding was allocated for two projects; namely a 2.5ML/day Reverse Osmosis (Desalination) re-use of effluent Plant, and Ground water abstraction. This study focuses on the latter project, as the main augmentation scheme developed in response to the drought crisis in Knysna.

Significantly, with respect to this ‘re-use of effluent’ project, whilst it was initially conceptualised as a Waste Water Reclamation (WWR) scheme directed toward processing the final effluent from the Knysna Waste Water Treatment Works (WWTW) into potable water. It was consequently determined, that the quality of effluent generated through the WWTW was of insufficient and inconsistent quality, thereby rendering the initial design unfeasible. Hence in order to continue with the development of an ‘effluent re-use scheme’ (as the grant was conditionally allocated for this purpose) it was decided that the most cost effective solution was the indirect re-use of final sewerage effluent.

This revised design is comprised two components, namely the Reverse Osmosis (RO) Desalination Plant for water purification located alongside the existing WWTW; and six source water boreholes to the West of the plant in the area adjoining the Knysna

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45 with the brine to be discharged and mixed with the final effluent before being released into the Knysna Estuary
46 following the initial Business Plan submission and grant approval
47 The grant conditions and impact on the plant development will be discussed further later in this chapter as well as in the next chapter
49 “Reverse Osmosis works by using pressure to force a solution through a semi-permeable membrane, retaining the solute on one side and allowing the solvent to pass to the other side. In this case the solvent would be water and reverse osmosis would therefore lead to only water molecules being pushed through the membrane, resulting in freshwater; thus removing salt and other unwanted solutes such as micro-algae, bacteria, some viruses, micro organisms and micro-pollutants
Subsurface pipelines connect the two components to supply the plant with water abstracted from groundwater sources. It is then intended that the produced water will be pumped 2.4km to a storage reservoir (Old Place) for distribution, with the brine to be mixed with the final effluent of the WWTW before release. The design continues to be presented as a ‘re-use of effluent’ project – although interviewees far more frequently referred to it as a R.O. Project. The map below shows the proposed location of the Knysna R.O. plant and source boreholes prior to construction. The plant was located to the South of the WWTW.

3.3 Data Collection Methods
3.3.1 Research Schedule

In total the research was carried out over a period of 11 months from October 2011 to August 2012. During this time, I engaged in three main phases/periods of deep immersion in the field settings, each lasting for a period of 7-12 weeks. During these periods I undertook semi-structured interviews, document analysis and participant observation with stakeholders involved in the crisis response and technology adoption. This included registered interested & affected parties (I&AP according to the formal Environmental Impact Assessment process), as well as other key informants. Furthermore, I sourced rainfall data, water production and storage data and information on the bulk water infrastructure in each of the towns.

While the majority of the fieldwork was carried out within the 2 towns, interviews were also held in the neighbouring town of George and the City of Cape Town, in cases when the interviewee was based in the city. The fieldwork immersion periods were interspersed with briefer periods of data reflection and analysis, when I returned to Cape Town. These periods were deemed valuable for its capacity to allow me to identify any gaps and errors in the data and consequently address these. The approach adopted allowed me to pursue supplementary questions at each of the following fieldwork immersion stages. This was further supported through relationship development with

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30 The process treatment steps involved include natural filtration, pretreatment, desalination, remineralisation, brine and waste stream collection.
key informants and research networks over the course of the process. The fieldwork phases are summarised in the table below:

Table 3.1: Fieldwork phases

<table>
<thead>
<tr>
<th>Month</th>
<th>Activity</th>
</tr>
</thead>
</table>
| **October 2011**          | Arrived in Cape Town, South Africa, from Manchester  
Continued to Identify (began initial process in August 2011) key stakeholders a) involved in the promotion, selection, installation and operation of the desalination technology (engineering companies; municipal officials, managers, engineers; Relevant provincial and national government officials, community forums, interested & affected parties; b) other informants: researchers, community forums  
established contact with key stakeholders and set up interviews (Round 1)  
Developed interview schedules for the identified key stakeholders |
| November to December 2011 | Travelled to Sedgefield, renting a ‘granny flat’ on the Sedgefield ‘Island’  
Conducted Interviews with key stakeholders in Sedgefield and participant observation  
Document analysis of official documents, newspaper articles & project reports |
| **January - February 2012** | Returned to Cape Town  
Document Analysis and write up early report on provisional findings  
Identification of interviewees and set up of second round of interviews |
| **March (partial); April - June 2012** | conducted interviews in Cape Town in March 2012; Returned to the KLM in April 2012  
Conducted interviews in George, Sedgefield & Knysna  
Document analysis of official documents, newspaper articles, project reports, archival material, meeting minutes, and internal communication  
Travelled to Cape Town for a brief period at the end of June 2012 |
| **July 2012 – August 2012** | Returned to the KLM in July 2012  
Conducted remaining interviews, meetings, participant observation  
Water consumption statistics; rainfall data for last 10 years  
Attempted to source further information on Municipal Budgets, National Treasury allocations for the disaster, and related project spending |

The details of the predominantly qualitative research is presented below.
3.3.2. Participant Observation

Participant Observation is a primary research method for ethnography and denotes watching, listening, interacting with and recording actions and discourses of people as they carry out day-to-day activities (Drury et al., 2011; Hammersley and Atkinson, 2007). Often a distinction is made between participant observer and observing participant depending on the degree of participation. I assumed the role of the participant observer in that I was present as an observer as opposed to actively participating in any of the forums I attended. I also disclosed my research objectives to the participants at the meetings I attended, which meant that I overtly conducted participant observation. Firstly, the main settings within which I was actively present as a participant observer were in the meetings held by the local water forum in Sedgefield, the Wilderness Lakes Catchment Management Forum; and at municipal Section 80 committee meetings. I also aimed to maintain a constant dialogue with project stakeholders through listening to conversations and observing what people do within these forums, I was able to gain valuable insights into how formal spaces function, thus deepening my reading of dimensions of power/ influence and the extent to which these spaces inform ‘decision-making’ and ‘participation’ processes. Furthermore, due to my research interests I also spent time walking and cycling within the selected towns conducting technology network visits. This involved visiting the water networks within the towns and complimented this through obtaining and analysing data on water and network distribution. Exploring the town through walking and visiting the network infrastructure was important as “walking is an embodied practice … a mode of experiencing place … and in this context is an aesthetic and insightful spatial practice” (Wunderlich, 2008:125). Through everyday walking I was able to develop a sense of (and for) place (Wunderlich, 2008:125).

32 The boundaries of the sub-catchment forum fall between the catchment areas of the Touw River in the West and the Karatara River in the East. It thus incorporates among others the Duiwe, Klein Keurbooms, Diep/Wolwe, and Hoekraal Rivers. The purpose and functions of the Forum are to assist the relevant responsible authorities with the effective management of water resources in its area of jurisdiction as prescribed in applicable legislation by providing an effective forum for public participation on water related issues. Furthermore it is stated in the Constitution of the Forum that an aim is to have as wide a membership as possible from a demographic, geographic and interest point of view, thus ensuring representation of the communities, interest groups and local authorities in the Forum’s area of jurisdiction (New constitution of the wilderness lakes sub - Catchment management forum (as amended by the Forum on 1 august 2007)).

33 Section 80 committees are usually permanent committees that specialise in one area of work and sometimes are given the right to make decisions over small issues. Section 80 committees will also advise executive committees on policy matters and make recommendations to council.
It should be noted that whilst living in Sedgefield, I also travelled to the town of Knysna, usually on a biweekly basis. Information obtained through participant-observation was documented in the form of field notes (Denscombe, 2007).

3.3.3 Semi-structured depth interviews

In this research semi-structured interviews were used, as compared to structured interviews, as they allow much more leeway for following up on whatever angles are deemed important by the interviewee. “Semi-structured interviews also give the interviewer a greater chance of becoming visible as a knowledge-producing participant in the process itself, rather than hiding behind a preset interview guide” (Kvale & Brinkmann, 2008, p. 3).

In order to familiarise myself with the drought emergence and response, and identify initial interviewees I initially reviewed secondary data sources - including policy and project documents, the municipal website, engineering consultant websites, internal municipal articles and newspaper and magazine articles. I then proceeded to establish contact with the latter via email to arrange interviews, to be conducted during the first phase of the fieldwork (October-December 2011). These respondents were consequently asked to identify other individuals and organisations with a stake in the crisis response and adoption of the desalination technology. The second group of identified interviewees were contacted and interviews conducted in the period March-June 2012, with the final phase in July-August 2012.

In conducting the interviews a variety of themes, guided by the main research questions and objectives were included. However the interview schedule and process varied per interviewee due to the differing roles and positions of each. Overall I was always conscious of the research interest in tracing the process through, beginning from the historical-materiality of the drought, moving through to the drought emergence and response, and finally the consequences of the desalination adoption as the dominant solution. Keeping this vision in mind, I framed the research questions accordingly based on the specific interviewee and their role within the larger drought response. Following this thematic and chronological approach I was able to contain the interview questions

\[54\] I lived on The Island, to the East of Sedgefield, and the start of the KLM when approaching from the CoCT.
to a few fundamental aspects, and used these to guide the specificity of the questions posed per interview. Having begun with a more rigid interview schedule per interview, I soon abandoned this for the latter approach which I found to be far more dynamic and fruitful. The vast majority of interviews were tape-recorded except in the case where the interviewees were uncomfortable with this and/or it proved to be a significant obstacle to open conversation. In addition to tape recording, fieldwork notes were taken in order to keep a record of the more important points raised during the interview.

The vast majority of the interviews were ‘face-to-face’ individual interviews with one interviewer and one interviewee. These were deemed the most appropriate as the study themes were sensitive and the approach to understanding the phenomena was to apply a retroductive mode of analysis. Hence it was preferable to use individual interviews that allowed for more confidentiality and often make it easier for the interviewer to create an atmosphere of trust and discretion (Brinkmann, 2013: 21-26). A total of 91 interviews were conducted\(^{55}\). The geographic area covered included the towns of Sedgefield, Knysna, George as well as key interviews with Provincial Government officials based within the City of Cape Town. The total number includes meetings, water infrastructure visits, second interviews & individual interviewees in the case of group interviews. Of which 3 were conducted with 2-4 participants present during the interview.

Interviewees included Local and District Municipal Officials, Politicians, Consultants, interested and affected parties, South African National Parks (Sanparks) and various government departments including Water Affairs, Environmental Affairs, Agriculture as well as the District and Provincial Disaster Management Centres. The table below summarises the interviewees based on location as well as position. A second table listing the human and non-human actors informing crisis and solution emergence is also provided.

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\(^{55}\) Includes meetings, infrastructure visits, second interviews & individual interviewees in the case of group interviews (excludes document review undertaken for a total of approximately 20 days at the offices of the Knysna Municipality Technical Services Department)
Table 3.2: Interview Breakdown

<table>
<thead>
<tr>
<th>Interviews</th>
<th>KLM</th>
<th>George/ Mossel Bay</th>
<th>CoCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meetings</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brief Discussion</td>
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<tr>
<td>Interested &amp; Affected Party</td>
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<td></td>
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<tr>
<td>Consultant</td>
<td>7</td>
<td>6</td>
<td>5</td>
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<tr>
<td>Municipal Official (HoD)</td>
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<td>2</td>
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<tr>
<td>District Official</td>
<td>2</td>
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<tr>
<td>Municipal Staff</td>
<td>10</td>
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<tr>
<td>Politician</td>
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<tr>
<td>Sanparks</td>
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<td>Development Bank South Africa</td>
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<td>Dept. of Water Affairs</td>
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<td>3</td>
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<tr>
<td>consultant/Informant</td>
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<td>Press</td>
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<td>Prov. Govt. Western Cape</td>
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<tr>
<td>Disaster Centre - City</td>
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<tr>
<td>Dept. of Environmental Affairs &amp; Tourism - Provincial</td>
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<tr>
<td>Dept. of Environmental Affairs &amp; Tourism - National</td>
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<td>National Treasury - Provincial &amp; National</td>
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<tr>
<td>Disaster Management Centre/ Dept. of Local Government (COGTA)</td>
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<tr>
<td>Agriculture</td>
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<td>Academic – SUN/UCT</td>
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It was my aim to interview additional key representatives within the DWA, the National DEAT, the National Treasury, as well as 2 additional technology suppliers and municipal consultants. However, despite frequent attempts to arrange these interviews, they failed to materialise by the time the fieldwork period had come to a close. I have attempted to overcome this potential limitation through sourcing secondary documents to address the themes that I would have hoped to explore further with the interviewees. Given the breadth and depth of documentary sources obtained, it is believed that this has approach has been effective in offering the necessary insights into the study.


3.3.4 Document Analysis

In addition to conducting interviews, extensive review of secondary document sources was undertaken, emerging as a vital source of data within this research. These sources included a wide range of written and visual material, including municipal publications, consultant reports, official rainfall and water production statistics; water and network distribution maps; newspapers and magazines; website pages; records of meetings, including council and portfolio committee meetings; as well as internal communication between various stakeholders – this included internal memos and emails.

“Ethnographic work in its various guises has frequently been employed in the investigation of essentially oral cultures, or at least that is how they have been treated. Whether they were the non-literate cultures of much social anthropology, or the street cultures and demi-monde beloved of many sociological fieldworkers, the social worlds studied by ethnographers have often been largely devoid of written documents other than those produced by the fieldworkers themselves” (Atkinson and Hammersley, 2007: 121).

As a challenge, to this traditional treatment of ethnography, Atkinson and Hammersley (2007) proceed to advocate researchers take better account of documentary sources in making sense of sites under investigation. They justify this, by highlighting that most of the settings in which contemporary ‘social scientists’ work are literate and contain a plethora of documentation. “Not only are their members able to read and write, but this capacity is also an integral feature of their everyday life and work (Smith 1987, 1993) … therefore … Indeed, these documents may play a central role in the activities taking place there” (Atkinson and Hammersley, 2007: 122).

Within this study, this approach and recognition of documentation as essential both as a recorder of and an actor in the transition from crisis to solution proved to be essential. Whilst the initial stages of the study involved a review of newspaper articles as well as official municipal and consultant websites - to source a range of relevant government publications, including the municipal Integrated Development Plan (IDP) and Annual Financial Statements, and the Environmental Assessment documentation. As the research developed the use of documents became more and more central to the study. A key moment was during an interview with an informant from within the KLM Technical Department. Following a number of questions, attempting to explore the decision-
making process and actor engagement with respect to the crisis and solution emergence, the interviewee offered instead that I spend time combing through the document files stored at the offices of the Technical Department. The result was to provide access to an extensive collection of files containing hundreds of pages of printed email communication, internal municipal reports, meeting minutes, and official statistics and maps on water and network distribution in each of the research sites; generally filed in order of date and theme. As a result of this access, I was able to go deeper into the process, through tracing through the mounds of available communication between the various actors. Hence, it emerged that in this setting it would have been hard to have gone beyond a shallow account of the process without the attention ultimately given to the documentary material in use.

Overall, the document sources supported the development of an initial historical tracing of the options that were weighed, the social actors involved and the representation and materiality of conditions (Guy and Raikkonen, 2011:10). Furthermore it helped to stimulate analytic ideas with respect to questions on actor influence, representations and materiality of socio-nature, governance arrangements in informing consensus, and how processes evolved over time. In other words, the generation of ideas took place throughout the research process, with this source serving as an important aid. As described above, access to many of the sources required negotiation with official gatekeepers, including municipal managers and consultants. However, in some instances access was offered as a means to respond to my questions when the interviewee did not have the information immediately at hand.

As a final point, the focus on documentary sources was concerned not only with a historical tracing of actions and material changes, but with the discursive dimensions informing consensus on the drought-technology nexus. In this sense a Critical Discourse Analysis (Antarky, 2008:434) approach was used, parsing the documents and focusing on the language and materials in the representation of water crisis, understood as the representation of particular ideologies of nature and the related promoted technological solutions. This also involved an interrogation of the display of power and actor interests through the mobilised discourse. Therefore in this research the discursive and material construction of socio-nature is understood, and examined as dialectically
related and mutually reinforcing. Whilst not exhaustive, the table below lists the key types of documentary sources analysed per site.

Table 3.3: Documentary Sources per site

<table>
<thead>
<tr>
<th>Research Site</th>
<th>Document Analysis</th>
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<tbody>
<tr>
<td>Sedgefield</td>
<td>Internal press releases; News paper articles; Engineering News; Website of Municipality, Engineering company, technology producer; Augmentation Scheme Business plan information; Annual Financial Statements of KLM; Local and District Municipal Water Development Plan; Local and District Municipal Socio-Economic Profile; water distribution statistics; Carte Blanche Documentary; Knysna-Plett Herald; the Edge; internal municipal communication between municipal officials, politicians, consultants; Municipal and consultant recorded meeting minutes, email communication, reports; Environmental Assessment Reports; SSI Technical Reports; Borehole reports; Section 80 committee Reports; Wilderness Lake Catchment Management Forum Minutes</td>
</tr>
<tr>
<td>Knysna</td>
<td>Internal press releases; News paper articles; Engineering News; Website of Municipality, Engineering company, technology producer; Augmentation Scheme Business plan information; Annual Financial Statements of KLM; Local and District Municipal Water Development Plan; Local and District Municipal Socio-Economic Profile; water distribution statistics; Knysna-Plett Herald; the Edge; internal municipal communication between municipal officials, politicians, consultants; Municipal and consultant recorded meeting minutes, email communication, reports; Environmental Assessment Reports; Stellenbosch University Drought report; Section 80 committee Reports</td>
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3.4. Analysis & Reporting

“It is vital to recognize that the generation of ideas can never be dependent on the data alone. Data are there to think with and think about…Ideas about our data go beyond that data. I should bring to them the full range of intellectual resources, derived from theoretical perspectives, substantive traditions, research literature, and other sources.” (Coffey and Atkinson, 1996: 153).

In undertaking analysis of the data and consequently translating this into the thesis report, care was taken to treat this process as an iterative one. This is to say the analysis of data was begun at an stage of the research and continued throughout the fieldwork process, as I grappled with the themes and detailed information emerging on the KLM waterscape in both of the towns under study. Furthermore, in terms of the relationship between the theoretical framework and the data from the case study site, an effort was made to not approach the fieldwork as a means to fit the data directly with ideas from the literature. Instead, I attempted to remain simultaneously open to new themes and at the same time sufficiently focused so as to keep the research focus clear. Overall the approach has been to attempt to bring the data and theory into a conversation “So,
analysis is not just a matter of managing and manipulating data”, but about going “beyond the data to develop ideas that will illuminate them, and this will allow us to link our ideas with those of others …” (Atkinson and Hammersley, 2007: 158)

Whilst it was recognised that sustained data analysis, alongside data collection, would have been the optimum approach. The fieldwork period was demanding, and the processing of data is always equally time-consuming. Hence in practice, formal data analysis only began after the main fieldwork had been completed. However, during the time in the field I practised a level of reflexivity, reflecting on the data collection process, making notes and thinking through the emergent themes, connections, inconsistencies and issues requiring further exploration and clarification. Once the fieldwork had been completed, I proceeded to transcribe the interviews and utilised NVivo to aid with the storage of the data, code and categorise the data, retrieve the data and generally support the data analysis as a process of deconstruction and reconstruction; guided both by the research questions as well as new insights emerging through the interview process. Furthermore, while recognising the benefits of employing a data analysis software, the shortcomings were also noted and every effort was made to avoid these pitfalls. These included the risk of de-contextualising the data being analysed through excessive coding and division of data into chunks; secondly the risk of data overload through becoming overly involved in the use of the many features of the software. In sum I was aware that the conceptualisation and the analytical steps are the role of the researcher, with the software functioning as an excellent data management instrument.

Coding the data involved identifying patterns and formulating potential explanations of these patterns. Coding was largely data-driven, however also engaging with the concepts developed in the framework. In the sense that these had already framed the study design, pre-fieldwork. However in carrying out the coding I began without codes and developed them upon reading the material (Brinkmann, 2013). Hence, I followed the approach of Coffey & Atkinson (1996) by thinking about theory as having and using ideas (Coffey and Atkinson, 1996:140).

With respect to data management and analysis, the documentary analysis proved to be particular challenging, primarily due to the sheer volume of records collected. As
explained above, internal municipal communication emerged as a key data source as I was provided with access to the filed reports, emails and other related sources within the municipal technical department. These records were filed in cardboard folders marked with a date and title indicating the type of information contained within, for example 'Desalination Sedgefield'. Whilst in the field, I only scanned the documents within the files but did not carefully review them. Instead, the approach I adopted was to photograph the documents in each of the files and transfer these onto my computer within thematic and dated folders. These folders however were very broad, containing a wide range of information. The task of organising the documented sources and using these in aiding me to carefully reconstruct the chronology of the historical-materiality of the drought, the drought emergence, response, and consequences began once I had left the field site. This was an arduous task, requiring a great deal of time and patience. I persisted in doing so however as I was conscious that the information obtained during the interviews was not sufficiently reliable in the absence of a careful tracing of documented records of the unfolding water management process.

Finally, in moving from analysis to reporting, an attempt was made to structure the writing process with the final report in mind. Furthermore in writing the thesis, this has also been more than just about reporting the findings. Instead the writing process has been lengthy and iterative, treated as a method for thinking alongside the data analysis. In this sense, lengthy ‘memos’ were written in relation to coded text, so as to already begin the process of thinking through the data, making connections and writing these in a reflective way (Brinkmann, 2013)

3.5 Ethical Considerations & Reflections

Ethical considerations were significant throughout my research. As a researcher obtaining data largely through both ‘elite’ interviews and document analysis it was vital to operate at all times with honesty and integrity, respecting the rights and dignity of those participating in my research, and avoiding any harm to the research participants. As an important aspect of the data analysis, I was fully aware of the potential dangers of misrepresentation, particularly since water access and technology developments are contentious issues, with a range of affected stakeholders and competing interests. I always obtained the prior and informed consent of all research participants. The ethics
committee of the University of Manchester scrutinized the ethical considerations of my research prior to my fieldwork.

An important ethical element which I was conscious of throughout the research process, was the sensitive nature of the information being sourced as well as the overall research agenda concerned with a tracing of the processes, actors and mechanisms of consensus manufacture, the gaps between materiality and representation, and the consequences thereof. In this regard, I grappled with the implications of the study for the individual interviewees and wider actor networks being examined. In the final analysis, I reconciled this struggle by maintaining an approach that was focused on an excavation of the modes of governance, as opposed to a personalised critique of any of the individual actors engaged in the drought response. It is hoped that the study and its findings will be received in this spirit by the interview respondents.

The use of email records as an essential data source posed a similar challenge to that discussed above - as it involved a detailed tracing of communication between individual actors involved in water management within the KLM, in the period preceding and following the drought – and was also approached in this way. That is, by focusing on the content of the email communication and the ways in which it informed the broader research questions and objectives. Over and above this point, the use of email communication was distinct from semi-structured interviews in that unlike the latter, explicit permission was not obtained from informants as these were already in the form of historical archived records. I attempted to overcome this issue by always making the relevant interviewees aware that in addition to the face-to-face interviews I had also been given access to the internal communication records within the Municipal Technical Department. In some instances I made a point of referring directly to findings within these records in framing exploratory questions to particular interviewees.

A further ethical aspect to conducting a study which involved engagement with a range of stakeholders, was a reflection upon my own identity within this context. Firstly, in engaging with a topic, involving a range of highly technical debates, the majority of interviewees were ‘male elites/experts’. Hence, as a female student, in most instances younger than the interviewees, I was aware of these identity differences, and attempted to utilise them advantageously. Often asking rudimentary questions linked to the themes
of interest, selectively and strategically revealing the degree of understanding I had already developed, as a means to obtain clarification and explanation from the perspective of the interviewee.

Furthermore, my race was another aspect of my identity which emerged as significant. Unsurprisingly in South Africa, a country with a history of racial segregation as an official policy, race continues arguably to lurk in the collective psyche of the South African citizenry. During my time in the field in the KLM, I was repeatedly struck by the visible degree of racial (and relationally class) segregation still in place within these areas, though no longer enforced legally. Segregation remains in place due to socio-economic impediments, as the demographic profile of the KLM reveals. Whilst the Knysna town centre was racially mixed, this was far less the case in Sedgefield. Furthermore, in terms of housing, both town profiles reflect segregated environments, with the poor black/coloured population living predominantly in certain parts of the towns, in townships with a mix of both formal and informal housing.

In my own experience I was acutely aware of this segregated space, having rented a ‘granny flat’ on the Island to the far West of Sedgefield. As far as I was able to establish, I was the only person of colour living on the Island, with other people of colour I encountered travelling daily to work in the homes of the residents of white middle class Sedgefield, largely as cleaners and gardeners. A final point regarding race, is that my identity as an ‘Indian’ South African also emerged as significant. As mentioned in the demographic profile of the KLM presented earlier, of the total population of 65 043 in 2007, only 261 were Indian/Asian. This made my identity a clear ‘minority’, and I was told on more than one occasion by residents/ interviewees that my race supported the development of rapport with the interviewees, as I did not fall into any of the main racial population groups in the KLM. The potential result was that I was treated with less distrust or prejudice by the KLM interviewees, as my identity placed me in the category of the ‘unknown’.

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56 Appended to this study
3.6 Conclusion

In this chapter I presented critical realism as the philosophical perspective informing this study, using ‘retroduction’ as my mode of analysis. I proceeded to discuss the ways in which the study was reflective of an ethnographic approach, furthermore making use of 2 case study towns, Knysna and Sedgefield, as my units of analysis. The towns were then presented, including a summary of the water network infrastructure in place pre-crisis. Finally I discussed the research methods used, explaining that over the course of 11 months, 3 periods of field immersion were carried out to collect data on the power, actors and broad social relations shaping the emergence of the drought crisis and technology solution. Making use of largely qualitative methods, including participant observation, semi-structured interviews, and document analysis. In researching the crisis-solution consensus in the KLM, I attempted throughout to remain flexible and open to data from the field while maintaining a theoretical focus. The chapters to follow will present the findings of my study, and is followed by the thesis conclusion.
Chapter 4: The Representation of Crisis

4.1 Introduction

“Every age has its own unique view of nature, its own interpretation of what the world is all about. Knowing a civilisations concept of Nature is tantamount to knowing how a civilisation thinks and acts” (Rifkin, 1983:20 in Davoudi, 2014: 3).

In the theoretical framework, I suggested that a stream of meanings, and un-ending list of 'things' have been located within the fabric of nature, extending back into the history of Western thought. With Raymond Williams (1983:219) having distinguished three specific, yet interlaced meanings. First as the essence or essential quality, that is deemed as necessary in defining something; second as a ‘universal’ nature, a force which directs the world or human beings or both; and third as the material, external world itself. These conceptions of nature suggest a dualism between an external and universal nature, with both conceptions simultaneously interrelated and mutually contradictory. A further anatomisation suggests that these meanings of nature are united in predicating a dualism between ‘nature’ and ‘society’. The significance of this recognition that, rather than being a ‘given’ indisputable entity, ‘nature’ is discursively constructed, is to point firstly to the inherent instability of the concept pivoting on a discursive dualism. And secondly that the conceptual capture of this inherently unstable concept necessarily implies the exercise of power and politics, as various actors compete to ‘speak’ for nature (Castree, 2014). According to Smith (1984, 2010:13) these multiple narratives of nature either melt away or become increasingly solidified in parallel to transformations in socio-natural relations (Demeritt, 2002:778), thus implying distinctive forms of meaning construction in contemporary society. Furthermore, Raymond Williams (1976), observed that representations of ‘Nature’ are “usually selective according to the speaker’s general purpose” (Williams, 1980: 70). In recognising this, Castree (2014) for his part suggests that the contemporary period is distinct in terms of the sheer volume and diversity of references

57 Meaning that human activity is located in one box, and the rest of nature in another. Whilst acknowledging interaction and influence, the spheres are not understood to be operating within a single totality (Moore, 2014b: 3-4).
58 However, Smith’s core argument, which I will return to in part 2 of this paper, is concerned more with the material construction of nature as socially and historically contingent.
concerning nature abound. Adding that “what’s also different today is that most of the spoke-person's presenting this information belong to communities and institutions whose inner workings are hidden from view and elude our everyday understanding …” (Castree, 2014: 37).

Taking up this analysis of the contemporary capture of 'nature's' empty conceptual core, Erik Swyngedouw has argued that these gestures, often hidden from view, are both inherently political – as actors compete to inscribe certain meanings whilst foreclosing others, denying the slipperiness of the concept - and serve to place 'nature' outside of the political - that is, outside the field of public dispute, contestation and disagreement (Morton, 2007: 24 in Swyngedouw, 2010: 301). Swyngedouw goes on to argue that this 'neutralisation' of nature – denying the conceptual absent ground - is a fundamental dimension upholding the post-political condition of contemporary ecological-politics. Defined by a politics of consensus, reducing the environmental crisis to a question of techno-managerial and behavioural innovations (Swyngedouw 2009: 604; 2007: 18; Swyngedouw, 2010a: 225; Reynolds et. al, 2014: 49; Blühdorn, 2014: 149).

In this chapter this notion of the 'conceptual capture of nature' and the role it plays in restricting spaces for debate - on the best response to a drought as 'nature's crisis' - to techno-managerial innovations within the existing mode of governance, is taken up. In other words, ideas and images will be taken seriously as generative in their own right (Demeritt, 2002:774-775). As the analysis is concerned with firstly capturing the concepts of drought advanced, and secondly surfacing the otherwise taken for granted actor relations and forces engaged in influencing the dominance of certain representations over others; by examining the process and resultant products of representation (Castree, 2014: 37). Showing that 'drought' is constructed as opposed to an ontological given and at the same time reflecting on the what, how, whom and why of certain conceptions over others (Demeritt, 2002: 778)60. In other words, this particular chapter, as empirical act one of the overall project,61 draws on post-political theory in mapping the process, actors and mechanisms engaged in the ideological

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59 The question of ‘why’ will be partially addressed within this chapter, with the answer developed further at later stages within this thesis.
60 The influence of these dominant representations on the solutions advanced will be examined further in the chapters to follow.
61 Which broadly aims to interrogate the logic of EM, as the approach informing the drought crisis-desalination solution consensus.
neutralisation of drought as 'the natural', specifically as 'nature's crisis'. Examining what conceptions dominate and how these are supported as indisputable. In other words tracing the process and mechanisms of manufacturing conceptual fixity and denying the contingency of 'nature's crisis'. Furthermore, in the chapters to follow, the significance of this process of conceptual capture will be considered further.

4.2 Dominant Narratives of Drought

I begin here with delineating the dominant narratives of drought which emerged in the KLM and following this with an examination of the processes and products producing this selective narrative.

4.2.1 Drought as an 'Act of Nature'

Firstly, the drought in the KLM, and the larger region was widely represented as an act of God, with residents urged by the Knysna Executive Mayor to ‘Pray for Rain’ as a collective response to the crisis (Knysna Plett Herald, 29 January 2009). According to a local newspaper report;

“‘Pray for Rain’ was the Knysna Executive Mayor’s call to residents on Monday. Hopefully by the time this paper appears on the streets, these prayers will have been answered” (Knysna Plett Herald, 29 January 2009).

It is significant that in this externalised representation of Drought, requiring an appeal to God, any social influence informing its emergence is scripted out of the narrative. This ‘outside’ is captured by a reader’s letter to the editor of the newspaper as follows;

“The call by the Executive Mayor … to “pray for rain” (Knysna Plett Herald, 29 January 2009) is not what … residents like to hear from the town’s leader. They would rather hear what has gone wrong and how it is going to be fixed … with this confusion in her management team and with no one apparently having a grip on the situation, the Executive Mayor’s strategy

62 Importantly this analysis of discourse and its effects is not to imply that ‘drought’ is discursively constructed without a material basis. Instead, in taking our cue from Kate Soper (1995) in adopting a ‘both/and’ argument, it is held that, to the extent that these are discursively constructed, their representations are based on material objects (Castree, 2014). Significantly, the principal aim of the next empirical chapter is an examination of the historical materiality of the ‘drought’ as a relationally produced entity, reflecting on what is otherwise muted.
was to push the problem “upstairs” … being at the top, the only place the Executive Mayor could push the problem was onto the desk of god” (Knysna Plett Herald, February 12 2009).

Secondly, in furthering the treatment of drought as operating in a space external to social influence, the event was portrayed as sudden and devoid of history; whilst simultaneously being referred to as ‘slow-onset’, as the official conceptualisation of drought within the disaster langue. Whilst these temporal conceptions of drought may appear somewhat contradictory, they are united in implying a ‘deviation from the natural norm’. Official reports and press releases stress that ‘normal’ rainfall levels were not forthcoming over the December 2008 - January 2009 period, resulting in failure of the main water source for Sedgefield, the Karatara River. These accounts suggest a deviant nature, behaving outside of its normal patterns, making it unpredictable and therefore difficult to manage.

Finally in continuing this treatment of Drought as both external of the ‘social’ and reflective of a disruption of the ‘normal’ balance of nature, a significant explanatory factor in the framing of crisis was a reference to the influence of ‘climate change’. Hence, whilst the point above makes clear the insertion into the narrative of ‘normal’ nature; reference to climate change suggests a discourse that presents this disruption of the ‘normal’ or ‘balance’ as operating within a wider shift in global climatic patterns. This would, therefore, require a longer-term transformation in the relation to nature. According to the Knysna Task Team Final Report (2009a), indications are that “similar droughts could be as frequent as every 10 years and the flow of the river can cease for up to two months” (Knysna Task Team 2009a). This view of the impact of climate change on water security in the region is echoed in the Revised Executive Summary of the Business Plan (“Comprehensive Integrated Water and Sanitation Business Plan for Greater Knysna: Revised Executive Summary” 2009), which dedicates a section to the ‘impact of climate change’. In this Plan, the Garden Route is described as a pristine environment characterized by natural beauty, where adequate rainfall and short rivers from the mountains to the sea have limited the need for large storage dams. However, it is further claimed that the maintenance of this pristine environment has come under

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63 Most accounts in reports and interviews conducted have referred either to the river ceasing to flow or ‘running dry’, leading to the water crisis
threat in the last 10 years as the rainfall situation has changed\textsuperscript{64}, with “soft soaking rains having changed to short sharp rainstorms that flood the area, causing severe erosion as well as lengthy periods of drought. Without means of harvesting the water from the floods, the municipality cannot rely on the rivers to supply the water needed for the community” (Interview 6)\textsuperscript{65}.

4.2.2. Drought as a real urgent threat

Alongside this externalised view of drought, as a product of nature induced climate change, a further consensus was forged on the undeniable reality and urgency of the drought threat. This consensus, amongst the key role-players in the drought management process, is best captured by a municipal official, whom when asked how the decision was taken to declare a disaster, asserted that “at that stage, the process WAS A DISASTER … I had no water, and I had to take action … REALITY” (Interview RN).

Similarly, a respondent key to ‘raising the alarm’, as a member, at the time, of the Sedgefield RPVA (in January 2009), insists that\textsuperscript{66}

“THE factor is that the river stopped running because there hadn't been rain for x amount of months. And you cannot rely on a river to feed a population … like Sedgefield … at that stage there was nothing to abstract … submersible pumps… were just sucking up mud” (Interview 20).

The efforts to continue to communicate a view of the severity and reality of nature’s crisis is evidenced in an article printed in the KPH on 17th September 2009, with the text supplied by the KLM, titled 'DROUGHT- it is real'. The article begins with the resolute statement that "[t]he Southern Cape is experiencing a drought - irrespective of

\textsuperscript{64} The information presented here is significant on two counts. Firstly as the change in the rainfall situation is presented as fact’, and secondly as climate change and apparent changes in rainfall patterns over the last 10 years are conflated

\textsuperscript{65} The above perspective on changes in rainfall patterns and further equating this to climate change, is virtually mirrored in a comment made by one of the main municipal actors engaged in the management of the crisis, as follows, “… because, the rain is not going to be coming down over a period of 6 months, I learn from weather services and climate change experts, I’re going to be having short sharp heavy storms, a lot of it will run off and not seep into the ground. Which means there's going to be a lot of erosion. Unless you can harvest that flash flood you're not going to be able to use the water” (Interview RN).

\textsuperscript{66} while acknowledging abstraction management particularly with respect to farmer’s water usage along the Karatara River as a factor influencing the water supply and demand dialectic
the occasional rainy day. As everybody knows, during a drought, less rain falls” (Knysna Plett Herald 2009j). And that, despite this reality of nature’s crisis, it is the human species, “who often appear to ignore these clear signals and fail to take heed of such stressful conditions … many believe they are independent of the natural system which must supply their needs” (Knysna Plett Herald 2009j). Interestingly this presents both an external and universal account of nature, placing humans simultaneously ‘outside of’ ‘nature’s crisis’ and ‘within’ a universal law like nature, governing humanity’s survival. The article concludes with the warning that, while some may explain the drought away as a result of a dry year, “[i]f one had to listen to what the vast majority of scientists are saying, global climate change is at the heart of this issue and a few drops of rain is not going to solve this far more significant challenge” (Knysna Plett Herald 2009j).

Given the above dominant framing of the drought crisis, as indisputable and threatening with reference to nature’s laws and in particular the impact of climate change\textsuperscript{67}, particularly on the reliability of surface water sources, the questions that follow, and which this chapter will now move toward reflecting on, are how, by whom and why this crisis consensus was generated\textsuperscript{68}.

### 4.3 The Forces Producing a Drought Narrative

In examining the ‘process’ of producing a drought narrative and response, it emerges that a range of forces and actors coalesced in generating a momentum. These included the influence of local associations; the selective use of forecasted population growth and water demand assumptions; the unfolding of governance arrangements emerging in response to the drought (including public and private sector actors); and the related mobilisation of exceptional environmental and disaster legislation. Whilst this account of the dimensions at play in informing the drought representations is by no means exhaustive, they have been identified as particularly influential.

\textsuperscript{67} despite alternative analysis of the data, to be presented in the next chapter, that at the very least brings this narrative into question

\textsuperscript{68} Following this exploration of the production of discursive consensus, the next chapter will undertake an examination of the materiality of crisis and its emergence.
In the empirical chapters to follow it will be argued that by restricting debate to these dimensions, it was possible to shift the focus away from a meaningful interrogation of the materiality of crisis; thereby producing a glaring, yet silent, gulf between the dominant crisis narrative and the materiality of crisis. The extent of this gulf and the reasons for its perpetuation will be examined in empirical chapters 2 and 3 respectively. For now however, I take the first step within this larger analytical journey by elucidating these central dimensions.

4.3.1. The power of Local Associations

On 16 January 2009, the Sedgefield Rate Payers & Voter’s Association (RPVA) distributed an email to approximately 150 Sedgefield residents warning that there was only four days of water left. It was only following this that the KLM started distributing fliers alerting residents to the crisis, firstly on 17 January 2009, and then going door to door explaining the emergency procedure as of 21 January 2009. An account of both the role of the RPVA and the apparent extent of influence of the organisation in triggering a municipal response and contributing to a sense of urgency at the time is provided by the former chairperson:

“I was called at the Ratepayers … to tell me I have to do something because there's 4 days water and Knysna's doing nothing. I created mayhem … It was December, people were on leave and … The MM (Municipal manager) didn't listen. The man in charge in technical services did not listen. And the man in charge in Sedgefield got so desperate that he phoned … the Rate-payers’ … I got the Sedgefield councillor in and I created mayhem. He would contact me knowing that when I start throwing my toys out of the cot they will listen ... Their response was 'oh I didn't know it was that bad'. I said 'don’t you listen to your officials, there's 4 days water left and its December when Sedgefield is full, the population goes up to 15, 000 to 20, 000'. But I'd been telling them since December that the Karatara river is not running any more” (Interview 20).

Firstly, through a review of newspaper reports it can be ascertained that it was in fact only following the email sent by the Sedgefield RPVA to its membership that the KLM started distributing fliers alerting residents to a water crisis on 17 January 2009, and

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69 Both in terms of the extent of material crisis AND the historical material dimensions informing crisis emergence.
then going door to door explaining the emergency procedure as of 21 January 2009. Furthermore, other accounts by municipal officials also confirm the role of the RPVA in portraying a sense of crisis, which informed a municipal response. According to a KLM portfolio councillor, the chairlady of the RPVA,

“basically got hold of some of the officials in Sedgefield and said 'look, I've got a problem' and got hold of our MM at the time, who didn't do anything. [laughs] So I only heard about it when the river stopped flowing … It was just after the holiday period, because it went through the holiday period alright. Then the problem was that there was no water to use. Then I were really in crisis” (Interview AF38).

This account is significant for highlighting the influence of the RPVA both in terms of the position of the chairperson, enabling her to make direct contact with municipal officials; and with respect to the response it generated, with the municipality consequently distributing fliers to residents. This influence can be understood to stem from the position of the RPVA as contributors to municipal income. With a substantial percentage of the municipal operating budget dependent on income generated through rates, as well as water and electricity tariffs. Thus it would be in the political interest of a municipal council to be responsive to the issues raised by this constituency.

A second important point with respect to the role of the RPVA in the generation of a sense of urgency in Sedgefield at the time, is that the RPVA, and the KLM thereafter, represented the crisis as having emerged due to the Karatara River having dried up due to insufficient rainfall, producing a drought crisis, and necessitating an urgent response. However, whilst largely omitted in official municipal accounts, interviews and a careful review of reports reveal that in January 2009 no water could be extracted from the Karatara river, “mainly due to the salinity of the water rendering it not fit for human consumption” (Otto 2009). That is to suggest that the challenge of water salinity – an historical challenge in Sedgefield70 - was in fact a central trigger for the Sedgefield crisis, as opposed to the sole impact of ‘climate change’ induced rainfall reduction.

70 The challenge of salinity at the Sedgefield ‘Rheenendaal Water treatment works’ will be discussed further in empirical chapter 2 of this thesis.
4.3.2 Calculated representation and decision–making

The Comprehensive Water and Sanitation Business Plan for Greater Knysna of February 2009 (revised in April and July 2009) identifies the figure of 4.5ML/day as the measure of water security within Sedgefield. The Plan stated that 'to meet the immediate/current water demand for Sedgefield, approximately 4.5ML per day is required' (BP, 2009). This quantified measure of water security versus scarcity is repeated within the Draft Scoping Report (DSR)\(^1\), developed during the Environmental Impact Assessment (EIA) process carried out on the proposed Sedgefield augmentation schemes. To support this estimated daily consumption figure, the DSR quotes statistics of the average peak season population increase in Sedgefield as follows: 'Sedgefield has an estimated permanent population of 5000 people that increases to approximately 25000 people during the peak holiday period'. However, a technical report as an appendix to the DSR restricts this figure to 'over 10,000'. Furthermore, the DSR estimates that 'at present the peak season demand is 30% higher than the average demand (of 1.5ML/day); which is substantially lower than 4.5ML/day. 'When questioned over this discrepancy, the environmental consultants, Cape EAPrac explained 'the 3.5ML/day includes the peak demand figures (holiday demand)' (Knysna Plett Herald 2009m), thereby suggesting here that the peak demand increases by more than 100% as opposed to 30%.

The presence of such inconsistency within the official municipal and consultant reports and accounts begins to suggest how quantified measures, far from being indisputable ‘facts’, are constructed. In taking this argument further, when traced through, it emerges that the figure of 4.5ML/day was first fostered in a Sedgefield Water Augmentation Report (Report No. 9933/3483) - developed in May 2003 by Ninham Shand Consulting Engineers\(^2,\)\(^3\), and consequently adopted in the Comprehensive Water and Sanitation Business Plan for Greater Knysna of February 2009 (revised in April and July 2009). That is, whilst the historical Ninham Shand (NS) Scheme, initiated as early as 2000, was cancelled on July 31 2009, the figure 4.5ML/day, and 3.5ML/day as the ‘immediate’ need (and the associated assumptions on growth in

\(^1\) Developed by the environmental consultants Cape Environmental Assessment Practitioners for the KLM during October 2009

\(^2\) now Aurecon

\(^3\) concerned with planning water supply to Sedgefield up to the year 2030
demand), was maintained and unquestionably adopted into the 2009 Business Plan (BP) and DSR thereafter. This adoption of a manufactured and contradictory figure as a measure of water security demonstrates the key measures through which crisis representations come to be produced and accepted, thereby justifying particular solutions.

4.3.3. The evolution of governance arrangements in directing a drought response

Alongside the forces outlined above, at least two other aspects surface as having played a defining role in influencing the generation of a crisis consensus; namely the evolution of governance arrangements and, secondly, the employment of exceptional disaster management and environmental legislation. I shall discuss each one in turn.

As noted earlier, the water shortage in the coastal town of Sedgefield represented the defining event for the 2009-2011 drought emergency, with KLM officials informing the EDM, EDMC and the PDMC on January 20 2009 that Sedgefield faced a water crisis. At the meeting it was stated firstly that the water crisis was specifically within the town of Sedgefield as “since 06h00 on 20/01/2009 no water could be extracted from the town’s only water source, the Karatara river, mainly due to the salinity of the water rendering it not fit for human consumption” (Otto 2009). And secondly, that the KLM considered the situation to be a local disaster, requesting assistance from the EDMC in the development of intervention measures. Simultaneously, the Western Cape Premier informed the Premier’s Coordinating Forum (PCF) of an impending water emergency in Knysna and established a water task team to investigate. By April 2009 the task team had finalised its report.

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74 However, by the following day (January 21 2009) the Knysna Municipal Manager Mr. Johnny Douglas declared, in reference to the town of Knysna, that “I’re in a disaster period now (KPH, 21 January 2009). The Knysna Municipality calculated that on January 20 2009, there was only about 30 days of water left for Knysna, depending on consumer’s water usage” (KPH, 21 January 2009). This however refers to the towns available water reserves in the Akkerkloof Dam, but the two rivers (Knysna and Gouma) supplying water to the town, while showing low flow readings, were still flowing in January and February 2009, with reports indicating that the Knysna River stopped flowing briefly on March 10 2009.

75 The EDMC response was to act in accordance with Article 54(2) of the Disaster Management Act, Act 57 of 2002, proposing that the KLM assume primary responsibility for the coordination of the disaster with support provided by the EDMC.
Following the January 20 2009 meeting, a second emergency meeting was called by the EDM Municipal Manager’s office, with the aim of discussing longer-term water management and augmentation interventions, looking beyond Sedgefield, for the entire EDM. At this meeting, in continuity with the course already embarked on in January 2009, the employment of the Disaster Management Act was proposed as “it makes provision for the declaration of a local disaster which could assist in access to the central contingency fund, as well as to allow the applicable national / provincial and municipal department’s budgets to be supplemented” (Otto 2009). This proposal was advanced in a special council meeting held on January 28 2009 where it was resolved to request the KLM be declared a local disaster area (Otto 2009).

It is reported however that almost two months later, with the resolution submitted to the EDM council, the process had not progressed due to a hung district council. This delay had “serious implications for the declaration of a slow onset disaster, …” Ultimately, the KLM was declared a local disaster area on 27 November 2009, consequently facilitating government assistance and provision of relief. Significantly, support for the classification of local disaster area, alongside the need for a local council resolution, also required the KLM to institute municipal budget adjustments, reallocating internal

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76 A meeting date is not provided, however the meeting is mentioned in a report dated 9 February 2009. Hence it can be inferred that it was held between the period 20 January and 9 February 2009

77 As a key stakeholder present at this meeting, Mr Rashid Khan, the DWA Western Cape Chief Director, reportedly indicated that he would investigate the release of funding from the DWA administered Bulk Infrastructure Grant (BIG) for the purchase of a 1Ml/day mobile desalination plant for the town of Sedgefield (Otto 2009).

78 Such a declaration process involves the enrolment of all three spheres of government beginning with a municipal resolution to declare a disaster, followed by a request by the relevant Disaster Management Centre – in this case the EDMC – to the Provincial Disaster management centre (PDMC) for the declaration of a local disaster. This is then followed by the PDMC, through a Provincial Cabinet Resolution, recommending the declaration request; and finally the National Disaster Management Centre confirming the local disaster declaration through a classification process. The outcome of this classification process will determine the declaration of a local disaster, which then has to be published in the provincial gazette (Interview GO; An overview regarding the water crisis in Sedgefield, 9 February 2009, G.Otto).

79 The unintended consequences of having no provincial disaster management policy to counteract situations such as these means that there is no policy mandate for the provincial government to intervene in … even though it is necessary to do so in order to access funds to resolve a slow onset water shortage” ((Knysna Task Team 2009b)).

80 On 20 and 27 November 2009, drought disasters were respectively declared for George, Mossel Bay and Knysna (Provincial Gazette, 2009a; Provincial Gazette, 2009b and Provincial Gazette, 2009c). Six months later, on 28 May 2010, a local disaster was declared in the Central Karoo (Provincial Gazette, 2010a). This was followed on 11 June 2010 by the declaration of a local disaster that now included all municipalities within the Eden District Municipality (Provincial Gazette, 2010b).

81 enabled through emergency provisions within the Municipal Finance Management Act (MFMA)
funds as a demonstration of commitment to the disaster response (Otto 2009; Interview GO; Interview 39, Interview 4, Interview 64).

In moving beyond the initial emergency meetings, a key catalyst identified in supporting the development of a “dedicated institutional framework for coordinating drought response …” (Holloway, A. et. al, 2012), came in the form of an explicit request in July 2009 from municipal engineers in Knysna for an urgent meeting with the PDMC and the DWA. This meeting provided the impetus for a drought management meeting in George in August, which consequently led to the establishment of two coordinating mechanisms in September 2009. These were the 1) Provincial Drought Management Meetings (convened monthly in George); and the 2) Drought Decision Support Team (convened monthly in Cape Town, but one week prior to the Provincial Drought Management Meetings).

The Provincial Drought Meetings provided an information sharing and decision-making platform and included municipal managers, representatives of PetroSA and key provincial departments including Treasury and Social Development, as well as municipal engineers and representatives of the DWA. Whilst the Drought Decision Support Team was established to support fast-tracking decision-making and was composed of representatives of the Provincial Departments of Agriculture, Local Government, Environmental Affairs and Development Planning and Treasury. Furthermore, within these two established drought management forums, the National Department of Water Affairs and representatives of the Provincial Disaster Management Centre (PDMC) and Eden/Central Karoo District Disaster Management Centres emerged as key role-players in driving the momentum forward within the established forums. Hence, with respect to a disaster declaration and consequent release and re-allocation of funds, these two forums, and member actors, were central to advancing this agenda. Functioning as spaces for intergovernmental engagement directed toward developing a comprehensive response in the conceptualisation of crisis and development of particular solutions at a regional scale.

82 This forum combined two initial consultative groups respectively, namely Strategic and Technical Task Teams. The Technical Task Team included the municipal engineers from affected municipalities, while the Strategic Task Team consisted of representatives of Provincial Departments and Municipal Managers from the affected areas.
4.3.4 The Declaration of a Local Disaster – the movement from conceptual inconsistency toward fixity

In light of these dedicated governance arrangements emerging specifically in response to the drought in the EDM, it is significant that a major challenge identified by a study commissioned by the PDMC “was the non-uniform usage and diverse interpretations of the term ‘drought’” (Holloway, A. et. al, 2012, p. 15). The research team found numerous instances where limited water availability was reframed as ‘drought’ rather than as ‘water shortage’ or ‘water scarcity’. In addition, there was a limited recognition that low reservoir levels was not suggestive of a ‘warning of impending drought’, but rather of trailing indicators of reduced rainfall a year earlier (often combined with the lagged effects of high water demand)” (Holloway, A. et. al, 2012, p. 15). How then were these multiple conceptions and ‘misconceptions’ of drought overcome, in order to forge a consensus within these forums, to support the crisis and solution development?

In response to this question, it is argued here that this conceptual inconsistency was ‘bridged’ at the outset of the drought management process through the legislative ‘making of drought’ through utilising both disaster management and environmental legislation. Thereby resulting in the collective official recognition of drought as a ‘disaster’; followed by the advancement of the implications of this ‘capture’ of the meaning of drought; including the release of emergency funding, and the bypassing of lengthy environmental authorisation. The case for this argument is made below.

In what follows the road toward the declaration of a local disaster will be traced, so as to show that this process was necessary to colonise the meaning of drought, creating a consistent unified front on the nature of the ‘problem’ amongst the actors engaged within the drought forums - thereby overcoming the issue of diverse interpretations - and furthermore enabling access to the money and environmental authorisations required to implement the augmentation solutions advanced, most notably desalination.

The process of declaring a disaster at the Local Municipal level

Firstly within the KLM, following the resolution to declare a local disaster, a key moment in this process of securing a legislated acknowledgement of an emergency or

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83 In the form of the NEMAA Section 24(f) 3 clause to enable making an allowance for an activity to commence prior to the issuing of environmental authorisation.
disaster was a Special Council Meeting held on 27 August 2009, where it was resolved that council:

“approves the proposed adjustment (capital and operating) budgets …; supports in principle the efforts of the DWA to assist the KLM firstly with a possible grant of R5 million through the Regional Bulk Infrastructure Grant in this financial year … additionally approves the deviation from Procurement Processes for the 2008/2009 financial year totalling R30 045 226” (Minutes of Municipal Special Council Meeting, 27 August 2009).

This Special Meeting was followed by a Mayoral Committee Meeting held on 17 September 2009 where a number of recommendations were made by the Director of Technical Services with regard to emergency measures for the drought. These included that

“1) the council proceeds with the emergency measures of boreholes for Knysna, and the Sedgefield Desalination Plant as a matter of urgency; 2) the council approves the consultants to take these emergency measures forward as a matter of urgency due to the necessity of immediate implementation before the peak summer period” (Knysna Local Municipality 2009); 3) the council approves the use of existing capital funds being deviated to these (emergency) projects …; and that the council makes additional operating funds available for the operating of the emergency measures” (Knysna Local Municipality, Minutes of Mayoral Committee Meeting, Item 31/09/09).

Next, in the process of declaring a disaster, at a special council meeting held on 19 October 2009, it was stated in progress report presented by the Director of Technical Services that funding from the existing budget was very limited and additional funds had to be made available in terms of Section 29 of the MFMA dealing with emergency and unforeseen expenditure (Progress Report: Director of Technical Services for the Knysna Local Municipality, 19 October 2009). Another special council meeting held on 28 October 2009 focused on the

“Application in terms of Section 55 of the Disaster Management Act 2002 (Act 57 of 2002) for the declaration of the Knysna Municipal Area as a local disaster area as a result of the continuous drought conditions” (Progress Report: Director of
Amongst others, it was resolved that the KLM be declared a Local Disaster Area in terms the Act; the EDM be advised accordingly and be requested to support council's decision; and the Municipal Manager and Chief Financial Officer be tasked to re-prioritise the capital budget.

**The ‘Scaling Up’ of Disaster**

Whilst the above summarises the key moments within the KLM council process in securing a legislated acknowledgement of a disaster, and more importantly, what action and resolutions this sense of ‘emergency’ was used to justify with respect to funding release and solution development. The process was not restricted to within the KLM, as the drought threat spread throughout the Eden region. As already expressed, in September 2009, the monthly Provincial Drought Management Meetings and Drought Decision Support Team Meetings were established as coordinating mechanisms for the regional drought response.

The engagement of the Provincial DMC and EDMC was central to the drought operation, facilitating and coordinating the regional emergency meetings during the drought, as well as liaising with Provincial and National Treasury as well as the Development Bank of Southern Africa (DBSA) for funding for drought-related interventions:

> “The PDMC later engaged with National State and Provincial departments and other role players to provide relief funding, provided situational updates to the MEC, the Premier and the Cabinet and facilitated the disaster declaration process”

Working alongside the PDMC and EDMC, the Department of Water Affairs (DWA) also played a central role liaising with Provincial and National Treasury, the Development Bank of Southern Africa (DBSA), co- facilitating the disaster declarations and relationally engaging with municipalities and other governmental departments (Holloway, A. et. al, 2012, p. 47). The account to follow will undertake a more detailed
consideration of these inter scalar processes, however from the perspective of the KLM drought response.

To begin with, as already mentioned, a key event supporting the development of a coordinated drought response was the meeting in July 2009 between the KLM, DWA and PDMC. With the DWA and PDMC as central actors engaged in the crisis response, the planning meeting held in Cape Town \(^{84}\) produced a number of decisions on the selection and funding of the KLM augmentation schemes. Including that the Regional Director of the Department of Water Affairs Western Cape, Mr. Rashid Khan, would visit Sedgefield along with municipal officials from the KLM \(^{85}\); the DWA would provide the necessary assistance regarding the envisaged desalination plant in Sedgefield; and a number of funding commitments were made with respect to the development of water infrastructure in the KLM over the short, medium and long term \(^{86}\) (Steyn 2009). Finally, a request was made that the KLM provide a summary of the needs and issues raised. With a revised version of the Executive Summary in the ‘comprehensive integrated water and sanitation business plan for greater Knysna – final April 2009’ \(^{87}\) sent, to Dr. H. Fast of the Department of Cooperative Governance and Traditional Affairs (CoGTA), in response.

Furthermore, a letter was sent by the KLM Executive Mayor E. Bouw-Spies to Minister Anton Bredell of the Ministry of Local Government, Environmental Affairs and Development Planning - which the CoGTA is apart of - on 28 September 2008. Contained within the letter was an indication that the KLM council had “re-prioritised the Budgets to initiate the short and medium term solutions that have been agreed with but have not committed to the physical implementation until the funding can be secured” \(^{88}\) (Letter from KLM Executive Mayor to Minister of Local Government,

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84 at the Belville offices of the WC DWA
85 on 11 July 2009
86 These included the re-assessment of grant funding of R7 million (through the Bulk Infrastructure Grant) allocated to the George Local Municipality, with the possibility of reallocating a portion to the KLM; a commitment to assist the KLM with an allocation of R50 million toward the development of augmentation schemes over the next 2 years; and finally over the medium to long term a provision of R100 million to assist the KLM in the building of a dam in Knysna.
87 an earlier version was developed in February 2009
88 The communication also indicated that representatives within the KLM had attended a Provincial Disaster Meeting on 21 September 2009, and proceeded to consider the proposed interventions at a council meeting on 23 September 2009. With the raising of public awareness to the “seriousness of the drought situation and the reduction of water demand” (Bouw-Spies 2009) considered to be of prime
Environmental Affairs and Development Planning: “Re- Emergency Interventions – Eden Drought). Driven forward by parallel intergovernmental processes outlined above, by November 2009, the KLM (alongside other local municipalities in the EDM) was declared a local disaster area⁸⁹, resulting in the release of a grant of R22 million from National Treasury, to be spent by the end of March 2010.

The Minister of Finance, Economic Development and Tourism, Alan Winde, explained that '[a]fter realising that a disaster was looming in the Garden Route with regard to its water supply, an emergency plan was devised to ensure water security' (Knysna Plett Herald 2009n). An application for funding, developed by the Provincial Treasury, was hand-delivered by Minister Winde to the Minister of Finance, Pravin Gordhan, who proceeded to approve the application four days later. With both National and Provincial Government officials on site the following week to investigate the exact nature of KLMs need, following which, Minister Winde met with the KLM to discuss their readiness to spend the allocated funding in the financial year, ending March 2010. He added that 'this matter has shown the tremendous amount that can be achieved through cooperation between the three spheres of government”. In further support of the declaration and funding release, Minister for Local Government, Environmental Affairs, and Development Planning, Minister Anton Bredell added, “[m]y Department made a presentation to National Treasury to obtain the money for Knysna. Now that they have it, I'll support them in any way that they go about alleviating the water crisis, by means of technical know-how or whatever administrative aid they need” (Knysna Plett Herald 2009n).

The decision to declare a disaster in the KLM, supported and co-facilitated by the above actors, and formulated through the drought forum meetings, has been explained as

importance and requiring the support of the ‘Joint District Communications Team’ and the Provincial Disaster Management Officials in order to “elevate the urgency for all residents to conserve water at every opportunity” (Bouw-Spies 2009).

³⁹ declaration appeared in provincial gazette as follows: november 27 2009 - knysna municipality declaration of local disaster - p.k. 447/2009 - notice is hereby given in terms of section 55(1) of the disaster management act, 2002 (act 57 of 2002) that the knysna municipality, in conjunction with the national, - district, and eden disaster management centres, on 4 november 2009, resolved that due to the current drought conditions in the jurisdiction area of the knysna municipality, the municipal area be declared as a local state of disaster in terms of the said act. The national disaster management centre endorsed the classification of the knysna municipality by classifying the drought as a local disaster in terms of section 23(1) (b) of he said act on 10 november 2009. (provinsie wes - kaap, provinsiale koerant, 6680, 27 november 2009)
essential due to the reality of the drought “irrespective of the occasional rainy day …” (Knysna Plett Herald, 2009c); with “The South African Weather Service (SAWS) … forecast in August 2009 that projected an imminent dry spell over the Eden District … presenting a clear rationale for the subsequent disaster declaration” (Holloway, A. et. al, 2012, pp. 44–45). Following the disaster declaration and funding commitment, a task force within the KLM was established.\(^{90}\) However, according to the head of the task force the R22million received was insufficient for the costs of the two projects in its entirety and that the KLM had already put forward an application for extra funding” (Knysna Plett Herald 2009n). The availability of additional funds was announced in the finance minister’s budget speech on February 17 2010 with the approval of R141.5 million to alleviate the effects of the drought in the Eden and Central Karoo District Municipalities. Of this, R17.9 million was allocated to the Knysna Municipality. At this point, the projects were pushed forward, supported by the availability of funds and official disaster declaration.

Given the above tracing of the initial crisis response, what emerges from this account is that once the decision was taken to declare a disaster - essentially at the outset of the process in January – February 2009 – the stakeholder engagement at the local and intergovernmental level was focused on obtaining this declaration. Thereafter, once achieved, the timely expenditure of the allocated money on the identified augmentation projects became the renewed focus\(^{91}\). Hence, the political universe was restricted from the outset, whilst the inconsistencies in conceptualising drought were overcome by applying the label ‘disaster’. Overall it is argued that the focus on the disaster declaration process produced a consensus on an undisputed drought emergency. With a ‘sense of urgency’ utilised as a justification to access funding and proceed with the development of rapid augmentation schemes\(^{92}\), masking that ‘drought’ as a concept remained unstable and constructed. This conceptual fluidity is explained by a municipal official within the KLM technical department, as follows:

\(^{90}\) headed by the head of the KLM Project Management Unit (PMU), Mr. Rodney Nay, to oversee the projects to be completed by March 2010. Mr. Nay said that he was still finalising who would be on the task force, but was going ahead with implementing the projects.

\(^{91}\) To be discussed in greater detail in the empirical chapters examining the augmentation schemes

\(^{92}\) However, these claims were not always supported by the state of river flow or rainfall levels; as will be shown in empirical chapter 2 of this thesis.
“So it’s a problem within a municipality because everybody has their own ideas about what is a drought. They use the data but there isn't actually a formula to base a drought on … also there's no money for disasters” (Interview 33).

4.4 Communicating Drought

Having thus far presented the dominant representations of drought and traced through the key moments by which this narrative took root so as to support the consequent development of envisaged solutions; a further aspect requiring deeper consideration is ‘what’ mediums were employed in communicating the drought narrative to the ‘public’, and consequently widening and deepening its roots. It will be shown below that to disseminate the dominant message, the KLM made use of a number of different methods including public meetings, engagement with influential local associations and individuals, the distribution of information leaflets & brochures, media releases, the printing of a water use ‘thermometer’ (update) in local newspapers, official statements and reports, and the development of a risk rating by the EDMC.

4.4.1 Public engagement

On 16 January 2009, Sedgefield's RPVA distributed an email to approximately 150 Sedgefield residents, warning for the first time that there was only four days of water left\(^93\). The following day, 17 January 2009, Knysna Municipality started distributing fliers alerting residents to the crisis and as of 21 January 2009 distributed fliers door to door explaining the emergency procedure. A few days later, in a press briefing on January 21 2009 the Knysna Municipal Manager Mr. Johnny Douglas declared, “I’re in a disaster period now”. Knysna Mayor Eleanore Bouw-Spies said that a special sitting of council might be held on January 22 2009 in order to declare an emergency, which would release additional Provincial funding.

The above summarises the main municipal response at the very outset of the ‘crisis’, and was accompanied by the holding of meetings, initiated within the first week. The first was scheduled for 22 January in the Sedgefield town hall and followed by meetings on 27, 28 and 29 January in Smutsville, Rheenendaal and Sedgefield town hall

\(^93\) The estimate was later revised.
respectively. Thereafter Public Information meetings were held in Knysna on February 10, 11, 12. It was reported on February 5th that KLM had reduced the amount of qualitative data made available at the press briefing and withheld figures on Sedgefield's reservoir levels, saying only that they were rising.

Following this initial 'public engagement' on the drought crisis, further public participation was initiated in the development of the augmentation schemes. This process and its implications will be discussed further in the next chapter, on the solution consensus.

**4.4.2 The distribution of leaflets and brochures**

Another important communication instrument employed by the KLM was the distribution of information leaflets and posting of fliers within the town. The two examples below show the contents of a poster placed at various points within the KLM to highlight the ‘water crisis’; and a leaflet issued by the George Municipality, dated 4 December 2009, respectively. Each of these examples effectively captures the sense of urgency being presented by the affected municipalities, at the time.
Figure 4.1: Poster Water Stress Area

Source: Knysna Municipality
The towns of George, Knysna, Mossel Bay and Plettenberg Bay have been declared Disaster Areas due to the current drought. The Southern Cape has experienced the lowest recorded rainfall in history. (Records date back 132 years.) Rainfall to date for 2009 is ~ 40% of the annual average.

The water situation remains extremely serious. Hot temperatures and below normal rainfall is forecast for January, February and March 2010. The re-use of waste water is going ahead. It is scheduled for completion in March 2010. This project will supply 30% of current demand. Rain is desperately needed to supplement the level of the Garden Route dam.

Short and long term plans to increase water supply have commenced. Boreholes will be drilled. The Malgas Pumping scheme and the raising of the Garden Route dam spillway (to provide more storage capacity) are going ahead as per the original planning (in place since 2004).

The plea is not just to save water. We must change habits inside the house! It will be inconvenient. Careful consideration must be given before using each drop of water.

Source: George Municipality
4.4.3 Media Releases

Through a review of the local newspapers - namely the Sedgefield based ‘Edge’ and the KPH - and their email communication with the KLM Public Relations (PR) department, it is evident that Media Releases were a central component in supporting the solidification of a drought consensus, amongst the ‘public’\textsuperscript{94}. The example provided below illustrates this well. Where it is stated that “ … the situation is not likely to change within the next four months as predictions indicate that the area will remain dry … a concerted effort between municipalities and the media needs to generate and improve public knowledge on the dire situation facing the district, capital expenditure needs to be focused on improving the situation and municipalities should not wait for funds pending as they may only materialise after the fact” (Media Release, Knysna Municipality, 21 September 2009). The media release is replete with statements playing into the drought narrative sketched above, with words such as crisis, scarce, alarmingly, severity, precious commodity, stress, emergency, dire situation, and scarce commodity all reinforcing the representation of a sense of urgency requiring exceptional collective action.

\textsuperscript{94} In this case composed of the newspaper readership base.
Figure 4.3: Media Release Knysna

MEDIA RELEASE
KNYSNA MUNICIPALITY
DATE: 21 September 2009
EMBARGO: Immediate

Eden District Sitting High and Dry

A bleak picture was painted at an Eden water crisis technical meeting held on 21 September at the Eden Municipal Disaster Management Centre in George.

The meeting provided an opportunity for the various municipalities within the Eden district to report back to the head of the Provincial Disaster Management Centre and Deputy Director General of Local Government, Dr Hildegard Fasie, on the current water crisis facing the region.

The municipalities discussed the impact on their specific areas, proposed solutions and funding issues. With rainfall exceptionally scarce throughout the district, the levels of dams and rivers from which water is drawn were shown to be running extremely low. It is projected that these will run dry in an alarmingly short time.

Only one thing can break a drought and that is significant rainfall, but it was noted that a two-pronged approach should be undertaken to remedy the situation in the interim. Firstly as much water as possible should be supplied from as many sources as possible and secondly the demand for water needs to be reduced drastically.

Knysna Municipal Manager Mr Johnny Douglas said it was this last point that needed to be stressed. “There are many approaches to this problem, but reaching out to and informing the public about the severity of the situation takes first priority. Fines will also be implemented where necessary.”

He indicated that the municipality had commenced with plans to stave off the worst scenario. “Measures to help relieve the highest demands on the system during December should be in place by the end of the year. That said, lowering the demand of this precious commodity needs to be at the fore in every resident’s mind,” said Douglas.

“One of these measures is the Knysna Municipal Water Demand Management Plan,” Douglas explained. “Implementation will take the form of a hard hitting campaign focussed on convincing consumers to reduce water demand down to target levels. These levels will be communicated in due course.”

Other key outcomes of the meeting included that the situation is not likely to change within the next four months as predictions indicate that the area will remain dry, municipalities under stress in terms of water supply need to implement emergency tariffs, a concerted effort between municipalities and the media needs to generate and improve public knowledge on the dire situation facing the district, capital expenditure needs to be focussed on improving the situation and municipalities should not wait for funds pending, as these may only materialise after the fact.

“It is time for us all to reconsider how we use this scarce commodity and do what we can to alleviate the situation,” said Douglas. “We need the residents to realise that the future of our water supply lies in our hands and as citizens of the Eden district, we all have to minimise our water consumption today to ensure we have water available tomorrow.”

ENDS

MEDIA RELEASE BY KNYSNA PR | Nicci Rousseau on behalf of the Knysna Municipality.
4.4.4 Water usage thermometer & Municipal Billboards

One of the main public campaign instruments launched by the KLM was the weekly printing of a ‘water usage thermometer’ within the local Knysna Plett Herald (KPH) newspaper. The visual represented the water usage patterns for Sedgefield and Knysna in the form of a ‘thermometer’ with a ‘smiling’ or ‘frowning’ face, depending on the discrepancy between actual versus targeted usage for each of the towns. In the example provided below, the ‘thermometer’ was accompanied by a municipal press statement, encouraging collective behavioural change amongst the residents of the Municipality, or else “[i]f I continue in the same water usage patterns, I’re going to be in trouble. Let’s all work together and use less water!”.

Figure 4.4: Rainfall Records
4.4.5 A supply risk-rating and monitoring system

The supply risk-rating and monitoring system was developed by the Technical Services Department of the Eden District Municipality during the course of the drought operation, and applied to all of the affected Local Municipalities within the EDM. The rating system contained water supply information, supplied by the respective municipalities, which was subsequently collated and shared at the monthly provincial drought meetings in the form of monitoring reports. These reports summarised regional drought and water supply indicators including recorded rainfall, dam levels, river flow volumes and projected rainfall conditions; translating this data into a visual output, categorising municipalities within a colour-coded risk rating scheme. Within this scheme the KLM was repeatedly categorised as high risk, with the municipal dam levels as a significant variable informing this categorisation (Holloway, A. et. al, 2012, pp. 44–45). For example, it is stated in a Water Crisis Management Progress Report of 7 May 2010 that, “At best Knysna has 80 days of water supply in storage (in the unlikely event that the Akkerkloof dam is full) and the local municipality is predominantly dependant on river abstraction systems for its water supply. The drought is having a very significant negative impact on the ability of the main rivers, including the Knysna and Karatara, to provide sufficient flow volumes in support of the abstraction rates required” (Du Preez 2010). These monthly water crisis reports, containing the ‘risk rating’ as a central output, served to reinforce the drought narrative, disaster declaration and motivation for the rapid implementation of the proposed emergency schemes as an essential response to water shortage95.

95 It is contended in this thesis however that firstly, whilst the enrolment of the Disaster Management Act was informed and supported by the review of water availability and weather assessment reports, consequent changes/improvements in water availability in the months following the initial Sedgefield ‘moment of crisis’ did not result in any deviation from the decided path, once the disaster declaration course was set. Secondly, in the chapters to follow, it will be argued that as a technical instrument, the ‘risk rating’ was devoid of any analysis of the role of historical governance failure in informing the evidenced crisis of supply, focusing exclusively on quantified water availability measures.
Figure 4.5: Supply Risk Rating criteria

Source: EDM Water Crisis Management Progress Report
4.5 Conclusion and Discussion

This chapter analysed the discourse of a drought crisis, carried out as part of a broader interrogation of a crisis – solution consensus, advanced within an ecological modernisation approach, promising a path out of ecological crisis through decoupling growth from environmental degradation (Wanner, 2014:2-3). In this chapter I show how drought consensus was ‘solidified’, ignoring the multiplicities, inconsistencies, and incoherences inscribed in its symbolization. What emerges from this analysis, is that climate change is the central explanatory variable in the dominant discourse on the drought crisis. However, instead of functioning as a reminder of the interdependencies between human and non-human nature, it is evoked to portray nature as an externalised threat. Also persistent within this narrative is a ‘sense of urgency’ to avert and revert the deepening of crisis.  

In other words, despite the language of the Anthropocene as the Age of Man (Davoudi, 2014: 1-2), a dualistic conception of human–nature relations is apparent in this conceptualisation. With this externalised nature blamed for the problem, scripting out any recognition of the role of modes of governance, history or politics in the analysis of the drought emergence. The significance of reflecting on the emergent drought discourse is that this has profound implications for what kinds of environmental politics are mobilised in both defining and responding to the 'crisis', and consequently what kinds of solutions are formulated (Davoudi, 2014: 2). In this case it emerges that emergency planning and the advancement of technical–rational decision-making informed both the codification of the dominant portrayal of drought and the crisis response. These included particular representations of forecasted growth and water demand, the mobilisation of institutional forums; the employment of exceptional environmental and disaster management legislation, a wide range of representational materials, and an emphasis on participation – however within the confines of the common-sense conceptions. Furthermore the solutions advanced, most notably in the form of desalination, reflect the advancement of technological security as a response to overcoming the threat of nature and protecting the existing order.

96 The theme of ‘urgency’ will be explored throughout this thesis. Where it will be argued that whilst urgency to respond to nature’s crisis was explicitly mobilised to justify action, the requirements of legislative and monetary conditionality functioned as the implicit material driver’s of urgency.
This act of ideological construction – as an act of power and politics - functions to foreclose contingency, as it insists upon the indisputability of drought as threat. Thereby reducing the challenge to a question of the best techno-managerial responses to be adopted. Resulting in a politics of expert management without any acknowledgement of the existence of ideological underpinnings, presenting the crisis-solution process and consensus as indisputable and rational beyond question. Thereby obscuring the actually existing relations through which the drought emerged. As a counter to this foreclosure, the next chapter focuses on examining the metabolism of drought as a historical relational process. Hence, in combination, these first two empirical chapters aim to make sense of the discursive and material constitution of the drought, with the emergence and consequences of the desalination solution explored thereafter in the remaining empirical chapters. The significance of examining the relational production of drought, is to contribute to an unsettling of claims of 'nature's crisis', as scientifically neutral and an indisputable phenomenon, pointing instead to the foreclosure of its inherent contingency and thereby enabling an examination of the purpose and consequences of this foreclosure.
Chapter 5: The Historical Materiality of Crisis

5.1 Introduction

In the previous chapter it was argued that ‘drought’ was discursively constructed, with particular representations emerging as dominant, and given form through both process and products of representation. Following this assessment of the manufacture of consensus of a drought crisis, as a post-political denial of contingency, it is argued that a relational ontology would function as a valuable counter by surfacing the historical material relations through which the drought phenomenon was constituted.

That is; in direct contrast to a dominant representation of drought as an ontologically independent sphere that people require protection from, or as a domain to be dominated; a relational ontology supports an examination of drought as part of a mutually constituted totality. In other words, where observed 'phenomenon' are understood as emerging out of a process of continuous historically contingent relations, between human and non-human natures (Swyngedouw, 2010: 304).

In locating the study in this way, the chapter draws on a fairly common tactic used by urban political ecologists (UPE) to question the naturalisation of notions of crisis and scarcity (Bakker, 2000, 2004; Castree, 1995; Castree and Braun, 2001; Kaika, 2003; Wisner, 2003; Swyngedouw, 2004; Linton, 2004; Murray, 2009; Mehta et.al, 2010). Specifically, the study operates at the interface between theoretical engagement and empirical study, drawing on a Marxian historical materialism\(^\text{97}\) to transcend dualistic, a-political and a-historical treatments of ecological relations by tracing the relational 'becoming of things'. In this case the historical 'becoming' of an apparent drought crisis. Thereby serving to unsettle 'neutralised' treatments of water crisis and scarcity and consequently questioning the reduction of solutions to technical and managerial debates and related fixes.

\(^\text{97}\) Neil Smith (1984) has been particularly influential in informing efforts to examine relational processes; drawing on a historical materialist framework, employing the concept of metabolism (Bellamy Foster, 2000: 116); as a counter to traditional approaches treating 'nature' and 'society' as independent spaces for scientific enquiry (Gandy, 2003; Swyngedouw; 2004; Kaika, 2005; Heynen et al., 2005)
This examination of the historical-materiality of drought crisis is undertaken in three parts as follows: First, as the core focus of the chapter, the water governance period preceding the drought is examined; second, the claim of drought as a sudden unexpected crisis is questioned; third, the represented extent of crisis is brought into question through presenting rainfall and dam level data.

5.2 The historical materiality of water governance in Sedgefield

The research findings suggest that the materiality of the drought crisis extends into the history of water governance in the KLM, at least to the previous water augmentation scheme, developed by Ninham Shand (N.S.)\(^{98}\) as the consulting engineers at the time, which began in earnest in the latter part of 2004.

Developed as a plan to provide water for Sedgefield up to the year 2030 (KLM Business Plan, 2009), the project was separated into two components. The first part, termed the ‘relocation of the Sedgefield water treatment works’ (SWTW), involved three elements: the ‘downgrading’ of the existing Ruigtevlei Water Treatment Works (RWTW) on the Karatara River into a pumping station - from which water would be pumped to the new SWTW; the construction of a water transfer pipeline - from the pumping station to the new treatment works; and the new SWTW itself – located on the Cloud Nine hill above Sedgefield. The second part, termed ‘Sedgefield water augmentation’\(^ {99}\) referred to plans to abstract water from the nearby Hoogeekraal River to be transferred to a new proposed (Swartrivier) Dam, with this water then transferred to the Ruigtevlei pumping station to enter the treatment and distribution cycle. In other words, in combination, the schemes proposed the Hoogeekraal River as a new water supply source, the construction of a storage dam, and the relocation of the water treatment works.

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\(^{98}\) On 16 March 2009, Connell Wagner (Pty) Ltd, one of Asia Pacific’s largest infrastructure consulting companies; Africon (Pty) Ltd, South Africa’s largest privately owned infrastructure consultancy; and Ninham Shand (Pty) Ltd, one of South Africa’s most established engineering and environmental consultancies, confirmed that they merged to form a new multidisciplinary global group, called Aurecon. To provide professional technical services on large scale integrated infrastructure projects to clients across Europe, Middle East and Africa, and Asia Pacific. The global group is now headquartered in Singapore and employs over 6 700 people across 87 offices in 28 countries

\(^{99}\) Although in progress reports provided by NS to the KLM the entire scheme, composed of all the component parts, was termed ‘Sedgefield Water Augmentation’
The scheme was supported by a claimed crisis of supply, related to two specific issues. The first was the precarious location of the existing RWTW, identified as a threat to town water security. The second was a 'Moratorium on Development', issued by the KLM to restrict further development in Sedgefield until additional water supply was guaranteed. To take each point in turn.

As the main water supply system in Sedgefield, all potable water flowing through the town is pumped out of the Karatara River, purified at the RWTW and pumped up to supply reservoirs for distribution. However, the location of the RWTW on the Karatara River and just above the saline Swartvlei estuary which leads into the sea, makes this system precarious in the case of both too much or too little rainfall. That is, when the water levels in the neighbouring estuary rise, the risk of saline estuarine water entering the extraction pool at the RWTW intensifies. At the same time reduced river flow impacts on the availability of freshwater in the extraction pool. In both cases the water at the extraction pool is at risk of becoming saline, and beyond the design capacity of the treatment works to purify. For this reason the relocation project was proposed as a response to the risk of saline contamination of the water pool at the treatment works. Understood as a direct threat to Sedgefield's water security (Knysna Plett Herald 2006; Interview 52)

The second perceived threat to water security, was a crisis of supply in relation to anticipated future demand, resulting in a 'moratorium on development' being issued by the KLM to restrict further development in Sedgefield until additional water supply was guaranteed. According to a letter sent by Ninham Shand to Mr. H E, the owner of a property identified as a potential site for the proposed Swartrivier Dam;

“Ninham Shand (NS) have been appointed by the Knysna Municipality to resolve Sedgefield's ongoing water supply problems ...The problem has reached the point that no new developments will be allowed until the water situation is resolved ... this matter needs prompt resolution to address the serious water supply problems the town currently experiences. The moratorium on development cannot be removed until the proposed upgrading of Sedgefield's water supply has been implemented” (NS. 2007a. Email NS to Mr. H E).
Hence, it emerges that these two identified threats to water security were mobilised to support an argument that Sedgefield faced ongoing, serious water problems, necessitating the development of an augmentation scheme. With this crisis narrative serving as the central justification, the project planning process was initiated. However, despite proceeding for a number of years, the entire scheme was ultimately cancelled in July 2008, prior to implementation and only a few months before the January 2009 drought crisis. The cited reason for this cancellation was the unforeseen exponential increase in estimated project cost over the course of the planning period, ultimately making the scheme unaffordable for the municipality. As stated in the KLM Business Plan of February 2009 – developed during the drought crisis,

“The total budget in 2008 for the scheme was R110 million… The plan was not implemented, due to a lack of funds” (KLM Business Plan, 2009).

In what follows I seek to interrogate this official representation, tracing the process from scheme conceptualisation and planning to cancellation. The insights gained from this historical-material analysis will be drawn on to inform our understanding of both the continuity between the historical crisis and the drought crisis, and the distinctions between the historical solution and the desalination solution, specifically what mechanisms contributed to the collapse of the former and the establishment of consensus for the latter (this analysis will be developed upon in the next empirical chapter).

5.2.1 Tracing the dimensions of scheme advancement

With the augmentation scheme planning having begun in earnest in the latter part of 2004, by 2007 the consulting engineers, alongside members of the KLM Technical Services Department, were actively engaged in conducting a range of desktop studies and site surveys to determine the optimum project design, identify project sites, secure the required environmental approvals and project funding (NS Internal communication 2007b:NS Internal Email Communication). In what follows I reflect on the

100 While this figure has been claimed by interview respondents and stated in the Business Plan, through document review it has proven difficult to verify. What is clear is that the estimated scheme cost increased from the period 2004 to its ultimate cancellation in 2008. The cost changes will be discussed later in this section.
mechanisms, deemed essential for project advancement. Arguing that ultimately the failure to co-ordinate these, specifically the environmental approval and funding requirements, contributed to project delays, cost increases and finally cancellation.

### 5.2.1.1 Securing Environmental Authorisation

Firstly it emerges that the decision to split the project components into two parts was taken in order to receive environmental authorisation for the scheme. That is, at a meeting held on 8 August 2007 between representatives from NS and the Department of Environmental Affairs and Development Planning (DEADP), it was decided that regarding the SWTW relocation, the 3 project components were connected and therefore the trigger for a Basic Assessment Report (BAR) at the pump-station required that the other two components - the pipeline and the new WTW - also be subject to a BAR, and be dealt with as one. However, with regard to the ‘Sedgefield water augmentation’, while it was agreed that an Environmental Impact Assessment (EIA) was required, this was not linked to the SWTW BAR requirements. It was stated, however, that “in some opinion it is [linked], therefore clear motivation needs to be made to justify the separation” (NS and DEADP 2007: Minutes on Preliminary EIA/BAR Consultation). Hence, the scheme components came to be separated so as to solidify this determination on the distinct environmental approval requirements for each part. Once the respective environmental approval requirements were established, NS proceeded to apply for these for each of the component parts. The process, and its impact on project development, will be considered below, beginning with the BAR on the SWTW.

**Seeking environmental approval for the Sedgefield water treatment works’ (SWTW)**

The final BAR Report for the Sedgefield WTW and Supply Infrastructure was submitted to the DEAT (Directorate Integrated Environmental Management) on 20 November 2007. However, while indicating support for the proposal in principle, the issuing of a final decision was made subject to verification, of the findings of the Archaeological Report by Heritage Western Cape (HWC) (Directorate: Integrated Environmental Management 2008: Sedgefield WTW and Supply Infrastructure, Directorate: Integrated Environmental Management to the DEAT). In the final
assessment the wait for the HWC verification caused a 3 month delay (NS 2008c:Progress Report Sedgefield Bulk Water Augmentation for April 2008; NS to KLM Attention NP), with the added consequence of delaying the tender process for the civil and mechanical work on the Ruigtevlei pump-station, intended as the first scheme component to be implemented, in utilising available funding received for a flood event in August 2006. Secondly the concern regarding ‘independence’ emerges as a factor requiring strategic management so as to ensure an ‘appearance of project legitimacy’. That is, the deliberate employment of legislative exemption from independence (as discussed earlier) and the deliberate coordination of actions.

An EIA and water abstraction licence for the ‘Sedgefield water augmentation’ project

Regarding the ‘Sedgefield Water Augmentation’ scheme component, a submission of Application for Authorisation for Scoping and EIA\textsuperscript{101} was sent on 3 September 2007 to the DEADP and consequently on 1 October 2007 to the Department of Environmental Affairs and Tourism (DEAT). The purpose of the submission was to provide background information on the proposed project in order to obtain the requisite reference number for the public participation process to begin (NS 2007f Submission of Application for Authorisation for Scoping and EIA for the ‘Sedgefield Water Augmentation’, NS to the DEAT)\textsuperscript{102}.

Around the same time a licence application for the augmentation of water supply to Sedgefield was sent to the DWAF explaining that the KLM had applied for a water use licence to abstract 1.2Mm$^3$ per annum (60l/s) of water from the Hoogekraal River. With the water to be transferred to a planned 400 000m$^3$ off-channel storage dam, located on the Swartrivier Farm to the east of the river. The application echoed the rationale being adopted in support of the overall scheme; that is linking the urgency for an increased water supply to future development within the town. It was stated that the municipality required the additional water urgently, as there was immense pressure on the town's existing water resources, and further pressure for additional development in the

\textsuperscript{101} As per the requirements of section 22(b) of the National Environmental Management Act EIA regulation, GN NO. R385 of 21 April 2006

\textsuperscript{102} Furthermore it was indicated that relocation of the SWTW was a related project, but formed part of a separate application
Sedgefield area, which had been put on hold until the water supply issues were resolved.

Furthermore, the link between the licence application and the EIA process was stressed. In recognising that the project required the completion of a full EIA Process in terms of the NEMA (No 107 of 1998)\(^{103}\), it was stated that

“due to the urgency of this proposed project, I urge the department (of water affairs) to commence with the licence application process and specifically the Reserve Determination component of the process as soon as possible. I intend to have the EIA process completed by April 2008, and expect to have the environmental decision by July 2008” (NS 2007e: NS to DWAF sent on 5 October 2007).

However, by April 2008 the dam related projects were suspended as per an instruction from the KLM (NS 2008c:Progress Report Sedgefield Bulk Water Augmentation for April 2008; NS to KLM Attention NP). And, while the final scoping report was submitted by NS to KLM on the 24 April 2008 for final comment before submission to the DEAT and commencement with the completion of the draft EIA\(^ {104} \) the reserve determination from the DWAF was still not available (NS 2008d:Progress Report Sedgefield Bulk Water Augmentation for May 2008; NS to KLM Attention NP). Even by July 2008 and once again January 2009 it was reported that the reserve determination being undertaken by DWAF, was still incomplete (NS 2009: Progress Report Sedgefield Bulk Augmentation for July 2008 to January 2009; NS to KLM Attention NP)

### 5.2.1.2 Co-ordinating environmental approval and allocation of investment

Hence, from the above it is apparent that the acquisition of environmental and water abstraction approvals proved to be highly complex, time-consuming, technical processes, that were challenging to co-ordinate in support of project advancement. Further analysis reveals that an added dimension within this process was the difficulty

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103 It was thought that this process was likely to be completed within an 8 month period

104 By the time the dam project was stopped by the municipality (31st July 2008) the draft EIA, was 80% complete and the project had not been removed from the DEAT’s project list Therefore the application could be re-activated with the submission of the draft EIA document for DEAT’s consideration.

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of coordinating municipal budget allocations with environmental approval and water abstraction licences. The case is replete with examples of this challenge and its effect on the scheme development.

As an illustration, in the case of the water licence, it was communicated that the KLM had secured the funding to develop the proposed dam and pipeline and was under pressure to start spending the money within the current financial year, i.e. ending June 2008, thus necessitating the urgent receipt of the water abstraction licence. The significance of this challenge is once again echoed in an email sent in July 2007 from the KLM to NS, which states:

“...Last financial year I left too much money on the table and this year there is a huge budget to spend ...I cannot have these projects going slow. ... please advise the status of EIA applications and whether I need to apply pressure for these” (NP KLM to AvM NS).

From the above it is clear that both securing and co-ordinating environmental approvals, water abstraction licences, and project investment was both central to project advancement and simultaneously proved highly complex and difficult to achieve. In the case of the historical scheme this challenge contributed to significant project delays and cost increases, leading ultimately to project cancellation. This movement toward project cancellation in July 2008 will be explored further below.

5.2.2 Tracing the movement toward scheme cancellation
5.2.2.1 Project delays and increases in cost estimates

The challenge to secure and co-ordinate environmental approvals and funding availability had the effect of continuous project delays, also leading to ongoing increases in the estimated project cost. At the outset, in a breakdown provided by the consulting engineers to the municipality, beginning from Financial year 2004/2005 through to financial year 2015/2016, the estimated costs of reports, studies, WTW relocation, dam construction as well as associated works totalled approximately R25 million (PE NS 2005: Study of Augmentation of Water Supply to Sedgefield; PE NS to JH KLM). However, in a budget report submitted to the KLM council by January 2008, presented in order to advise the council on the project delays and anticipated cash flow...
for the augmentation of water supplies to Sedgefield, the estimated cost of the entire scheme had increased to R53 850 000\(^{105}\) (NP KLM 2008: Budget to Council Revised Cash Flow Report). The explanation provided for the project delays and consequent increase in cost estimates was that;

“The project has to follow various environmental processes ... This has had the effect of delaying the project and a revised cash flow has been submitted by the consultants” (NP KLM 2008: Budget to Council Revised Cash Flow Report).

The cost estimate for the project was once again revised by the consulting engineers, and sent to the KLM Director of Technical Services on 20 March 2008 (NS 2008b: Updated Cost Estimate Swart-river Dam Project, AvM NS to NP/JH KLM). According to this revised estimate the total costs for the SWTW relocation came to R31 224 114.89, with the total costs for the Sedgefield Dam and related infrastructure coming to R58 233 678.35; i.e. a total for the project of R89 457 793.24. It is unclear from the estimate provided what aspects of the scheme accounted for the further increase from R53 850 000 in January 2008 to R89 457 793.24 by March 2008 (NS 2008b: Updated Cost Estimate Swart-river Dam Project, AvM NS to NP/JH KLM).

In the context of the project challenges and consequent repeated cost estimate revisions, a meeting was held between the KLM Directorate of Technical Services and representatives from NS on 30 June 2008, to discuss the problems experienced with the project. This meeting was significant as it preceded the cancellation of the entire scheme but it is apparent that the Director of Technical Services believed the consulting engineers had mislead him through the process, with the project costs having increased from an initial R25 million in 2005 to R89 457 793.24 by March 2008.

According to the meeting minutes, the KLM representative suggested that “the fact that the project had increased from approximately R35m to the present R93m, had not been timeously communicated by NS to the KM” (Interview PE 2012). However, in contrast

\(^{105}\) According to the report the scheme “consists of the following elements with the current estimated cost (excl VAT) as follows: New Water Treatment Works at R20 150 000; Ruigtevlei Pump station at R3 175 000; Re-routed pumping main at R4 695 000; Swart-river Dam - R10 990 000; Hoekraal Pump station at R2 180 000; Hoekraal pumping main at R2 470 000; Gravity main at R10 190 000. For the new water treatment works an amount of R14 000 000 has been received as MIG funding from storm relief funds” (NP KLM 2008).
to this perspective the consulting engineers insisted that project developments and changes, including price increases had been communicated clearly to the KLM throughout the process and that project delays, largely as a result of lengthy environmental authorisation processes, meant that the price increases were unavoidable with the initial cost estimate provided three years prior to the project cancellation. This position was explained as follows,

“Remember R35m is a figure that comes from way back when ... you know the environmental issues had a major role to play in the cost of the whole thing ... remember I couldn't construct anything as I were still going through the environmental. Then everything got stopped” (Interview 67; Interview 37; Minutes of Meeting, Sedgefield Bulk Water Project - Problems Experienced with Sedgefield Water Augmentation Project).

5.2.2.2. The politics of the scheme cancellation

Through this tracing of the dimensions of the previous augmentation scheme, it is apparent that the process was at times analogous to a technical juggling act in an effort to manage and synchronise a range of variables enabling or hindering project development. In this case, ‘things fell apart’ with the cancellation of the project in July 2008. However, while the substantial increase in project cost estimates, deeming the project unaffordable to the KLM, was cited as the reason for the council resolution, the actual extent of the decision to cancel the project in its entirety was received as a surprise by the consulting engineers. That is, while the meeting held on 30 June 2008 reflected a shift in the relationship between the consulting and municipal engineers (Department of Technical Services), at that stage alternatives to overcome the project problems were still explored. This invites the question, 'what, beyond the variables already outlined, were the forces that drove this movement to the the resolution in July 2008?"

A review of internal municipal communication and reports suggests that the answer lies in competing interests between Municipal Departments. Specifically in a report submitted to the KLM council in January 2008, the concluding recommendation from

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106 resulting in the abrupt end of a project that had occupied the centre stage of Sedgefield water augmentation planning at least since 2003.
107 which preceded the council decision on 31 July 2008 to cancel the project
the Municipal Director of Technical Services was “that the council notes the report on the revised cash flow for the Sedgefield Water Supplies Augmentation Projects and that the 2007/2008 Capital Budget be revised accordingly” (NP KLM 2008). In contrast to this recommendation, the comment provided by the KLM Director of Financial Services was that “As far as I am aware this project has been stopped. The only comment I can therefore make is that some sort of discussion needs to take place to clarify this” (NP KLM 2008: Budget to Council Revised Cash Flow Report ). This report therefore surfaces a contention between the finance and technical municipal directorates with respect to the projects future.

This is further supported by interviews conducted with key role-players within each of these two municipal directorates, suggesting that disunity in the municipal vision for the Sedgefield water augmentation was brewing. Triggered by the already identified issues of project delays and related cost increases; the Finance Directorate began to challenge the financial feasibility of the scheme and expressed concerns that the impact of a phased (per financial year) implementation of the scheme would result in the Technical Directorate utilising all the allocated Municipal Infrastructure Grant (MIG) funding for a few years to come, in order to fund the project. Furthermore, it was suggested that the project components were presented to the council without connecting these component pieces, hence having the effect of not making the project costs in its entirety visible. This concern regarding the individual ‘selling’ of the project components, was explained as follows:

“They were all being SOLD, because this is all about SELLING, they were all being SOLD individually … I looked at this and I went (connects the pieces). Very Simple, and the result was that this thing was costing R120mill. And that was the point” (Interview 4).

Armed with these concerns the Financial Services Directorate launched a challenge against the scheme, as,

“... this was a R120 million project which would give water to Sedgefield … The simple problem is that Sedgefield has 2500 tax payers and there's a population of about 10-15-20000, there's only 2500 who actually pay anything” (Interview 64).
This account of the individual ‘selling’ of the project components was however contested by the Technical Services Directorate, claiming that the project components, changes in cost estimates and reasons for project delays were clearly presented to council;

“...They took the decision to award the tender... And they were aware in my reports of what additional funds they were looking for. But then the finance ... said it shouldn't be wasted on a small town like Sedgefield. Regardless of the fact that they were sitting with a very dicey water supply system that was going to fail at anytime” (Interview 37).

To conclude this examination of the historical augmentation scheme, it can be seen that the official explanation provided for project cancellation, serves to deny the complexity of the process. Specifically the factors informing the increase in project costing – influenced by lengthy delays in environmental approvals – and the contested process pitting competing interests, regarding the allocation of limited municipal funds, against each other.

5.3 A gulf between crisis materiality and representation

5.3.1 Questioning the unforeseen crisis

In the above analysis of the historical NS augmentation scheme, it was shown that the project was supported by a crisis narrative; on the insecurity of water supply to support future development, and the precarious location of the RWTW. However, as I have seen above, a number of variables coalesced in preventing the scheme implementation, with the implication that the identified 'dimensions of crisis' remained unresolved. It is argued here, that the drought crisis was reflective of a resurfacing of these historical crisis dimensions. That is, whilst the drought crisis narrative insisted on the emergence of a sudden unexpected crisis, claiming that the Karatara River had dried up due to insufficient rainfall, as follows;

“...who would have ever thought this river running for 25 years was going to dry up” (Interview 29).

Further investigation makes apparent that, instead of an externalised threatening nature, the crisis was constituted through a significant increase in demand in the tourist season,
despite dramatically reduced rainfall in the months of December 2008 and January 2009, coupled with the problematic location of the RWTW.

As explained in an official report developed by the Eden Disaster Management Centre, “no water could be extracted from the Karatara river in January 2009, mainly due to the salinity of the water rendering it not fit for human consumption” (Otto 2009). In other words, continuous extraction coupled with reduced river flow resulted in the increase in water salinity at the RWTW extraction pool, to a level beyond the purification capacity of the WTW, thereby acting as a central trigger of Sedgefield’s water crisis. Hence pointing to the historical continuity of 'crisis' and making clear that this crisis was internally constituted, a feature of increasing water demand and infrastructure challenges. However, the 'drought crisis' narrative denies this relation to the historical dimensions of crisis, focusing instead on the threat posed by climate change on future water security.

From this analysis, it can be seen that a 'gulf' exists between the historical-materiality and the representations of the drought crisis. In what follows, this notion of a 'gulf' will be examined further.

### 5.3.2 Questioning the extent of crisis

In this section, the represented extent of crisis is compared to data on water availability – focusing on rainfall and dam levels.\(^\text{108}\)

According to municipal records, the rainfall levels in Sedgefield in December 2008 were the lowest on record for the last 10 years, with recorded rainfall of 10mm, compared to 92mm in the previous year. However, despite this, the Municipality remained silent on the variation over the period December 2008 into January 2009, which coincides with the peak holiday season demand\(^\text{109}\). Resulting in the emergence of ‘crisis’ in January 2009, when it was no longer possible to pump water for purification at the RWTW. However in the months thereafter, the dominant narrative, continued to insist on the unreliability of rainfall, with a municipal official interviewed claiming that;

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108 I’ll focus on the crisis emergence and the months thereafter; as the period during which the crisis narrative was strongly articulated and mobilised to support particular solutions as essential.

109 During this period there is an annual influx of holiday makers into the seaside town.
“It was an emergency because I were still relying on the 1.5ML from the rivers and at that stage I still hadn't had rain. ... there was still no rain the Karatara river was still not flowing and the Hoogekraal was drying up. The rain came about July 2010” (Interview RN 2011).

Since this would suggest that the town had been without rain for more than a year, confirmation of this claim was consequently sought from the interviewee. The response received was that,

“The (Karatara) river was dry, yes ... I still aimed for 1ML a day, of which 0.5ML was coming from the boreholes ... 0.5ML from the Hoogekraal, which was dropping ... The (Karatara) river was dry ... the Weather Services are available to give you that data” (Interview 6: Interview 90).

However, in contrast to this claim, it can be established through a cursory review of the rainfall levels during the 2009 period\textsuperscript{10} that, with 3.5mm of monthly rain recorded up to February 10 2009, rainfall on February 10th and 11th brought an extra 12mm of rain to Sedgefield and 26.6mm of rain to Knysna, adding to February's 3mm up to that point for the town. By February 19 2009 it was reported that sufficient rainfall had fallen in the region (a cumulative 44mm of monthly rainfall), resulting in the Karatara river flowing again, and the suspension of pumping from the recently laid pipeline, prompting the Knysna Municipality to announce that the ‘water supply in Sedgefield is back to normal” (Knysna Plett Herald 2009e). With the Karatara River flowing again the municipality suspended pumping from the emergency Hoogekraal pipeline.

Furthermore, in the case of Knysna, as a further counter to the insistent claim of the ‘reality of drought’, and as an external nature induced crisis, an article appearing on 1 October 2009 in the KPH poses the question 'Is there really a drought?’ (Knysna Plett

\textsuperscript{10} The information presented here was sourced from the local Knysna Plett Herald newspaper. While more detailed data on rainfall patterns within the KLM, over the period 2009 – 2010, have been sourced, these are located within an array of sources, including newspaper articles, official reports, and internal municipal communication. Therefore the development of a comprehensive monthly rainfall graph would require a review of all these sources, and will only be undertaken at a later point within this study. However, while the information presented here currently provides an incomplete record, it is already sufficient to demonstrate the inaccuracy of the above claims made – in this case by a key municipal figure engaged in the process of managing the crisis and consequent solution development within the KLM - regarding the extent of a material crisis in the Municipality.
Herald 2009k). Based on an analysis of rainfall figures in Knysna over the last 16 years collected by a Knysna resident, the records provided indicate that,

“The average from April to August for the past 15 years is 305.5mm. This year (2009) Knysna has had 267.2mm. This is 13% less than 'normal' - not 40% as the Mayor suggests” (Knysna Plett Herald 2009k). Furthermore, over the past 3 months Knysna has had 191.5 mm and the average for those 3 months for the past 15 years is 181.5mm. So in fact Knysna has had more than the expected rainfall, not less ... The above figures reveal that there have been some dry months, but not enough to conclude that Knysna is currently in a severe drought” (Knysna Plett Herald 2009k).

Finally, in continuing the analysis of the extent of crisis in Knysna, while in April 2009, the KLM Director of Technical Services, Mr. Neale Perring, warned that the water crisis had worsened and the town of Knysna may be faced with only a month of water remaining, adding that, 'there's a real sense of urgency' (Knysna Plett Herald 2009h). By the following week it was reported that, despite the earlier warning issued, rainfall during the period 17th -20th April totalled 18mm in Sedgefield and 14mm in Knysna, and both the Charlesford (Knysna River) and Gouna (Gouna River) pump-stations, - abstracting water from the two main rivers supplying Knysna’s water - were operating at full capacity. In addition, stores from within Knysna’s 800Ml Akkerkloof Dam were not drawn on, despite the warning suggesting that this may be necessary, resulting instead in the Dam level increasing to 27.7% (Knysna Plett Herald 2009i). In fact the 800Ml Akkerkloof Storage Dam level – as the only Dam in Knysna - continued to increase over the course of 2009 into 2010. Beginning at 25% in February 2009, increasing to 32% in September 2009, 55% by 24 February 2010, 76% by 26 May 2010, 95% by July 2010, and reaching 100% soon thereafter (Municipal records). Furthermore it emerges that, similar to Sedgefield, the water challenges in Knysna, materialised in the low Dam levels recorded at the start of 2009, were largely related to infrastructure challenges. These infrastructure challenges are summarised below.

Firstly, electricity problems were experienced due both to the 2008 'load-shedding' programme of the national electricity supplier, Eskom; and flood conditions in the rivers supplying Knysna, which resulted in a serious disruption of pumping at the Charlesford
pumping station on the Knysna River, which pumps to the Akkerkloof Storage Dam\textsuperscript{111}. Alongside the above problems, a number of pump related issues were also faced at the Charlesford pump station. Without going into the detail, what is important to emphasise is that these problems were experienced at least since 2008. With a number of interventions attempted, based on consultant advice, to resolve the problem. However, these efforts continued into 2009, affecting the pumping capacity at the Charlesford pump station and therefore the filling of the Akkerkloof Dam. Therefore, while being 42\% full before the December 2008 holiday period, high consumption rates over the festive season coupled with electrical problems at the Charlesford pump-station, resulted in the Dam being 25\% full by 20 January 2009.

In sum, it emerges that there is an inconsistency between the dominant crisis narrative – regarding claims of the extent and causes of crisis – and the materiality of crisis. With the latter highlighting firstly that a crisis of supply was caused by a combination of reduced rainfall, increased demand in the tourist season, and the surfacing of ongoing infrastructure challenges (in both Sedgefield and Knysna). Secondly beyond pointing to a material crisis of supply, the analysis also suggests that this was not as severe as claimed. This insight is deemed important as I proceed to the next chapter concerned with the emergence of solutions, including the way in which they came to be justified; which included a reliance on an undisputed acceptance of the dominant representation of crisis.

\textsuperscript{111} The Charlesford Station; on the Knysna River, provides 70\% of the water supply to the Akkerkloof Dam, hence problems faced with this pumping station has a major bearing on the levels of the Dam, that is on the water reserve available to the town at times when the river levels are low.
5.4 Conclusion & Discussion

This chapter, was broadly concerned with examining the historical materiality of crisis, with a view to interrogating the crisis narrative, and developing understandings of the internal logic producing crisis. Having carried out this analysis, the chapter contributes at two fronts to the overall thesis project, which is concerned with tracing processes of depoliticisation and contributing to an analytical repoliticisation, as part of an broader evaluation of the logic of Ecological Modernisation.

To take the latter concern first, the historical-material analysis brings to the fore an otherwise unspoken gulf between the surface representations of a 'sudden drought', and the underlying historical-material flows through which it was in fact constituted. In this sense, the chapter analysis of the metabolism of crisis reads the drought crisis as a socio-natural assemblage, rather than an externalised threatening nature. Constituted firstly out of a crisis of ageing and precarious municipal infrastructure, coupled with growing water demand to support economic growth; and secondly by the failure of consequent attempts to respond to this historical crisis. Due largely to the complexity of techno-managerial mechanisms, limited municipal funding, and competing actor interests. The significance of bringing to light the existence of a representation-materiality gulf is to imply that the risk narrative silenced the historical-materiality of drought crisis. With the corollary that this silence was essential in supporting the adoption of desalination technology as a necessary security solution against risk. This is a vital finding, as part of an evaluation of the logic of the drought crisis-desalination solution consensus, as illustrative of contemporary modes of ecological governance. Showing that the crisis-solution consensus, supported as indisputable, pivoted on the maintenance of an ideological fiction.

Secondly, with respect to tracing processes of depoliticisation, the chapter analysis points to the context specific ways in which the partitions of the sensible, in Rancière’s words, can be potentially stabilised or destabilised. More specifically, this historical study shows how failed attempts at constructing solution consensus contributed to the emergence of new ‘crisis’, and the ways in which these spaces have the potential to unravel from within. That is, through the study it emerges that the period preceding the drought was defined by the active advancement of an ‘engineered solution’, to what
was already defined as a water crisis. With the decision-making process for the 'solution' encased by and orchestrated through ‘expert engagement’ from both the public and private sector, drawing on an arsenal of techno-managerial apparatus including environmental legislation, funding with attached conditionality, fluctuating project costs, and competing political interests. However, this promise, of the ‘techno-managerial fix’, collapsed when the internal variables supporting this logic, coupled with political contestation, failed to be synchronised. In sum the collapse of the historical scheme, as a failure to hold the consensus in place, contributed to the emergence of the drought crisis. However, as will be in seen in the chapter to follow, this collapse of consensus, does not imply a fundamental unravelling of the partitions of the sensible. As the growth assumptions informing the historical scheme continued to inform the new scheme, defined by the mobilisation of a new range of techno-managerial apparatus supported by the maintenance of the representation-materiality gulf. It is to the emergence of this revised augmentation scheme, that I now shift our focus
Chapter 6: The solidification of solution consensus

6.1 Introduction

“If politics is … the ongoing critique of what exists, post-politics designates a political way of emptying out the political. In this sense … already recognised groups compete and negotiate interests without challenging the hegemonic relations in a given political constellation … Thus consensus is the essence of post-politics … it is an agreement regarding the terms of disagreement” (see Rancière 2010: 144) (Reynolds et. al, 2014: 52).

In this chapter I examine the movement from crisis to solution consensus. Reflecting on the narrative supporting the adoption of desalination technology, the mechanisms through which solution consensus was manufactured and finally the reasons why the portrayal of urgency was perpetuated in the crisis-solution narrative, that is as a denial of the historical-materiality of crisis. This examination therefore aims to contribute still further to understandings of the dimensions of consensual politics in practice, exploring the how, whom, what and why of solution adoption.

With respect to the questions how, whom and what, the chapter shows that a ‘sense of urgency’ was articulated to support the development of the project components. In other words as a ‘construct’ the narrative of urgency supported the validation of solutions, most notably desalination technology as ‘essential’ (Castree, 2014: 139). This construction process, as a movement from crisis to solution, involved the coalescing of a range of variables including; an engagement between state and private sector actors, the selective employment of environmental and disaster management legislation, expert management and discourses, and the consequent availability of funding. Importantly these variables mirrored those evidenced in the historical augmentation scheme, as discussed in the previous chapter. However in this instance, it was possible to synchronise these to support scheme advancement as opposed to cancellation. This synchronisation was enabled through the usage of exceptional institutional arrangements to open up spaces for the release of funding and the provision of environmental approvals.

Secondly, in asking the the question ‘Why was desalination technology adopted as
essential?”, the chapter contributes to broader thesis aims, by examining the logic of capitalist metabolism, contributing to analytical re-politicisation, by examining what is both foreclosed and produced by the dominant logic. Specifically, in responding to this question, it is argued that in parallel to the transition from crisis to solution, a more fundamental transformation, from crisis into opportunity, was underway. In support of the critique of a techno-centrist approach to ‘nature’s threat’, as advanced by Foster et al (2010); it emerges in this chapter that nature is treated firstly as a source to fuel industrial society with the adoption of water augmentation strategies as essential for economic growth; secondly, and relatedly as an obstacle to be overcome; and finally as a direct accumulation strategy, with drought mobilised as an opportunity to profit from nature's crisis.

6.2 The dimensions of the Solution Narrative

In what follows I aim to outline the dominant solution narratives, which emerged in the KLM. Thereafter I undertake an examination of the processes that the narrative interacted with in advancing solutions. This section on ‘solution representation’ is considered a significant insertion into the reflection on solution emergence, as it is held that “representations are both fabricated and, in turn, may shape the world – they are constructs that can themselves construct” (Castree, 2014: 139). Furthermore, “They’re the means by which, and the media through which, meanings are attached to various portions of reality …” (Castree, 2014: 48). These representations can take multiple forms including forecasts, assessments, depictions etc., to be considered below.

6.2.1 There is No Alternative (TINA)

Firstly, as has already been argued, ‘climate change’ in particular surfaced as central

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112 Concerned with securing water supply during the peak tourist season, as the economic lifeblood of the towns, and for future growth, thus enabling the lifting of a Memorandum on Development placed on Sedgefield.

113 As already clarified in the preceding chapter, this does not imply an adoption of a constructionist reading of nature. Instead the focus on representation in this thesis is thought to be valuable for its capacity to bring attention to discourse as referring to something, that they themselves are not. Furthermore that “representation is the principal vehicle that epistemic communities rely upon to have a wider influence. Most epistemic communities affect us by means of persuasion not force” (Castree, 2014: 48). Having said that however, in seeking to contribute to an agenda of denaturalisation, the ontology advanced within this thesis is a relational one.
within the crisis narrative, leading to the claim that rainfall and surface water sources were unreliable and consequently supporting the adoption of desalination technology as imperative. This argument, insisting on the necessity of desalination adoption was further emboldened by the claim that the town’s water supply problems required prompt resolution due to the “resulting water shortages having a devastating effect on all aspects of the local economy” (Perring et. al; 2009). This insistence that water availability was insufficient to support development is reiterated in both the EIA motivation report and final scoping report\textsuperscript{114}, where it is stated that;

“\textbf{It is evident that the current water supply source is insufficient and unsustainable and cannot continue to supply in the present and future needs of Sedgefield. The Knysna Integrated Development Plan (IDP, 2007) states that …until water supplies for Sedgefield have been secured and assured, the Council is not able to approve water supplies for any new developments in Sedgefield}” (Cape Environmental Assessment Practitioners, 2009b),

And,

“\textbf{The Knysna Town Council has thus put an embargo on all new developments in the town, citing water shortages as the main reason}” (Cape Environmental Assessment Practitioners, 2009b; Cape Environmental Assessment Practitioners, 2010).

From the above, it is evident that the mobilisation of a ‘There is No Alternative’ (TINA) argument; based on the claim that traditional water sources were unreliable and unsustainable, and that future development necessitated the prompt augmentation of water supply; was significant in supporting and justifying the movement toward alternative technologies, particularly desalination.

Interestingly the preceding Ninham Shand augmentation scheme was also supported by emphasising the link between future development and water availability, where it was stated that; “\textbf{The problem has reached the point that no new developments will be allowed until the water situation is resolved … this matter needs prompt resolution to address the serious water supply problems the town currently experiences}. The\textsuperscript{114}

\textsuperscript{114} by the Environmental Consultants CapeEAPrac for the KLM, as a part of the environmental impact assessment process for the desalination technology
moratorium on development cannot be removed until the proposed upgrading of Sedgefield's water supply has been implemented" (NS 2007a: NS to Mr. HE).

In this case however, the construction of an off-channel dam and use of surface water sources was promoted as central “to address the serious water supply problems the town currently experiences” (NS 2007a: NS to Mr. HE), whilst the ‘drought crisis’ emergency scheme reflects a tidal change away from dam construction - deemed unfeasible and expensive - toward the development of alternative supply sources, notably desalination.

6.2.2 Urgency & a pre-emptive response

A second theme emerging within the solution rationale is a somewhat contradictory melding of an immediate sense of urgency with a pre-emptive response to water crisis. This statement will be clarified below.

Firstly, the immediate severity of crisis is emphasised in a brochure produced by SSI\(^{115}\), where it is stated;

“They are the consulting engineers on the revised augmentation scheme for the KLM...”

“Drought on the African continent is a fact of life – whether one subscribes to the theory of climate change or not. The Southern and Eastern Cape coastal belts are currently severely affected with the worst drought in 150 years” (SSI Brochure, life beyond our rivers, 2009).

However, despite this representation of the indisputability and urgency of water crisis, it is significant that the adoption of desalination was proposed as a pre-emptive measure. That is, by September 2009 it was stated

“I still have some water from the river and I have water from the emergency boreholes in Sedgefield”, but that “these sources will not be able to supply water for the peak demand period and the Municipality cannot afford to have a repeat of last year when they had to truck in water for the town” (Minutes of Meeting held on 30 September 2009; between DEAT, KLM, SSI, Cape Environmental Assessment Practitioners; DEAT National Office, Pretoria)
This representation of the necessity of the desalination development, as a pre-emptive response to an anticipated supply crisis, is repeated within a number of other official sources, including the ‘Sedgefield water augmentation case study’ report (NP et. Al, 2009); the SSI developed ‘life beyond our rivers’ brochure, and a KLM developed information booklet titled ‘Sedgefield Desalination Plant’. In essence, each of these mediums simultaneously emphasise the immediacy of crisis, through statements such as “On the 18th January 2009 the Karatara River stopped flowing – the impact of climate change was no longer an academic concept but a reality” (Sedgefield Desalination Plant booklet); whilst at the same time supporting the necessity for desalination through appeals for future security, through a pre-emptive response as follows; “A permanent solution was needed that would meet the peak demand before the next tourist season” (Sedgefield Desalination Plant booklet, 2009).

In sum, then, it emerges that a parallel narrative of crisis was advanced in support of the necessity of the adoption of desalination technology. That is a narrative emphasising the immediacy of crisis, necessitating immediate action; whilst at the same time insisting on the need to act now to pre-empt an anticipated future crisis. However, these conceptions of ‘crisis’, that is immediate and impending, were united in supporting desalination as the logical response as unlike “[i]ncreasing the capacity of conventional storage structures (which) require long term planning and financing models that are often beyond the means of the average holiday town – bearing in mind that such infrastructure could take years to build when immediate relief is required” (SSI Brochure, life beyond our rivers). The SSI developed augmentation solution “takes

116 It is also significant, as I have already seen in the chapter on the crisis narrative, that various reports developed by the environmental consultants to the KLM contained divergent claims with respect to the population increase during the tourist season and anticipated peak demand. For example, in the November 2009 Motivation Report it is stated that Sedgefield “has an estimated permanent population of 5 000 – 6 000 people (StatsSA – CS 2007) with an estimated 20 000 visitors during the peak holiday period (http://sedgefield.garden-route.bix/about.php). It is estimated that during the peak holiday week (mainly Christmas to New Year) Sedgefield accommodates approximately 10 000 people at any one time (SSI November 2009). At present the peak season demand is 30% higher than the average demand taking into account water demand management initiatives” (Motivation Report, November 2009). Whereas, elsewhere it is stated that, “To meet the immediate/current water demand for Sedgefield, approximately 3.5ML/day assured supply is needed” (Final Scoping Report, January 2009). This is significantly higher than the average demand of 1.5ML/day. Furthermore, in the ‘Technical Report’ produced by SSI it is claimed that, “The water supplies for urban (domestic and industrial) use in the Southern Cape are increasingly under stress, and in Sedgefield in particular, the water supplies have been severely stressed for a number of years … Sedgefield has approximately 6000 permanent residents living in approximately 2000 households, and it is estimated that the population increases to over 10 000 people in the peak holiday season. (Technical Report, 2009)
weeks, rather than years, to implement” (SSI Brochure, life beyond our rivers). Or as expressed by the KLM Technical Director at a meeting with the DEAT in September 2009; “[i]f I sign the contract today, they can construct the Plant in Cape Town in about eight weeks and then bring it here” (NP, September 2009).

### 6.2.3 Insurance Policy against risk

In addition to the above narrative supporting the adoption of desalination technology in response to the drought crisis, it was emphasised that the technology offered a reliable water source, functioning as an insurance policy for future water supply. This narrative is evident in the following quotes:

“The Desalination Plant offers the fastest assurance of water with potentially the least impact. According to SSI an important aspect of the desalination option, is the ability to provide assurance’ against peak season failure in the short to medium term” (Cape Environmental Assessment Practitioners, 2009b)

And furthermore, as stated by an SSI representative at a stakeholder meeting with the DEAT in September 2009,

“[w]e have very little choice/options available that gives sufficient insurance, unless you have a source that cannot fail during drought periods i.e. sea water. The desalination of sea water is an expensive exercise, but it is worth it given the high assurance level” (Interview 58, 59).

And again by a consultant interviewee:

“Desalination is considered an insurance option where the water supply is not questioned” (Interview 22).

### 6.2.4 Green Development

Finally, it emerges that desalination was supported as a ‘green alternative’ to surface water sources and the linked construction of dams, with growth assumptions left intact. In this respect, the ocean is seen as a limitless future supply source, overcoming the traditional economic challenge of scarcity as a mismatch between limitless demand and limited resource capacity:
“I think it’s pretty much a given that the human population is going to continue to expand and our overall water demand is going to continue to grow… given that there's increasing global environmental pressure to stop damming rivers and you know to stop extracting water from the ground. The sea is the next logical choice, from a water supply perspective it’s a virtually untapped resource at this point. And of course not to mention that 97-98% of the earth's water is in the oceans” (Interview 3).

And furthermore,

“By going for desalination, I're not damming, putting in weirs, affecting our river systems. River systems in the future are going to become more and more important from a food production perspective. Those resources will have to be directed more and more toward food production. And domestic use has to come more from sources such as desalination” (Interview 3)

This position is echoed by the KLM Executive Mayor at the time, emphasising the importance of alternative future supply sources in order to support the conservation of water as a ‘natural commodity’:

“The time has come for us to realise that water is one of the most precious natural commodities available to us. I need to continue in our diligent efforts to conserve this limited life force and to identify alternative sources to supplement our natural sources. This project will not only assist us for as long as the drought persists, but will provide us with an alternative water source well into the future” (A message from the KLM Executive Mayor, Sedgefield Desalination Plant booklet).

6.3 The dimensions of consensual politics

In what follows I will continue the reflection on the aspects informing the manufacture of consensus. This will involve shifting our focus, from the preceding examination of crisis, to the solidification of a solution. The discussion is concerned not with providing an exhaustive account of the details of the process, having already outlined

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117 In so doing, it is recognised that the separation between crisis and solution belies the continuity in the processes producing them. In other words, to draw a line at the point when the process has ceased to be about the ‘production of crisis’ and transitioned into the ‘production of solution’ is somewhat contrived. This is done nonetheless for heuristic purposes.
this in part in preceding chapters, but instead in extracting some of the main dimensions of consensual politics identified as having pushed forward the solution\textsuperscript{118}.

### 6.3.1 Mapping process and actors

Table 1 below summarises the key identifiable events both within the KLM as well as engagement at a regional (district, provincial and national) scale, which came together in driving forward the momentum from crisis emergence through to solution identification and implementation.

<table>
<thead>
<tr>
<th>Month/Year</th>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Jan-09</td>
<td>27</td>
<td>Water Crisis in Eden - EDM discussions with Rashied Khan</td>
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<tr>
<td>Apr-09</td>
<td></td>
<td>Task Team report on the Water Shortages in Sedgefield/Knysna</td>
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<tr>
<td>Jul-09</td>
<td>7</td>
<td>Letter to the DWA from the KLM requesting &quot;a meeting to discuss and seek advice on funding options from the DWEA or Donor Agencies&quot;, proposed for 13 July 2009</td>
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<td></td>
<td>8</td>
<td>Meeting between the KLM and PDMC on Knysna water shortage (followed by letter of support on 12 October 2009)</td>
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<td></td>
<td>15</td>
<td>Letter from Deputy Director General Intergovernmental Relations to KLM – Approval is granted for the utilisation of the sum of R11 292 035, 85, a portion of the 2006 disaster funding, for the relief of the current water crisis (according to the Business Plan provided to the department of cooperative governance and traditional affairs, national treasury and the national disaster management centre).</td>
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<td></td>
<td>27</td>
<td>Meeting between KLM and DWA representatives to discuss allocation of BIG funding to the value of R5 million to cover the Sedgefield Desalination Plant shortfall</td>
</tr>
<tr>
<td>Aug-09</td>
<td>12</td>
<td>Items for the municipal budget committee meetings sent from Director Technical Services to MM, referring to the critical and urgent items discussed with MAYCO on 3 August 2009.</td>
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<td></td>
<td>26</td>
<td>First EDM ‘drought crisis meeting’</td>
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<td>Sep-09</td>
<td>1</td>
<td>Council Agenda Item - Emergency measures for current drought conditions</td>
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<td></td>
<td>7</td>
<td>Letter/ project funding report sent from KLM to Dr. H. Fast the Deputy Director General of Local Government and chairperson of the ‘drought crisis meetings’</td>
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\textsuperscript{118} taking the earlier discussion into the role of governance arrangements; and the employment of exceptional disaster management and environmental legislation further
<table>
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<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>Oct-09</td>
<td>Signing of the Sedgefield Desalination contract, DWA WC Chief Director present at signing</td>
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<td></td>
<td>EDM 'drought crisis meeting'</td>
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<td></td>
<td>KLM water situation update</td>
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<td></td>
<td>Letter from KLM to A. Bredell, Minister of Local government, environmental affairs and development planning; refers to report by A. Bredell to Provincial Cabinet on the EDM drought crisis</td>
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<td></td>
<td>EDMC update report to the executive mayoral committee on the water crisis in the EDM</td>
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<td></td>
<td>Email from KLM Director Technical services to DWA, requesting R. Khan support to the DEAT to follow 'emergency environmental procedures'</td>
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<td></td>
<td>Support letter from the PDMC expressing support for the identified measures in the KLM to respond to Knysna Water Shortage</td>
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<td>EDM 'drought crisis meeting'</td>
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<tr>
<td>Nov-09</td>
<td>KLM Council Decision to declare a local disaster</td>
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<td>Notification from NT to KLM of allocation of drought relief conditional grant (Minister of Finance, Economic Development and Tourism, A. Winde motivated for allocation)</td>
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<td>Declaration of KLM as Local Disaster Area</td>
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<td>Dec-09</td>
<td>EDM 'drought crisis meeting'</td>
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<td>Feb-10</td>
<td>EDM 'drought crisis meeting'</td>
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<td>KLM water situation update</td>
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<td>Mar-10</td>
<td>EDM 'drought crisis meeting'</td>
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<td>KLM water situation update</td>
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<td>Apr-10</td>
<td>EDM 'drought crisis meeting'</td>
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<td>KLM water situation update</td>
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<td>May-10</td>
<td>EDM 'drought crisis meeting'</td>
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<td>Provincial Drought Meeting</td>
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<td>KLM water situation update</td>
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<td>KLM water situation update</td>
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<td>Jun-10</td>
<td>EDM 'drought crisis meeting'</td>
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<td>KLM water situation update</td>
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<td>Aug-10</td>
<td>Provincial Drought Meeting</td>
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<td>Nov-09</td>
<td>Provincial Drought Meeting</td>
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<td></td>
<td>Knynsa status report</td>
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<td>Dec-10</td>
<td>EDM 'drought crisis meeting'</td>
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<td>KLM water situation update</td>
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I will now proceed to delve into key aspects/moments, within this charted process, that have been identified as linchpins in the production of solution consensus. In other words the particular forces holding consensus in place and supporting the solution adoption. To begin with a central finding, in reflecting on the process and actor relations in the politics of solution consensus, is that this was driven by a shared vision of development and governance. The spaces of decision-making, which emerged in response to the drought, were reflective of how modes of governance were directed toward collaboration, coordination and integration, in the development of an expert driven technological solution. This point has already been illustrated through the earlier discussion on the particular form and function of governance arrangements in supporting a drought consensus. To recap, it was identified that both KLM and regional level engagement were central. The KLM council and the regional drought forums in particular were identified as spaces through which funding was motivated, and a common language of ‘disaster’ was forged, consequently concretised through the disaster declaration (Holloway, A. et. al, 2012, p. 47). This was then followed by monthly Provincial Drought Meetings where the primary focus was placed on sharing information regarding weather patterns and funding provision. With very little evidence of debate on the factors producing crisis – beyond nature – or deviation from the determined techno-centric path and TINA narrative despite consequent reports of improved rainfall levels. In other words, with the focus placed on securing a disaster declaration, sourcing funding, and ensuring that this funding was spent in time on the identified technology the political universe and the room for engagement and debate were restricted from the outset. (Provincial Drought Meeting Minutes, 2009, 2010, 2011)

119 These forums were the 1) Provincial Drought Meetings which included; municipal managers, representatives of PetroSA and key provincial departments including Treasury and Social Development, as well as municipal engineers and representatives of the DWA. 2) The Drought Decision Support Team composed of representatives of the Provincial Departments of Agriculture, Local Government, Environmental Affairs and Development Planning and Treasury.

120 However, these claims were not always supported by the state of river flow or rainfall levels; as will be shown in empirical chapter 2 of this thesis.
A second fundamental dimension of the process was that any separations between public and private actors were highly porous. Significantly, the process is replete with examples of municipal reliance on a range of experts, including engineering consultants, environmental consultants, scientist reports, and technology developers in the production of solution. Especially striking is the extent to which the municipal officials relied on the expertise of the consulting engineers, SSI in interacting with the technology developers, sourcing and engaging with the environmental consultants and in developing the reports required throughout the process; including the business plan to source funding, and the technical reports on the desalination technology. The examples supporting this statement are too numerous to attempt a recounting here, except to say that a quick scan of internal municipal email communication speaks volumes of the extent to which municipal decision-making involved a deep reliance on the expertise and guidance from private consultants. So much so that any traditional boundaries between public and private are difficult to discern. Support for this claim is provided by a municipal official when discussing how desalination emerged as central within the drought response:

“I was talking to the Director of SSI, and I thought it (desalination) sounded like a good idea. I’d done a little bit of investigation in the past. But more from an interest perspective than from a serious perspective. That was the moment really that I made the decision. I then thought, I’ve got so much water, it is salty, I’ve got to look for something else, what can I do. And that was how the idea came up for desalination … It was in the morning, I were discussing in the morning and both went away with the idea of lets see what I can find out about a desalination plant. SSI is an international consultancy, and he asked his various players in his team. I contacted a few of my friend’s in the consulting engineering field that had done work in Dubai and South Australia … between all of us, I thought, ‘well it sounds like a reasonable idea’. A day or two later I sat around the table and said ‘lets go for it, let’s see what it can be done” (Interview 6)

A final point relates to the particular instruments through which the spaces for debate were contained. That is, whilst the above discussion already suggests that engagement was managed through particular constructed spaces, and prominent actors, thereby resulting in a narrowing of the room for problem and solution conceptualisation. It is argued that this was made even more effective through the use of Disaster Legislation
and selective Environmental legislation. The employment of which was essential to support an urgent response as well as enable the release of funding. These will be discussed in the sections below.

### 6.3.2 Funding a Disaster

I have already seen how the Declaration of a Disaster was an essential instrument in producing a consensus on the crisis, thereby overcoming the challenge of multiple notions of ‘drought’ amongst the actors engaged in the municipal and regional forums. In addition to this function, it is significant that the declaration served as a vital route through which to unlock project funding. This relationship, and therefore the significance of a disaster declaration, is best communicated by an interviewee, from one of the local water forums:

“For the municipality there were two benefits to the Disaster Declaration; speed and the fact that they could get the money. If they put in an application for the pumping stations (which had been inoperable at various stages prior to the ‘crises’) they would have been laughed at … when faced with this crisis they had no capital fund. In terms of forward planning, something went wrong with that mechanism and left them in desperate situation. Cap in hand to central government” (Interview 2).

In fact the Disaster Declaration of November 2009 resulted in the release of funding for the EDM region totalling R572,035,501. These included R 364.1m from National Treasury, R 92.5m in commitments by PetroSA, R 89.29m in contributions by the affected municipalities, and R 1.8m from the Eden District Municipality. Additional support valued at R 9.21m and R 15.0m was respectively provided through Municipal Infrastructure Grant and Regional Bulk Infrastructure Grant mechanisms. The Western Cape Department of Social Development also released R 135,000 for assistance to distressed farm workers. Although there was no official declaration marking the end of the emergency, the heavy rainfall that accompanied an intense cut-off low system in June 2011 is widely viewed as confirming the drought’s endpoint in the Eden District (Holloway, A. et. al, 2012).

This is especially significant in light of the findings of the historical scheme, where it emerged that a primary barrier to project advancement was money availability. Hence,
the application of disaster legislation, supported by an externalised treatment of 'nature', appears to have been fundamental in unlocking funds, which was an obstacle that hindered the development of the historical scheme.

6.3.3 Fast-tracking Environmental Approval

The analysis in the preceding chapter on the historical augmentation scheme, highlighted the centrality of the Environmental Impact Assessment (EIA) process\(^{121}\) in determining whether project development may commence. In the case of the revised augmentation scheme that followed, developed in response to the drought crisis, this too was initially subject to an EIA, by virtue of having triggered various "listed activities as stipulated in the National Environmental Management Act (NEMA). Beginning in June 2009, a Background Information Document (BID) was released by the environmental consultants on the project, explaining that;

> “The EIA process provides for specialist input as well as the opportunity for the public and key roleplayers to give input and participate in the process.(Cape Environmental Assessment Practitioners, 2009a)".

At the time of the BID release, the augmentation scheme project proposal included groundwater extraction, upgrading of Sedgefield's wastewater treatment works, and a Desalination Plant. However, a few months later, at a meeting held on 30 September 2009 between representatives of the KLM, the engineering and environmental consultants on the project, and the Department of Environmental Affairs and Tourism (DEA&T), it was agreed that the implementation of the Desalination Plant would be separated from the rest of the EIA process. In order for the construction of the plant to continue prior to the receipt of Environmental Authorisation. This decision was endorsed through the employment of exceptional legislation, specifically Section 24F(3) of the NEMAA, which makes allowance for an activity to commence or continue in response to an emergency so as to protect human life, property or the environment. (Cape Environmental Assessment Practitioners, 2009b: iv)\(^{122}\). As with the

\(^{121}\) As a legislated requirement; if a proposed development triggers various "listed activities" as stipulated in the National Environmental Management Act (NEMA)

\(^{122}\) In following Sedgefield's lead, the remaining towns in the region; Knysna, George, Mossel Bay and Plettenberg Bay; took the same route in enabling the accelerated construction of their respective desalination plants.
declaration of a Local Disaster Area, the usage of the clause was rationalised through an insistence on urgency and the necessity to act to ensure water security. Arguing that the plant,

“is considered an emergency procedure in order to address the serious water shortfall that is being experienced due to the severe drought gripping the Southern Cape” (Cape Environmental Assessment Practitioners, 2009b).

Alongside enabling an acceleration of project development, this fast-tracking of environmental approval, also had implications for the public participation process on the EIA. Whilst a standard EIA makes allowance for public participation throughout the process\(^{123}\), with the further prospect of appealing the decision taken by the relevant environmental authority prior to plant commencement, the implication of the accelerated process is that, “Section 24F3 effectively does not provide for public participation or the opportunity to appeal … However, following implementation of the project, the Department can, … still ask for the Plant to be removed, or alternatively that a Section 24G process be followed” (FR, Minutes 30 September 2009). However, despite this, in the case of the Desalination project it was agreed that public engagement should still be prioritised (Meeting Minutes, 30 September 2009). Specifically, it was agreed to keep the Ratepayers Association, the Water Forum and any other key stakeholder groups involved and informed (CEP, Minutes 30 September 2009). Citing this prioritisation, despite the emergency status, as reflective of the democratic and inclusive character of the process (Interview CEP, Interview RN, EIA Motivation Report, 2009). However in light of this characterisation, it is significant that the

\(^{123}\) That is, prior to the scoping phase the project design is communicated through a Background Information Document and advertised in various local media. At this stage interested members of the public are invited to register as Interested & affected parties (I&AP). Thereafter only registered I&AP are kept informed through the remainder of the process. Beginning with a Draft Scoping Report (DSR) made available for a 30-day period, for public review & comment, consequently incorporated into a Final Scoping Report (FSR). Once again made available for I&APs to view for a 30-day period, before submission to the relevant environmental authority for consideration. This is followed by the appointment of specialists (if necessary) to determine (potential) constraints for development and evaluate/assess potential significant issues of concern. Resulting in the compilation of a Draft Environmental Impact Report (DEIR) with relevant Environmental Management Plan(s) (EMP), containing all the specialist reports, findings, recommendations and mitigation measures. This DEIR is then made available to I&APs for a 30-day period during which it is possible to submit any additional comments. Thereafter the appointed environmental consultants revise the concept if necessary, based on inputs from stakeholders and specialists, into the Final Environmental Impact Report (FEIR), once again making the document available to registered I&APs for a 30-day period before submission to the environmental authority for decision-making. Thereafter Registered I&APs are informed of the decision with the prospect of appealing.
encouragement of debate did not influence the decision to construct the desalination plant. Which was treated as a matter of urgency and beyond dispute.

Alongside, this legislated limitation of the spaces of debate and influence, a further identified limitation of the process is that of the 'voices' of participation. That is, discourses of participation speak of 'community', the 'public', 'interested stakeholders', and 'representative forums' to name a few terms suggesting homogeneity of a collective 'public'. The consequence of this is to deny distinctions and relations of power within and between the 'public', and imply that groups such as the ratepayers association and water forum are widely representative of 'community' voices and interests. In the Section 24f (3) 'Motivation Report' submitted to the Department of Environmental Affairs (DEA) it is stated that,

“The key Issues and Concerns raised during the initial public participation and by the project team show that there is support for the proposal albeit with concerns about potential impacts. In the meeting with the Knysna Water Forum and the Sedgefield Ratepayers Association, unequivocal support for the proposal was declared. There was however definite need for clarity regarding technical issues which have been addressed and/or are receiving further attention” (Cape Environmental Assessment Practitioners, 2009: 23).

Whilst presented as reflective of broad-based 'public' support, further examination reveals firstly that debate was restricted to the boundaries of sensibility, focused on the technical issues of concern, and secondly that this had the further effect of limiting the voices of engagement. That is the issues raised related to Noise pollution, Visual impact, Power consumption of the Plant, Possible effect on existing groundwater, the impact of brine discharge on the receiving marine environment, and the financial feasibility of the Scheme. Whilst not insignificant in themselves, restricting engagement to these technical concerns, serves to neutralise the crisis and solution narrative, treating these as beyond dispute. Furthermore, the techno-managerial lexicon of the debate produces a participation process which is fundamentally exclusionary, preventing the large majority of the 'public' from competently engaging. As a result, those officially registered parties stemmed predominantly from the affluent, educated parts of both towns, with the established rate-payers & voters association and the local water forum - as groups with a history of political participation, and a professional
membership, including retired engineers – as the most active. However, in this case, there was evidence of members of this group being recruited into the process as 'community representatives' and used (apparently unwittingly) to disseminate information to the wider 'community' and offer further public legitimacy for the project.

The above discussion is significant in providing insights into the techno-managerial apparatus employed in holding solution consensus in place. Furthermore, this study is deepened when read in relation to the historical scheme. As what emerges from the above is the ways in which the windows for opportunity, which were closed in the previous scheme, came to be pried open in the revised scheme. Most notably through an insistence on a nature-induced crisis, necessitating the use of exceptional institutional and legislative mechanisms, to ensure water security. With the implication that the historical inhibitors to project development, namely money and timely environmental approval, were overcome.
6.4 Translating crisis into opportunity

As has already been shown, there was a gulf between the crisis narrative and materiality of crisis; and consequently the solution narrative. Leaving the question, as to why the insistence on urgency was maintained. It is the overall contention of this thesis, and particularly this section, that the primary reason was the translation of crisis into opportunity. This case is made below.

6.4.1 A necessary denial of the historical-materiality of crisis

Firstly it is argued that the fear of political consequences was a factor that motivated the maintenance of the narrative of urgency as a necessary denial of the historical-materiality of crisis. Specifically, it has already been argued that the abrupt cancellation of the historical scheme generated a planning gap, which was exposed at the end of 2008 into January 2009. It is suggested here that this exposure raised concerns amongst KLM officials and politicians of a reaction by Sedgefield ‘residents’ against the Municipality. Therefore this threat was key in providing the momentum for the immediacy with which an ‘emergency response’ was developed, and the historical-materiality of crisis was denied. This argument is supported by a statement made by a municipal actor centrally involved in municipal infrastructure governance at the time:

“In Sedge there were no proper studies except the one. And I had to sit in front of hoards of people banging their feet on the floor wanting to know why there isn’t any water” (Interview 38, 39).

And furthermore that,

“… The council was fully aware that this was a very tricky water situation. It could fail at any time. Then I had the drought... the politicians had taken a negative decision on the N.S. scheme. They now had to justify … and DWA weren't any help at all. They overreacted and may have been political pressure. Making statements like no dams will ever be built again” (Interview 37).

124 specifically those involved in motivating for the cancellation of the previous scheme
125 The question of ‘voice’ amongst the Sedgefield ‘public’ will be considered later in this chapter
Hence, the maintenance of political credibility emerges as a factor informing the crisis narrative, and related denial of the historical-materiality of crisis. Importantly a concrete consequence of this was the selective integration or complete abandonment of components of the historical scheme. Most notably the relocation of the RWTW was abandoned and the Hoogekraal river source was selectively used. With a temporary emergency pipeline, from the Hoogekraal River to the Ruigtevlei WTW, constructed in January 2009 and excluded as a component of the revised augmentation scheme. With respect to the former, this abandonment is significant given that in this study it was established that the location of the treatment works acted as a drought crisis trigger. However, this factor was largely scripted out of the crisis narrative. With the ironic consequence that, instead of including the relocation of the RWTW as a core component of the solution response, a request was made to the National Treasury for the remaining flood relief funding of R11, 292, 035.85 – initially received in 2006 to be used for the purpose of relocation – to be reallocated to fund the revised scheme, with desalination as a core component.

In the case of the Hoogekraal River, the official explanation provided for the selective use of the river, through the temporary emergency pipeline, is the growing unreliability of surface water sources, due to climate change. However, a deeper investigation shows that the acquisition of environmental approval and water abstraction licence were still pending by the time the temporary emergency pipeline was laid from the Hoogekraal River to the RWTW in January 2009. This challenge to obtain environmental approval, as a pre-condition for long-term usage, continued to be elusive thereafter and was central in influencing the marginalised treatment of the river within the overall revised scheme. That is, the approval process emerges as a complex techno-centric web, inhibiting the advancement of the Hoogekraal River as a component within the larger augmentation project. This argument serves to challenge as simplistic and reductive those assertions that the unreliability of surface water was the primary reason for the marginalisation of the Hoogekraal Scheme.

126 following the laying of the temporary pipeline
127 Refer to Appendix 2 for a more detailed account of the Hoogekraal emergency scheme, and efforts to formalise it
6.4.2. The ‘church’ of Conjunctive use

Following the initial emergency meeting, held on 20 January 2009, a second meeting was called for 27 January 2009 by the EDM Municipal Manager’s office, with the aim of discussing longer term water management for the entire EDM. The correspondence was addressed to all the Local Municipal Managers within the EDM, as well as the private consulting engineers SSI and Ninham Shand/ Aurecon. In the correspondence it was stated:

“currently I am experiencing a severe drought in the Eden District … I cannot continue with our fragmented approach to bulk water supply and the solution lies in a regional network strategy … Mr. Rashied Khan, Regional Manager from DWAF, will be visiting … this would present us with a golden opportunity to put forward a collective request for a regional bulk water solution (26 January 2009, G.W. Louw, Municipal Manager, water crisis in Eden: Urgent discussion with Mr. Rashied Khan, DWAF: 27 Janaury 2009).

It was reported that during this meeting Mr. Khan indicated he would investigate the release of funding from the DWA administered Bulk Infrastructure Grant (BIG) for the purchase of a 1ML/day mobile desalination plant for the town of Sedgefield (Otto, 2009).

Following the emergency meetings of January 2009, a task team consisting of representatives from national, provincial and local government, as well as stakeholders from outside government was convened128. At this stage the adoption of “a new mindset or a change of mindset”129, was once again strongly advanced by the WC DWA130, as the answer to the water shortage challenges in the region (Knysna Task Team 2009a). According to Mr. Rashid Khan the WC DWA Chief Director, municipalities such as the KLM can no longer rely on surface water and dams for their future raw water supply and should instead be moving toward water management practices involving the

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128 following a resolution on its establishment by the Premier’s Coordinating Forum (PCF), dated 26 February 2009. The key deliverable of the task team (Knysna Task Team 2009a) was to report back to the Premier of the Western Cape and the Provincial Cabinet within 30 working days, beginning March 2 2009, on how best to “address the issue of water shortages in the Knysna/Sedgefield area” (Knysna Task Team 2009a).

129 concerned with the development of a holistic approach to water management in the context of climate change

130 as a central actor within the Task Team
“conjunctive use”\(^{131}\) of groundwater and surface water sources.

Hence, from the above it becomes apparent that at least as early as January/February 2009, the DWA was interested in advocating the adoption of conjunctive use\(^{132}\) approach amongst municipalities. This then emerged as the dominant approach within each of the EDM local municipalities (first captured in business plans developed during the crisis response, with the KLM as the forerunner), with desalination and/or waste water reclamation identified in every instance as ‘necessary’ water sources to be developed within a holistic supply scheme (Knysna Task Team 2009a).

The extent to which this position was being advocated within the higher echelons of DWA is confirmed by a high-ranking employee of the Western Cape (WC) DWA,: “to the question ‘why would I want to move to Reverse Osmosis plants to reclaim treated effluent, or seawater; or why would I move to ground water’? It’s because it gives quick results and I are not dependent on rainfall. That 100% dependency on rainfall is not in the package anymore” (Interview 52).

The centrality of DWA in advocating this approach is further confirmed with the following quote:

“Certain people in DWA were very vocal about how I can’t rely on rainwater, climate change was the flavour of the month and the disaster management people were also onto climate change etc. As I said statements were made that South Africa will never build dams again and that was official statements from DWA. And by the end of the drought dams were quite acceptable again. But people were reacting in a political way instead of in a scientific basis … There was no way you could fight people on the situation. You can fight them when you don’t have a crisis on your hands. But when there's a crisis and people don’t have water and the money's coming in bucket fulls” (Interview 37)

A further finding of this research has been the pervasiveness of this perspective

\(^{131}\) The perceived impact of climate change on water security in the region was both informed by and come to inform the Department of Water Affairs(DWA) growing advocacy of what is termed ‘conjunctive use’, where municipalities are being required to source 40% of water supply “from non run-of-river sources” (RN 2011).

\(^{132}\) involving a multiplicity of raw water sources; including conventional river water, rainfall, underground aquifers, desalination plants and the re-use of discharge from waste water treatment works
amongst other key stakeholders; ranging from municipal officials, to EDMC and PDMC employees, to consulting engineers at the time. Hence it would appear that the emergence of the drought corresponded with a ‘moment’ where the employment of alternative water sources was inserting itself more strongly into the visions of the primary role-players. It has been suggested by interviewees that the Sedgefield Desalination Plant was promoted by the DWA as it was seen as an opportunity to attempt a ‘large-scale’ pilot desalination project within a South African Municipality.

6.4.3. Innovation as the ‘new development’

It is held that a major motivation for the adoption of desalination as the THE solution, was the claim to innovation, by a number of the role-players involved. This argument is supported by the ways in which the technology adoption was promoted and lauded, to be discussed below.

To begin with, the SSI emergency scheme information/promotional material, presented in the Figure below, captures the dominant sentiment of finding new solutions best with the slogan ‘life beyond our rivers’.

Figure 6.1: SSI Promotion Material

In fact it was this embrace of a ‘beyond our rivers’ approach which was cited as a principal reason for why the company was selected as the project engineers for the revised emergency scheme. The company engineers were described as ‘out of the box’
thinkers, moving beyond the traditional water supply solutions of river supply and dam construction (Interviews AF, RN, GO). This claim to innovation is made by SSI:

“Innovative engineering solutions don’t happen by accident … SSI has been innovative in the water sector in southern Africa since 1922” (SSI, Life beyond our rivers),

Furthermore:

“The essence of SSI’s is to make better use of what is available … SSI’s approach has been accepted and implemented by several of the worst affected town’s in the region, i.e. by utilising a combination of surface water, ground water, desalination, and indirect water reuse strategies” (SSI, Life beyond our rivers).

In the case of the KLM, the claim to be an ‘innovative’ Municipality as a result of the technology adoption is also clear in the Executive Mayor’s message in KLM brochure on the technology:

“With this endeavour, Knysna has taken the lead nationally in what proves to be an exciting venture. This desalination plant, the largest in South Africa, is utilising the latest desalination technology in the world. Desalination on this scale is not taking place anywhere else in our country. What makes us even more proud is that the desalination plant is also “proudly South African” as all technology used was designed right here in South Africa” (Sedgefield Desalination Plant brochure).

6.4.4 Selling the sea

It emerges that SSI as well as other private engineering companies active within the South African water sector including VWS Envig/Veolia had already been advancing the desalination cause within the region in the years preceding the ‘drought crisis’, however were unable to ‘seal the deal’ as surface water was still regarded as the central supply source in the area, as communicated by Veolia below.

“I think it maybe started earlier, around 2006/2007, Veolia did a few road-shows in the Southern Cape area because of frequent problems in each catchment area … So along with some of the consultants in the area I had a road-show just presenting
different technology in 2006/2007. Then it went quite quiet. So I think there was at least some kind of awareness amongst the municipalities for the potential for desalination and they already had some of the cost figures … I would say in the whole area - riversdale to plett - I had about half the municipalities that showed interest but in general you didn't get the impression that everyone bought into the idea of a shared infrastructure of large desalination because they didn't feel the heat at that stage. Everyone had plans, largely related to upgrading dam capacities. So obviously once you stop having rainfall the plans and all big dam walls extended doesn't mean anything because there's nothing to catch. And that was when they went to the next logical step, desalination” (Interview 23, 24).

Similarly an earlier interest in and promotion of desalination technology prior to the 2008/2009 drought crisis was also confirmed by SSI as follows:

“…now this goes back in time… I did a bit of work in 2006, I somehow knew that, a hunch … And I came up with this idea of water reuse and desalination. That was in 2006” (Interview HE) and “I gave a lot of presentations to the mayors and the MM and the town engineers in 2006 and 2007, on desalination and reuse, warning them that some day they will have a drought and run out of water, and 2 years later …” (Interview JVE), “And this is what I were proposing to the municipalities in 2006/2007” (Interview 58, 59).

These efforts to ‘sell’ desalination and reuse technology to local municipalities along the South African coasts in the preceding years is further confirmed by a high ranking municipal official as follows:

“Well before the drought every desalination rep was knocking on my door to try to sell a desalination plant, they were looking for an entry into the market. Some were ‘fly by nights’ and others had invested heavily into the technology and had markets overseas and were looking for local entry, and had strong marketing teams. They were looking for an entry, very much so” (Interview 37).

Hence it emerges that the search for and promoted use of water sources ‘beyond our rivers’ was a while in the making before the drought crisis. However, in addition to the prevailing promotion of the conjunctive use approach, and consultant efforts to ‘enter
the market’, an added dimension to the movement from crisis to opportunity relates to obtaining access to funding for the project development, discussed next.

6.4.5 Urgency & funding

A more detailed examination of reports and interviews reveals, less publicly cited, reasons for the employment of a Disaster Declaration as “it makes provision for the declaration of a local disaster which could assist in access to the central contingency fund, as well as to allow the applicable national/provincial and municipal department’s budgets to be supplemented” (Otto, 2009) 133. This explanation of the reasoning behind the declaration, that is to enable the release of project funding, is further supported by the following account by a central municipal actor at the time:

“declaring an area a disaster area is a huge thing … But the more I went into the problem and the more I discussed, I realised that for us to get the funding I needed to be declared as a disaster area so that I could qualify for that … I decided to put it to council and called a special council meeting and after a report given of the situation, the council decided it was in the best interest of the town to do it in that way” (Interview 54).

And once again in an internal KLM report titled “worst drought in 150 years triggers emergency measures”, it is clearly stated that

“the Knysna council decided to declare Knysna a disaster area at a special council meeting at the end of October (2009), Finn (portfolio councillor for infrastructure, development and integrated Human Settlements) said that this was for operational reasons only. ‘I made this decision for operational reasons only and there is no reason to panic. I are now able to access emergency funding to install the emergency measures to make our water supply systems more secure’ (January 2010?, worst drought in 150 years triggers emergency measures, internal report).

133 Such a declaration process involves the enrolment of all three spheres of government beginning with a municipal resolution to declare a disaster, followed by a request by the relevant Disaster Management Centre – in this case the EDMC – to the Provincial Disaster management centre (PDMC) for the declaration of a local disaster. This is then followed by the PDMC, through a Provincial Cabinet Resolution, recommending the declaration request; and finally the National Disaster Management Centre confirming the local disaster declaration through a classification process. The outcome of this classification process will determine the declaration of a local disaster, which then has to be published in the provincial gazette (Interview GO; An overview regarding the water crisis in Sedgefield, 9 February 2009, G.Otto).
Hence what emerges here is a representation of disaster, carefully constructed so as to be convincing to funders whilst simultaneously avoid being alarmist to KLM residents.
6.5 Conclusion and Discussion

From the above it emerges that desalination was represented as an essential insurance policy against the risk of nature, ensuring water supply for economic growth. With the historical growth assumptions retained whilst displacing an acknowledgement of 'infrastructure failings' (in the form of the RWTW) with 'the threat of nature', as the risk to be overcome. Thereby resulting in the advocacy of a solution, acting against the 'insecurity of an externalised nature', in the form of desalination, with the ocean represented as an ‘infinite’ source of water, holding the promise of decoupling growth from resource finitude.

Hence, this analysis of the solution narrative shows that representations of nature, as risk, fed into the necessity of desalination as an insurance policy. However, the corollary of this crisis-solution dynamic is that keeping up demand for security solutions requires maintaining a heightened sense of risk (Davoudi, 2014: 7). This suggestion both partially answers and implies the need to explore more carefully the question of why a crisis representation – crisis materiality gulf (as a key finding emerging out of the two preceding empirical chapters) was maintained. Hence, following an outlining of the dominant drought narrative, this chapter reflected on the interplay between crisis and solution in two ways. Firstly asking the question, how was the solution consensus maintained; and secondly, why was the gulf between crisis representation and materiality maintained. The findings for each of these core sections of the chapter will be discussed below.

Beginning with the question of consensus manufacture, it emerges that a complex web of negotiations, presentations, charts and calculations, involving a wide-range of human and non-human configurations, came together in supporting the established consensus on desalination technology adoption. In other words an arsenal of techno-managerial apparatus and expert knowledge were imagined and assembled - including forums, legislation, money flows, and expert reports (business plans, planning documents/strategies, EIA documentation) - with a view to producing a socio-ecological fix. However this mobilisation of technical instruments and expert knowledge took place within the established boundaries of sensibility, defined by the necessity of overcoming nature's threat to protect market growth. Insisting on the
necessity of secure water supply for the tourist season, as essential for the economic lifeblood of the towns.

A dominant dimension of the wide-ranging mechanisms mobilised - within the various local and district municipal drought forums and the environmental assessment process - was an encouragement of broad-based participation. However further scrutiny of these processes shows that participation, rather than being reflective of democracy in action, was profoundly undemocratic. To begin with it emerges that the governance arrangements drew in a range of actors and instrumentation, built upon absolute consensus as the dominant rationality of governing, with a growing dependency on experts and a narrowing of spaces of engagement through the dominance of expert discourses. Reflective of ‘governance-beyond-the-state’ (Swyngedouw, 2010); the observed effect of this institutional model's promise of 'good governance' was a narrowing of the field of debate to questions of appropriate solution selection, project funding and urgent project implementation. With this containment supported by the manufactured fixity of the notion of drought as disaster', through the use of disaster legislation.

Similarly the environmental assessment process also took place within the agreed upon terms of disagreement. That is, whilst encouraging public participation from registered interested and affected parties, the discursive space was defined by and restricted to debate on technology selection. Furthermore, even this debate was constrained with the use of exceptional environmental and disaster legislation codifying the insistence on the adoption of desalination technology as beyond dispute due to the treatment of the drought as an emergency. Hence, the use of disaster management legislation and environmental legislation had the combined effect of neutralising drought as 'nature's crisis' and desalination technology as the indisputable solution. Enabling the urgent release of disaster funding to secure the future of the status quo, as the perpetuation of ensuring water security for economic growth.

In addition to the containment of debate, the participation process limited the audible 'voices' engaged within these formalised – already restricted - spaces. That is, through the study, it can be seen that discourses of participation disavow heterogeneity, preferring notions of 'community' and the 'public', thereby suggesting entities composed
of individuals with equal resources, capacity and power to access formalised spaces of engagement and exert influence on decision-making. However, as the case of the KLM demonstrates, this notion is a dangerous fiction, which serves to support the perpetuation of post-political forms of anti-democracy, in the name of democracy. It was shown that participation involved highly technical expert-dominated themes - related to brine discharge, water supply systems, engineered water technology systems, and marine ecosystems to list a few. Thus excluding the large majority of the 'public' from competent engagement in the language of debate. As a result, those officially registered parties stemmed predominantly from the affluent, educated parts of both towns, with the established rate-payers & voters association and the local water forum - as groups with a history of political participation, and a professional membership, including retired engineers – as the most active.

Hence the case of desalination adoption appears to epitomise the post-political condition, where on the one hand there was a heightened emphasis on wide-ranging participation, as groups were encouraged to engage, debate and negotiate, whilst on the other hand there was an emphasis on absolute consensus, defined by an agreement regarding the permitted spaces of disagreement (see Rancière 2010: 144; Kamat, 2014: 79) which ensured that the framework of debate and decision-making did not question the existing neutralisation of market growth (Wilson, Swyngedouw, 2014). In this case, the post-political treatment of the crisis-solution consensus restricted debate to decisions on the 1) instruments of management and expert administration, 2) timing of funding release and technological implementation, and 3) selective employment of legislative arrangements. That is, whilst engagement was detailed, demanding, and highly technical, importantly it was contained within the spaces of policy making, whilst the existing socio-natural relations were left unchallenged (Swyngedouw, 2010).

In the above discussion, I have seen how the need for economic growth, treated as a necessity, informed the solution consensus as offering guaranteed water security for future development. That is, how 'nature', in the form of water, is treated as a lubricant to growth. However, in understanding capitalism as a 'matrix of human- and non-human nature, premised on surplus accumulation' (Moore, 2011b: 8), it emerges that within contemporary capitalism, transitioning toward a green economy, 'nature' is increasingly
being treated as a direct accumulation strategy\(^\text{134}\) in itself. That is in answering the second main question addressed in this chapter, 'why was the gulf between crisis representation and materiality maintained?'. It is argued here that the reason for the maintenance of the gulf, insisting on the indisputability of crisis and solution representations, was the objective of maintaining demand for security related technological solutions through maintaining a sense of risk. Thereby translating crisis into opportunity.

Smith (2009) argues that the significance of contemporary ‘green capitalism’ is profound, as it has become nothing less than a major strategy for ecological commodification, marketization and financialization which radically intensifies and deepens the penetration of nature by capital, and where there is no solution to the environmental problem, it is simply moved around (Smith, Accumulation: 2, 5). Where what is said to be 'kind' to 'nature' is also viewed as kind to profits. In the case study, desalination technology is offered as the panacea to crisis. However, it emerges that the private interests, 'selling' desalination as the solution, had also been promoting the technology to municipalities in the years preceding the 'drought'. However, access to the municipal market remained largely impenetrable until the drought crisis intensified the sense of threat and risk, thereby supporting the necessity of desalination as guaranteed security.

Hence, the solution to nature's crisis opened up new market opportunities for the desalination industry, presented as the innovative solution to crisis. For Smith, this marriage of ecology and economy, represents not just an ideological victory for capitalism but an extraordinary economic opportunity insofar as it opens up an entirely new domain for capital accumulation … it absorbs nature more fully and completely within the circuits of capital (Smith, accumulation: 11). Harnessing the ocean as an infinite source of water to fuel growth and as a direct accumulation strategy for corporations engaged directly in the business of desalting the seas. A business that relies on insecurity for its own security of expansion and profit.

\(^{134}\) Alongside the traditional treatment of 'nature' as a source to fuel industrial society or an obstacle to be overcome within capitalism
In sum, the above analysis shows firstly how the post-political manufacture of consensus, as a techno-managerial function, served to neutralise both 'nature's crisis' and desalination technology, as the essential solution. Positioning both of these within the dominant treatment of non-human nature, within capitalism, as an input for capital production and accumulation. However, a second key insight from the chapter is to point to a further transformation in the 'production of nature', as a transformation in contemporary capitalist metabolism. Where capital accumulation is facilitated not only by the traditional 'production of nature', where non-human nature is treated as an exogenous set of material properties’ extracted to fuel production (Smith, 2009: 13, 14, 17), but also where capitalists are able ‘to take hold of and transform natural production’ (Smith, 2007: 15). In other words, in the latter case, certain ‘biological systems are industrialized and may be made to operate as productive forces in and of themselves’ (Smith, 2007:15). Desalination fits neatly into this latest mode of capitalist metabolism, taking hold of and producing non-human nature within circuits of capital, as a direct accumulation strategy. However, as I have seen, funding 'security technology' relies on the maintenance of an atmosphere of urgent threat. In the case of the KLM, this relied on exceptional mechanisms of consensus manufacture which in themselves produced consequences for the relationship between funding access and project development; and the consequent challenges faced during and post project development. It is to these two issues that I shift our focus in the remaining two empirical chapters of this thesis.
Chapter 7: Tracing funding assembly and project assembly: Part 1 in the evaluation of the solution

7.1 Introduction

As I proceed to the two final empirical chapters of this thesis, evaluating the desalination techno-fix, it is worthwhile to pause and reflect on what I have established thus far, and its relevance for the overall thesis project. This will then be followed by an outline of the remaining two empirical chapters and their function in contributing to this agenda.

To recap, the overall thesis aim is to explore the logic of Ecological Modernisation, specifically taking desalination as one emblematic technology and interrogating the apparent 'neutrality' of the crisis- solution consensus. Defined by an insistence that the solution to ecological crisis lies in the promotion of an ecological-economic “win-win” form of modernisation\(^\text{135}\) (Revell, 2007: 115; Jaenicke, 2007: 558). Understood as a continuation of the belief in a ‘world without end’ where economic growth can continue forever and is seen as the solution to all economic, social and environmental problems (Wanner, 2014:13). In performing this interrogation post political theory and Marxian dialectics are blended to inform a tracing of the techno-managerial manufacture of consensus, and a surfacing of the metabolic relations constituting crisis and solutions, as that which is simultaneously produced and foreclosed by this consensus.

The three preceding empirical chapters have already succeeded in contributing to this broader critical agenda. Firstly it was established that drought was portrayed as an externalised threat, with conceptual fixity achieved through the declaration of an official disaster, thus overcoming and ignoring the multiplicities, inconsistencies, and incoherences inscribed in the concept. Secondly, I countered this neutralisation of 'nature', by showing the drought crisis as a socio-natural assemblage, rather than an externalised threatening nature. Thus bringing to light a gulf between crisis representation and crisis materiality. The significance of this finding was to make apparent that the justification for desalination technology, as a movement from 'crisis as

\(^{135}\) In economic terms, as the systematic, knowledge-based improvement of production processes and products (Jaenicke, 2007: 558).
risk' to 'solution as essential security', pivoted on the maintenance of an ideological fiction. I proceeded to show that the solution consensus was solidified through the mobilisation of a complex web of techno-managerial apparatus, including the selective employment of disaster and environmental legislation. Resulting in an acceleration of environmental approval and the release of disaster funding. Finally, it was argued that desalination was treated as an opportunity for capital, functioning as a direct accumulation strategy. Thus highlighting the necessity of maintaining the crisis narrative, as the funding of 'security technology' relies on the maintenance of an atmosphere of urgent threat.

Hence, at this point in the analysis the picture that emerges is one of manufactured consensus resulting in the advancement of the desalination project. However, the story does not end there. Instead, the remaining two chapters reveal that the reliance on the foreclosure of the historical-materiality of crisis and a neutralisation of nature and capital, as essential in prying open this space of opportunity, did not come without consequence. Instead, the fictitious ground upon which funding approval was constructed, insisting on nature's urgent threat, had a direct bearing on the form of funding assembly, project assembly and the consequent operation of the desalination technology. In other words, whilst securing funding, the convoluted process of consensus manufacture also informed the dimensions of this promised funding, which then proceeded to produce consequences of its own. This case will be made in the two remaining empirical chapters, concerned with an evaluation of the implementation and operation of the desalination solution, as an evaluation of the promise of the ‘techno-managerial fix’, carried out in three parts. Part one, comprising a single chapter, examines the ‘politics of money’ in the scheme development, through firstly tracing funding assembly and secondly reflecting on the consequences of this for project assembly. Parts two and three respectively, to be addressed in the final empirical chapter, present the problems emerging from within the solution as a consequence of the dimensions of funding and project assembly; and examine the operating and maintenance costs of plant operation. The metabolic analysis approach is used to capture these assemblages since it provides a rigorous method for studying the 'matrix of human- and non-human nature, premised on surplus accumulation' (Moore, 2011b: 8).
7.2 Untangling the Sedgefield Desalination Funding Web

In this first part of the paper, I reflect on the ‘politics of money’ in the scheme development, in both Sedgefield and Knysna. This is undertaken through firstly tracing the money flows in each of the towns and following this presentation with an analysis of the dimensions directing this flow. It is argued that, far from being a ‘neutral’ enabler of project advancement, the avenues and mechanisms through which money was released was central in informing the form of project ‘assembly’ and the problems which followed this, in both Sedgefield and Knysna.

7.2.1 Tracing money flows in Sedgefield

According to the official ‘Sedgefield Desalination Plant’ brochure produced by the KLM, the total cost of the Desalination Project was R16m, with the Desalination Plant cost comprising 66% of this total cost; and the remainder made up of civil & mechanical (13%); Bulk Electrical work (6%); Engineering and project management services (9%); Environmental work & specialist studies (4%) and other minor items (2%). At the same time the funding sources for the project are identified as follows: MIG (26%); Disaster Management (44%); Own funds (30%) (KLM, 2010).

Whilst the above information on project costs and funding sources presents an image of clearly demarcated available funds spent on a well-defined project. It has been established that the funding source and process for the Sedgefield Desalination Project was complex, requiring negotiation with funders, and ultimately resulting in various funding sources being assembled, with the KLM having to contribute a significant percentage of the overall project costs. Furthermore, that this funding complexity had a direct bearing on the ways in which project development unfolded, and the final project form. In what follows, I will begin by tracing the funding sources, and follow this with a discussion on the context within which these funds flowed.

With this representation further supported by a number of municipal and consultant interviewees, claiming that the project was ‘funded’ and therefore ‘free’ to the municipality (Interview GE, RN, AF, LH).
7.2.1.1 Assembling Funding

The idea of funding being assembled for the Sedgefield Desalination plant, as well as fluidity in determining the funding sources to be utilised, is corroborated by a review of internal municipal communication on the issue. An email sent earlier on in the process, in August 2009 (14 August 09; email from RN to NP Municipal Technical Services Department: “Funding for Sedgefield”) contains an attached spreadsheet for the various components of the Sedgefield Augmentation Scheme, listing expenditure incurred, and committed as well as available funding. Of significance firstly is that the funding sources identified include 1) ‘August 2006 Disaster Funding approved by NT’ valued at R11,292,035.85; 2) ‘November 2007 Disaster Funding’, broken down into a portion obtained through the Municipal Infrastructure Grant (MIG) valued at R2,137,500 and a municipal contribution valued at R1,862,500; 3) a MIG project fund ID149009 with a R5,388,000 MIG contribution and a R1,077,000 municipal contribution. Finally 4) a potential commitment of R3,500,000 from the Eden District Council is also identified.

Furthermore the total estimated expenditure is broken down into the augmentation projects (excluding the desalination plant) totalling R5,770,728.56; the upgrading of the existing Water treatment works (WTW) totalling R4,700,000 and finally the desalination plant totalling R16,500,000 (including professional fees). Hence, an estimated funding shortfall of R5,215,492.71 is reflected (That is before accounting for the potential fund from the EDC)\(^\text{140}\).

Figure 7.1: Total estimated expenditure

\(^{140}\) Similarly a report developed by the KLM Project management unit on 31 August 2009 for the KLM ‘Finance, Economic Development & Governance Committee’, declares that “the water crisis has not been resolved; the drought continues and it is essential to procure the desalination plant”. Hence 5 potential suppliers had already been provided with a Terms of Reference and presented their proposals. However the process had been “stalled to allow time to secure the necessary funding”, with meetings held with a number of potential funders including the “Eden DC (District Council), Provincial Disaster Management, MIG and the Premier’s Task Team, National Disaster Management, Department of Water Affairs and National Treasury”. The report proceeds to identify the project funding sources as outlined above, aside from the ‘November 2007 Disaster Funding’, but goes further to identify additional potential funding totalling R8,500,000 to address the anticipated shortfall on the project; firstly from the Eden District council (as already evident in the spreadsheet developed earlier in August 2009), and described as “promised assistance”; and secondly a Bulk Infrastructure Grant (BIG) allocation of R5,000,000 “anticipated in the National Budget Adjustment Gazette November 2009 (31 August 2009, report developed by the KLM Project management unit for the KLM ‘Finance, Economic Development & Governance Committee)"
Before proceeding to unpack these funding sources, a few notable points emerge. Firstly, that in assembling the funding for the desalination plant, there was a pervasive fluidity and lack of clarity within the KLM itself. This is glaringly apparent in an email titled ‘Explanation of Desal Funding’, with a number of questions posed by a representative within the finance department to the Project Management Unit (PMU), with respect to the various sources and their intended allocation. The email begins with the statement,

“I am slightly confused with project registrations for Sedgefield water treatment works. The projects you requested is being processed. I must get my mind clear as to what fits in where” (2 November 2009, Email communication, RN to DT & LE, cc GE, RP, NP; Explanation of desal funding)

An emailed response is provided by the PMU in the form of an attached document, responding to the initial questions, by 2 November 2009, as well as the following explanatory note provided in the email,
‘It is complex, Treasury have approved part of the August 2006 funds, DWA – RBIG has “said” I have R5m, I want to use MIG for the Ancillary work (4.7m). So if all work well, I will have the money. Meanwhile, Knysna has had to commit to the project R16m (2 November 2009, Email communication, RN to DT & LE, cc GE, RP, NP; Explanation of desal funding.  

In what follows, I will proceed to present each of these funding sources and then discuss the implications of their use for the project design and development.

7.2.1.2 RBIG Funding

Firstly, on Friday 24th July a meeting was convened between representatives from the DWA and the KLM to discuss the prospect of releasing funds from the DWA administered Regional Bulk Infrastructure Grant (RBIG) fund. It is significant that at the meeting the complexity involved in potentially accessing the grant was highlighted. However, despite this, access was pursued and presented as ‘anticipated’, as evidenced in a report developed by the PMU (31 August 2009). At the same time, this impression of an ‘anticipated but as yet unavailable’ fund was paralleled by a movement to motivate for council commitment of internal municipal funds in the interim as there was a “shortfall of R7 million on this project and … There is an urgency to implement this project now …. The council cannot wait for funding” (12 August 2009– Items for budget committee meetings, P to JD). This case was then put

Both the August 2006 portion and the November 2007 allocations, were registered with MIG project ID numbers, namely MIG-ID 121 885 and MIG- ID 170897 respectively. Hence, it was assumed by the Finance Department representative that these funds originated from a MIG allocation to the KLM. However, according to the PMU, despite the assigned MIG-ID numbers, these sources are not MIG but Disaster management funds. Resulting in the PMU explicitly stating that “No MIG funds will be used for the Desalination Plant”, in response to the understandable confusion. However while the claim, that the August 2006 and November 2007 funding sources were not MIG funds, can be accepted, the overall claim that “No MIG funds will be used…” is disputable, given that in the email itself it is stated that “I want to use MIG for the Ancillary work.”

At the meeting the following information regarding the funding source was established: the National Treasury oversees the programme with funding allocation needing to pass through multiple approval channels including the National DWA, Regional DWA, National Treasury, Department of Provincial and Local Government (DPLG) and have undergone an EIA Process (if a listed activity is triggered by the proposed project) before final approval. Furthermore once a project is approved it has to be first be Gazetted before funding can be released. Finally it was emphasised that the funding % allocated from the BIG for a municipal project is based on a formula designed to ‘calculate’ the project’s overall social upliftment contribution, with the remaining project costs to be covered by municipal own/counter funding.
forward at the council meeting on 1 September 2009 where it was argued that the council was required to commit to spending available internal municipal funds on “certain parts of the scheme” whilst postponing the rest until the RBIG fund became available by November/December 2009 (1 September 2009, Council Agenda Item, Emergency Measures for current drought conditions, Director Technical Services).

However, despite a “series of meetings and discussions … held … with representatives of DWA regarding an accelerated Regional Bulk Infrastructure Grant (RBIG)”\textsuperscript{147}, (Internal report on the RBIG to the municipal council) and efforts to “obtain Council support for the process in order that support be communicated to the Department of Water Affairs (DWA)”\textsuperscript{148}; by December 2009 it is clear that the R5 million is no longer ‘anticipated’ from the DWA, with significant consequences for the municipal account; resulting in the Municipality having to source this amount from internal municipal funding. Before considering the implications of this fund cancellation for the Municipality in greater detail, I will first proceed to outline the remaining funding sources contributing to the Desalination Project.

### 7.2.1.3. MIG Funding

Aside from the anticipated RBIG fund, the Municipal Infrastructure Grant (MIG) also emerges as a significant funding source. The quote below refers to two MIG related sources, the first initially received to fund the municipal relocation of the RWTW in Sedgefield, following a flood in August 2006; and the second an unspent portion of disaster funding received to respond to the November 2007 floods in the region. In addition, as has already emerged, a third MIG source was also utilised in the ‘funding package’, identified in the above communication as MIG Project ID 149009.

“In Sedgefield I had a portion of our MIG grant … instead of using the MIG on the water works, they got the approval for the MIG changed so that they could channel that toward the desalination. I also had a disaster grant, that I had a portion unspent … So it was a like saying I have a crisis, (and) pots of money not allocated … With the Knysna one there was

\textsuperscript{147} Internal report on the RBIG to the municipal council

\textsuperscript{148} Internal report on the RBIG to the municipal council
provincial funding. But the Sedgefield … it was a case of consolidating that (money) to make sure I had enough to cover everything. And I think I ended up putting in about R6m of our own money” (Interview 57).

i) August 2006 Flood Relief Funding

The funding received during August 2006, followed in response to floods in the entire southern Cape, with most of the region registering approximately 300 mm of rain within 48 hours. These floods caused significant damage to local infrastructure, with the estimated costs of the damage valued at R350 million (State of the Rivers Report, 2007). In order to repair the flood related damage the KLM received a “Special Disaster Relief Funding’ Allocation of R31, 818, 676; of which R14, 200, 000 was allocated to relocate the RWTW” (Internal communication, spreadsheet on expenditure; 2 November 2009, Email communication, RN to DT & LE, cc GE, RP, NP; Explanation of desal funding)

However, as has already been established, this relocation did not take place, with the 2006 allocation for the RWTW relocation left largely unspent. Hence, when faced with the ‘drought crisis’, the KLM submitted a request to the National Treasury for the remaining portion of this allocation to be utilised for the ‘drought crisis’ response. In July 2009 the request was approved for R11, 292, 035.85 of the Special Allocation to relocate the RWTW to be used “for the relief of the current water crisis. According to the Business Plan provided to the Department of Cooperative Governance and Traditional Affairs, National Treasury, and the National Disaster management Centre”150. The approval came with the condition that, in accordance with the terms of Act 29 of the Municipal Finance Management Act (MFMA), the expenditure must be approved by the municipal mayor as “unforeseeable and unavoidable”151,152.

150 Kenneth Brown, Deputy Director General intergovernmental relations, 15 July 2009
151 Kenneth Brown, Deputy Director General intergovernmental relations, 15 July 2009
152 This claim however can be challenged, given the study findings that there was an existing awareness of the systemic insecurity of supply due to the location of the RWTW, plans in place to respond to this, and finally that these factors, in particular water salinity at the extraction pool, served as the ‘crisis trigger’. There is therefore an arguable irony in the redirection of these funds to respond to the ‘drought crisis’, given their initial intended purpose.
ii) November 2007 Flood Relief Funding

Further flooding of the RWTW in November 2007\(^{153}\) resulted in a special allocation of funds made available to the KLM by Disaster Management, totalling R15, 514, 400; with a municipal own contribution of R4, 362, 500; resulting in a total of R19, 876, 900. Of this, R4, 000, 000 was allocated to the ‘rehabilitation’, as opposed to ‘relocation’ of the RWTW, following the ‘drought crisis’. Furthermore, it is stated that the November 2007 allocation must be “used by March 2010. (or) Risk not being rolled over” (Email between RN and LM, 1 October 2009, “That cash flow from this morning”).

**MIG allocation ID 149009 & MIG-ID 1883291**

According to a progress report developed by the PMU for the KLM Finance, Economic Development & Governance committee in August 2009, the usage of the MIG allocation ID 149009 is recommended as MIG expenditure “stands at 18% at the end of August, which is well below the national requirement of 60% at the end of September. Expenditure needs to be accelerated so that the full allocation is used, or risk jeopardizing future RBIG and MIG allocations”\(^{155}\). This is further emphasised later in the report where it is clearly stated that “if the contract for the desalination plant is not awarded, it will result in under expenditure of the MIG allocation for 2009/10. This in turn will jeopardize future allocations”\(^{156}\).

However, despite these motivations to utilise this funding source for the “Ancillary” costs for the desalination plant (referring to the civil, mechanical and electrical costs of connecting the plant to the existing water distribution network); further investigation reveals that this was ultimately prevented by national MIG\(^{157}\). Resulting in the

\(^{153}\) August 2006 (which itself followed December 2004- January 2005 floods) was closely followed by a flood event in November 2007. According to Adams & Fraser (2009, 2011) these two events, along with November 1996 and March 2003, marked the most significant flooding of the Swartvlei system in Sedgefield, over the last 30 years. It was claimed by the area manager that the “November (2007) flood levels were the highest recorded at the Water Treatment Works and were approximately 300mm higher than the August (2006) flood levels”(Karataara River Weir, Flood Management Report, 16 November 2011, Adams & Fraser)

\(^{155}\) 31 August 2009, report developed by the KLM Project management unit for the KLM ‘Finance, Economic Development & Governance Committee

\(^{156}\) 31 August 2009, report developed by the KLM Project management unit for the KLM ‘Finance, Economic Development & Governance Committee

\(^{157}\) 2 November 2009, Email communication, RN to DT & LE, cc GE, RP, NP; Explanation of desal funding
replacement of this source with MIG- ID 183291; made up of a MIG contribution of R4, 729, 900 and a municipal contribution of R734, 006. The table below summarises these sources, contributing to the assembly of funds for the Sedgefield desalination plant. This will be followed by a reflection on the implications of funding assembly for the project assembly.

Table 7.1: Identified funding sources for the Sedgefield Desalination Plant

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Anticipated Amount (ZAR)</th>
<th>Motivation for allocation</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBIG</td>
<td>5,000,000.00</td>
<td>Application for fund submitted to the DWA. In the interim internal municipal funds committed – based on the insistence of urgency and necessity</td>
<td>The RBIG fund was not received, with internal municipal funds used instead</td>
</tr>
<tr>
<td>MIG August 2006 Disaster Relief</td>
<td>11,292,035.85</td>
<td>Disaster relief funding initially intended for the relocation of the RWTW. Request to National Treasury for the funds to be reallocated for the desalination project</td>
<td>Approved, used to contribute to the capital costs of the plant</td>
</tr>
<tr>
<td>MIG November 2007 Disaster Relief</td>
<td>4,000,000</td>
<td>Disaster relief funding initially to address flooding of the RWTW. Request to use this for the new scheme. Supported by a claimed urgency to spend by the end of the financial year, or risk losing the money.</td>
<td>Approved and used for the rehabilitation of the RWTW</td>
</tr>
<tr>
<td>MIG ID 149009</td>
<td>4,729,900</td>
<td>Requested for the ancillary costs of the desalination plant. Supported by the argument that if the MIG fund goes unspent, it will jeopardise future allocations</td>
<td>Whilst the claimed necessity of spending the MIG allocation was used to motivate for the advancement of the desalination project. Ultimately the desalination project went ahead but this fund was not used</td>
</tr>
<tr>
<td>MIG ID 1883291</td>
<td>4,729,900</td>
<td>This fund was the replacement fund for ID149000, and used to fund the ancillary costs of the desalination plant</td>
<td>Part of the municipal MIG fund, received annually and officially meant to contribute to poverty alleviation projects. With the cancellation of ID 149009, the fund was used for the desalination project</td>
</tr>
<tr>
<td>Municipal own contribution</td>
<td>734,01</td>
<td>Used to fund the ancillary costs of the desalination plant</td>
<td>A further contribution from the municipal budget</td>
</tr>
</tbody>
</table>

158 2 November 2009, Email communication, RN to DT & LE, cc GE, RP, NP; Explanation of desal funding
7.2.2 Analysing flows

What insights does the above presentation of the funding sources for the Desalination Project provide into the ways in which funding assembly came to shape the specificities of project assembly? In what follows three central issues will be discussed in response to his question. Firstly the link between funding availability and a sense of urgency; secondly the impact of funding uncertainty on the municipal budget; and finally the irony of reallocating funds intended for the relocation of the RWTW to fund the desalination plant.

7.2.2.1 The circular relationship between Funding availability & urgency

Firstly in the case of the RBIG fund, what emerges is the way in which the case was made to commit internal municipal funds, whilst awaiting the release of the BIG fund, as it was essential to do so now “to meet the year end peak demand”\(^\text{159}\). Hence illustrating how claims of the anticipated availability of the fund was used to motivate for advanced council financial commitments, fundamentally through an insistence on urgency and necessity.

Secondly, a key insight, emerging from the above tracing of funding sources, is that the relationship between funding availability and urgency is not linear but relational. That is, the availability of funding also served to generate an urgency to spend ‘accordingly’, with the principal goal of not losing the money. In the case of the MIG allocation ID 149009 it emerges that funding conditionality was blatantly mobilised to support funding commitment to the desalination project. Going as far as to state; “if the contract for the desalination plant is not awarded, it will result in under expenditure of the MIG allocation for 2009/10. This in turn will jeopardize future allocations”\(^\text{160}\).

7.2.2.2 Impact of Funding uncertainty on municipal budget

In continuing our reflection on the link between funding assembly and the influence on project assembly, it emerges that the withdrawal of the RBIG fund impacted on the Municipal Budget. An internal memo addressed to the Project Management Unit

\(^{159}\) 1 September 2009, Council Agenda Item, Emergency Measures for current drought conditions, Director Technical Services

\(^{160}\) 31 August 2009, report developed by the KLM Project management unit for the KLM ‘Finance, Economic Development & Governance Committee
(PMU) Manager from the Acting Manager of the Budget Office captures this best. With a key point emerging from the memo being that “expenditure relating to the R5million is being funded by external loans”\footnote{9 December 2009; internal communication addressed to the Project Management Unit (PMU) Manager from the Acting Manager of the Budget Office; financial substantiation and motivation for R5million RBIG}. This impact is confirmed in another letter from the KLM Department of Finance to the Municipal Manager and Project Management Unit (PMU) Manager on 1 December 2009; concerned with the issue of sourcing additional funding for the ‘Re-use of effluent project’; where it is stated that “Knysna is already going to be borrowing some R7 million for the desal plant to secure Sedgefield”\footnote{1 December 2009; GE to RN & JD; EDM Water Supply crisis}.

The implication of using funds from the municipal budget, is that these could not be used elsewhere. This is a significant consequence in the context of widespread municipal poverty and inequality. This is made even more striking by the study findings on the gulf between crisis representation and materiality. Which suggests that the narrative of necessity, supporting the funding allocation, is an ideological fiction.

7.2.2.3. The historical source of funding

A further point relating to the funding source and its implication, is the continuity with previous, unspent, disaster funding. In the case of the MIG allocation ID 149009, it emerges that this funding source was initially meant to contribute to funding the N.S. Augmentation scheme. An amount of R29,000,000 was applied for but only R5,300,000 was approved. This funding shortfall is cited as a reason contributing to the ultimate cancellation of the historical scheme. In fact the head of the PMU goes as far as to cite this as the moment when “the whole original project fell apart”\footnote{2 November 2009, Email communication, RN to DT & LE, cc GE, RP, NP; Explanation of desal funding}. Similarly, the November 2007 disaster allocation was meant to contribute to the RWTW project but went unused. The consequence of the failure to use these funds for the relocation of the RWTW meant that this issue continued to contribute to the insecurity of supply within Sedgefield, which – as I have seen - was once again exposed in the case of the ‘drought’. Ironically, the role of the RWTW location in the emergence of the drought crisis, as an issue of salinity, was foreclosed through the drought crisis narrative. With
the funds initially intended to address this infrastructure weakness consequently redirected toward the desalination project, developed in response to a represented crisis of 'nature'.

The above examination of these funding sources challenges the KLM claim that the projects were funded through external sources and therefore did not impact on municipal funds. Or as has been claimed by some within the Municipality,

“it was very simple, the real option of selling it was I were getting money … therefore DWA and all those good people decided what a good idea. I have the technology and the opportunity here. So they went for it … financially it was seventh heaven, because I were getting something that I didn't have to pay for. Because this town couldn't have afforded it” (Interview 64).

Instead, the above examination demonstrates that in the case of the Sedgefield scheme, funds intended for other purposes had to be redirected through a highly technical negotiation process. With a ‘sense of urgency’ mobilised in justifying the use of these funds, as well as driving the necessity to spend ‘in time’, due to the risk of funds being withdrawn if left unused.

Furthermore, the fluidity and negotiated emergence of project funding, had the consequence of placing constraints on project design and cost. That is, the 'appropriate size' for the Sedgefield desalination plant was determined by cost, with the condition of project development being that, “the current estimate of R16, 000, 000 is not exceeded”\textsuperscript{164}. As will be seen in the next chapter, this restraint on plant cost had implications for the project tender specifications and design, creating problems of its own.

\textsuperscript{164} 31 August 2009, report developed by the KLM Project management unit for the KLM ‘Finance, Economic Development & Governance Committee
7.3 Untangling the Knysna R.O. Funding Web

7.3.1. Tracing money flows in Knysna

In the case of the town of Knysna, an application was submitted for a special allocation of funding for the emergency provision of potable water, directed toward the re-use of effluent and groundwater exploration. In response R22,2 million and R17,9 million were approved, by the National Treasury, for the 2009/2010 and the 2010/2011 financial years respectively\textsuperscript{165}, with the awarded contracts consequently divided into Phase I\textsuperscript{166} and Phase II\textsuperscript{167}, so as to coincide with the phased funding allocations. Beginning in November 2009 the KLM MM was informed by the Provincial Treasury that the amount of R22,200,000 had been made available to the Knysna Municipality\textsuperscript{168}. Contracts were awarded by December 2009 and on-site work commenced by January 2010\textsuperscript{169}. The table below summarises the Knysna funding allocations.

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Anticipated Amount (ZAR)</th>
<th>Motivation for allocation</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Treasury</td>
<td>R22,200,000</td>
<td>Application for disaster funding for re-use of effluent and groundwater exploration project</td>
<td>Funding approved, with attached conditionality to spend on identified projects and within the financial year of allocation – Financial year 2009-2010</td>
</tr>
<tr>
<td>National Treasury</td>
<td>R17,900,000</td>
<td>Application for disaster funding for completion re-use of effluent and groundwater exploration</td>
<td>Funding approved, with attached conditionality to spend on identified projects and within the financial year of allocation – Financial year 2010-2011</td>
</tr>
</tbody>
</table>

This Provincial Treasury communication of November 2009 is significant for providing further insights into the nature of funding flows within the ‘disaster’ environment. Firstly, it suggests that the utilisation of Finance legislation was necessary in unlocking funds within the 2009/2010 financial year. That is, in order to ‘authorise the release of

\textsuperscript{165} with the grant allocations to be monitored and managed by the Department of Water Affairs concerned with initially providing a basic supply of potable water of 4.0 ML/day (2.0ML from each of the 2 project components) (Knysna Local Municipality, 2010)

\textsuperscript{166} Concerned with upgrading the emergency scheme (Phase 1) to a permanent potable water supply (Knysna Local Municipality, 2010)

\textsuperscript{167} Eden Water Crisis: Municipal Drought Relief Conditional Grant: Knysna Municipality, letter from Provincial Treasury to Knysna Municipality Municipal Manager, 16 November 2009

\textsuperscript{168} Due to project delays it was claimed that the projects were ‘operational’ by the end of July 2010 as opposed to the targeted February 2010 (Knysna Local Municipality, 2010).
emergency funding for the water crisis in the Eden District, which was not appropriated for in the respective 2009/10 municipal budgets” 170. Section 16 of the Public Finance Management Act, 1999 (Act 1 of 1999) was required171,172. Hence, as has already been explored in earlier chapters – with respect to the Disaster Management Act and the National Environmental Management Act - the employment of Finance Management legislation emerges as another instrument in supporting the solidification of both ‘crisis’ and solution consensus; and furthermore in supporting the opening up of spaces for the flow of money.

Secondly it points to conditionality attached to the allocated funding. The first being a condition to spend allocated funds within a given financial year. The second being a condition placed on the permitted usage of the allocated funds, where the KLM was contractually required to spend the money in a certain way. A final point relates to the anticipated release/transfer of funds. In the letter it is suggested that transfer should follow the publishing of the gazettes by the National Treasury in December 2009. However, it has been possible to establish that in actuality this release was delayed by the DWA173. Below I will proceed to examine these identified factors further, and how they came to influence project design and development. In particular, I will investigate the relationship between the dimensions of funding release and the process of project assembly – including delays in plant commissioning and project conceptualisation.

7.3.2. Analysing flows

While the Knysna funding allocation, as summarised above, initially appears to be far more straight-forward than the ‘assembled’ Sedgefield package, the study findings suggest that it was similarly complex, with a few key variables underlying ‘money flows’ as follows: 1) an initial uncertainty on the amount of money to be released by National Treasury, with two phased grants ultimately allocated; 2) conditionality to

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170 Eden Water Crisis: Municipal Drought Relief Conditional Grant: Knysna Municipality, letter from Provincial Treasury to Knysna Municipality Municipal Manager, 16 November 2009
171 Eden Water Crisis: Municipal Drought Relief Conditional Grant: Knysna Municipality, letter from Provincial Treasury to Knysna Municipality Municipal Manager, 16 November 2009
172 This requirement to mobilise legislation in order to enable ‘money flows’ is confirmed by the KLM Finance Director, who explains that “There are 2 ways of declaring an emergency … Firstly there’s the Disaster Management Act and … the other one is actually the Municipal Finance Management Act (MFMA) … and that allows you to move money around in a budget. Because the way local authorities work is very rigid and difficult to move money around. But declaring a disaster in the MFMA suddenly allows you to move money” (Interview GE).
173 As the allocating agent
spend within a given time frame or risk losing the money; 3) conditionality to spend on the identified projects (stated in the MoA with the DWA) or risk losing the money; and finally 4) delays in the transfer of the funds by the DWA, creating a cash flow challenge for the KLM. These variables came to have a consequent effect on project development, both in terms of the project design and commissioning, and ultimately resulted in problems faced in project operation. This argument will be presented below, and serves simultaneously to set the stage for the next chapter, concerned with outlining and reflecting on the problems faced with project operation in both towns.

According to an Annual Report produced by the KLM for the DWA in December 2010 the key challenges faced by the project since commencement were as follows:

“I) Time was a critical factor. A combination of using innovative technology and being able to provide water in drought conditions, was a major challenge
ii) The use of untried and untested geo-hydraulic data in the tenders increased the risk (to) … design and process
iii) The eruption of the volcano in Iceland disrupted the supply of imported essential equipment from Europe
iv) The labour unrest and strikes at the harbours prevented the equipment being offloaded. This delayed the completion of the project by 6 weeks” 174

The latter two challenges are significant for highlighting the relationship between national and global processes on local project development. However, whilst acknowledging these, this study does not extend into exploring them. The former two will be considered below in continuing our discussion on the variables underlying money flows and their impact on project development.

7.3.2.1 Funding uncertainty

Firstly, whilst operating within a declared state of emergency, the KLM faced initial uncertainty on the amount of money to be released by National Treasury, resulting in the Municipality developing plans without having full commitment of funding to support these. It is stated in the annual report to the DWA that the overall project came

174 Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010

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to be programmed in 2 phases in order “to comply with budget restrictions” and furthermore that “The biggest risk taken by the Municipality was to award the full contracts without having secured proof of the Allocation from National Government, i.e. for both phases while only having confirmation for Phase I funding”. This funding uncertainty also came to impact on the KLM goal of commissioning the project by early 2010, instead as late as August 2010, Phase II of the project was still in process, with this explained as follows: “Due to the magnitude and complexity of the project as well as the lack of funding, it was not possible to complete the project before the end of June 2010. When the funding was approved Phase II of the project was initiated. When complete this project will provide a permanent additional supply of water for Knysna”.

7.3.2.2 Funding conditionality & urgency

As already mentioned above, a key study finding is that the availability of funding also served to generate an urgency to spend ‘accordingly’, with the principal goal of not losing the money. In the case of the disaster declaration allocations to the KLM, this argument is evidenced through the influence of two conditional aspects of the fund release, related to when and how to spend these allocations, to be discussed respectively below.

I) Conditionality to spend within a given time-frame or risk losing the money

With respect to conditionality on ‘when to spend’ funding availability was conditional on the municipalities ability to spend within the national financial year, as follows;

“…after the national adjustment estimates have been approved and the subsequent gazettes been published … the transfer of

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175 Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010
176 Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010

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funds should take place during December 2009. During discussions it has been confirmed that the funds must be spent by the end of the national financial year, i.e. 31 March 2010\(^{178}\).

In a letter sent on 16 November 2009 by the Provincial Treasury to the KLM MM it is stated

“...The Minister of Finance, Economic Development and Tourism ... has approached the National Minister of Finance ... The amounts of R7 million (exploratory boreholes) and R15.2 million (upgrading of Knysna WWTW to re-use discharge effluent project) have been made available to Knysna Municipality. It is expected that the fund will flow to the respective municipalities after the national adjustment estimates have been approved and the subsequent gazettes been published. It implies that the transfer of funds must be spent by the end of the National Financial year i.e. 31 March 2010” (Eden water crisis: Municipal Drought relief conditional grant: Knysna Municipality; National Treasury to KLM; 16 November 2009\(^{179}\)).

Therefore, in returning to the earlier quote, “Time was a critical factor. A combination of using innovative technology and being able to provide water in drought conditions was a major challenge”\(^{180}\), it is argued that this can now be better understood in light of the above discussion. That is an ‘urgency’ borne less from nature’s threat as from conditionality to spend on time.

ii) Conditionality to spend on the identified projects or risk losing the money

The Knysna ‘effluent re-use project’ is a potent illustration of how conditionality attached to ‘how to spend’ comes to influence project design and development. Where the KLM was contractually required to spend the money as follows:

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\(^{178}\) Eden Water Crisis: Municipal Drought Relief Conditional Grant: Knysna Municipality, letter from Provincial Treasury to Knysna Municipality Municipal Manager, 16 November 2009

\(^{179}\) According to a Knysna Plett Herald newspaper report, that following the approval of the application, four days later, both National and Provincial Government officials were on site the following week to investigate the exact nature of the KLMs need, following which, Minister Winde met with the KLM to discuss their readiness to spend the allocated funding in the financial year, ending March 2010 (Knysna Plett Herald, 2009d).

\(^{180}\) as taken from the Annual Report produced by the KLM for the DWA in December 2010.
“R7,000,000 (Exploratory Boreholes project) and R15,200,000 (upgrading of Knysna WWTW to re-use discharge effluent project)” 181.

This condition is evident in the Memorandum of Agreement – between the DWA and KLM - for Phase 1 of the project, with the clause;

“The department hereby confirms that the granting of funds to Knysna Municipality for the projects listed below ... an amount of R22,200,000... for up to the end of the Financial Year 9/10 ... for potable groundwater ...; Re-use of treated effluent ... Should the grant not be utilised for its intended purpose, the Department shall have a right of recourse against Knysna Municipality to reclaim the full amount” 183.

From the above it is clear that the KLM was ‘locked into’ a re-use of effluent project or be at risk of losing the funding. It was this conditionality - coupled with the insufficient and inconsistent quality of the effluent generated through the WWTW 184 - which resulted in a ‘creative re-engineering’ of the ‘effluent re-use scheme’. This introduced the boreholes as a component of the R.O. project design as an avenue through which the KLM could continue to claim conditionality was met. However both the ‘when’ and ‘how’ conditionality lead to an urgency around the drilling of the emergency source boreholes, with no long term testing and data collection carried out on the borehole raw water. In the final analysis, this lack of long term tests resulted in what are termed “Unforeseen Outcomes” 185 by the KLM. Where,

“the initial tests of the water from the boreholes indicated water of sufficient quantity and to potable standard” 186. However

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181 Eden Water Crisis: Municipal Drought Relief Conditional Grant: Knysna Municipality, letter from Provincial Treasury to Knysna Municipality Municipal Manager, 16 November 2009

183 Memorandum of Agreement (MoA) between the Department of Water Affairs and Knysna Municipality, Signed by the last DWA party by 25 February 2010

184 As it emerges that in fact; “During the testing and investigations by the consulting engineers, it was found that the final effluent from the Sewerage Plant could not provide a consistent quality of raw water suitable for re-use until the plant had been upgraded”

185 Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010

186 Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010
“The test results from some of the boreholes after a more lengthy test period indicated high levels of iron and with a lower yield.”

The consequence of which has been a poor match between the borehole water quality (with high turbidity levels) and the R.O plant design requirements. The details of the impact of this on the plant operation will be explored further in the next chapter.

7.3.2.3 Funding Delays

In the Provincial Treasury communication to the KLM in November 2009 it is suggested that funding transfer should follow the publishing of the gazettes by the National Treasury in December 2009. However, it has been possible to establish that in actuality this release was delayed by the DWA. With Mr. Rashid Khan, the DWA Western Cape Chief Director, requesting in early November 2009 that the local municipalities of Knysna, George and Mossel Bay compile business plans that, “must reach this office (DWA Western Cape) not later than Friday 13 November 2009” as a requirement for the release of the drought relief funding. Following this, a further letter addressed to the KLM on December 4th 2009 states that

“DWA has requested a copy of the Business Plan proposal … the DWA has not received the preferred project in the format as discussed … please be advised that your commitment and

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187 Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010

188 Hence the challenge, “The use of untried and untested geo-hydraulic data in the tenders increased the risk (to) … design and process” should be understood in relation to the ‘usage’ conditionality, and the ‘temporal conditionality’ discussed above, as “due to the emergency it was not possible to carry out the long term quality tests on the raw water from the boreholes to ensure the optimum design of the R.O. These tests will be carried out when the R.O. plant is operational before any decision to include additional pre-treatment equipment (Ultra Filtration) is needed” (Emergency Provision of Potable Water for Knysna Municipality Closing-out Report for Phase I (2009/10) – Part a: Reuse of Effluent, Part b: Groundwater exploration & abstraction; Report submitted by the KLM to DWA; 15 June 2010)

189 As the allocating agent

190 email communication: Request for business plans from Southern Cape municipalities for National Treasury Funding, email Marianne Claasen to Simphiwe Maschicila et al, c.c. Rashid Khan, 6 November 2009
cooperation is paramount to fast track the project and thus the funding …”

Almost three months later the transfer was still pending. This delay is significant given that the KLM had intended to complete Phase 1 of the project by this stage, and furthermore was contractually required to spend the Phase 1 funding allocation by March 2010. The consequence of this gap between ‘conditionality on spending’ and ‘fund transfer’ was that the Municipality had to utilise internal and/or loan funding in the interim, as captured in an email sent on 20 January 2010, by the Finance Department to the municipal PMU, as follows;

“NO MONEY received … Cash flow really beginning to feel the punch of having to carry this out of our pockets for so long”.

This transfer delay, resulting in cash flow problems for the municipality continued to deepen into 2010, even after an application and consequent National Treasury approval for a second funding allocation, with the payment transfer once again delayed by the DWA. The request for additional funding was made by the KLM by November 2009 for an anticipated shortfall of R15, 559, 000 on the project; justifying the request and project necessity as follows:

“The only available resources for Knysna are Groundwater and the indirect reuse of final effluent from the Waster water treatment works … the Programme is that the boreholes be commissioned by 18 December 09 and the effluent reuse plant commissioned before the end of February 2010. Should the rivers fail, Knysna could run out of water during January 2010.”

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191 Drought Relief: Knysna – Re-use of effluent for emergency potable water and abstraction of groundwater from boreholes, letter from Department of Water Affairs Western Cape to Knysna Municipality Municipal Manager, 4 December 2009
192 According to an update report submitted by the municipality to the DWA on 23rd February 2010; “DWA indicated that they would transfer the full amount to the municipality … At this time no funding has been received by the Municipality” In fact the MoA between the KLM and DWA was only signed, by the last DWA party, by 25th February 2010 (refer below), with the DWA committing to transfer the funds to the municipality before the end of the national financial year, March 2010.
193 2009 Drought Relief (Municipal Disaster Management Grant), from Finance Department (LM) to PMU (RN), 20 January 2010
194 Appealing to Dr H. Fast - the then Head of the Provincial Disaster Management Centre and Deputy Director General of Local Government - to motivate to the NT on behalf of the municipality
195 Knysna emergency water financial request 2009 – Executive Summary, letter from Department of Water Affairs Western Cape to Knysna Municipality Municipal Manager, 30 November 2009
196 Knysna emergency water financial request 2009 – Executive Summary, letter from Department of Water Affairs Western Cape to Knysna Municipality Municipal Manager, 30 November 2009
With the above claim serving as a central argument in motivating for funding and urgent action, it is significant that the projects were in fact not available by the time of the identified potential threat. Instead, according to the 23rd February 2010 update report, it was only by February 2010 that “the Municipality were advised that an additional R17,9 million had been allocated by National Treasury to Knysna for 2010/11”. Furthermore, the funding release was delayed by the DWA; leading the KLM to appeal to the National Treasury in May 2010. The extent of the financial pressure placed on the KLM as a result of the delay, as well as a mention of the impact of the ‘withdrawal’ of the DWA administered RBIG fund for the Sedgefield Desalination Plant, is cogently communicated in the May 2010 National Treasury appeal:

“… at the March crisis water meeting … DWA agreed to pay over on receipt of a business plan, which ironically they already had. What I did not say in the meeting … was that Knysna would in any event also have to borrow some R10 million to fund the shortfall on the plants caused by DWA reneging on its promise to fund the shortfall through the RBIG … The point that involves NT … is that DWA have just presented a contract that Knysna will only get the Grant moneys in MARCH 2011. This means our cash flow budgets for 2010/11 are rendered meaningless … I will be forced to take out bridging finance or else not pay salaries or other creditors … will be putting our business at serious risk”.

As a result of the appeal an eventual transfer of R10m of the total fund was made by 5th July 2010, as opposed to March 2011(refer to letter below).
Delays in the transfer of the funds by the DWA, produced a cash flow challenge for the KLM, and consequently delayed project commissioning\textsuperscript{199}, as explained in the quote below.

“Due to the magnitude and complexity of the project as well as the lack of funding, it was not possible to complete the project before the end of June 2010. When the funding was approved Phase II of the project was initiated. When complete this project will provide a permanent additional supply of water for Knysna”\textsuperscript{200}.

\textsuperscript{199} alongside the volcanic eruption in Iceland, and labour unrest at the Harbour as mentioned above
\textsuperscript{200} Emergency Provision of Potable Water for Knysna Municipality: Interim Progress Report for Phase II (2010/11) – Part a: Reuse of Effluent, Part b: Groundwater exploration & abstraction; Report submitted by the KLM to DWA; 6 August 2010
And furthermore, “The RO plant in Knysna was operational and handed to the municipality on 16 July 2010. Samples of the water have been sent for comprehensive testing before the product water will be CONNECTED into the water distribution NETWORK. The results have been received and connections have been made into the existing pipe network. The connection of the pumped pipeline into the OLD PLACE RESERVOIR will only be operational when the reservoir is complete. The contractor is experiencing serious DELAYS and the reservoir is expected to be complete by December 2010 … It is expected that both projects will be complete and operational before 30 March 2011”  

Hence, while it was claimed that the plant was ‘operational’ by 16th July 2010; it was yet to be connected to the municipal water distribution network, with the Old Place reservoir incomplete. Furthermore, with March 2011 stated as the revised anticipated date of completion, this in itself remains silent on the quality of the water produced and dynamics of plant operation. This will be considered in the next chapter, where it is suggested that the claim of ‘operationality’ is a slippery term, which masks much.

7.4 Conclusion

This chapter was concerned with presenting the funding sources for the desalination plants in both Sedgefield and Knysna, and reflecting on the ways in which the complex avenues and logic through which funding was assembled came to influence the specificities of project assembly. It is argued that, far from being a ‘neutral’ enabler of project advancement, the motivations and mechanisms through which money was released had a direct bearing on the form of project ‘assembly’.

Specifically, whilst different strategies and funding sources were used in each of the two towns, it is possible to extract a few key variables that were central in informing ‘money flows’ and relationally project development. These included, 1) an initial uncertainty on the source and/or amount of money available; 2) conditionality to spend within a given time-frame or risk losing the money; 3) conditionality to spend on selected identified projects or risk losing the money; and finally 4) delays in the transfer of the funds, creating a cash flow challenge for the KLM. All of these constraints placed on money flows - defined by delays, uncertainty and conditionality - were related to the ‘crisis as risk’ and 'solution as security' narratives - and its legislative solidification through disaster and environmental legislation. As the solidification of narratives had the effect of making disaster funding available and accelerating environmental approval. However, with the consequence of determining what was spent on, when, and how much.

In sum, the chapter demonstrates the linkages between the crisis-solution consensus, funding assembly, and project assembly. Aiming to show that whilst the consensus manufacture resulted in the release of funding within a manufactured atmosphere of urgency, this should not be taken to imply an unproblematic movement toward solution development and operation. Instead the absent ground upon which the consensus was manufactured, influenced the dimensions of funding assembly which in turn limited the conditions within which the projects were assembled, influencing the project design and

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202 It should be noted that this conclusion is kept necessarily brief, focused on summarising the key chapter findings. As the conclusion presented in the following chapter serves to locate the argument of the two final empirical chapters within the wider thesis framework.
resulting in problems emerging out of the solution itself, to be explored in the next chapter.
Chapter 8: The problems and costs of the solution: Part 2 in the evaluation of the solution

8.1 Introduction\textsuperscript{203}

In the preceding chapter it was argued that a few key variables of funding assembly came to impact directly on the conditions of project assembly. These variables included, 1) an initial uncertainty on the source and/or amount of money available; 2) conditionality to spend within a given time frame; 3) conditionality to spend on selected identified projects; and 4) delays in the transfer of the funds. With the result that they coalesced in constricting project design and commissioning. In this chapter I look at the problems faced with the operation of the desalination technology in both Sedgefield and Knysna, emerging as a result of the constraints faced in project development. This presentation of the project problems, is followed by an examination of the ongoing operational and maintenance costs of desalination to the KLM, despite the in-operability of the technology.

What emerges out of this analysis is a complex assemblage underpinned by a manufactured sense of urgency, which came to inform the conditionality and constraints on money flows and project development producing a situation where the solutions were problematic from the very outset. In this chapter it is argued that these problems were not unrelated to, but instead a symptom of the nature of the solution emergence in itself. In other words, the significance of this analysis is to point to the circularity of the crisis-solution consensus as it emerges through a framework of naturalisation of both 'nature' and modernisation.

8.2 The Problem with the Solution in Sedgefield\textsuperscript{204}.

8.2.1 A Malfunctioning brine discharge system

By January 2010, with less than a month having passed since the plant commissioning in December 2009, reporters from the local Knysna Plett Herald (KPH) newspaper were

\textsuperscript{203} It should be noted that this chapter introduction is kept brief, focused on outlining the details of what will be covered in the chapter. As the introduction presented in the preceding chapter already served to explain the broader relevance of both of these two final empirical chapters, understood as collectively contributing to an evaluation of the promise of a desalination techno-managerial fix.

\textsuperscript{204} Refer to Appendix 3 for a description of the component parts of the Desalination systems in Sedgefield and Knysna. For clarification on the technical terminology used in this chapter
informed by the KLM that the two Reverse Osmosis (R.O) units on the plant were being operated alternately as opposed to simultaneously – with an average 250kl of water produced per day – firstly due to “a slight glitch with one of the seawater wells on the beach”; and secondly as the municipality “wanted to keep the electrical kVa demand as low as possible …” Then, in late January 2010, the Municipality was faced with “an urgent issue” when it was reported that “I have just had a call from a resident … he has seen that the discharge pipe is now on the surface and appears to have become dislodged/ disconnected”.

In response to the “malfunctioning brine discharge system”, by May 2010 excavations were carried out on the beach in order to “construct a temporary brine discharge until permanent alterations could be executed in August 2010 during favourable tide conditions”.

However, prior to the carrying out of any alterations, a number of emails were sent in July 2010 - by the KLM consulting engineer, on behalf of the municipality – requesting the contractor to urgently present a program of action to address persistent problems with the plant. According to an email sent on 5 July 2010,

“The beach well system is incomplete. The discharge pipe has been severed to allow the system to work. It discharges over the beach to the sea, which is unacceptable … the Employer is not at this time prepared to entertain costs of the order of magnitude indicated for the construction of a longer outfall. You are

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205 11-12 January 2010; email from KPH to Knysna PR; JH, NP, RN
206 11-12 January 2010; email from KPH to Knysna PR; JH, NP, RN
207 27 January 2010, KT to JV, cc KG, JM, Program Sedgefield
208 26 January 2010, RN to KT, cc JH, RP, Sedgefield Desalination Plant, Discharge wells
209 According to an email sent by the plant supplier Grahamtek to the municipal consulting engineer on 27 January 2010 the problems included a leaking intake line, repair of discharge system, and the reinstallation of the manifolds, all of which would be addressed by the subcontractor in February 2010 (JV to KT, cc KG, JM, Program Sedgefield, 27 January 2010)
210 27 May 2010, interoffice Memorandum, from AMS to PMU , Re: Invoice SC1036 – Brine Discharge
211 The TOTAL cost of the exercise was R11, 846.31
212 27 May 2010, interoffice Memorandum, from AMS to PMU , Re: Invoice SC1036 – Brine Discharge
213 Firstly the operation and maintenance manual provided by Grahamtek to KLM was described as “totally inadequate”. Furthermore, it was stated that the July emails, are a continuation of earlier correspondence in February 2010 listing items still to be finalised and which must be dealt with urgently. These included a number of issues with the plant mechanics and instrumentation, with the most salient being the required replacement of the sea-water pump on beach-well No.3 of the intake system; an ongoing problem with starting one of the R.O. units, referred to as RO2, with the contractor having been informed of the problem on “11 June 2010 … the unit has not been operated regularly and the membranes are danger of becoming damaged …”; and finally the continued question of how to proceed with the rectification of the discharge system.

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required as part of your contractual obligations to reconnect the diffuser on the beach” 214

8.2.2 Resolving the discharge challenge?

Firstly, following the above communication, an excavation to retrieve the outlet pipe of the discharge system was in fact undertaken on September 8 2010. However, the KLM was dissatisfied with the handling of this process, as communicated in this revealing email, painting a significantly different picture of the Municipal position on the plant development process, when compared to official communication through media and other reporting channels;

“…after all the fuss and struggle to get the repairs planned for low tide etc. it came as a bit of a shock to see the way this was managed and organised today … Everyone seems to think that this is an unimportant issue … There has been so much publicity, so much interest and many people are watching to see how I tackle this challenge … I’ve been at pains to tell the media how good the team were … next time I am asked I may … say the attitude I am seeing now once the bulk of the money has been transferred” 215

Secondly, with respect to the reference to the construction of a longer discharge outfall, this is based on recommendations made in the Marine Specialist Report (Clark and Hutchings, 2009), as a part of the EIA ‘Section 24G application for rectification’ process216. Reviewed in September 2010 by the Directorate of Integrated Environmental Management, the following recommendations were made to the DEA Head of Department,

“The possible shifting of the brine discharge points to behind the surf zone must be assessed before the application can be finalised. Alternatively the continued monitoring must be made compulsory and it must be ensured beforehand that funding is

214 5 July 2010; KT to KG, JV; Knysna Municipality, Sedgefield Emergency Water Supply … outstanding Issues; 8 July 2010; KT to KG, JV; Knysna Municipality, Sedgefield Emergency Water Supply … outstanding Issues

215 Sept 8 2010, CR to RN et.al, Repair to Sedgefield

216 Whilst the application was submitted to the Department of Environmental Affairs (DEA) on 20 May 2010, the Marine Ecology and Marine Water Quality Assessments followed almost a month later and were reviewed in September 2010
available for the monitoring and implementation of the mitigation measures that may culminate”.

Hence it was anticipated by the KLM that as a requirement for application approval by the DEA, the brine discharge pipe would need to be extended further into the sea, beyond the surf zone; prompting the submission of an application, in December 2010, for additional funding to support this intervention. The funding request was to extend the brine discharge pipeline approximately 100m into the sea, as “the Marine Biologist Report … indicates the brine discharge directly into the sea is unsatisfactory and must be rectified”. However, the Report itself recommends that the pipeline should be extended 500m further into the sea. The reason for reducing this length is due to a desire to save costs with the estimated additional funding for a 100m totalling R2, 300, 000 (R2, 000, 000 for the pipeline extension and R300, 000 for professional fees).

8.2.3 Problems continue and multiply

The problem of the brine discharge system continued into 2011 and was accompanied by additional challenges to plant operation. By February 2011 it emerges that a number of unanswered questions plagued both the Sedgefield and Knysna R.O. Plants.

This lingering sense of an incomplete project, at least in the case of the Sedgefield Desalination plant, is reinforced with expressions of concerns regarding the contract and lack of response from the contractor, Grahamtek on the continued plant operational problems, as follows:

30 September 2010, Directorate Integrated Environmental Management (Region A) to Head of Department, Department of Environmental Affairs; comments: specialist reports on Marine Ecology and Marine Water Quality Assessments for the Sedgefield Desalination Plant, Knysna

23 December 2010, MM to Dr. Fast; Sedgefield Desalination Plant: Additional Funding required

23 December 2010, MM to Dr. Fast; Sedgefield Desalination Plant: Additional Funding required

23 December 2010, MM to Dr. Fast; Sedgefield Desalination Plant: Additional Funding required

in an email sent from the KLM PMU to actors within the Municipality, the consulting engineers as well as contractors on the Sedgefield and Knysna R.O. plants

These included the need to confirm what the full capacity of the plant is after 48hr test, how much power is used to produce and supply the reservoir with water, the cost per kl of water when compared with conventional water from the river.

References:

217 30 September 2010, Directorate Integrated Environmental Management (Region A) to Head of Department, Department of Environmental Affairs; comments: specialist reports on Marine Ecology and Marine Water Quality Assessments for the Sedgefield Desalination Plant, Knysna

218 23 December 2010, MM to Dr. Fast; Sedgefield Desalination Plant: Additional Funding required

219 23 December 2010, MM to Dr. Fast; Sedgefield Desalination Plant: Additional Funding required

220 23 December 2010, MM to Dr. Fast; Sedgefield Desalination Plant: Additional Funding required

221 These included the need to confirm what the full capacity of the plant is after 48hr test, how much power is used to produce and supply the reservoir with water, the cost per kl of water when compared with conventional water from the river (3 February 2011, RN to AW, JV, JH, KT, RP; Operation of Knysna RO and Sedgefield Desalination plant)

180
“It is getting VERY concerning about our inability to complete the contract and also to get Grahamtek to respond. If you cannot get a response then I think I will have to go the legal route … experiencing operational problems, the plant is standing, pumps are failing and I don’t even have a maintenance contract …”

In direct response to the above, Grahamtek confirmed that

“they will install the repaired pump next week and will carry out the 48hr test next weekend, 25-27 February 2011.”

This commitment was honoured, however it was once again met with municipal disgruntlement as,

“it seems as if the weekend tests were a waste of time … disappointed with the results I will be presenting at the International Water Week in Cape Town later this month … understand that they also were on a learning curve but … very disappointed. I paid for a 1500kl plant. This is not what I have …”

At the same time the KLM proceeded to procure the services of “a local contractor … to move the brine discharge to a temporary position on the beach, halfway between the dune and the present discharge point”, with the intention that “Once the monitoring on the brine discharge during the 48hr test is reported, the recommendation on the final brine discharge position will be made, and the necessary work programmed and budgeted.”

Interestingly this action by the Municipality prompted Grahamtek, and the subcontractors on the project to request the municipal consulting engineers “to confirm in writing that RLH/Southern Oceaneering are released from their responsibilities on this contract.” The municipal response was to meet the request but state that “I have been forced to intervene because they have not achieved the criteria … that there will be no visible signs of the plant (i.e. discharge) on the beach.”

8.2.4 Resolving the growing problems? Claim and counter-claim
Ultimately by March 2011 an official letter, responding to the outstanding issues listed by the municipal consulting engineers, was sent by Grahamtek Systems. Firstly, from the letter, it emerges that there was an outstanding payment to the contractor of R152,190.00 for plant operation during the months of November and December 2010 and January 2011; as well as an outstanding payment of R68,656.50 (including VAT) for earlier work performed on the brine discharge system. Secondly, it is claimed that the issues highlighted by the Municipality and consulting engineers in the numerous ‘snag lists’ sent to the contractor were all addressed, even in instances when the supplier’s warranty had expired, and signed off by the KLM or consulting engineer. The two final points relate to the ongoing themes of plant operation and the 48hr test. In the case of the plant intake pumps and beach wells it emerges that the ongoing problems with the submersible pump ‘No.3’ on the intake system (as already mentioned previously) continue, despite efforts to remedy it, and have been joined by Pump ‘No.2’ “not performing to specification”. It is proposed that the beach work, to extract and replace the two pumps, be performed during the next low spring tide, with the proviso that the client (KLM) purchase a second spare pump as “the client only has one spare unit and two units require replacement”. Finally, the previous failed attempts at a 48 hour test are explained by way of the 2 inoperable submersible pumps, Pump No2 and Pump No 3.

A response letter was issued by 24 March 2011, with the following counterpoints;

“…it is a matter of record that the plant has never produced the contractually stated 1,5MI/day of product water on any given day …The reliability of the plant has not been adequately proven and hence the actual ‘taking over’ of the plant has never been signed off… Due to the emergency nature of the project it was agreed that the Employer would make use of the plant before handover, and progress payments were made in this regard and in good faith.”

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229 7 March 2011; JV to KT; Sedgefield Desalination Plant: Outstanding Issues
230 7 March 2011; JV to KT; Sedgefield Desalination Plant: Outstanding Issues
231 9 beach wells were installed as a part of the intake system, with 5 containing submersible pumps, as the number needed to ensure the intake flow rate. The remaining 4 were installed as back up wells, in case of problems with the 5 main wells
232 24 March 2011; KT to JV; Knysna Municipality: Sedgefield Emergency Water Supply, completion, handover and payment issues
This communication was followed by ongoing back and forth ‘requests and responses’, with regard to remedying the beach intake system, between the consulting engineer and the contractor. The problematic pumps, No.2 and No.3 were ultimately replaced on 22 August 2011 however the 48 hour was not run at this time due to a broken casing on RO2, “which is not an on-site repair”233.

8.2.5 A continuous exposure of the problem with the solution

Then, whilst the above issues regarding the intake system, 48 hour test as well as the still ‘temporary’ discharge system continued to plague the plant, disaster struck once again in September 2011, when it was reported that a member of the Wilderness Lakes water Forum (WLWF) contacted the environmental consultant to inform them that “someone had told him that there were pipes (exposed?) on the beach”234. By Monday 26 September 2011

In response to this unexpected exposure, by 5 October 2011, it was reported that 5 beach wells had been removed and taken to Cape Town for testing and servicing; the R.O membranes were rinsed and put in preservation mode - which would keep them protected for the next 6 months - by Nuwater which had since bought out Grahamtek; and that drilling of boreholes at the Myoli beach car park (as an alternative water supply source for the Desalination plant) were being costed and investigated235. The car park boreholes were consequently drilled with a report submitted on 15 February 2012 by SSI to the Municipality stating that drilling and testing of source water boreholes at the Myoli beach car park took place on 22 December 2011, with the findings

“in favour of using the car park boreholes to supply the plant, and to drill further boreholes with the objective of ultimately supplying the full quantity of water required for the plant”236.

This recommendation is reinforced in a later report on 23 March 2012 with a further modification to the above that firstly,

233 22 August 2011; KT to EM, RP, Sedgefield Desalination Plant final repairs and testing
234 Notes on beach intake wells damage meeting, 26 September 2011, Internal Municipal minutes
235 5 October 2011; email from KT to EM, cc: RP, RN; Sedgefield Desalination Plant Damage Feedback
236 Knysna Municipality: Sedgefield Emergency water supply, Desalination Plant – beach wells repairs, car park boreholes, brine discharge & O&M contract; SSI to KM; 15 February 2012
“I recommend that the next step for moving the water source for the plant, from the beach wells to the car park boreholes is implemented urgently … (using the 2 functioning beach wells and the new borehole)” 237 and furthermore that “the 2 beach intake wells be left as they are … there is some risk that the pump no.2, that is not working, will be damaged if not removed, but the cost of retrieving one pump … is approximately two times the replacement cost of the pump. Therefore it makes economic sense to maintain the status quo at this stage” 238.

Hence it emerges, that in the final analysis the problem was left un-addressed at the beach and the solution shifted elsewhere, which thus far in this analysis of the ‘story of the Sedgefield water crisis’ has repeatedly surfaced as something of an ongoing theme. The above concludes the telling of the Sedgefield Desalination plant ‘history’ up until the first half of 2012, which is when this study had already commenced, making it difficult to obtain much more information beyond this point, as the decisions were still (in the process of) being made, and arguably guarded. However, one central message surfaces from the above account, that the ‘necessary solution’ was problematic from the outset. This is in contrast to claims of desalination as THE ANSWER to future water supply risk, as evidenced in promotional material, such as the SSI ‘life beyond our rivers’, as well as information dissipated by the KLM through promotional material, trade publications, conferences and through the media, on the Sedgefield Desalination Plant. Furthermore, in answering the question ‘why did the solution emerge as problematic from its very beginnings? I have already argued in the previous chapter that the dimensions of money flow impacted on project design decisions, leading to the problems outlined above. Specifically in the Sedgefield case the problems plagued the plant from the very outset as a consequence of accelerated project implementation – necessitating project designs that were rapidly implemented, limiting the time available to monitor the surrounding environment - and by budget limitations. As illustrated in the case of the discharge system. The recommendation made by the Marine Specialist was to extend the brine discharge pipeline 500m into the sea. Instead the brine was being discharged directly into the sea with an outlet pipe located on the beach. Furthermore, in responding to the Specialist recommendation, the KLM requested

237 Knysna Municipality: Sedgefield Emergency water supply, Desalination Plant – beach wells repairs, car park boreholes, brine discharge & O&M contract; SSI to KM; 23 March 2012
238 Knysna Municipality: Sedgefield Emergency water supply, Desalination Plant – beach wells repairs, car park boreholes, brine discharge & O&M contract; SSI to KM; 23 March 2012
funding to extend the brine discharge pipeline approximately 100m into the sea, as reducing the length from 500m to 100m would save costs. In the final assessment even this 100m extension never materialised. This discussion into the reasons for the circular relationship between problem and solution will be taken up again in this chapter. However, before doing so, a brief account will be given on the problems faced with the Knysna R.O plant (in this case one issue, which has already been presented in the previous chapter, stands out above the rest, i.e. the quality of the feed-water supplying the plant).

8.3 The Problem with the Knysna Solution

As has already been discussed in this thesis, whilst the ‘re-use of effluent’ project was initially conceptualised as a Waste Water Reclamation (WWR) scheme it was consequently determined that the quality of effluent generated through the WWTW was of insufficient and inconsistent quality, thereby rendering the initial design unfeasible. Hence in order to continue with the development of an ‘effluent re-use scheme’ - and still receive the allocated funding - a revised design was advanced, comprised of two components, namely the Reverse Osmosis (RO) Plant for water purification located alongside the existing WWTW; and six source boreholes to the West of the plant in the area adjoining the Knysna Estuary. From this, it is clear that this project re-design introduced the boreholes as a component of the R.O. Scheme, and resulted in rapid drilling, due to the atmosphere of urgency surrounding the projects.

8.3.1 A mismatch between the ‘filtration system’ and borehole ‘feed water quality’

“Due to the emergency it was not possible to carry out the long term quality tests on the raw water from the boreholes”, resulting longer term test results indicating high levels of iron

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239  23 December 2010, MM to Dr. Fast; Sedgefield Desalination Plant: Additional Funding required
240  “Reverse Osmosis works by using pressure to force a solution through a semi-permeable membrane, retaining the solute on one side and allowing the solvent to pass to the other side. In this case the solvent would be water and reverse osmosis would therefore lead to only water molecules being pushed through the membrane, resulting in freshwater; thus removing salt and other unwanted solutes such as micro-algae, bacteria, some viruses, micro organisms and micro-pollutants
and with a lower yield.” was that the borehole water supplying the plant was of a significantly higher turbidity level than expected, resulting in a mismatch between the filtration capability of the sand filters in use and the feed water quality. In a report by the plant contractor, Veolia, to the Municipal consulting engineer, in September 2011 it is stated that “the filtration capability of the sand filters remain a limitation with the high turbidity, out of-spec borehole water”.

Whilst the above account of the problems with the ‘out-of-spec borehole water’ is highly technical, making it difficult to fully comprehend the implications for plant operation, explanations obtained through interviews with both plant developers and plant operators (Municipal and private contractor), augment the report description, and shed more light on the plant challenges as well as ‘operational status’. According to one account,

“… the Knysna plant has been used infrequently and not at full production, there’s still issues … when running at full production. The filters don’t really cope because the water quality is less than what was anticipated. … I had a target that I must produce water at a certain stage. But when the plant was commissioned at phase one I weren’t getting enough raw water out of the boreholes, and the quality was quite difficult water to deal with and the, pre-treatment filtration and stuff was battling to deal with it. So in the second phase, when the next trunch of money was released that system was improved. Two more boreholes were put in, the filtration system was improved slightly and modifications were made to the plant to give it more protection. So it can shut down on bad quality water ” (Interview 6)

8.3.2 An inoperable plant

Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010

Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010

In addition it is explained that “When operating a full flow the sand filters do not provide stable filtrate quality and/or turbidity below 0.5NTU. The additional borehole pumps and increased capacity filter feed pumps allow for production of full flow filtrate while backwashing every 8 hours per filter, but the sand filtration area for the out of spec borehole water is not sufficient” (8 September 2011; Email from AW to KT, cc: RN, RP, TN, SM; D&B Close -out)
The above account on limited plant operation and problems experienced with the feed water quality highlights that the problems emerged as a consequence of the process of project design unfolding within an emergency context. As explained by an interviewee;

“This is the symptom of implementing something like that in this way. I mean normally something like that would have pilot study. You’d put in a small trial unit, inside a little mini container, down near your boreholes. But in this case none of that was done” (Interview 6)

Furthermore following project improvements during phase 2, it is significant that the plant continued to be problematic, with the latest water quality tests (at the time of the interview) in fact reflecting poorer water quality, then at earlier stages in the plant development and operation. As explained by a member of the project development team;

“I think I commissioned in July, month or two continued to run, thereafter stopped, 1 December (2010) started again, then ran the 5 months and then mothballed. But most of that time it was not running full capacity because of the feed-water from the boreholes as high turbidity water … That is still the case. So I think the plant is doing well with the water it is receiving. I’ve done some changes, it was the beginning of last year (2011), there was some directive … releasing more money to do some improvements … There have not been major changes but it will improve the plant. But what I have found since is that the water quality is actually worse now, in the beginning of 2010 it was bad, in 2011 it was better, now since December (2011) its been very high turbidity, so its difficult water” (Interview 23, 24).

With the interviewees adding that;

“the water quality has a major impact on what the plant is yielding for the municipality. What has been invested compared to what is being produced …The result is that the filter bags have to be replaced frequently and they take heavy load. And sometimes the bags last 8-10 hours, I replace all the time. Then you have breakthrough of some of that particulate matter into the membranes and you have to do chemical cleaning of the membranes. Under emergency conditions the decision was taken to go desalination and have the beach wells there. But it’s resulting in a lot of operating problems with the plant that’s there to the extent that in December (2011) it was not operable so it has produced very little water in the last 5 months (2011-
Hence, from the above, it can be argued that the official KLM statements that the plant was ‘commissioned by July 2011’ and that it was ‘operational’ are claims that remain outstandingly silent on the above fundamental plant design flaws, which prompted the above conclusion that the plant feed water cannot be treated with the system as it is, that is with a basic mismatch between the ‘filtration system’ and borehole ‘feed water quality’. As a fundamental design flaw, emerging as a consequence of the conditionality to design a 're-use of effluent' solution, the urgency of plant development and spending, and therefore the lack of long-term testing of borehole feed-water quality.

### 8.4 The problem – solution cycle

In combination with the previous empirical chapter, I have sought to show thus far that the solution – in both towns - emerged as problematic from the very beginning as a result of the key variables underlying ‘money flows’. Variables which in themselves were a consequence of the crisis- solution narrative, as a movement from an urgent threat toward an immediate security solution. To recap, these variables were identified as 1) an initial uncertainty on the amount of money to be released, 2) conditionality to spend within a given time frame or risk losing the money, 3) conditionality to spend on specific identified projects or risk losing the money, and finally 4) delays in the transfer of funds, creating a cash flow challenge for the KLM. It what follows, a few additional points will be made, thereby extending the argument made thus far on the circular relationship between the problem and solution.

#### 8.4.1 The politics of funding conditionality

It emerges that efforts to ensure that the Knysna project met with funding conditionality, which resulted in a ‘re-imagining’ of the Knysna project design, emerged through a contested process. With the Director of Technical Services, at the time, unwilling to support the original re-use project design as,

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245 According to a municipal employee within the technical department, interviewed in May 2012, “Twice monthly the boreholes are started… this is done to make sure everything is working mechanically” (Interview SM).
“... NT approved money for reuse ... (but)the Director didn't believe I could control the sewage works well enough and had enough barriers in place to protect the public ... to the extent that treasury wanted to take the money back. And then council removed the Director from all emergency projects and put the PMU in charge with the consultants. Because the Director’s position meant that the funding would go. This funding was for reuse of sewage effluent ... Eventually ... they fuzzed the thing gradually over time so that it is built next to the sewer works using lagoon water and putting it back into the lagoon using the sewage effluent as dilution of the brine ... don’t think that anybody NT, DWA, Knysna, anybody wants to say that what it was approved and what was done are 2 different things " (Interview 37).

The above account of the Director of Technical Services position on the original re-use of effluent design, and consequent replacement by the PMU, is supported by two letters sent by the Municipal Manager (MM) on 28 October 2009 to the newly appointed Project Leader of the PMU, and the Director of Technical Services, respectively. The main points that can be distilled from this correspondence are that a resolution was taken by the Knysna Council to ‘ring-fence’ the emergency water projects. This was followed by the MM establishing a Project Management Unit, temporarily transferring the selected project leader and assistant (from the Technical Services Department) and official from the Finance Department, to the unit. With the,

“task of this unit ... to ensure that the Projects are implemented with the necessary speed it deserves ... and that I spent the funding allocations received from Provincial and National Government” 246.

Hence the Director’s indication that he would not be able to spend the NT allocation resulted in the shifting of project responsibility to the newly established Project Management Unit (PMU). It was then, through the PMU, that the project re-envisioning could take place. With the actors within the unit tasked with the official mandate of ensuring that the projects are implemented and the funding allocations spent by March 2010, so to prevent the risk of withdrawal.

246 28 October 2009; letter from MM to RN; Allocation of Emergency water projects to an official
8.4.2. The materiality of non-human nature

A further dimension to the problem-solution cycle which has not been considered thus far, is the materiality of non-human nature. Whilst the techno-managerial consensus relied on specialist studies to evaluate the anticipated impact of the desalination technology on the surrounding environment, the agency of non-human nature was not sufficiently acknowledged in the development of solutions. In reflecting on the factors contributing to the emergence of problems within the solution itself, it emerges that this unaccounted for materiality was significant. Specifically 1) the complexity of the technology in use; and 2) the borehole/seawater acting as both the supply source for the desalination process as well as the receiving environment for the generated waste (Brine).

With respect to the former, themes that have surfaced in both the Knysna and Sedgefield cases are the ‘newness’ (especially in the case of South Africa), the ‘complexity’, and the ‘site specificity’ of the technology. This is further complicated in South Africa by the lack of long term monitoring data on the potential impact of the technology on the surrounding environment. Resulting in local study assumptions and conclusions, on potential impacts, which are informed by data drawn from other parts of the world, where the technology has already been in use. According to one of the sub-consultants, contributing to the ‘Specialist Studies’, required as a part of the EIA process;

I’ve looked at other parts of the world. The problem is our ecosystems are so different. The majority of the assumptions I've made have been based on the experiences of the rest of the world and their large scale desal projects and that’s what I've drawn on and that's why I remain unsure. Yes … in some areas it hasn't been a problem at all. But I don’t know how our ecosystems are going to respond to that so I need to follow it up with this monitoring” (Interview 3).

The implication of the complexity of the technology is a linked reliance on ‘expert knowledge’ which comes at a cost, as

“One of the issues is that it’s highly technical. And the capacity to run technical things is limited, you actually need skilled people and In the field of desalination, there is no Municipality
that would have the expertise … So I are very very reliant on the company providers and what their particular technology is (Interview 37).

Finally, regarding site specificity it emerges that “The membranes were site specifically selected for the plant. (as)You cannot put any membrane into any environment (Interview 29, 30, 31)”. The membrane site specificity brings us to the next point on the role of non-human nature. As was seen in the case of Knysna, non-human nature has agency, with the quality of borehole feed water emerging as a central variable in informing membrane operation, with the resultant poorer water quality described by the KLM as an ‘unanticipated outcome’. However, according to an interviewee from the DWA, to suggest that ‘certain’ results could have been anticipated belies the complexity of the geology in the area, thereby necessitating longer term studies.

“So many layers of geology, that’s its difficult to know the inter-linkages. You would only know that if you’ve drilled sample holes and done various tests to know that the quality is not suitable (Interview 51).

The above point, on the agency of non-human nature in impacting on the operation of the desalination technology is also evidenced in the case of Sedgefield, with respect to the issues faced with both the brine discharge and raw water intake system247. Specifically the case points to the ways in which the variables already identified as contributing to the problem-solution cycle, became further entangled with the unaccounted for agency of non-human nature. This argument will be elaborated on below, in discussing the process through which the design specifications for the plant inlet and outlet pipes were determined.

To begin with, it emerges248 that the tender specification released for the Sedgefield project differed from a conventional tender specification, as a result of the time constraints placed on moving the project from the approval through to the commissioning stage (the contract was signed on 1 October 2009 with the plant commissioned on 18 December 2009) (Interview 27). Instead, both the plant design and

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247 as the two main challenges affecting the plant operation
248 Through interviews conducted; with municipal officials, consulting engineers, contractors and subcontractors; involved in the Sedgefield Desalination project
construction was carried out by the contractor and appointed subcontractors on the job, without a detailed tender specification having been provided by the municipal consulting engineer in advance (Interview 27). In addition to this unusual tender specification, the contractors/ subcontractors for the plant were also required develop this design within budget limitations, where they were told “I will give you R16,000,000 and nothing more” (Interview 27). The implication of this was that the plant design was directed by the budget, with implications for plant robustness and the level of risk to plant operation, as follows;

“For a very robust design you pay for the vessels, divers, but the small plants can’t afford that. It’s basically money versus risk. With a larger plant you need to make the intakes. All of this I’ve done in agreement with the client on what risks I are taking on intakes and discharges and if they want a zero risk approach they need to find the budget to pay” (Interview 27).

The ultimate result of the approach described above; driven by financial and time constraints; was that both the intake and discharge systems were rapidly implemented, with assumptions made about the surrounding environment, which proved to be inadequate. In the final analysis both the intake and discharge systems failed with pipes exposed on the beach, and pumps failing to operate. This failure and pipe exposure on the beach has been explained to have been as a result of the beach dynamism, which none of the project developers had anticipated.

In sum the failure of the inlet and outlet pipes of the Sedgefield Desalination plant, and the problem with the Knysna feed-water quality, can be understood as having being constituted through an entanglement between the unaccounted for materiality of non-human nature and the other variables already identified as informing funding and project assembly.

8.5 Accounting for the longer term costs

As a final step in this evaluation of the two principal ‘solutions’ to the water crises in the two towns, I will proceed to consider the operation and maintenance costs associated with the plants, and what the implications are of these for the municipal budget. This is carried out so as to query the oft repeated claim by project proponents
that the plants were ‘free’, external funding sourced, thereby not impacting on the municipal budget. As has already been shown, especially in the case of Sedgefield, this is an unfounded claim. However, a further dimension, which this claim serves to mask are the longer term costs associated with plant operation and maintenance. This masking is reinforced by a decision to not reflect the costs independently of the overall operational and maintenance costs of the municipal infrastructure, as;

“The funding is used to provide a basic level of potable water for the community – during the current emergency. It is not an optional choice. As such the operation and maintenance of the plant will be included in the normal operational and maintenance budget. They will not be reflected separately.”

It is clear from the above, that this decision is further justified by the supposed ‘necessity’ of the plant for water supply to the towns. This, once again, emerges as an unfounded claim, with the plants having contributed very little, if anything to the water supply to the town. In the case of Sedgefield, in 2010, the plant produced a total of 115 Ml of water with a maximum of 28Ml produced in April 2010. Whereas during 2011 the plant was run in a limited capacity only, to maintain the system, and usually only one unit at a time. Ironcally, the main reason for the plant usage in 2010 was due to the rehabilitation of the Ruigtevlei Water Treatment Works (RWTW). Hence, it emerges that the main purpose for the plant in this period was to ‘fill the gap’ whilst the historical infrastructure challenge, as the ‘Achilles Heel’ of Sedgefield water supply system; was addressed. The water production for 2010 is shown in the table below.

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251 only partially as it was a rehabilitation as opposed to upgrading of the WTW
Table 8.1: Water production for year 2010

<table>
<thead>
<tr>
<th>2010 (Month)</th>
<th>Production (kl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>2 216</td>
</tr>
<tr>
<td>February</td>
<td>9 164</td>
</tr>
<tr>
<td>March</td>
<td>19 286</td>
</tr>
<tr>
<td>April</td>
<td>27 976</td>
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<tr>
<td>May</td>
<td>17 311</td>
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<tr>
<td>June</td>
<td>479</td>
</tr>
<tr>
<td>July</td>
<td>1500</td>
</tr>
<tr>
<td>August</td>
<td>987</td>
</tr>
<tr>
<td>September</td>
<td>8 134</td>
</tr>
<tr>
<td>October</td>
<td>6 821</td>
</tr>
<tr>
<td>November</td>
<td>12 716</td>
</tr>
<tr>
<td>December</td>
<td>8 247</td>
</tr>
<tr>
<td><strong>Total (kl)</strong></td>
<td><strong>114 837</strong></td>
</tr>
</tbody>
</table>

According to a report produced by the consulting engineers, SSI, for the KLM in August 2011, the plant per unit costs (cost per kl) are composed of **Operating staff, preventative maintenance and electrical availability** as the main costs with fixed monthly amounts; with **electrical consumption, chemicals, filter bags and reactive maintenance** as variable costs based on plant production, adding that the unit costs of the plant will slowly decrease as the utilisation rate increases.\(^{253}\) Accounting for the above component ‘fixed’ and ‘variable’ costs; the report proceeds to identify the following estimated (initial), actual (based on usage in 2010), and consequently revised costs per kl of water produced, as shown in the table below.

\(^{252}\) Knysna Municipality: Sedgefield Emergency water supply, Desalination Plant – Summary Report: O&M contract & O&M manuals; SSI to KM; 26 August 2011

\(^{253}\) Knysna Municipality: Sedgefield Emergency water supply, Desalination Plant – Summary Report: O&M contract & O&M manuals; SSI to KM; 26 August 2011
Table 8.2: Estimated operating and maintenance costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated Cost (R/kl) *</th>
<th>Actual Cost (R/kl) #</th>
<th>Revised Cost (R/kl) ##</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Costs**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed (based on kV A)</td>
<td>1.90</td>
<td>1.84</td>
<td>1.25</td>
</tr>
<tr>
<td>Variable (based on kWh)</td>
<td></td>
<td>1.02</td>
<td>1.20</td>
</tr>
<tr>
<td>Consumables (chemicals, filter</td>
<td>0.70</td>
<td>0.49</td>
<td>0.49</td>
</tr>
<tr>
<td>cartridges)</td>
<td></td>
<td>0.40</td>
<td>0.40</td>
</tr>
<tr>
<td>Maintenance/ Replacement Costs</td>
<td>0.40</td>
<td>1.75</td>
<td>1.50</td>
</tr>
<tr>
<td>Operator Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Estimated O&M cost (per kl produced)** | **3.40** | **5.50** | **4.84**

Notes:
- * Estimate cost based on the plant running 24h/day, producing 1.5Ml/day, i.e. lowest unit cost
- ** Estimated power cost based on R0.50 per kW to cover fixed and variable power costs
- # Actual costs from March, April, May 2010 (highest monthly production to date)
- ## Revised cost based on monthly cost of producing 1Ml/day (30M/month)"

From the above it can be seen that the actual and revised costs of running the plant were significantly higher than the initial estimated cost. This is because the original estimation was based on running the plant at full production continuously, “which is not how the plant is presently run or will be run in the near future” 255. Instead “at this stage and in the short to medium term, the plant will only be required to supplement the water supply at peak holiday times and when unusual events occur (e.g. drought, repairs to waterworks etc)” 256. With the overall aim, in this chapter, of evaluating the desalination plants impact on municipal water flows and money flows; as a next step, whilst acknowledging that the revised cost provided in the table above is based on the use of specific assumptions, I will unpack the cost components, focusing on the nuances of power costs and mode of operation.

8.5.1 The multiple costs of power

As reflected in the table above, the power costs are made up of fixed and variable costs. Through the document review and interviews, it’s been possible to establish that the electricity costs for plant operation are constituted of four components as follows.

a. Consumption:

The ‘consumption’ component is a variable cost dependent on plant operation and measured in kWh (kilo Watt hours). Furthermore, Eskom, the national energy provider, offers three different tariff options, referred to as Time of Use (ToU) tariffs, namely; normal, high, and low demand ToU tariff options, with related costs. That is, the cost per kWh differs based on the time of operation of the plant, and informed by the Eskom Time of Use (ToU) grid/timetable. As explained by an interviewee;

“…what’s tricky is this time of use electricity tariffs … You've got to choose your hours per day. you've got 3 categories, peak, off peak and standard … and high season is different to low season … if you can stay in completely off peak and lower season then you getting your electricity cheapest. But if you're running the plant quite a lot its better to just go to an average rate. The thing is you've got to … make decisions in advance, and then that’s how the plant will be billed for its electricity”

(Interview 62, 63)

In sum the consumption component of the total electricity cost is a variable cost, based on plant operation, and measured in kWh. However, the cost per kWh is further informed by the time of operation, as guided by the Eskom determined ToU tariff structure. The municipality aims to operate the plant during off-peak ToU when the plant is not the main water supply source. A further point influencing the electricity consumption cost relates to the kWh required to produce 1kl of water. Hence in the Knysna plant, with challenges with feed water quality, of 1kl of water requires more electricity (kWh) to produce, as explained below:

“Typically for desalination plants there’s an acceptable norm of power consumption for every 1000l of water produced. For your larger plants its typically lower - economies of scale - for the smaller plants 4kw/hours for every 1000l produced. At Knysna for example lots of backwashing and large pumps so get quite a bit of extra kWh clocked because of frequent backwashing and
low recovery of water. So all contributes to a higher electricity cost” (Interview 23, 24).

b. Network Access:

The ‘Network Access’ component is a fixed cost based on the overall bulk electricity supply made available to the plant and measured in kV A (kilo Volt Amperes). In the case of the Sedgefield a 500 kV A substation was constructed at the plant location, with a 550 kV A substation at the Knysna plant257.

c. Bulk Demand Charge:

The ‘Bulk Demand Charge’ component is a cost based on the maximum demand drawn from the Eskom supply by the plant, within a given month, and is measured in kV A (kilo Volt Amperes). Hence if, for example, the maximum demand in a given month on the Eskom supply was 328 kV A, a charge is levied on this maximum demand, regardless of whether the plant is operated at any other time during the month. Furthermore, as with the consumption charge, the rate charged is also based on the Time of Use (ToU) tariff. That is, the cost per kV A in this case differs based on the time of operation of the plant. As explained by an interviewee within the municipality electrical department:

“Eskom work on a demand basis on large equipment. The maximum demand you draw from their supply. They charge you on that demand, Whether you use it for 10min or a day. Once you start the plant it has a needle that stops at a certain demand, let’s say 250kva. And you pay for that … Now, you apply to them for the off peak, and they give you a tariff scale, between 2pm to 10pm you pay reduced demand rate” (Interview 62, 63).

The distinction between the ‘Network Access’ and ‘Bulk Demand Charge’, both measured in kV A, is explained as follows;

“You pay for infrastructure, what you could potentially take, and what you do take … If I have a transformer next to the plant e.g. 1000 kV A then there are fixed costs linked to that. If I only use say 200 kV A electricity, then I pay on that” (Interview 62, 63).

257 Section 24G Application for Rectification; Cape Environmental Assessment Practitioners; 20 May 2010
d. Basic:
The final cost component of the total electricity cost is a ‘Basic Charge’ which is a fixed cost of R500 paid to Eskom for the electricity supply.

In sum, as an illustration, the Bulk Account on the Knysna R.O. plant for the month of June 2012, was composed as follows:

Table 8.3: Knysna R.O. plant electricity costs for June 2012:

<table>
<thead>
<tr>
<th>Cost component</th>
<th>Total Units</th>
<th>Cost per unit</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption</td>
<td>1191</td>
<td>R0. 38</td>
<td>R452. 58</td>
</tr>
<tr>
<td>Network Access</td>
<td>550 kV A</td>
<td>R26. 52</td>
<td>R14, 586.00</td>
</tr>
<tr>
<td>Bulk Demand Charge</td>
<td>10 kV A</td>
<td>R138. 11</td>
<td>R1, 381.10</td>
</tr>
<tr>
<td>Basic</td>
<td></td>
<td>R500. 00</td>
<td>R500. 00</td>
</tr>
<tr>
<td>Total cost</td>
<td></td>
<td></td>
<td>R16, 919.68 + VAT</td>
</tr>
</tbody>
</table>

Hence, what is important to extract from the above is that regardless of monthly water production, the Network Access Charge and Basic Charge are fixed; with the Bulk demand charge payable on the maximum demand, even if the plant is only operated once in a given month. Hence implying an ongoing monthly operation and maintenance (O&M) expense for the Municipality, irrespective of plant operation.

8.5.2 The mode of operation

The implication of this ongoing cost to the Municipality resulting from the plant, irrespective of operation, is made even more striking when one considers the operational status of each of the plants. Due both to the availability of surface water making the usage of the plants unnecessary, except during the periods in 2010 (presented above) – and the problems encountered with the operation of both plants, as outlined in the previous section.

“… three basic operational modes are possible:

Option A: Full production mode for 24h/day producing 1.5 Ml/day when water is needed due to failure of other sources, or planned maintenance or shut-downs

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258 Due both to the availability of surface water – making the usage of the plants unnecessary, except during the periods in 2010 (presented above) – and the problems encountered with the operation of both plants, as outlined in the previous section.
**Option B: Limited production mode**, for up to 16 hours/day producing only the amount of water needed to supplement the other sources during peak holiday season or other times of high use or low supply from the other sources. This is the most common mode at present and it is scheduled to make use of electricity out of peak demand hours. The low end of this mode is to use plant enough only to maintain and rinse the membranes, as this keeps the plant available should water be required at short notice. This avoids adopting the zero production preservation mode.

**Option C: Zero production preservation mode** is for shutdown of the membrane units when no additional water is required. Note that the start up and rinsing procedure (allow 2 days) and operational staffing must be arranged, and so the plant can not be taken in and out of this mode quickly or at random. In addition this mode still requires the running of the beach well intake and brine discharge pumps to prevent corrosion and seizing of bearings etc.”

In the case of the Sedgefield plant, the SSI report states that “Option B … is recommended at present and should be reviewed monthly.” Interviews with municipal staff and the consulting engineers have confirmed that this was the mode adopted at the time of the research, implying that, even in the case of no water production by the Desalination plant, the Municipality would be paying electricity costs for all of the components discussed above. Furthermore in the case of the Knysna plant, Option C is adopted, however, as recommended in the report, this implies that while the membranes are in preservation mode the boreholes and pre-treatment system are operated to “prevent corrosion and seizing of bearings etc”.

A final implication then of mode of operation is that even when the plants are not required as a supply source – assuming of course that the component parts are operational - the Municipality is faced with two choices: either operate the plant according to Option B or C above – both implying monthly electricity costs OR,

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preserve the plant with the risk of a plant which may not be operational and/or supply water at short notice in the case of an ‘emergency’. The above statement is confirmed as follows;

“Due to the nature of the RO plants, all of the components (machinery and instrumentation need to be operational all of the time for the plant to produce treated water. Furthermore, it is important that the correct decisions are made regarding the maintenance and cleaning of the membrane and the filter, and it is essential that much effort is put into the maintenance and upkeep of the plant … Therefore, it is preferable that a technical manager suitably experienced in R.O. plant operation, and suitably skilled operators are deployed, or contracted, to run the plant. This operational team should be deployed when the plant is required to run at full capacity. However, when limited production, or weekly maintenance runs are required, it is practical and economic for the normal waterworks operators to run the plant in addition to their normal duties”262
8.6 Conclusion and discussion

Ecological Modernisation attempts to dispel as a myth the notion that there is a trade-off between economic growth and environmental sustainability. Insisting instead that the solution to ecological crisis lies in the promotion of an ecological-economic “win-win” form of modernisation, grounded in the belief that technological innovation, a combination of policy instruments, and a movement toward decoupling can achieve economic and ecological sustainability. However, the evaluation carried out of the promise of the desalination technological-fix, shows the E.M. efforts to debunk the ‘trade-off myth’ as a myth in itself. The three parts of the analysis carried out here - examining (i) the link between funding assembly and project assembly (ii) the problems emerging from within the solution itself, and (iii) the ongoing operational and maintenance costs of the desalination plants - points to the fact that, rather than overcoming the problems through technological fixes the problems were simply shifted elsewhere, whilst silencing and leaving the historical problems un-addressed (Clark & Foster, 2010: 147).

More specifically, the evaluation performed here directly challenges claims by the KLM that,

“The ‘conjunctive’ basket of water sources has reduced the reliance on rainfall and surface water run-off. This will contribute towards the growth and development of the area … lowering the risk to the Municipality.” 263

Instead it is shown that the projects were problematic from the outset, and served to contribute to ongoing costs, despite their in-operability, without contributing to additional water security to the towns. Which was the basis for its justification. Fundamentally, it is argued that, rather than being external to the solution consensus, these problems are intrinsically connected to the mechanisms and logic through which the crisis-solution consensus emerged in the first place. In other words, it was shown that the dimensions of funding assembly were a direct consequence of the crisis

263 Emergency Provision of Potable Water for Knysna Municipality: Annual Report for the conditional grant programme for 2009/10, Special Allocation for the emergency provision of potable water for Knysna Municipality (overseen by DWA; Report submitted by the KLM to DWA; 6 December 2010
narrative and related foreclosures, emerging from the consensus process. It was then shown that these dimensions proceeded to determine the specificities of project ‘assembly’ resulting in problems – from within the solution itself, in both Sedgefield and Knysna. This suggestion has the further implication that the movement from crisis to opportunity served to perpetuate a crisis-solution cycle. That is, firstly the crisis narrative has been shown above to have been central in informing the dimensions of funding assembly, with its consequent effects. At the same time, in the chapter on the solution consensus it was shown that the crisis narrative was central in justifying the desalination consensus. That is the risk narrative and security narrative fed each other. Hence, it can be further derived that the basis of opportunity for the desalination industry – as nature's threat - was also the basis of problems within the promised solution. In other words, instead of transforming the underlying metabolic relations, the crisis-solution consensus operated within and naturalised the dominant relations. Thereby producing artificial solutions that simply shifted the problems elsewhere, creating additional environmental concerns and compounding the overall problem (Clark & Foster, 2010: 147), whilst supporting a deepening of the penetration of a growth logic into nature. Supporting Swyngedouw’s (2010) analysis of climate change governance, where he states;

“Post political climate governance does not solve problems, they are moved around” (Swyngedouw, 2010)

At the same time however, through tracing the underlying processes, another significant point which emerges through this metabolic analysis, is the ways in which the matrix of human and non-human relations created accidental, unintended and even counter-effective results (Smith, accumulation: 9). That is, while desalination is concerned with 'remaking' seawater, the study shows that this non-human nature in turn, cannot be exploited indefinitely: it has a materiality of its own which cannot be ignored (Castree, 2000: 29; cf. Bakker and Bridge, 2006: 10).

To summarise, E.M. advocates moving deeper into capitalist modernity as the rational, indisputable path. Defined by its concern with good governance, scientific and managerial enterprise, models of ‘participation’, and technical instrumentation and legislation. However, the analysis carried out here, shows that, rather than being
rational, this logic results in a deeper movement into crisis, in the form of a perpetual crisis – (pseudo) solution cycle.
Chapter 9: Conclusion

9.1 Introduction

23rd September 2014: UN Climate Summit 2014

As I sit at my desk; reflecting on the findings of my study on the adoption of desalination technology as a drought crisis response, in the South African coastal municipality of Knysna; world leaders from government, finance, business and civil society are gathering, more than 6000km away, at the United Nations in New York at the Climate Summit 2014. The summit catchphrase is ‘catalysing action’, with those in attendance - including Barack Obama, David Cameron and China’s Vice Premier Zhang Gaoli - asked by the UN Secretary-General Ban Ki-moon to proffer bold announcements and actions that will reduce carbon emissions, strengthen climate resilience, and mobilize political will in order to reach a meaningful legal agreement in 2015.

This one-day summit on climate change is being promoted as a moment to be seized by global leaders. As an opportunity to catalyse action and solutions on Greenhouse Gas (GHG) emissions reductions, strengthen climate resilience and mobilize political will for a global agreement by 2015 that limits the world to a less than 2-degree Celsius rise in global temperature. This concern with injecting momentum into international negotiations on climate change, positions this event within a broader movement, concerned with achieving 'sustainable development'. As we have already seen, this movement, spanning more than 20 years, is directed toward overcoming the threat of global ecological crisis in the time of the Anthropocene, whilst at the same time retaining capitalist modernisation at the heart of solution conceptualisation. In other words, the path being charted is the view that the world can 'grow' out of crisis by greening capitalism. However, as suggested at the outset of this thesis, what increasingly distinguishes the current path from that advanced at the birth of the 'sustainable development' movement is the belief in technical and procedural innovation as a central dimension of the solution. With this belief in technical innovation and science and technology, labelled Ecological Modernisation (E.M), gaining ground in the

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264 As a target that more than 100 governments signed up to as part of the Copenhagen accord of 2009

Given this suggestion of transformations in the green growth agenda in parallel to visions of a mounting environmental threat, it is significant that the pervasiveness of this approach is strikingly apparent in the latest global report, titled 'Better Growth, Better Climate: The New Climate Economy Report'. Released on 16th September 2014, just one week before the UN Climate Summit in New York, the report begins with the question „Is it possible to tackle long-term climate change while also, now, promoting economic growth and development?“ (New Climate Economy Report: Synthesis 2014: 7). And proceeds to conclude resolutely that „countries at all levels of income now have the opportunity to build lasting economic growth at the same time as reducing the immense risks of climate change“ (New Climate Economy Report: Executive Summary 2014: 1).

Central to this report conclusion is the view that „We live in a moment of great opportunity, and great risk“ (New Climate Economy Report: Synthesis, 2014: 14). With the risks identified as those posed to economic growth and those posed by global climate change (New Climate Economy Report: Synthesis, 2014: 14). In response, it is stated that an opportunity exists to harness the expanding capacities of human intelligence and technological progress to improve the lives of the majority of the world’s people. Concretely, the report proposes that what is needed are policy and institutional reforms, that promote three main drivers of transformation, namely; raising resource efficiency, investing in low carbon infrastructure and stimulating (technological) innovation (New Climate Economy Report: Synthesis, 2014: 16).

From the above, it becomes clear that the contemporary treatment of the environmental question is to conceive of environmental policy as the management of risk to both the environment and to economic growth (Wanner, 2014: 6). With the institutions of modernity; including the market, industrialism and technology; advocated as the essential solutions to ensure the sustainability of the environment and capitalism. That is whilst economists, politicians, corporations and scientists alike have come to acknowledge that economic growth has generated environmental problems, they argue that capitalism will provide the correcting mechanisms to overcome these (Foster et. al,
through technical innovation, and science and technology, allowing for greater resource efficiency and a decoupling of economic growth from environmental degradation (Jaenicke, 2007: 557). Best captured by the following quote:


It is this ecological-economic 'win-win' approach, captured in the above vision of transformation, that this thesis was concerned with querying, through focusing on the case of desalination technology as the proposed solution to the threat to water scarcity. Specifically, a case study approach was employed, performing a fine-grained analysis of a drought crisis, which resulted in the adoption of desalination technology in the Eden District Municipality (EDM) of South Africa. The study focused on the towns of Sedgefield and Knysna in the Knysna Local Municipality (KLM) of the EDM, asking the critical questions of ‘what, how, by whom, why and to what end was desalination technology adopted?’Posed so as to inform the broader aim of interrogating the apparently 'neutral' crisis-solution consensus, as reflective of an E.M. logic. Furthermore, this interrogation involved two central objectives firstly tracing the dimensions, instruments and process through which this consensus was manufactured, and secondly countering this apparent naturalisation through examining the underlying metabolic relations constituting both crisis and solutions. In other words, as a complete project, the thesis was concerned with firstly considering what is framed as indisputable, secondly examining the process of its solidification, and thirdly interrogating this naturalisation - of both 'nature's crisis' and a capitalist growth logic, centralising technological innovation in responding to 'crisis. Therefore in this sense the thesis movement was twofold, firstly examining the dimensions of depoliticisation and secondly countering this with an 'analytical repoliticisation'. Whilst this movement is not an act of 'politics' in the sense that consensus is disrupted, it does aim to contribute to this project, through offering an analytical reflection on the political difference – understood as the difference between the institutionalisation of an ecological modernisation logic and the absent ground upon which this is constructed (the absence of a given foundation).
The theoretical strands drawn upon in carrying out this thesis project were a blending of post political theory, drawn on to inform an analysis of the techno-managerial orientation of the crisis and solution adoption, including the process and dimensions of consensus manufacture; and a largely Marxian relational ontology, drawn on to examine that which is simultaneously produced and foreclosed by the logic. Specifically, the empirical study was divided into five parts undertaking an examination of 1) the drought crisis narrative informing technological adoption; 2) the historical-material dimensions of drought emergence; 3) the process and mechanisms through which consensus was reached, including the ways desalination functions as both solution and opportunity for various stakeholders; and finally an evaluation of technology adoption in two parts, focusing on on 4) the relationship between funding assembly and project assembly, and 5) the consequent problems emerging out of the solution implementation.

In the next section the thesis findings will be presented. This will be followed by a reflection on the thesis contributions and potential future research.

9.2 Thesis summary and main findings

Chapter 2: Conceptual Framework

I begin this discussion by briefly revisiting the theoretical resources drawn upon in informing the empirical examination of the desalination adoption in the KLM. It was explained that the thesis is concerned with interrogating the apparently neutral crisis-solution consensus by firstly tracing the dimensions, instruments and process through which this consensus was manufactured, and secondly counteracting this apparent naturalisation through examining the underlying metabolic relations constituting both crisis and solutions. This reading was supported by the use of post-political theory and a relational ontology – predominantly a Marxian dialectics - respectively.

Beginning with the former, it was explained that the key thinkers of the post-political thesis share the view that the current era is defined by a politics of consensus around the non-negotiable inevitability of capitalism and contemporary forms of democracy, that is the naturalisation of these as conditions of necessity (Žižek 2009; Swyngedouw 2009: 609; Wilson et. al, 2014: 3-6; Blühdorn, 2014: 149). Achieved through the displacement of contestation by consensual mechanisms of techno-managerial planning,
administration, science, expert knowledge, stakeholder participation and good governance (Swyngedouw 2010: 225; Swyngedouw 2011: 371–2; Wilson et. al, 2014: 3-6; Reynolds et. al, 2014: 51-52). Furthermore it was explained that the basis of this analysis, of the age of consensus, is a shared post foundational ontology, meaning that they begin from the position that all social orders are contingent, therefore there is no essential ground upon which they rest. With the corollary that all attempts at grounding the social order, at naturalising this order, should be understood as attempts to conceal its always absent ground, as the political (Reynolds et. al, 2014: 52). Hence, the value of this post-foundational ontology in informing the study carried out here, is its insistence on an interrogation of the processes and mechanisms through which a given consensus comes to be naturalised. That is, highlighting that this 'naturalisation' is produced and functions to deny the political.

I then moved on to consider the implications for this argument for the specific focus of this study, which relates to the treatment of ecological crisis. It was explained that contemporary environmental politics is defined by the reduction of environmental crisis to a question of techno-managerial and behavioural innovations (Swyngedouw 2009: 604; 2007: 18; Swyngedouw, 2010a: 225; Reynolds et. al, 2014: 49; Blühdorn, 2014: 149). Furthermore, it was suggested that this reduction rested upon the neutralisation of the institutions of modernity- including the market, industrialism and technology (Foster et. al, 2010: 253-254) –, and the ideological neutralisation of ‘the natural’ (Williams 1980). Hence, in following a post foundational analysis, it can be seen that this contemporary treatment of the environment, is a fervent expression of post politics, as an advanced form of consensual politics. That is as a denial of contingency, a neutralisation of modernisation and 'nature', and a reliance on techno-managerial solutions. With the consequences being firstly that the ontological contingency of both 'capitalism' and 'nature' are foreclosed, and secondly that notions of 'crisis' and 'scarcity' are separated from existing relations of capitalism, depositing these into the container 'nature' instead, presented as ontologically independent of these relations (Moore, 2014b: 3). In other words the post-political obscures the actually existing relations through which the environment emerges. It is this implication of the post-political condition, that informed the conceptual framework, as a blending of post-political theory and a relational ontology.
That is, following a reflection on the consequences of post-politicisation as obscuring the historical-material dimensions of the problem - it was argued that a relational ontology would function as a valuable response to contemporary depoliticisation and compliment the analytical insights offered by post-political theory. Firstly by replacing the 'naturalisations' upon which post-political consensus is constructed, with a relational conception, and secondly by enabling an analytical repoliticisation of environmental crisis by supporting a historical material analysis of the dimensions producing the problem and of the consequences of solution implementation. Overall the value of a relational ontology in informing this study, concerned with interrogating a crisis-solution consensus, was in supporting an analytical repoliticisation of the tendency toward depoliticisation operating in the treatment of ecological crisis and solution. The essence of the ontology is to critique the denial of historical relations between humans and the rest of nature. Countering this with an approach premised on relations rather than ‘products’. Thereby demolishing the neutralisations of the existing order as inscribed fictions to be replaced by more complex analysis and interpretation of the emergent environment.

In tracing the underlying relations constituting both crisis and solutions, Marxian dialectics – as a mode of thought that challenges an externalised method of problematisation, locating responsibility for change within internal systemic relations - was adopted as the relational ontology most strongly informing this study. This is because a Marxian analysis understands capitalist metabolism to be historically distinctive because relations between humans and non-humans is an exchange value relation above all else, due to capitalism’s basis in surplus accumulation (Smith, 1984; Smith & O’Keefe, 1980). Therefore, arguing that to theorise “society–nature relations in abstraction from processes of capitalist accumulation is to miss a vital aspect of their logic and consequences” (Castree, 2002:123). The implications of this philosophy, for interpretations of socio-ecological crisis is to understand problems as internally constituted and therefore as emerging from the inner contradictions of capitalist metabolism.

In sum, within this thesis, it was held that the empirical value of blending post-political theory with a relational ontology was that it supported on the one hand an examination of the processes and mechanisms of contemporary depoliticisation, specifically the
The manufacture of consensus on drought and desalination, and on the other end, an examination of the materiality of drought and desalination adoption, as historically informed and contingent.

Chapter 3: Research Methodology
The data collection method adopted in this study was a broadly ethnographic approach, employing qualitative methods for data collection (McCoy and Richards, 2006). Specifically the research focused on two case study sites, namely Sedgefield and Knysna, both within the KLM, and involved three periods of lengthy (2-3 months at a time) field visits to the towns. Whilst a number of towns within the EDM were declared Local Disaster Areas in November 2009, resulting in the release of disaster funding and the predominant adoption of desalination technology, the study was limited to these two towns to enable a deeper inquiry. This in-depth study is supported by a selection of primarily qualitative methods for data collection and interpretation. These methods are deemed appropriate as they enable an unpacking of the meanings and consequences of technological development, locating the research within a fine-grained investigation of human nature/non-human nature/technology interaction (Guy and Raikkonen, 2011:9).

In total the research was carried out over a period of 11 months from October 2011 to August 2012. During this time, I engaged in three main phases/periods of deep immersion in the field settings, each lasting for a period of 7-12 weeks. During these periods I undertook semi-structured interviews, document analysis and participant observation with stakeholders involved in the crisis response and technology adoption. The semi-structured interviews were conducted with registered interested & affected parties (I&AP according to the formal Environmental Impact Assessment process); municipal officials; politicians; and representatives of relevant departments engaged in the drought response including the Department of Water Affairs, the Department of Environmental Affairs, and the Disaster Management Centre. Participant Observation was carried out at a range of meetings and forums - including meetings of the local water forum, and Municipal committee meetings – and also involved site visits to view the desalination technology and the water infrastructure in both towns. In addition, extensive review of secondary document sources was undertaken, emerging as a vital source of data within this research. These sources included a wide range of written and visual material, including municipal publications, consultant reports, official rainfall
and water production statistics; water and network distribution maps; newspapers and magazines; website pages; records of meetings, including council and portfolio committee meetings; as well as internal communication between various stakeholders – this included internal memos and emails.

While the majority of the fieldwork was carried out within the 2 towns, interviews were also held in the neighbouring town of George and the City of Cape Town, in cases when the interviewee was based in the city. The fieldwork immersion periods were interspersed with briefer periods of data reflection and analysis, when I returned to Cape Town. These periods were deemed valuable for its capacity to allow me to identify any gaps and errors in the data and consequently address these. The approach adopted allowed me to pursue supplementary questions at each of the following fieldwork immersion stages. This was further supported through relationship development with key informants and research networks over the course of the process.

Chapter 4 – The Representation of Crisis

In this chapter, the first of the chapters focusing on the findings of the empirical study, the notion of the 'conceptual capture of nature' and the role it plays in restricting spaces for debate on the best response to a drought was taken up. Specifically the analysis was concerned with firstly capturing the concepts of drought advanced and secondly pointing to the presence of actor relations and forces engaged in influencing the dominance of certain representations over others, that is by examining the process and resultant products of representation (Castree, 2014: 37). Showing that 'drought' is constructed as opposed to an ontological given and at the same time reflecting on the what, how, whom and why of certain conceptions over others (Demeritt, 2002: 778) In other words, this particular chapter, drew on post-political theory in mapping the process, actors and mechanisms engaged in the ideological neutralisation of drought as 'the natural', specifically as 'nature's crisis'.

To begin with, what emerges in reflecting on the dominant narratives of drought is that the drought was represented as an 'act of nature' operating in a space external to social influence, and as sudden and devoid of history. At the same time drought was described as a 'slow-onset' disaster. However, these conceptualisations of drought as both 'sudden' and 'slow-onset' were united in conceiving of the drought as a deviation from the
'natural norm', an inexplicable, acting out of nature. Furthermore, 'climate change' was referenced as a central factor informing crisis. Hence, implying that the notion of a disruption of the 'normal' or 'balance' of 'nature' was now operating within a wider shift in global climatic patterns, requiring a longer-term transformation in the relation to nature. Overall, the dominant narrative functioned to centralise a 'sense of urgency’, to avert and revert the deepening of an externalised crisis.

In relation to this threatening conception of nature, it emerges that a number of forces were engaged in producing a drought narrative and solidifying the drought response. These included the role of local associations, the selective employment of particular representations of forecasted growth and water demand, the mobilisation of institutional forums; and the employment of exceptional environmental and disaster management legislation. Interestingly, with respect to the latter, it emerges that a major challenge faced in the drought response “was the non-uniform usage and diverse interpretations of the term ‘drought’” (Holloway, A. et. al, 2012, p. 15). It is argued in this chapter that these multiple conceptions and ‘misconceptions’ of drought were overcome through the legislative ‘making of drought’ through utilising both disaster management and environmental legislation. Thereby resulting in the collective official recognition of drought as a ‘disaster’; followed by the release of emergency funding, and the bypassing of lengthy environmental authorisation, made possible through this codified ‘capture’ of the meaning of drought.

Finally, after presenting the dominant representations of drought and the key moments by which this narrative took root, the chapter concluded by looking at the 'mediums' that were employed in communicating the drought narrative to the ‘public’, and consequently widening and deepening its roots. It was shown that to disseminate the dominant message, the KLM made use of a number of different methods including public meetings, engagement with influential local associations and individuals, the distribution of information leaflets & brochures, media releases, the printing of a water use ‘thermometer’ (update) in local newspapers, official statements and reports, and the development of a risk rating.

In sum, the chapter argued that the act of ideological construction of a 'drought crisis' functioned to foreclose contingency, by insisting upon the indisputability of drought as
threat. Thereby reducing the challenge to a question of the best techno-managerial responses to be adopted. Resulting in a politics of expert management without any acknowledgement of underlying historical-material relations informing the drought emergence, presenting the crisis-solution process and consensus as indisputable and rational beyond question. In other words, it was shown that the representation of drought was post-political, in the sense that it was reflective of the dominance of processes and mechanisms directed toward the conceptual capture of drought in informing the drought response, functioning to obscure the relational ‘becoming’ of drought.

Chapter 5: The Historical-Materiality of Crisis

In the previous chapter it was argued that the conceptual capture of ‘drought crisis’ served to obscure the actually existing relations through which the drought emerged. This chapter was focused on countering this foreclosure by examining the metabolism of drought as a historical relational process. In locating the study in this way, the chapter drew on a fairly common tactic used by urban political ecologists (UPE) to question the naturalisation of notions of crisis and scarcity (Bakker, 2000, 2004; Castree, 1995; Castree and Braun, 2001; Kaika, 2003; Wisner, 2003; Swyngedouw, 2004; Linton, 2004; Murray, 2009; Mehta et.al, 2010). This questioning involved a tracing of the historical-materiality of drought crisis and was undertaken in three parts as follows: First the water governance period preceding the drought was examined; second the claim of drought as a sudden unexpected crisis was questioned; and third the represented extent of crisis was brought into question through presenting rainfall and dam level data.

To begin with it was argued that the materiality of the drought crisis extended into the history of water governance in the KLM, at least to the previous water augmentation scheme, developed by Ninham Shand (N.S.) as the consulting engineers at the time, which began in earnest in the latter part of 2004. It was shown that the historical augmentation scheme was itself supported by a crisis narrative; based on the insecurity of water supply to support future development, and the precarious location of the Sedgefield water treatment works (RWTW). In response a scheme was advanced that in combination proposed the (neighbouring) Hoogekraal River as a new water supply source, the construction of a storage dam, and the relocation of the water treatment
works. However, a number of variables coalesced in preventing the scheme implementation, most notably the difficulty to co-ordinate environmental authorisation with funding allocations. Resulting in repeated project delays, an exponential increase in the estimated cost of scheme development, and the eventual cancellation of the project, a few months prior to the drought crisis. Significantly, the implication of the cancellation of the historical scheme was that the identified 'dimensions of crisis' remained unresolved.

In this chapter I show that this implication was central to the materiality of the drought crisis. It is argued, that the drought crisis was reflective of a resurfacing of these historical crisis dimensions. That is, whilst the drought crisis narrative insisted on the emergence of a sudden unexpected crisis, claiming that the Karatara River had dried up due to insufficient rainfall. Further investigation makes apparent that, instead of an externalised threatening nature, the crisis was constituted through a significant increase in demand in the tourist season, despite dramatically reduced rainfall in the months of December 2008 and January 2009, coupled with the problematic location of the RWTW. In other words, continuous extraction coupled with reduced river flow resulted in the increase in water salinity at the RWTW extraction pool, to a level beyond the purification capacity of the WTW, thereby acting as a central trigger of Sedgefield’s water crisis. Hence pointing to the historical continuity of ‘crisis’ and making clear that this crisis was internally constituted, a feature of increasing water demand and infrastructure challenges. However, the 'drought crisis' narrative denies this relation to the historical dimensions of crisis, focusing instead on the threat posed by climate change on future water security.

The chapter compares the represented extent of crisis to data on water availability – focusing on rainfall and dam levels. From this analysis, it is shown that there is an inconsistency between the dominant crisis narrative and the extent of crisis, suggested by an analysis of the rainfall and dam levels. Overall the chapter analysis of the metabolism of crisis is important for showing the drought crisis to be a socio-natural assemblage, rather than an externalised threatening nature. The further significance of the chapter is bringing to light the existence of a representation-materiality gulf, thereby implying that the dominant risk narrative silenced the historical-materiality of drought crisis, and served to exaggerate the extent of crisis. With the corollary that this silence
was essential in supporting the adoption of desalination technology as a necessary security solution against risk. This is a vital finding, as part of an evaluation of the logic of the drought crisis–desalination solution consensus, as illustrative of contemporary modes of ecological governance. Showing that the crisis-solution consensus, supported as indisputable, pivoted on the maintenance of an ideological fiction

Finally the chapter examination of the historical scheme was also significant in showing how failed attempts at constructing solution consensus contributed to the emergence of a new ‘crisis’, and the ways in which these spaces have the potential to unravel from within. That is, through the study it emerges that the period preceding the drought was defined by the active advancement of an ‘engineered solution’, to what was already defined as a water crisis. With the decision-making process for the 'solution’ encased by and orchestrated through ‘expert engagement’ from both the public and private sector, drawing on an arsenal of techno-managerial apparatus. However, this promise, of the ‘techno-managerial fix’, collapsed. Thus prompting the question what made the historical consensus collapse and the drought-desalination consensus succeed. This analysis of the forces engaged in holding the desalination solution consensus in place is continued in the next empirical chapter. Furthermore, in combination, these first two empirical chapters aimed to make sense of the discursive and material constitution of the drought. It was argued that the significance of this was to contribute to an unsettling of claims of 'nature's crisis', as scientifically neutral and an indisputable phenomenon, pointing instead to the foreclosure of its inherent contingency. Deemed an important insight in implying the need to then examine the purpose and consequences of this foreclosure, these questions are also taken up in the remaining empirical chapters.

Chapter 6: The solidification of solution consensus
This chapter examined the movement from crisis to solution consensus. Reflecting on the narrative supporting the adoption of desalination technology, the mechanisms through which solution consensus was manufactured and finally the reasons why the portrayal of urgency was perpetuated in the crisis-solution narrative, that is as a denial of the historical-materiality of crisis. This examination aimed to contribute still further to understandings of the dimensions of consensual politics in practice, exploring the how, whom, what and why of solution adoption.
The chapter showed that desalination technology was supported as essential, offering an insurance policy against the threat of nature and ensuring water supply for economic growth. In other words the dominant narrative of drought as a threat fed directly into the narrative of desalination as an essential solution as a technology of security, overcoming the threat posed by 'nature'. That is they each reinforced each other.

It then proceeded to examine the process and mechanisms through which the solution consensus was solidified. What emerges from this examination is that a complex web of negotiations, presentations, charts and calculations, involving a wide-range of human and non-human configurations, came together in supporting the established consensus on desalination technology adoption. However this took place within the established boundaries of sensibility, defined by the necessity of overcoming nature's threat to protect market growth. Insisting on the necessity of secure water supply for the tourist season, as essential for the economic lifeblood of the towns. In other words, the case of desalination adoption appears to epitomise the post-political condition, where on the one hand there was a heightened emphasis on wide-ranging participation, as groups were encouraged to engage, debate and negotiate, whilst on the other hand there was an emphasis on absolute consensus, defined by an agreement regarding the permitted spaces of disagreement (see Rancière 2010: 144; Kamat, 2014: 79) which ensured that the framework of debate and decision-making did not question the existing neutralisation of market growth (Wilson, Swyngedouw, 2014), and the techno-managerial arrangements mobilised to support this. In particular, it emerged that an essential aspect of the solidification of consensus was the employment of exceptional disaster management and environmental legislation which had the combined effect of neutralising drought as 'nature's crisis' and desalination technology as the indisputable solution. Enabling the urgent release of disaster funding to secure the future of the status quo, as the perpetuation of ensuring water security for economic growth.

Finally in asking the the question ‘Why was desalination technology adopted as essential?’, or in other words, ‘why was the portrayal of urgency perpetuated despite the gulf between the crisis narrative and crisis materiality?’ In responding to this question, it was argued that in parallel to the transition from crisis to solution, a more fundamental transformation, from crisis into opportunity, was underway. That is, it is argued that the reason for the maintenance of the gulf, insisting on the indisputability of
crisis and solution representations, was the objective of maintaining demand for security related technological solutions through maintaining a sense of risk. Thereby translating crisis into opportunity. Specifically, treating ‘nature’ as a direct accumulation strategy in itself (Smith, Accumulation: 2, 5). In the case study, it emerges that the private interests, ‘selling’ desalination as the solution, had been promoting the technology to municipalities in the years preceding the ‘drought’. However, access to the municipal market remained largely impenetrable until the drought crisis intensified the sense of threat and risk, thereby supporting the necessity of desalination as guaranteed security.

**Chapter 7: Tracing funding assembly and project assembly: Part 1 in the evaluation of the solution**

In the preceding chapter it was shown that the maintenance of an atmosphere of urgent threat, resulted in the mobilisation of exceptional mechanisms of consensus manufacture in the KLM, and the consequent release of funding for desalination. In other words, justification for funding the 'security technology' depended on the maintenance of a narrative of risk, and its associated idioms of threat, emergency and disaster. Whilst this analysis would seem to suggest that the release of funding lead to the unproblematic implementation of desalination. This and the next empirical chapter, developed in combination as an evaluation of the technology adoption, show that the basis of the funding release - that is as pivoting on the ideological fiction of an externalised crisis of 'nature' - consequently influenced the particularity and conditionality of funding release. Which in turn informed project development and ultimately the challenges faced during and post project development. This chapter focused on the issue of funding assembly and its impact on project assembly. With the final empirical chapter considering the problems which emerged out of the solution.

Specifically this chapter was concerned with presenting the funding sources for the desalination plants in both Sedgefield and Knysna, and reflecting on the ways in which the complex avenues and logic through which funding was assembled came to influence the specificities of project assembly. It was argued that, far from being a ‘neutral’ enabler of project advancement, the motivations and mechanisms through which money was released had a direct bearing on the form of project ‘assembly’. It was possible to extract a few key variables that were central in informing ‘money flows’ in both towns,

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265 Alongside the traditional treatment of ‘nature’ as a source to fuel industrial society or an obstacle to be overcome within capitalism
and relationally project development. These included, 1) an initial uncertainty on the source and/or amount of money available; 2) conditionality to spend within a given time-frame or risk losing the money; 3) conditionality to spend on selected identified projects or risk losing the money; and finally 4) delays in the transfer of the funds, creating a cash flow challenge for the KLM. All of these constraints placed on money flows - defined by delays, uncertainty and conditionality - were outcomes of the 'crisis as risk' and 'solution as security' narratives - and its legislative solidification through disaster and environmental legislation. As the solidification of narratives had the effect of making disaster funding available and accelerating environmental approval, however the insistence on urgency, emergency, disaster introduced constraints of its own. With the consequence of directing what was spent on, when, and how much.

In sum, the chapter demonstrates the linkages between the crisis-solution consensus, funding assembly, and project assembly. Aiming to show that whilst the consensus manufacture resulted in the release of funding within a manufactured atmosphere of urgency, this should not be taken to imply an unproblematic movement toward solution development and operation. Instead the absent ground upon which the consensus was manufactured, influenced the dimensions of funding assembly which in turn limited the conditions within which the projects were assembled, influencing the project design, and resulting in problems emerging out of the solution itself, explored in the next (final) empirical chapter.

**Chapter 8: The problems and costs of the solution: Part 2 in the evaluation of the solution**

In the preceding chapter it was argued that a few key variables of funding assembly came to impact directly on the conditions of project assembly. With the result that they coalesced in constricting project design and commissioning. In this chapter I look at the problems faced with the operation of the desalination technology in both Sedgefield and Knysna. This presentation of the project problems, is followed by an examination of the ongoing operational and maintenance costs of desalination to the KLM, despite the inoperability of the technology. In this chapter, the argument of the preceding chapter is developed further, that the problems with the solution were not unrelated to, but instead a symptom of the nature of the solution emergence in itself.
In other words, the significance of this analysis, carried out here of the promise of the desalination technological-fix, is to show that the projects were problematic from the outset, and served to contribute to ongoing costs, despite their in-operability. Fundamentally, it is argued that, rather than being external to the solution consensus, these problems are intrinsically connected to the mechanisms and logic through which the crisis-solution consensus emerged in the first place.

At the same time, through tracing the underlying processes, another significant point which emerges through this metabolic analysis, is the ways in which the matrix of human and non-human relations created accidental, unintended and even counter-effective results (Smith, accumulation: 9). That is, while desalination is concerned with 'remaking' seawater, the study shows that this non-human nature in turn, cannot be exploited indefinitely: it has a materiality of its own which cannot be ignored (Castree, 2000: 29; cf. Bakker and Bridge, 2006: 10).

Overall, the evaluation of the technological-fix shows that instead of transforming the underlying metabolic relations, the crisis-solution consensus operated within and naturalised the dominant relations. Thereby producing artificial solutions that simply shifted the problems elsewhere, creating additional environmental concerns and compounding the overall problem (Clark & Foster, 2010: 147).

### 9.3 Thesis contributions

This thesis was concerned with querying the logic of Ecological Modernisation, through focusing on a drought crisis-desalination solution consensus in the KLM. In what follows I will reflect on the key contributions of the thesis, specifically to a) the conceptual framework adopted in this study, b) understandings of desalination technology as a solution to water scarcity, and c) understandings of the Ecological Modernisation logic more broadly.

#### 9.3.1 Contributions to the conceptual framework

Beginning with a reflection on the thesis contribution to the conceptual framework. It was explained that the interrogation carried out of the crisis-solution consensus was conceived of in two parts. Firstly it involved a tracing of the dimensions, instruments
and process through which this consensus was manufactured, to be supported by the use of post-political theory. Secondly it involved a countering of this naturalisation through examining the underlying metabolic relations constituting both crisis and solutions, supported by the use of a relational ontology – predominantly a Marxian dialectics.

With respect to the former, the study showed the ways in which the drought crisis was reduced to the question of the best techno-managerial solutions required. Specifically showing that this reduction was achieved through the employment of a range of institutional and legislative mechanisms, expert knowledge, science and technology, representational materials, and public participation. Which came together in solidifying the neutralisation of economic growth, 'nature's crisis', and the consequent adoption of desalination technology, to ensure water security, as indisputable. With the consequence that the historical-materiality of crisis emergence was silenced. It was also argued that this was a necessary silence, as support for a security technology, including the release of disaster funding, relied on the maintenance of a narrative of an externalised risk. Hence, the contribution of this study, to the post-political framework, is to offer a detailed grounded analysis into that which comes to be treated as indisputable, the processes and mechanisms through which this indisputability is solidified, how this functions to hold existing social orders in place, and the logic and consequences of this denial of contingency. Specifically the ways in which the post-political condition in practice serves to obscure the actually existing relations through which the environment emerges.

In tracing the underlying metabolic relations constituting crisis and solution, the study firstly shows the drought crisis to be a socio-natural assemblage, rather than an externalised threatening nature. Furthermore, the examination of the historical-materiality of crisis brings to light the existence of a representation-materiality gulf, implying that the dominant risk narrative, essential in supporting desalination technology adoption, pivoted on the maintenance of an ideological fiction. Next in asking the question ‘Why was desalination technology adopted as essential?’. The study argues that this was based on translating crisis into opportunity for the desalination industry and related private interests. Thereby treating 'nature' as a direct accumulation
strategy\textsuperscript{266} in itself (Smith, Accumulation: 2, 5). Finally, through the evaluation of the promise of the desalination techno-fix it is shown that the desalination solution was problematic from the outset, and served to contribute to ongoing costs, despite their in-operability. Fundamentally, it is argued that, rather than being external to the solution consensus, these problems are intrinsically connected to the mechanisms and logic through which the crisis-solution consensus emerged in the first place. At the same time, this evaluation shows the agency of non-human nature, demonstrating that it can not be absolutely dominated as it possesses a materiality of its own which cannot be ignored. Hence, the contribution of this study to an analysis of capitalist metabolism is to show what the dominant logic – resting on a neutralisation of modernisation and nature – serves to produce. In other words, this offers a grounded, detailed reflection into the practices and nuances of the contemporary treatment of ecological crisis and solution adoption, within a logic premised on surplus accumulation.

Overall, while the study was not original in its concern with tracing the dimensions of post politics and capitalist metabolism. It is held that a particular contribution of this thesis is to operate at the interface of theoretical reflection and empirical study, functioning to ground theoretical abstractions. In this respect, the thesis is original in contributing a detailed and nuanced account of these processes in the case of desalination technology as a particular techno-fix in response to perceived threats to water security. Furthermore in blending these two strands in the conceptual framework, it was possible to both trace the manufacture of consensus, as a denial of the political, and to counter this with a tracing of that which a post-political consensus serves to both foreclose and produce. In other words, this theoretical blending supported a more comprehensive analysis of processes of depoliticisation and enabled an analytical repoliticisation in response. Thereby offering an analytical reflection on the political difference – understood as the difference between the institutionalisation of an ecological modernisation logic and the absent ground upon which this is constructed (the absence of a given foundation). The additional implication of this reflection was to challenge externalised methods of problematisation by showing empirically the inner contradictions of capitalist metabolism, and how this functions to produce a perpetual, internally constituted, problem-solution cycle. Importantly, the study also contributed

\textsuperscript{266} Alongside the traditional treatment of 'nature' as a source to fuel industrial society or an obstacle to be overcome within capitalism
an alternative reading to the dominant narrative that „I live in a moment of great opportunity, and great risk“ (New Climate Economy Report: Synthesis, 2014: 14). That is, whilst the study findings concurred with the importance placed in the New Climate Economy Report on the concepts of ‘risk’ and ‘opportunity’, it does so in an alternative way. Showing instead that ‘risk’ is necessarily manufactured - through the conceptual capture of nature and a related denial of the underlying historical-materiality producing ‘risk’ – to create opportunity for surplus accumulation. That is, the promise of technological innovation, is less about meaningful solutions, and more about producing opportunities for the perpetuation of capitalist metabolism.

9.3.2 Offering an alternative reading of desalination technology

A further contribution of this study is to offer an alternative reading of desalination technology. For the advocates of desalination, the sea represents an infinite supply of water, promising to decouple growth from the concerns of depleting fresh-water resources (Swyngedouw, 2013; McCoy, 2014). However, this study moves the analysis of desalination beyond a technical debate by offering a few key insights into the contemporary promotion of the technology and the foreclosures it depends on. Firstly, the study shows that the promise offered by the desalination techno-fix functions to obscure the historical-materiality of water scarcity and crisis, depositing these into the container nature instead and leaving the assumptions of water demand unchallenged. Furthermore it is shown that this denial of the metabolism of scarcity and crisis means that the technological adoption pivots on an ideological fiction. Finally it was shown that the maintenance of this fiction is essential to maintain demand for the technology.

In other words the study of desalination shows that rather than being neutral, a-political ‘things', technology and technological choices can be understood to reveal or disclose contemporary metabolism. This is not to suggest a form of technological determinism but to say that socio-natural relations can be understood through an examination of technology and choices of technology as both mediators of and the materialised expression of these unfolding relations (Harvey, 2010b:88)\textsuperscript{267}.

\textsuperscript{267} This academic study of (the history of) technology, undertaken as a theoretical engagement with processes of social transformation, was arguably pioneered by Marx (Harvey, 2010a), theorising the forces driving technological choices and why capitalists fetishise technologies (machinery in particular) and new organisational forms as the ‘fix’ to emergent problems (Harvey, 2010b:88).
“Technology reveals the active relation of man to nature, the direct process of the production of his life, and thereby it also lays bare the process of the production of the social relations of his life, and of the mental conceptions that flow from these relations” (Marx:493 in Harvey, 2010a:192).

Finally, it is also argued that this is a necessary and timely study, due to its contribution to examining a largely un-researched technological-fix in South African municipal water governance. In other words, given the recent rapid growth of desalination adoption in the South African municipal sector, as a direct outcome of the EDM drought crisis, the research responds to a current dearth of research asking the critical questions of ‘what, how, by whom, why and to what end is the technological uptake expanding?’.

9.3.3 Offering an alternative reading of an ecological modernisation logic

A further contribution of this study is to offer an empirically grounded and detailed reflection into the rationality and efficacy of an Ecological Modernisation (E.M) approach. E.M. advocates moving deeper into capitalist modernity as the rational, indisputable path. Defined by its concern with good governance, scientific and managerial enterprise, models of ‘participation’, and technical instrumentation and legislation. However, the analysis carried out in this study, shows that, rather than being rational, this logic results in a deeper movement into crisis, in the form of a perpetual crisis – (pseudo) solution cycle. The study findings support Smith's (2009) argument that the significance of ‘green capitalism’ is profound, as it has become nothing less than a major strategy to intensify the penetration of nature by capital, and where there is no solution to the environmental problem, it is simply moved around (Smith, Accumulation: 2, 5). This insight into the logic and consequences of green capitalism, as the latest incarnation of capitalist metabolism, is deemed a vital contribution. Especially as it contests the conclusions of the recent New Climate Economy Report (2014) which argues for deepening of an E.M. logic as the solution to environmental and economic sustainability.
9.4 Future research

This thesis offers a partial contribution to an examination of post political processes and metabolic relations in the constitution of the contemporary environmental condition, directed by a green growth agenda. Furthermore, it only begins to reflect on the promise of the techno-fix that is desalination technology. Additionally, whilst recognising that a relational approach begins with the premise that all social projects are ecological projects and vice-versa (Moore, 2011b: 3). Succinctly captured by David Harvey (1993) in the statement, "in the final analysis (there is) nothing unnatural about New York City" (Harvey,1993: 28). This thesis has not fully succeeded in extending the analysis of ecological crisis, beyond the traditional symbols of the environment.

Based on these limitations of the thesis, it is suggested that a number of fruitful future research agendas could be pursued, as an extension of the findings within this study. To begin with, in advancing studies into the post political condition, there would be an opportunity to carry out further in-depth grounded studies into the actually existing ways in which green growth and green technologies come to be institutionalised in different places and times. In the case of this study it was shown that desalination technology adoption relied on a sense of threat, risk, urgency, and its range of associated idioms. That is, an opening up of the municipal market was dependent on a narrative of necessity. It would be valuable to examine more concretely the distinctive ways in which this institutionalisation takes place in other settings, and furthermore to utilise these grounded insights to undertake a mapping of the logic, foreclosures, processes, mechanisms, and consequences of the institutionalisation of contemporary environmental politics, and its technological instruments. It should be added, that this focus on environmental politics should be understood as an analytical strategy, as a containment of the study focus to enable and support easier comparability. However, that this information should be used to inform understandings of contemporary depoliticisation more broadly. A further point, relating to studying the post-political condition is the need to dedicate more analytical energy toward capturing and understanding moments that serve to destabilise this established consensus, as opportunities for rupture and change, be these in the form of explicit acts of politics or more subtle moments with the prospect of transforming the police order, in the Rancierian sense. Whilst this study attempted an analytical repoliticisation, this did not
involve a reflection on spaces of politics. This would present another important avenue for future study into the post-political environmental condition.

Next, in considering the examination of capitalist metabolism carried out here, two issues stand out as important related themes for future study. Firstly, in this case study analysis it was shown that the adoption of desalination technology contributed to an intensification of the penetration of nature by capital. However, whilst the actors involved in the promotion of desalination in the EDM case are active industry players at a global scale, the study fell short of offering an examination of the desalination industry more broadly, in order to deepen this analysis of the treatment of nature as a direct accumulation strategy. This presents another avenue for future research. That is, a study explicitly focused on the global desalination industry suggests an interesting entry point into considering how the contemporary 'production of nature' is transforming. Where capital accumulation is facilitated not only by the traditional 'production of nature', where non-human nature is treated as an exogenous set of material properties’ extracted to fuel production (Smith, 2009: 13, 14, 17), but also where capitalists are able ‘to take hold of and transform natural production’ (Smith, 2007: 15). This study, directed by the above objective, would then move beyond detailed individual case study analysis, focusing instead on a wider mapping of the industry, looking at dominant industry players, market share, market growth, market drivers and restraints, promotion strategies, funding strategies and sources, and more.

The related theme, that would benefit from further study, is the suggestion that there was no solution to the environmental problem, it was simply moved around (Smith, Accumulation: 2, 5). It is significant that this conclusion is supported by existing theoretical resources, largely informed by a Marxian analysis. However, it is suggested that there is still room to commit to a research agenda dedicated to firstly contributing grounded analysis of the actually existing ways in which a capitalist metabolism functions as a circular destructive logic. And secondly to bringing these insights into conversation, both with each other and with the existing, already extensive, theoretical resources. This is understood as important both as a research agenda and a political agenda, to concretely counter and discredit the dominant win-win argument.

268 With David Harvey notable as one of the most prolific contributors to this analysis.
Finally, it has already been suggested that given the recent rapid growth of desalination adoption in the South African municipal sector there is a current dearth of research asking the critical questions of ‘what, how, by whom and to what end is the technological uptake expanding?’. This study already began to fill this gap, however there would be the potential to extend this study, by continuing to examine the developments in the case of the KLM, and looking at other South African coastal municipalities, beginning with those in the EDM. This would be an important contribution to examining a largely un-researched technological-fix in South African municipal water governance. Furthermore it would present the opportunity to deepen the reflection, begun here, into the rationality and efficacy of dominant global environmental policy, guided by an Ecological Modernisation (E.M) approach, advocating a more potent cocktail of environmental protection with economic growth, as a response to ecological crisis. Already in the case of the KLM, a recent update received on the Sedgefield Desalination plant further reinforces the argument developed here on the circularity of the logic, serving to move the crisis around. Specifically in Chapter 8 it was explained that the proposed solution to the problems (with the solution) with the inlet system of the desalination plant was to drill boreholes in the adjacent car-park. In a report received in April 2014, it was stated that,

“The Desal plant operated until the sea abstraction wells were damaged by heavy seas in mid 2011. Some new boreholes were then drilled … as the source of sea water … However, I understand that the use of water from two of these boreholes … has created a problem at the Desal plant, such that the plant is no longer functional as a source of potable water for Sedgefield” (WLWF, Letter to MM, Sedgefield water concerns, 8 April 2014).

This recent status update lends more substance to the argument advanced in this thesis of the false promise of a win-win solution. And points to the importance of undertaking detailed historical-material analysis. Finally, this examination would also present the opportunity to look more explicitly at the water-energy nexus, as a central issue in the case of desalination technology, with energy costs making up more than half of the cost of producing potable water from the ocean (Herndon, 2013). This theme was only
touched on in this study, and would present an important aspect for future examination, as part of an evaluation of the 'logic' of the desalination techno-fix.

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269 by looking at the operational and maintenance costs of the desalination plants in the KLM
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Appendix I: Demographic profile of the KLM

The KLM has the fourth largest population in the EDM, with 65,043 people in 2007. Of this number 25.6% were children, with the working age population (15-64) accounting for 68.6% in 2007. With respect to racial grouping, the breakdown in 2007 (latest census figures) was as follows: Coloured: 28,806; Black: 22,773; White: 13,203; and Indian/Asian: 261 (Knysna Municipality Annual Report 2009/2010, 2011).

In 2004, Knysna contributed approximately 11% of the Eden District’s GDP. In 2003/2004, the economy of Knysna grew at 5% per annum, but has averaged between 3% and 4% in the years between 2000 and 2004. The largest contributors to the economy were Finance and Business Services (26%) and Retail and Wholesale Trade (25%). Manufacturing (12%) and General Government Services (11%) were also major contributors (Knysna Water Services Development Plan, update 2010/2011, 2011: 13).

The socio-economic situation in the Knysna Municipality area has stark contrasts. The population consists of a minority of wealthy residents and a majority of poorer residents. It was reported in the Knysna Municipality Integrated Poverty Study in 2004 that some 46% of low-income households living in the municipal area are affected by poverty. Furthermore, there continues to be a strong correlation between poverty and race, with black and coloured populations among the poorest residents. The large majority of poorer residents within the town of Knysna are concentrated in Hornlee, on the Eastern side of the town; and the Northern Areas, which include Flenters, Robololo, White Location, Jood se Kamp, Concordia, Endameni, Nekkies, Dam-se-Bos, Oupad. Similarly in Sedgefield the correlation between race and poverty is strong, with the majority of poorer residents concentrated in the area to the East of the town, named Smutsville and Sizamile. Hence, despite the end of legalised segregation, the poorer settlements continue to function as segregated townships, housing predominantly coloured and black residents, and receiving basic service delivery. In addition the towns of Rheenendal and Karatara also house the poorer population within the KLM (Knysna Water Services Development Plan, update 2010/2011, 2011: 13).

The table below gives the income distribution of households as a percentage of all households. The figures are based on the Distinctive Choice (2007) survey. The R 801
to R 1 600 is by far the largest income group. The numbers are shown graphically in the graph below.

**Table: Distribution of households monthly income levels as a percentage of all households:**

<table>
<thead>
<tr>
<th>Settlement Type</th>
<th>&lt; R400</th>
<th>R401– R800</th>
<th>R801– R1600</th>
<th>R1601– R3200</th>
<th>&gt; R3200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knysna Group</td>
<td>11,59</td>
<td>11,59</td>
<td>32,21</td>
<td>26,38</td>
<td>18,24</td>
</tr>
<tr>
<td>Sedgefield Group</td>
<td>6,62</td>
<td>10,00</td>
<td>32,21</td>
<td>23,77</td>
<td>27,40</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Settlement Type</th>
<th>Eligible Workforce (19-65yrs)*</th>
<th>Permanent Residents without jobs</th>
<th>Formal Sector</th>
<th>Informal Sector</th>
<th>Work for private person</th>
<th>n/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knysna Group</td>
<td>54 651</td>
<td>23 334</td>
<td>15 244</td>
<td>11 684</td>
<td>3 637</td>
<td>751</td>
</tr>
<tr>
<td>Sedgefield Group</td>
<td>14 204</td>
<td>6 524</td>
<td>3 844</td>
<td>2 478</td>
<td>1 251</td>
<td>107</td>
</tr>
</tbody>
</table>

With respect to water supply, the KLM Water Services and Development Plan of 2010 states that all residents are provided with a ‘basic water supply’, according to that prescribed within the National Water Act. That is, access to 25 litres of safe water per person per day, within 200 metres of the household. This provision is given as part of South Africa’s Free Basic Water policy, which requires Municipalities to provide 6kl of water per household per month. According to a DWA official quoted in Muller (2008), the rationale informing the introduction of FBW is the awareness that the “significant number of poverty-stricken people who are unable to afford even the minimal cost
attached to essential water use. Hence, the introduction of the Free Basic Water (FBW) policy as part of the government’s strategy to alleviate poverty” (Muller, 2008).

This same argument is used by the KLM in ensuring the ‘basic water supply’ for all residents at no cost. However, it is also significant that the water provision to the Northern Areas of Knysna continued to be un-metered, with usage within the area determined by measurements available at standpipes that are located within 200m of the users. The reason provided for this is that the usage is thought to be equivalent to the FBW allocation per household. Therefore, according to the finance officer of the KLM, the need to meter the usage is not justifiable from a financial perspective. Furthermore the implication of this is that the FBW amount, as a minimum has become approximately the maximum water consumed by the poorer residents of the KLM. This is supported by the total usage of the unmetered water, as a percentage of overall purified water produced. According to data obtained on the monthly production & losses for the Knysna area; the % of unmetered water is between 10%-15% per month. This is significant given that the large % of the poorer residents of Knysna live within the un-metered Northern Areas.
Appendix II: The lineage of the Hoogekraal Emergency Water Transfer pipeline

As already discussed the previous project also referred to plans to abstract from the Hoogekraal River, however with the stated intention of transferring the water to the proposed Swartrivier Dam (and then to the Ruigtevlei pump station). This project was marred by repeated delays in obtaining relevant environmental and water abstraction approvals, ultimately contributing to rising costs and project cancellation on 31st July 2008, at which point the respective approvals were still pending. This continued to be the status by the time the temporary emergency pipeline was laid from the Hoogekraal River to the RWTW in January 2009.

Given this condition, two significant points on the (dis)continuities between the ‘new’ and ‘old’ scheme emerge. Firstly and interestingly, at least three of the proponents active in the development and advancement of the SSI scheme maintained that the Hoogekraal River had been ‘discovered’ either by themselves or colleagues during the search for ‘new water’, in the face of the ‘drought crisis’. The following accounts of the project development are illustrative of this claim:

“There was nothing coming out of the treatment works, it had been stopped. I then found that there was another river flowing into the Swartvlei.” (Interview RN).

“Nobody ever told anybody that there was a thing such as the Hoogekraal” (Interview AF1).

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270 As part of the ‘Sedgefield water augmentation’ component of the NS scheme
271 The KLM had applied for a water use licence to abstract 1.2Mm³ per annum (60l/s) of water from the Hoogekraal River. With the water to be transferred to the planned 400 000m³ Swartrivier off-channel storage dam, located on the Swartrivier Farm to the east of the river.
272 Firstly the final scoping report had been submitted by NS to KLM on 24 April 2008 for final comment before submission to the DEAT and commencement with the completion of the draft EIA. By the time the entire project was stopped the latter was 80% complete and the project had not been removed from the DEAT’s project list, with the implication that the application could be re-activated with the submission of the draft EIA for DEAT’s consideration. Secondly the reserve determination from the DWAF, as a requirement for the Hoogekraal pumping scheme to proceed, was still unavailable by July 2008 and once again by January 2009.
However the detailed outlining of the preceding water management period – carried out in this thesis - clearly demonstrates that the Hoogekraal river was not ‘discovered’ in 2009, but already featured centrally as the proposed future water source for the town of Sedgefield. Secondly, and further refuting the above claims, a review of internal communication reveals a continuity between the original and ‘new’ emergency Hoogekraal plan, and significantly the ways in which municipal actors as well engineering and environmental consultants were actively engaged in mediating these. This claim of the lineage of the Hoogekraal scheme will be considered below.

**Formalising the Hoogekraal Emergency Water Transfer**

The Hoogekraal Emergency Water Transfer, operational by Wednesday 28 January 2009, was carried out within a climate of crisis, where “it was proposed that certain interventions be very rapidly implemented to prevent interruption to the town’s water supply” (SSI, Hoogekraal Emergency Water Transfer Scheme - Technical details Summary, 4 August 2009). With the scheme presented as one of the immediately available options to augment the water supply to Sedgefield, with the ‘temporary’ overland pipeline and associated pump put into place in January 2009, and used for a number of weeks, until the Karatara River flowed again after rainfall. Two alternative routes for the approximately 3900m long pipeline were investigated; one following the existing P1615 road, and the other following the Hoogekraal River downstream of the weir, traversing the lower contours of the hill, and then rejoining the road. The former route was selected as it was shorter and presented fewer physical and landowner issues. The pipeline was laid above ground as an interim measure with the intention of later burying it, with the pump and motor placed on a portable frame and used to pump approximately 8l/s to the WTW (with an electrical connection secured from a landowner). The KLM was consequently eager to proceed with the formalisation of the scheme by securing a permanent electrical connection; formalising the extraction point for the pump-set and suction intake; placing the pipeline underground; and obtaining environmental approvals.

Set in motion by July/August 2009 the municipality commissioned the services of the environmental and engineering consultants SSI and Aurecon. Following and SSI report, the Aurecon project leader advised the municipality firstly that a Basic assessment report (BAR), to be submitted to the DEAT, was necessary for the formalisation
process. Secondly that the Water abstraction licence application, initiated during the original augmentation scheme, was still on hold as it was dependent on the issuing of a decision from DEAT (August 09; email from CNorman to NP: “Hoogekraal River emergency abstraction & pipeline). Hence as a first step in formalisation the original BAR application “would have to be amended and resubmitted to reflect the current needs of the Municipality (i.e. Emergency abstraction only)” (18 August 09; email from CNorman to NP: “Hoogekraal River emergency abstraction & pipeline).

However, as the entire environmental process, having begun during the historical NS scheme, came to be proverbially ‘exhumed’, the first burning question facing the municipality was on whether to retain or realign the emergency pipeline route in facilitating its authorisation; as portions of the emergency route deviated from the original assessed route. Realignment to fit with the original route would involve a river crossing at the low water bridge which “would be technically simple compared with the formalisation of the existing temporary crossing. Further … the pipe can be anchored to the existing causeway and the possibility of it being washed away is therefore reduced” (18 August 09; email from CNorman to NP: “Hoogekraal River emergency abstraction & pipeline). Whilst the emergency route; seen as the best option by the municipality, was seen as cheaper (with the realigned route)” (24 August 2009; email from JH to NP as a response to CN proposal on 18 August)

However, this process was consequently delayed for at least 2 months, from late August 2009 until end October 2009, with the contract for the Sedgefield Desalination Plant signed during this time on the basis that the implementation of the plant “is considered an emergency procedure in order to address the serious water shortfall that is being experienced due to the severe drought gripping the Southern Cape” (Cape Environmental Assessment Practitioners, 2009). The above presents the question, 'why the formalisation and utilisation of the Hoogekraal scheme was not similarly motivated and pursued?’. The official reasons offered include 1) opposition from

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273 Required from Water Affairs as an independent process from the BAR application
274 Hence the two options available were to either “1) Realign the pipeline to fit with the original assessed route and submit the Basic Assessment with the existing information or 2) retain the emergency pipeline route and commission additional specialist information covering the portion of the route which does not align with the original studies (ecological and heritage – aquatic specialist input may be required depending on the design of the river crossing)” (18 August 09; email from CNorman to NP: “Hoogekraal River emergency abstraction & pipeline).
‘environmentalists’ to use the river as a permanent water source; and 2) the unreliability of surface water (as a continuation of the argument of the impact of climate change on rainfall patterns). However, further analysis of the process of attempted formalisation of the route contests these responses. Showing that the side lining of the Hoogekraal river was influenced by the continued complication with issues related to environmental approval, discussed below.

**Resuming the process – toward a creative resolution of the Hoogekraal question**

On November 1 2009 Aurecon was once again contacted by the KLM explaining the hiatus, somewhat perplexingly, as follows: “Sorry for the delay but this has not been one of the priorities with the drought” (1 November 2009; email from NP to CN). And adding that in response to the original Aurecon proposal (August 2009) “The decision is that I will proceed to bury the pipeline where it does not trigger the Basic Assessment and leave the ends as temporary for the moment. (1 November 2009; email from NP to CN).” However, following the initial hiatus and claim that the project had not been one of the priorities, a notable shift happens. In an email sent by the KLM to the consultants on 24 November 2009 it is stated: “I are compelled to spend the money to bury the pipeline by end of February 2010 to be claimed before the end of Province’s financial year end, March 2010. Do you have a way forward to meet our urgency?” (24 November 2009; Reply from NP to GdW/ Aurecon). Hence a sense of urgency is emphasised, however apparently driven more by efforts to coordinate project development with money flows as opposed to water flows. This emphasis mirrors the relationship between funding and urgency witnessed with both the historical NS scheme and the desalination scheme.

The consultant proceed to communicate with the DEAT on 26 November 2009, with the intention of discussing “the need for an amended approach to the (pipeline) installation as a result of water shortages experienced earlier this year”. It is significant here that while the need for an amended approach was attributed to the water shortages, as shown above, in this instance it was money flows that were driving the sense of urgency. The DEAT recommendation was that it would be possible to regard the activity as ‘not listed’, that is not triggering the need for a BAR, provided that [1] The

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275 As it emerges later this request to proceed with obtaining a BAR on the original route did not imply an intention to realign the position of the emergency pipeline to match the original route.

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alignment follow existing infrastructure, 2] No pump infrastructure be installed and ,3] No excavations of constructions take place within the 1:100 year flood line (or 32M from the River bank). As the recommendation was based on an understanding that the municipality intended to realign the pipeline along the original route this would involve a crossing of the Karatara River at the low level bridge. Hence in order to enable the crossing whilst also meeting condition 3 above; it was suggested by DEAT that a plan to secure the pipe to the existing bridge without substantive construction activities be devised by the consulting engineers. “This would imply that the pipe would have to run above ground either side of the bridge within the 1:100 year flood line (or 32M from the river bank) prior to being secured to the bridge” (27 November 09, reply cn to np in response to 24 November email above). Based on the above DEAT recommendations, and consequent discussion with the consulting engineers to the municipality, SSI, with respect to the proposed “design of the pipeline, which is based on earlier work done by Aurecon for a larger pipe and a dam, while the dam is now excluded and the pipe is much smaller (110mm)” –(15 December 2009 – CN TO JH, NP, KT, DDW, “Please review …”); the KLM proposal was sent by December 2009 to the DEAT to make a determination on whether or not any listed activities would be triggered276277. In requesting a statement on the DEAT’s interpretation of the proposed activity, the communication was concluded with the reminder that,

“As you may well be aware the KLM has been declared a disaster area in terms of the DMA as a result of the current water shortage and your urgent response will thus be appreciated”.

\[276\] as described in GN No R386 and R387
\[277\] The details of the proposal were as follows:
1. A pipe was laid above ground for emergency supply from the Hoogekraal River to the existing WTW adjacent to the Karatara River. The pipeline follows existing roads and has been placed within the road reserve.
2. Knysna Municipality now wishes to bury to pipe to protect it as … negotiations are under way with provincial roads authority … further a submission has been compiled for HWC, and a Water Use Licence application is also being compiled.
3. The pipeline has been installed only for use during emergencies, and due to this no permanent infrastructure is associated with it. Due to its ad hoc use the municipality installs a temporary pump … as and when pumping is required. The pump is removed from the site at all other times…Thus no permanent abstraction point has been constructed. The pipe feeds directly into the WTW
4. As such no pump infrastructure will be installed, no excavations or construction will take place within the 1:100 year flood line(), and the alignment will follow existing infrastructure. With regard to the Karatara River crossing at the low level bridge … It is understood there is no risk associated with this arrangement as, if there was a flood and the pipe was dislodged, it would be at a time when the pipe was not needed due to the availability of sufficient water in the Karatara River
By May 2010 the KLM was informed by Aurecon that,

“Based on the project description provided it appears that DEAT is in agreement that no activities listed in terms of NEMA will be triggered should excavations avoid the 1:100 year flood line (or 32m from the river). Thus no authorisation is required from his department … Thus it appears the pipeline can be buried … bearing in mind that this is dependent on the undertakings given to DEAT … avoid the flood plain; construction to comply with an EMP, … The only outstanding matter relates to the Water Abstraction Licence, which is required for abstraction and not construction. I await the signed form … in order to submit this application to DWA.” (4 May 2010; cn to np)

Given the agreement and conditions attached to the above project, so as to avoid the triggering of a listed activity, it is significant that the stated project description, as provided to DEAT, may not be reflective of the actual municipal plans. (30 November 09, reply jh to cn (cc: kt & np) in response to 27 November email above). From internal communication records it emerges that a pipe realignment to include the river crossing was not planned, but presented in this way so as to obtain permission for the original scheme design in case it is needed in the future. Whilst, in practice, retaining the emergency route.

In sum the Hoogekraal scheme emerges as a complex web, given form through its continuities with the historical scheme, including a continuity in having to engage in a technical ‘juggling act’ in determining the form the scheme assumes and the ways in which it may be formally used. Challenging as reductive official assertions on the unreliability of surface water sources as the primary reason for the marginalisation of the Hoogekraal Scheme. Showing instead that its marginalisation can in part be explained by the technical complexity of achieving its formalisation as a source of potable water. The other reasons for the centrality of desalination have already been

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278 A letter was received by the KLM on 23 June 2011 from the DWA, stating “This letter serves to acknowledge the receipt of your water use licence application DATED 9 NOVEMBER 2010 for Hoekraal River for the taking of water from a water resource. Your application will be assessed to ensure the minimum critical information has been submitted …” (23 June 2011 –DWA TO KM: ‘WATER USE LICENCE APPLICATION IN TERMS OF SECTION 40 AND 41 OF THE NWA, 1998: Hoogekraal emergency water transfer scheme).

279 If declared this would trigger a listed activity, necessitating an EIA. Which the KLM was eager to avoid.
addressed within this study. This finding further supports the study argument that the treatment of crisis has been reduced to highly complex, expert driven, technical-managerial debates and constraints. Whilst retaining the wider consensus on the necessity for growth as beyond dispute.
Appendix III: Desalination Plant Operation

Desalination is the process of removing dissolved matter from brack water or seawater. It involves taking raw water from a source (the sea or groundwater) and subjecting it to a treatment process through which dissolved gasses, dissolved and suspended inorganic solids, dissolved and suspended organic matter, and suspended micro-organisms are removed from the water. The desired result is the production of potable water. Desalination can be achieved using two basic methods - distillation and membrane processes. In this case the membrane process of reverse osmosis (RO) was the desalination technology of choice. The details of the desalination system components in both towns will be presented here, summarised from the technical reports for each of the plants, developed by the consulting engineers as part of the environmental approval process. The process of reverse osmosis is related to a semi-permeable membrane, allowing selective migration of water from one side to the other. By applying pressure to the solute side, substantially greater than the osmotic pressure, water diffuses (against the osmotic pressure) from the solute side to the pure water side (du Plessis et al.).

The Sedgefield desalination plant

The Sedgefield plant is a reverse osmosis (RO) system designed to produce 1.5 Ml/day of potable water, consisting of two 0.75 Ml/d modules, in two separate 12m steel shipping containers, placed at the Myoli Beach parking area. The feed water abstraction and the disposal of concentrate (brine) were designed to be achieved by beach wells. The production of 1.5 Ml/d of potable water from the plant requires the supply of more than twice that amount of raw seawater. The original plant design composed the following elements.

Intake System

Seawater is abstracted from the beach through a well-points equipped with perforated intake pipes and submersible pumps. This water passes through the sand which is a natural filter media. Submersible pumps inside the perforated pipe, and a sub-surface rising main convey the seawater to the desalination plant located about 8 m above the lowest spring low tide level. Additional abstraction points were also installed that could

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280 The description below is summarised from the technical report developed by SSI for the motivation for the Section 24(f)3 Environmental approval process
be equipped in future. A total of 8 well points were installed with 5 of these equipped. All infrastructure at the beach was installed underground.

**Pre-Treatment**

The objective of pre-treatment is to prevent membrane fouling. The proposed pre-treatment in the plant consists of chemical dosing (if and when required), sand filtration and micro filtration.

**Reverse Osmosis System**

The process of RO desalination involves the pressurised flow of raw water through minute pores in membranes, separating the concentrate or brine from the product water. The membranes are typically housed in cylindrical cartridges, containing spirally wrapped membrane sheets. Up to seven of these cartridges can be installed in series in a single pressure vessel. Several of these pressure vessels are then installed in parallel based on the required rate of production. The Sedgefield RO plant is designed to recover 45% of the incoming water as product water. The plant operates at pressures between 63 and 65 bar, and has an allowance for increasing the pressures as the membranes get older. Membrane replacement interval is approximately 5 years.

**Post-Treatment**

The objective of post-treatment is to ensure that the product water is safe to drink, and non-corrosive. In this case disinfection is achieved by the addition of sodium hypochlorite (NaOCl), and the correct pH maintained by controlled dosing of hydrated lime (Ca(OH)2).

**Brine Disposal**

Brine disposal is often referred to as concentrate management. Brine is the salty concentrate remaining on the upstream side of the membranes during the separation process. The brine stream contains higher concentrations of salts and other impurities that may be found in the feed water, and which must be disposed of in safe and acceptable way. In this case, with the plant situated at the coast, brine is returned to the sea through wells on the beach.
Cleaning in Place (CIP)

Cleaning of the membranes is required after approximately 6 months of plant operation. With every CIP, the cleaning agents are mixed up and pumped a number of times through the membrane vessels. The membrane cleaning powder is mixed with approximately 5 000 litres of water, for each of the two cleaning cycles (low pH and high pH). Therefore approximately 10 000 litres of CIP effluent is generated every six months, and this will be transported by tanker to the sewage treatment works.

Shutdown preservation

During extended shut-downs, a preservative is used to preserve the membranes. This is normally a food grade preservative called Sodium Metabisulphite (SMBS), and it will be stored in the chemical tanks after being used, and then disposed of at the sewage treatment works.

Figure Appendix III: Sketch of Sedgefield Desalination Plant

Source: SSI, (2009)
The Knysna desalination plant

The Knysna project comprises two components, namely, the Reverse Osmosis (RO) Plant for water purification, and the boreholes which supply the plant with groundwater extracted at the edge of the Knysna Estuary (Lagoon). Subsurface pipelines connect the six source boreholes with the plant. The plant consists of an intake system, pre-treatment facility, the reverse osmosis units, post treatment system, waste discharge and product delivery systems.

Intake System

Water is abstracted at Loerie Park on the Knysna Estuary, through six shallow boreholes (well-points) equipped with perforated intake pipes and submersible pumps, from where it passes through the sub surface layers which filter out larger particles and organic matter from the water. A total of seven boreholes were proposed with one as a standby. The average borehole depth is 20m. Submersible pumps convey the water in a 300mm diameter pipeline, to the RO plant, located about 300m from the boreholes, and approximately 3 m above mean sea level. It was anticipated at the design stage that approximately 40% to 45% of the feed water will be product water.

Pre-Treatment

A pre-treatment system is used to prevent membrane fouling. This system consists of chemical dosing, sand filtration and micro filtration. The filtration section consists of down flow dual media sand filters, with an air scour and backwash system which discharges to the waste sump. Disposal of this waste is combined with the brine discharge. Further filtration is carried out on the RO units by means of 5 micron cartridge filters which are replaced when necessary.

Reverse Osmosis System

The plant is a single stage high pressure seawater reverse osmosis plant. In this plant, the membranes, separating the concentrate or brine from the product water, are housed in 8 inch diameter cylindrical cartridges, containing spirally wrapped membrane sheets. Up to seven of these cartridges can be installed in series in a single pressure vessel. Several of these pressure vessels are then installed in parallel based on the required rate.

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281 The description below is summarised from the technical report developed by SSI for the motivation for the Section 24(f)3 Environmental approval process.
of production. The Knysna plant is designed to recover 42% of the incoming water as product water. The plant operates at pressures between 60 and 65 bar, with three RO trains operating in parallel. The high pressure pumps are driven by 110kW electrically driven motors, and an energy recovery turbine uses residual energy from the brine stream to boost the feed pressure to the main pumps. Energy recovery is estimated at approximately 25%.

**Post-Treatment**

Post-treatment of the product water is to ensure that the water is safe to drink and non-corrosive. In the plant, it is proposed that post treatment disinfection be achieved by the addition of chlorine which is supplied from the existing chlorine installation at the WWTW. The correct pH and partial remineralisation of the product water will be maintained by dosing with soda ash. The product water will be pumped to the town’s reservoirs and blended with the water from the main water purification plant.

**Brine Disposal**

The disposal system proposed is to discharge the brine into the maturation pond situated at the existing WWTW. The brine would thus be blended with the treated sewage effluent and returned to the estuary with the treated sewage effluent (TSE).

**Cleaning in Place (CIP)**

It was envisioned that cleaning of the membranes would be required after approximately four months of plant operation. With every CIP, the cleaning agents are pumped a number of times through the membrane vessels. The membrane cleaning solutions are mixed with approximately 5 000 litres of water for the pre flush and for each of the two cleaning cycles. Therefore approximately 20 000 litres of CIP effluent is generated every four months. The cleaning effluent can be diluted and returned with the brine to the waste system.

**Shutdown preservation**

During extended shut-downs, a preservative is used to preserve the membranes. This is normally a food grade preservative called Sodium Metabisulphite (SMBS), and it will
be stored in the chemical tanks after being used, and then disposed of at the sewage treatment works.
Appendix IV: A Brief Historical Tracing of South African Water Governance

While acknowledging the existence of pre-colonial governance regimes, this brief historical tracing of water governance will begin with the arrival of the Dutch East India Company, marking the onset of the colonial period and South Africa’s connection to emerging global trade relations. As early as 1652, influenced by Dutch Law, the Dutch Company declared water a public good, giving the State the overall right to control the use of public water. However, this principle was replaced in the early 19th century through the introduction of the English riparian doctrine, thereby permitting the property owners the right to access and to make reasonable use of water from the river adjoining their property. It was only with the apartheid regime that the Afrikaner government challenged the English riparian doctrine and shifted the balance back toward state management of public water, through the Water Act of 1956, vesting in the Minister of the newly formed Department of Water Affairs a large measure of control over water affairs.

The Water Act of 1956 was significant on two counts regarding its influence on the materialised water environment. Firstly, while it (re)introduced the principle of government control over public water, the Act prioritised the interests of the commercial agricultural sector, mandating the Department of Water Affairs (DWA) to allocate water specifically for the development of the sector. This prioritisation was largely a political strategy, as a substantial percentage of the ruling National Party’s (NP’s) support base were commercial farmers. Despite this degree of bias, the prevailing concern was with harmonising water regulations with the interests of all the economic heavyweights, including agriculture, mining and industry (Tewari, 2005:442). In recognising the role of the 1956 Act in codifying this effort, it is noteworthy that the alliance between State and commercial interests in informing water allocation had developed at a much earlier period in South African history. Most notably at the time of the discovery of gold in 1886 which led to the settlement of a large number of prospectors in the mining town of Johannesburg. This then lead to the establishment of the Rand Water Board in 1903 to satisfy demand for water supply and sanitation services in the greater Witwatersrand area (a low mountain range near Johannesburg),
with the consequent legislation granting preferential water rights to mining operations (Funke at al., 2007; Turton et al., 2006).

The second point of influence of the 1956 Act, while shifting the balance back toward state management of public water, was the prioritisation of water provision to white South Africans. Within this Act white South Africans received near universal access to water and sanitation while ‘non whites’ were deprived of these services. However, as with water provision to the commercial sector, this emphasis reflected a historical continuity in that the earlier riparian rights system, coupled with widespread colonial land accumulation, had already resulted in the production of inequitable resource access. However the apartheid government was notable for its explicit codification of racial segregation, extending into all apartheid era public service provision. Therefore the 1956 Act was part of the apartheid architecture supporting the development of racial enclaves defined by ‘connection’ and ‘disconnection’ to housing, electricity, public transport, employment opportunities and social welfare support.

The apartheid policy of segregation also meant that municipalities (white local authorities) were initially established in designated ‘white areas’, and only in 1982 were Black Local Authorities (BLAs) introduced to manage service provision in Black urban townships. However, the BLAs had a limited tax base and virtually no powers and capacity to execute their mandate (Van Donk and Pieterse, 2006:108), leading to rent and service rate increases as their only source of revenue. It was the lack of urban services and increased rent and service rates that sparked township mobilisation and resistance, with strategies ranging from rent to consumer boycotts and attacks on symbols of the apartheid system. These uprisings, initially repressed, spread to a national level by the 1990s (Van Donk and Pieterse, 2006:109), taking hold in the urban centres of South Africa, and has been widely acknowledged as a central force in undermining the apartheid machinery.

The shifting tide of Contemporary Water Governance

With service provision functioning historically both as an instrument in producing racial and material inequity and relationally as a central catalyst for resistance, the post apartheid state was faced with the challenge of extending service provision to all South
Africans as a part of achieving social equity and stability. In this regard, the infrastructural developments achieved have been widely praised. Before 1994 commercial agriculture and forestry accounted for about half of water use in South Africa, with mining, manufacturing and power responsible for about 20%; domestic water supply to mainly white consumers was provided by 16 water boards, and the black population was severely under-serviced (Butler, 2009: 100). With 12 million South Africans without access to clean water and 21 million with inadequate access at the end of apartheid (Hagg & Emmett, 2003: 67; Kasrils, 2004; DWAF, 2005). The Department of Water Affairs and Forestry (DWAF) has since achieved some notable successes, with more than 10 million people given basic access to clean water, and 6.9 million provided with sanitation facilities by 2004 (DWAF, 2005). It is estimated that around 90% of South Africans now have access to a source of clean water, while the remaining 10% continues to access water from unsafe sources, such as streams, dams or wells (Butler, 2009). While the progress reflected in these figures is significant, the actual degree to which they have resulted in materially consequential transformations has been widely debated. Firstly, regarding the actual credibility of the delivery figures and the sustainability of the community water supply schemes, “DWAF ... have been criticised for inflating delivery figures and underplaying the lack of sustainability of community water supply schemes” (Hagg & Emmett, 2003). Accusations have been made that a large percentage of these schemes deliver irregularly or have dried up completely. However these accusations are difficult to verify as there is insufficient reliable information on these schemes (Hagg & Emmett, 2003). Secondly the statistics on access to water and sanitation services conceal the differences in the form of access which cut across class, race, gender and geographical boundaries. A third fundamental challenge is the issue of affordability, as infrastructure alone does not guarantee access to water (Fil-Flynn, 2001; McDonald & Pape, 2002; Xali, 2002; Hagg & Emmett, 2003).

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282 With over 14,000 rural households dependent on rudimentary water sources such as rivers, wells and boreholes (Hagg & Emmett, 2003: 69).
283 Renamed the Department of Water Affairs in 2009
284 The basic standard of water supply was set at 25 litres per person per day, available within 200m from the home, with the medium term goal of 50-60 litres on site per day
285 Wellman (1999) argued that over 50 per cent of the schemes were functioning inadequately, Hemson (2001) referred to a success rate of 33 per cent at RDP level, and Greenberg (2001) cited what he regarded as being misleading numbers provided by DWAF” (Hagg & Emmett, 2003: 73).
These tensions in infrastructure developments also appear in the contemporary water legislation, which emerges as something of a legislative ‘hybrid’ concerned with social equity, resource protection, and economic efficiency. The main water laws are the Water Services Act of 1997 and the National Water Act of 1998\textsuperscript{286} which identify the government as the entity responsible for the sustainable management of water resources for the benefit of all in accordance with the constitution\textsuperscript{287}. The water law also foresees a transformation to a decentralised, participatory form of water governance, with the country divided into 19 Water Management Agencies (WMA). However WMA management bodies, referred to as Catchment Management Agencies (CMAs) are still in the process of being established, with only two currently established and operational. It is envisaged that once established the CMAs will take over the responsibility of water management and allocation, currently assigned to the DWA\textsuperscript{288}, functioning as vehicles for transformation in resource equity\textsuperscript{289}. The contemporary water law is influenced by Dutch Law, to the extent that water is treated both as a ‘public good’ and an ‘economic good’. This emphasis on achieving social equity following the historically explicit (legislated) production of inequity; and on payment for water services supported by the claim that equitable allocation necessitates and benefits from the economic valuation of a scarce resource, has generated a number of political fault lines and linked efforts to mediate these both materially and discursively.

Firstly, post apartheid South African water politics has mirrored trends, especially in the global South, with the development of public-private partnerships and the promotion of water privatisation. However, the last few years have witnessed a retreat by capital as it has encountered difficulties in profiting from water concessions. Despite this, the focus of the South African public sector has remained on economic efficiency in water delivery, thereby supporting arguments that one of the central myths concerning the

\textsuperscript{286} Tewari, 2005; Funke et al., 2007; Brown, 2010; Ziervogel et al., 2010; Herrfahrtd-Paehele, 2010
\textsuperscript{287} However the Water Services Act and National Water Act have established a dual structure of water management and governance, with the responsibilities for drinking water supply and sanitation vested with the local government, while the management, protection and use of the water resources are the domain of the national government (DWA) (Herrfahrtd-Paehele, 2010).
\textsuperscript{288} While the DWA and the future CMAs are identified as the responsible agents for water management and agricultural water use, the Water Service Authorities (municipalities) are responsible for the management and delivery of individual and industrial water use. This allocation of responsibilities introduces a tension between hydrological and administrative boundaries.
\textsuperscript{289} While the CMAs are the not focus of this study, it is noteworthy that their transformative capacity has been questioned, with Brown arguing that they may in fact reinforce inequitable outcomes (Brown, 2010).
advancement of market principles is the notion that it should necessarily be accompanied by the rolling back of state regulation (Bakker, 2010; Loftus, 2005). Secondly, a linked instrument in the treatment of water as an economic good in South Africa is the principle of Cost-recovery. This principle has emerged as central within South African water delivery and has been widely debated (McDonald & Pape, 2002; Naidoo, 2005; Coalition against water privatisation, 2003, 2006; Cottle & Deedat, 2003; Oldfield & Peters, 2005; Loftus, 2005, Koelble et al., 2010). Cost-recovery is supported by a view that resources such as water are scarce and require control over their distribution with a pricing mechanism as the best instrument to achieving this. The suggestion then is that improved fiscal and managerial controls are necessary to solving the crisis of service delivery within South Africa. Furthermore the predominant view within the DWAF was that the ‘rates boycotts’ of the 1980s lead to a sense of entitlement resulting in a ‘culture of non-payment’.

However critics contend that promotion of cost recovery as a necessary solution to municipal budget constraints and resource conservation (Koelble et al., 2010:565), sidesteps the fundamental challenges of unemployment and its relationship to inequality and an inability to pay for services. A number of empirical studies carried out over the last 10 years in South Africa have shown that non-payment is actually related to the affordability issues, high rates of unemployment and service quality (McDonald & Pape, 2002, Xali, 2002, Cottle & Deedat, 2003; Oldfield & Peters, 2005). Faced with growing criticism, full cost recovery290 practiced in the 1990s, has since been adapted with the introduction of Free Basic Water (FBW)291, in October 2000. This most notably followed a severe cholera epidemic in several provinces and cities in the same year, the worst in South Africa’s history, which was linked by many to the policy of full cost recovery (Cottle & Deedat, 2003; Budds & McGranahan, 2003). Free Basic Water (FBW) can therefore be understood as a mechanism adopted to mediate the materialised fault lines of the waterscape. Studies critically examining FBW have written of the paradox of FBW and Cost Recovery showing its effect in increasing household debt and

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290 The concept of Cost Recovery is defined as the recovery of all, or most, of the cost associated with providing a particular service by a service provider (McDonald, 2004: 18). Cost recovery defines water users as ‘consumers’; and commits them to contributing to at least the operation and maintenance costs of delivery (McDonald & Pape, 2002; Smith, 2002; Hagg & Emmett, 2003; Ruiters & McDonald, 2005).

291 A lifeline amount of 6 kilolitres per household per month
municipal financial loss (Oldfield & Peters, 2005), and referring to FBW as the Free Basic Commodity (Loftus, 2005). Drawing on an empirical study in Durban, Loftus shows the paradox presented through the offer of Free Basic Water which, intended to be a universal minimal quantity of water available to all, became the maximum accessed by many of the City’s poor. Furthermore, while the effect of FBW has been to prevent complete disconnection for non-payment, this practice has been replaced by the use of crude technologies directed at restricting water access to the Free Basic Water quantity (Peters & Oldfield, 2005; Loftus, 2005; Schnitzler, 2008). In a study tracing the history of pre-payment technology in South Africa from its initial development as a depoliticising device in the context of the rent boycotts to its contemporary use - alongside the water restrictor and flow limiter – in the context of ‘cost recovery’ and neoliberal reforms, Schnitzler (2008) argues that the history of the technology becomes inscribed within it and the meter has been re-rationalised as an instrument ‘aiding’ residents to calculate and economise their water consumption consequently creating “spaces of calculability”, forcing especially poor Soweto residents to subject their daily consumption patterns to metrological scrutiny” (Schnitzler, 2008).

The Bio-politics and Techno-politics operating along the fault lines of the contemporary South African waterscape, treating water as a ‘human right’ and economic good, surfaced notably in the case of the residents of Phiri, Soweto versus Johannesburg Water. The case was brought to the Johannesburg High Court in 2006 by five female residents of Phiri, supported by the Coalition Against Water Privatisation. All five of the applicants, together with their neighbours had their water cut off, or were persuaded into accepting a pre-paid meter. The Phiri Residents argued that the South African Constitution guarantees their right to water and obliges the state to “achieve the progressive realisation of each of these rights” (Republic of South Africa, 1996). This ‘rights based discourse’ has been mobilised by left academics, social movements and the urban poor alike as an ideological and strategic counter to the treatment of water as an economic good. In April 2008, the High Court ruled in favour of the Phiri applicants concluding that pre-paid meters were unconstitutional and unlawful, and the city should provide residents with fifty litres of water per person per day (above the allocated FBW quota of 25 litres per person per day). However, this ‘victory’ was short-lived as Johannesburg Water immediately appealed the decision, and the Supreme Court overturned the High Court’s decision in 2009, ruling that prepaid meters were not
unconstitutional and that a basic quantity of 40 litres per person per day was sufficient. Finally on appeal the Constitutional Court upheld the Supreme Courts ruling in favour of Johannesburg Water. The case is a powerful illustration of the false antithesis between market principles and the stated goal of human rights, and the ways in which tensions between these principles are mediated. Drawing on this case it emerges firstly that the human right to water does not foreclose private property rights, secondly rights do not guarantee sufficient access as the legal/institutional framework can be constructed in a way that further restricts citizenship and inclusion, furthermore the framework is limiting in focusing only on the right to drinking water as opposed to wider aspects of water resources, land and integrated socio-ecological dimensions.
### Appendix V: Interview list

<table>
<thead>
<tr>
<th>No</th>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Town</th>
<th>Interviewee Position/role</th>
<th>Transcription Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>09 November 2011</td>
<td>10:30am</td>
<td>Interviewee's Home</td>
<td>Sedgefield</td>
<td>Interested &amp; Affected Party</td>
<td>Not transcribed as interview was scattered and focused on many themes including the Water Forum, the floods in Sedgefield, Desalination and public participation especially of retired engineers from Sedgefield. None of these especially deeply. However the information gleaned from the interview was used as a starting point to begin to think of the themes to explore in more depth (Have the recording)</td>
</tr>
<tr>
<td>2</td>
<td>10 November 2011</td>
<td>16:00pm</td>
<td>Interviewee's Home</td>
<td>Knysna</td>
<td>Interested &amp; Affected Party</td>
<td>Transcribed</td>
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<tr>
<td>3</td>
<td>11 November 2011</td>
<td>10:30am</td>
<td>Consultant's Office</td>
<td>George</td>
<td>Consultant</td>
<td>Transcribed</td>
</tr>
<tr>
<td>4</td>
<td>15 November 2011</td>
<td>10:00am</td>
<td>Interviewee's Office</td>
<td>Knysna</td>
<td>Municipal Official</td>
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<tr>
<td>5</td>
<td>15 November 2011</td>
<td>2:30pm</td>
<td>Interviewee's Office</td>
<td>Knysna</td>
<td>Academic – SUN/UCT/Other</td>
<td>Transcribed</td>
</tr>
<tr>
<td>6</td>
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<td>10:00am</td>
<td>Interviewee's Office</td>
<td>Sedgefield</td>
<td>Municipal Official</td>
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<tr>
<td>7</td>
<td>17 November 2011</td>
<td>10:00am</td>
<td>Interviewee's Office</td>
<td>George</td>
<td>Interested &amp; Affected Party</td>
<td>Transcribed</td>
</tr>
<tr>
<td>8</td>
<td>17 November 2011</td>
<td>2:00pm</td>
<td>Interviewee's Office</td>
<td>George</td>
<td>Consultant</td>
<td>Notes &amp; reflections from interview (error in recording interview)</td>
</tr>
<tr>
<td>9</td>
<td>17 November 2011</td>
<td>2:00pm</td>
<td>Interviewee's Office</td>
<td>George</td>
<td>Consultant</td>
<td>Notes &amp; reflections from interview (error in recording interview)</td>
</tr>
</tbody>
</table>
10 November 2011  9:00am  Interviewee's Office  Mossel Bay  Politician  Transcribed

11 November 2011  12:00pm  Interviewee's Office  Mossel Bay  Municipal Official  Transcribed

21 November 2011  10:00am  Interviewee's Office  Sedgefield  Press  Transcribed

23 November 2011  14:15pm  Interviewee's Office  Knysna  Municipal Official  Transcribed

24 November 2011  12:00pm  Interviewee's Office  Knysna  Press  Provided with a number of press clippings from the early Sedgefield crisis period. I reviewed these and returned them at the next meeting (examples included in appendix)

25 November 2011  2:00pm  Interviewee's Home  Sedgefield  Interested & Affected Party  Not transcribed as research focus shifted. The Mayn outcome from the interview was contacts for further interviews. We then drove to the beach together to view the work being carried out on the Desalination inlet pipes (have Recording)

25 November 2011  4:00pm  Myoli Beach  Sedgefield  Consultant  Introduction on beach, beach work on inlet pipe explained. Told to return the next morning to observe further activity

26 November 2011  10:00am  Myoli Beach  Sedgefield  Consultant  photographs taken of work on the beach, beach work on inlet pipe explained

26 November 2011  10:00am  Myoli Beach  Sedgefield  Municipal Staff  Brief introduction on beach, whilst observing work on inlet pipe. Arranged another meeting
<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Role</th>
<th>Status</th>
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<td>Sedgefield</td>
<td>Consultant</td>
</tr>
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<td>2:00pm</td>
<td>Interviewee's Office</td>
<td>Sedgefield</td>
<td>Politician</td>
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<td>05 December 2011</td>
<td>10:00am</td>
<td>Coffee Shop</td>
<td>Knysna</td>
<td>Interested &amp; Affected Party</td>
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<td>06 December 2011</td>
<td>2:00pm</td>
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<td>Knysna</td>
<td>Consultant</td>
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<td>20 March 2012</td>
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<td>Interviewee's Office</td>
<td>Cape Town</td>
<td>Consultant</td>
</tr>
<tr>
<td>20 March 2012</td>
<td>3:00pm</td>
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<td>Cape Town</td>
<td>Consultant</td>
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<tr>
<td>21 March 2012</td>
<td>10:00am</td>
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<td>Cape Town</td>
<td>Consultant</td>
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<tr>
<td>28 March 2012</td>
<td>9:30am</td>
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<td>Cape Town</td>
<td>Consultant</td>
</tr>
<tr>
<td>21 March 2012</td>
<td>10:00am</td>
<td>Interviewee's Home</td>
<td>Cape Town</td>
<td>Consultant</td>
</tr>
<tr>
<td>04 April 2012</td>
<td>2:00pm</td>
<td>Interviewee's Office</td>
<td>Cape Town</td>
<td>Consultant</td>
</tr>
<tr>
<td>16 April 2012</td>
<td>10am</td>
<td>Interviewee's Office</td>
<td>Sedgefield</td>
<td>Interested &amp; Affected Party</td>
</tr>
<tr>
<td>17 April 2012</td>
<td>9:30am</td>
<td>Municipal Office</td>
<td>Sedgefield</td>
<td>Municipal Staff</td>
</tr>
<tr>
<td>17 April 2012</td>
<td>9:30am</td>
<td>Municipal Office</td>
<td>Sedgefield</td>
<td>Municipal Staff</td>
</tr>
<tr>
<td>17 April 2012</td>
<td>9:30am</td>
<td>Municipal Office</td>
<td>Sedgefield</td>
<td>Municipal Staff</td>
</tr>
</tbody>
</table>

Not transcribed as research focus shifted. The entire interview was concerned with the boreholes in both the towns of Sedgefield and Knysna. Ultimately the research did not focus largely on this augmentation measure. The interview did result in the suggestion that the boreholes at the Knysna desalination plant were problematic and that this related to the accelerated process. This was a key finding which I proceeded to explore further (have Recording).
<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Interviewee Type</th>
<th>Notes</th>
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<td>32</td>
<td>19 April 2012</td>
<td>8:30am</td>
<td>Interviewee's Home</td>
<td>Sedgefield &amp; Affected Party</td>
<td>The interview was far more focused on the issue of floods in the area. With Sedgefield having faced two floods in the years preceding the drought. Whilst this was useful contextual information, this was not the core research focus (have Recording)</td>
</tr>
<tr>
<td>33</td>
<td>23 April 2012</td>
<td>9:30am</td>
<td>Municipal Office</td>
<td>Sedgefield Official</td>
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<td>34</td>
<td>24 April 2012</td>
<td>10am</td>
<td>Interviewee's Home</td>
<td>Sedgefield &amp; Affected Party</td>
<td>Not transcribed as research focus shifted. The interview was far more focused on the issue of floods in the area. With Sedgefield having faced two floods in the years preceding the drought. Whilst this was useful contextual information, this was not the core research focus (have Recording)</td>
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<td>35</td>
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<td>11am</td>
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<td>Sedgefield Politician</td>
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<td>36</td>
<td>27 April 2012</td>
<td>10am</td>
<td>Interviewee's Home</td>
<td>Sedgefield &amp; Affected Party</td>
<td>Not transcribed as research focus shifted (have Recording) – Mayn outcomes of interview were referrals and history and membership of the water forum</td>
</tr>
<tr>
<td>37</td>
<td>04 May 2012</td>
<td>10am</td>
<td>Coffee Shop</td>
<td>Knysna Municipal Official</td>
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<td>38</td>
<td>07 May 2012</td>
<td>11am</td>
<td>Interviewee's Office</td>
<td>Knysna Politician</td>
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<td>39</td>
<td>21 May 2012</td>
<td>10am</td>
<td>Interviewee's Office</td>
<td>Knysna Politician</td>
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<td>40</td>
<td>22 May 2012</td>
<td>8:00am</td>
<td>Interviewee's Office</td>
<td>George District Official</td>
<td>Transcribed (obtained documentation &amp; access to historical records)</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Location</td>
<td>Interviewee</td>
<td>Type of Interview</td>
<td>Notes or Details</td>
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<td>15 &amp; 22 May 2012</td>
<td>10am</td>
<td>Interviewee's Office</td>
<td>George</td>
<td>Consultant</td>
<td>Unrecorded discussion on types of electricity costs associated with plant operation (informed further pursuit of this question), obtained consultants reports electronically</td>
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<tr>
<td>23 May 2012</td>
<td>10am</td>
<td>Interviewee's Office</td>
<td>Knysna</td>
<td>Discussion - Consultant</td>
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<td>2pm</td>
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<td>Knysna</td>
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<td>2pm</td>
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<td>5pm</td>
<td>Municipal Hall</td>
<td>Sedgefield</td>
<td>Meeting</td>
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<td>Interviewee's Office</td>
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<td>Municipal Staff</td>
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<td>13 June 2012</td>
<td>11am</td>
<td>Coffee Shop</td>
<td>Sedgefield</td>
<td>Interested &amp; Affected Party</td>
<td>Not transcribed as research focus shifted. Most of the discussion focused on the history of the Wilderness Lakes Water Forum (have Recording)</td>
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<td>14 June 2012</td>
<td>10am</td>
<td>Vehicle, Water Treatment Works, Desalination Plant</td>
<td>Sedgefield</td>
<td>Municipal Staff</td>
<td>Notes from tour</td>
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<td>15 June 2012</td>
<td>11am</td>
<td>Interviewee's Office</td>
<td>Knysna</td>
<td>Press</td>
<td>Collected documentation, and received interview leads</td>
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<td>11:45am</td>
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<td>Knysna</td>
<td>Municipal Official</td>
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<td>20 June 2012</td>
<td>1pm</td>
<td>University of Cape Town Graduate School of Business – Presentation</td>
<td>Cape Town</td>
<td>Consultant/Informant</td>
<td>Attended presentation made to municipal officials/ engineers/ other interested partes. Notes taken &amp; report received</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Location</td>
<td>Interviewee</td>
<td>Transcriber</td>
<td>Notes/Details</td>
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<td>27 June 2012</td>
<td>10am</td>
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<td>Cape Town</td>
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<td>DWA</td>
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<td>19:30pm</td>
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<td>Cape Town</td>
<td>DBSA</td>
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<td>02 July 2012</td>
<td>9:30am</td>
<td>Interviewee's Office</td>
<td>Knysna</td>
<td>Politician</td>
<td>Transcribed</td>
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<tr>
<td>02 July 2012</td>
<td>11am</td>
<td>Coffee Shop</td>
<td>Knysna</td>
<td>Interested &amp; Affected Party</td>
<td>recording poor, unuseable</td>
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<td>02 July 2012</td>
<td>2pm</td>
<td>Interviewee's Office</td>
<td>Knysna</td>
<td>Municipal Staff</td>
<td>Received minutes of Section 80 committee meetings going back to 2008, discussed process of meetings</td>
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<td>Knysna</td>
<td>Municipal Staff</td>
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<td>Consultant</td>
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<td>Consultant</td>
<td>Transcribed</td>
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<td>Interviewee's Office</td>
<td>Knysna</td>
<td>Sanparks</td>
<td>Transcribed</td>
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<tr>
<td>05 July 2012</td>
<td>8am</td>
<td>Desalination Plant</td>
<td>Knysna</td>
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<td>68</td>
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Brief discussion on existing data on plant operation in Knysna. Told to arrange another meeting to obtain this information. This was attempted at the final stages of the fieldwork. However, this information was ultimately not obtained.

Collected documentation on municipal expenditure wrt Sedgefield plant.

Follow up interview, notes taken – referred to secondary documentation by interviewee.

Notes taken - interviewee refused recording.

Attempted to collect information on Provincial MIG expenditure – meeting did not yield much.
<table>
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<tr>
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<td>6pm</td>
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Notes taken, attended to observe participation, inform broader analysis on decision making.
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<td>notes taken, reports obtained</td>
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Appendix VI: Transcriptions

Interview 2 on 10 November 2011 – Interested & Affected Party
ssi as taking gap from aurecon
the response to crisis as an opportunity also by the municipality as they had hit a wall with the dam
lack of planning - now called an emergency, resulting in bypassing all environmental regulations = travesty of justice
desal as ill-timed given the increase in electricity costs… making a huge financial obligation to future generations to pay for expensive water, to be used at best a few weeks a year - compared to cost of investment, operating plant, now had problems with pipes. which de warned them about - affect the natural flows of sand and water - no surprise that everything got exposed... sees the whole design system as bad engineering. did tell them so, but nobody listened because it was all in such a hurry. told that effluent dispersal beyond surf zone was the right way. BUT this is more expensive. THEREFORE have too much money wasted/ spent, while at the same time, not enough spent. Therefore all done with huge panic. If compare costs to George, could bring a lot of water!
cycles - make panic decision, then committed thereafter. Lack of perspective, historical, lack of forward thought Engineers sometimes not soc, env, econ sustainable = real issue with desal plant. Knysna, don’t know much about. Information has kept tight. just snippets of info slip out. WIFE can't get the info to figure out what went wrong. initially designed to process effluent. R.O plant. exactly same process.
Plant is not designed to handle much saline dissolved chemicals. But for some reason had to reengineer it. Because lots of leakage from sea, plant can't handle. Apparently re-engineered plant at more cost, to treat brine. Sunk holes at loerie park. Don't know, not a lot of info. Again an enormous waste of money. should have been thought through properly. who were the process engineers. people think properly? fatal flaw in the design. for me somebody should be held accountable for that. its an awful lot of money. they now having to spend the muni money, which they haven't got to fix the plant. problem is grant from central government and cant go back to government, therefore really in a problem. must make it work. will be costly. otherwise central says give us our money back. engineering, environ, political elements. politicians under lots of pressure to come with solution to say to public ‘we've solved the problem’ when those kinds of things happen, rational thinking gets lost. see as an engineering problem, for engineers to solve. dont want think about env, finac, we're engineers we'll build you something... did anyone do a proper risk analysis? whenever using process that hadn't been used for a problem, did an proper rsik analysis first. BUT seemed to me, was a closed mind, we need desal, this is the answer. pick a contractor, go to public, say we've solved the problem
don’t think the crisis was deliberately manufactured. Don’t think there was enough lateral thingking. Number of ways to tackle a water ctsiis. Increase supply, reduce demand, can maybe temporally shut off some of users. Needed to be a heirarchy of use. needed to look at the problem from ademand and not a supply problem. fundamntal problem was that pumping systems were not working properly. if thakn money and applied to pumping. would ahve solved the problem (need to make sense og the pumping problem better)
golf courses as users. Could have looked at things like that. In the short term up
stream are agric users, one fo the golf courses, they had the power through the dwa to
go to user and say we're going to restrict extraction. But maybe olitical ramifications.
but in panic they got themseves into, felt solution in 6-8months. really a panic. but all
political ramif. pol looking for painless solution, but not that simple.
top 20 water users - seems to be a pretty closely guarded, revisint this whole thing
again, because of proposal to build dam. Looking at solutions, engineering solutions.
Doing what consultants should be doing. Company for dam project is basically an
engineering company with a big vested interest in building dam. do have an
environmental group who they say are doing an independent assessment. just dont
believe that
people quoted for desal would have downplayed cost, envir, risks. They wanted to sell
a desal plant. You musn't to the people selling to you. Were in suh a panic. Got into
tunnel vision. Were looking at boreholes as well. It’s a short term solution. But not
long term. were looking at other solutions like that. but big problem, was a lack of
foresight. if they operated pumping on charlesford to capacity of permit, wouldnt
have had a problem through whole drought. would have survived. in fact did survive.
used boreholes a bit. never used ro as always problems with.
sedgefield if raised wier, which now doing. If looked at long range forecasts, could
have seen it coming, done something about it. The other measure was hoogeakraal
which gave lots of water. Don’t think even now, sedge needs a desal. I think with use
of supplies, possibly off stream storage - seasonal - all ahve to do is cope with peak
deadmd. which you do by storing water. you dont buy a plant that you then only
operating a few weeks a year. or you have pumps with more capacity and you run
these when needed
certainly one could see the drought gettign worse and worse. Would have to asl the
engineers really . Town engineer, project engineer. Have to talk to him. He could tell
you of options, whyc don't look at other options. But never infomred the public. So
people like me sit and wonder. leave you in doubt. if they had been more transparent
about the decision making process. would have made it easier for all stakehoders to
belive what they were doing
I mean I don’t go around telling people it was a disaster. A lot of people don’t know
that much. Why should we alarm the public that the money ha sbeen wasted. Analyse
whole thing, make recommendations on the decision making process
risk analysis shuld be very much part of any decision making process. But it seems to
me that this whole situation was very much overwhelmed by pol. I think there was
lots of pressure on muni. Water restrictions being tightened. Cirsi only realy hit
home when started to truck water in from george. then the panic came in. In the 12
month period to point of commissioning. initially panic sets in, dont kow political
thinkign into it. can imagine municipal admin, pressure from politicaisen, respond to
public. main pressure coming from people wantign to water their gardens. you’d be
amaed at the amount of political ressure that comes from people over a simple thing
like that.
I don’t know if any restrictions on golf courses. Agric users, upstream, nothing to do
with knysna munic. But I’m just speculating. Would think lots of pressure cme wfrrom
the general public because of restrictions. Businesses. Put the prices up. Not
politically desirable. costs have gone up more. but haven’t seen accounts. dont know
how it all works. how much is being spent on reticualtion, distribution, desal plant,
boreholes... YOU’LL FIND OUT HOPEFULLY
ro plant has hardly ever operated. Ran fro less than a week. Something broke donw.
Runs for a short while. Then they have to shut it down.
when you declare an emergency essentially the env act and regulations are suspended.
Process continues in parallel. And eventually they are supposed to meet. And the
process will come up with an rod (NB to chec with Zaida and company and fatima
rawjee….). So ran the plant 4-6 weeks originally. but since then have been fits and
starts. i presume enevironemntal consultants should be able to give full account (NB
is to check with Consultants on plant status over time)
(ask de to send me his documents)
last communication from melissa was 14 december 2010. dear stakeholder. Almost a
year since construction completed. In terms of process not much to repost back on. ..
That was the last time heard from Melissa. (almost a year ago)
my wife's a councillor, responsible for infrastructure, see the monthly reports (NB to
get monthly reports), she tells me. Know about the problem. THERE WAS A
BUDGET VOTE, money was allocated - ratepayers money that was spent now.
The ro plant also I ask my wife from time to time, is it running now. And one can
attend the meetings if one wants to. Been a long time to the section meetings. It’s a matter
of public record.

kef, we can go back through our minutes. The muni used to attend these meetings.
The other place its been regularly raised, it the kforum. Chairman of the forum. John
kennedy. They've been highlighting the issue for many years. And the responsible
from the muni has always been. everyhtign is under control dont worry. and it want.
then if you speak to neil peerring, he'll tell you he's been applying fro money, and
been told no money. so comes to political decisions
I mean the muni is in possession of all the info, know property dev approved. Should
be able to project furture demand. Know when exceed supply. Don’t think they were
ver restrcited with how much could pump out ofriver. Problems with the pumping
stations - gouna and charlesford, therefore storage was quite low.
talking about knysna, that actually made it through
look at sedgefield. Could they have seen it coming, people from sedge was looking
for storage dma. When investigate find this out. Price at R20mil.
(been told 'storage wasn' viable solution to desal')
storage would have worked. Like I said. You have to get throguh the storage dam (he
ah usage figures!)
the law says 3 months stoarge - 180k l - not very big. Akkekloof stores 900kl. Maybe
looking at something to big. I don’t know. Just think that with more foresight
for years and years the kef and cmf have been espressing concerns. Everytime they
approved a new developemnt. The standard thing would have been to say 'whewere's
the water coming from, you know.
lines of inquiry’, I can point to things that say 'go and look at that
John Kennedy - kcf
Launa watt- kef
prof allanson, his been very involved with dwa determing the er. Don’t think the er of
the karatara river has ever been determiend, so don’t think they know how much they
can extract

imagine you have a naturally flowing river. Want to extract water. Put a submersible
pump in - operate under water - then pump out into a holding tank and then frm that
tank a centrifugal pump. Operates with a much bigger head. Also driven by electric
motor. aouldnt use submersibel to pump all the way to town. therefore then into a
holding tank, then pumping to storage dam, or where it needs to go. need to get your
sub into a pool. but if water too low, oull air. therefore put in a wier, wall across the river. bascially raises the lev of the water. in the karatara river, hvae a wier, and stick sub behinf the wier. becasue if river level drops so low. happened in that december. dried up so much there wasnt any water. therefore need storage. currently put in a wier. gives storage capacity, but more in tha the pump operates better. doing that in the knysna river. Same thing on a much bigger skill. Charlesford wier. Subs, dam, . Also something similar in the gouna river. hvae a diagram, looking at this whole system, trying to get to grip s with
if that’s the knysna, charlesford, 200m3 pa, project to increase this, the amount of permit,. therefore saying that if knysna wa in trouble. Gouna. They could have used that. Transfer into akkerkloof. Got another system, gravity. Glebe. If you tak e ti all into account. knysna has present cap of 4.6. m3 per annum. but permit is fro 6.3. and storage of .93. well wihtin the LAW of how much storage they're supposed to have. dams 7m3 pa storage capacity, incidentally current draw off is 3.1 m3. discussing it becasue the engineers have made a demand projection. CURRENLY WRITING A REPORT ON IT. BEEN ANALYSING THE REPORT BY AURECON. projected demand increase at 5. % per annum. using 1987 as the base. looked at fiures, at think 3.5 % is more realistic. looking at period 1987-2010, was big groth period in knysna. rant the figure on 3.5% pa and makes ahuge difference. going to need 6.5... whihc is what we have capacity for at the moment. engineers would bid for the dam, but have done a proposal/report for the municipaility. regcognise a proper eia ahs to be done. but saying to muni that if you want an independent assessment, get an independent consultant witout ties to a company to build dams. 
advocating a pes system. Used in ny city. Go to catchment, land owners. Come up with a system where land is seen as a water resource and people get paid for water provision, for proving ecosystem servies. In ny city gets water from upstate new york. Hihg quality water. people are basically looking after the catchment. dont put up a dam, look after the catchment.
its again an engineerig solution.lets throw money at it. Lets engineer it. Nobody is thinking about the conomics of it. It costs r20mil. It’s a lot of money to throw at something
engineerig solutions - ran an engineerig company for 14 years. Process engineering. Do feasibilites, risk analysis. In those days - 1980s - environemtnal issues were not addressed. Where they paid lip service to environemnt. To me 3 elements to any project - state of art engineering, fits the purpose; thye need also to be seen in the context of economics - affordability, profitable - you see there are trade-offs between the two. for example in the long time , discounted cas flow always trade -offs. Then brign the nvironemnt in. have a 3rd leg. If you have nt looked at environ, still havent got an optimal solution. Would say need to add sociological leg. Also very importatn. Benefit, involvemnt, emplyment, generating wealth in local areas. needs to come in as well. ... its all tradeoffs in the desal, to me there was a lot of panic and no one focused on the trade-offs. the officials, chaps like neil perrign and rodeny nay, they bascially want to keep their jobs. So that don’t argue much with the politicians. Maybe neil was part of the problem, he was in the job for 30 years. Should have spoken up, cetainly would have had support from people in town. basically it was panic stations. just find me a slution. central government is paying. we've declared its an emergency. the miute that happens, its deangerous.
for the muicapliy theriare was 2 benefits : speed and the fact that they could get the money. If they put in an appliation for the pumping stations they would have been aughed at. Would have said, muni should pay for this. Take put of ratepayers money. developpers paying augmentation schemes. to go to a capital reserve. then used for a operatign the ssytem. but 2 things wrent wrong. set at too low a lvel. secondly the aug fees were not out into a cap fund. used for current expenditure. then when faced with this crisis they have not capital fund. in terms of forward planning, something went wrong with that mechansim. left them ind espertae situation. cap in hand to central, bypass all the approvals. lets do it. important issue. augmentation funds (pointing to 2 simultaneous crsiis)

there will be reports. Technical report mainly written by rodney nay. Don’t know what role aurecon played. Only become better informed when the da came into power. Been much more free with the information. Partly because my wife is a councillor. My wife brings it home. these meetigns are held evry month. what they call the section 80 committee meetings.

from government printer… reports, refer to legislation often - section 80 committees are ways in which the munis are organised to interface with the political office holders. Wife runs technical. Technical director produces monthly report, make applications for approvals, recommendations, variations from budget, all go through section 80. if wanted to trace the political history of any of these decisions. section 80 would be the way to do it. infra, planning and housing, used to be one committee. those reports would be very helpful in tracing the decision making process section 80 - committees to assist the exec committee and exec mayor. Only mayor has exec power. Wife is an executive councillor. she's had all sorts of problems - sewage plant packed up, water crisis continues, desal keeps packing up

decision making chain of command: from certainly puttign together appplication to central governemnet: in knysna e bouw spies; section 80 committee head was andrew finn; then nealle perring; fin grant easton; although grant would have helped with estimating different options; then rodney nay would have been the main driver of the prject. thats about it. the key rolellayers. mm, johnny douglas is not a technical person, so not involved in decision making. would haVe been in apoition to question or veto it. but seems to ahve accepted it. then would have gone to full council for approval.

there was no political opposition from the da. Seemed to stand back and say fine. Knew people in the da at the time, all seemed comfortable. We need this. Doris nayler. Thought it was necessary, puts sedge on the map. Very proud of it over there. councillor lousie hart, new councillor for sedge. certainly was very active on environmental side prior to becoming councillor. don't know of her view then. also lakes environmental forum. make contact with them. also from melissa mckay. .. judy dickson and son mark (dr. in marine biology), doing the eia.

basically told that the decision was made. We'll deal will the environmental issues later

the first time I even heard about this thing was 4 october 2009 and they'd made the decision by then. You could say effectively, there was no public participation. Was not aware that the discussion was taking place throughout the course of the year, following the trucking in of water from george. didn't have the same experience as
described by mike, regarding the informal channels and the openness.

prints out copy of his appeal to the political channels. Wasn’t very helpful, at the end was too late. Response from cape eprac. The forums details entered into the stakeholder database, keep all informed through remainder of process. Draft scoping report available from next week...DA tried to challenge the legality of the whole process
this guy makes a good point 'is this an emergency or is the muni using this to bypass participation'
you quite welcome to troll through my emails, can forward it to me (wont have dates on them)
I'LL SEND YOU AN EMAIL BASED ON OUR DISCUSSION....
been this awkward silence since december 2010 (almost a year ago)
desal had been talked about. It first would have come to the munis attention through various developers trying to overcome challenges of water.. In fact soe ven ut o quotations on the table. Saying we'll build you a desal plant. We'll build it, you run it.
so it had been kick around a bit.
given short space of time to respond. 10 days between hearing about it and going to capeeprac. Even then told it was too late.
Interview 3 on 11 November 2011 – Consultant

Aurecon is a fairly new company. It was a merger between Colin Wegner in Australia, Africon and Ninham Shand of South Africa. They merged together to form this thing. So they are only about 3 years old. We are currently the 17th largest civil design engineering firm in the world. So we have various sectors. Ninham was historically strong in water management. I work in envir dept with Aurecon. Small component of far larger animal. We do EIA processes

Ninham Shand historically had a very strong env dept. That still resonates within Aurecon. Very strong in SA, main office based CT, we have an office here, and in Pretoria. 90% of work is the applications in terms of NEMA. The EIA. My role is we’ve been appointed as independent environmental assessment practitioner, a term used in the law. So every time a proponent of a project wants to put forward a project that has triggered an activity in terms of the NEMA, they are required to appoint an independent environmental assessment practitioner, to undertake the process for them. That process obviously entails engagement with the public. You know to get their impressions of the project and to sort of follow the, chase all the paperwork down as it were.

Well one of the major challenges we have is that there is very little integration. That is a function of the legislation itself. We, the environmental department, we are not allowed to do work for any of our other departments. Because then our independence is compromised. So anywhere where our engineers have any role in a project, we essentially walk away from it.

Any time that these desal projects for example. If our engineers had to be doing the design on it, we couldn’t work on it because our independence is compromised. And typically we have to work away from quite a lot of work as a result.

Nothing that’s occurring right now. A lot of proposals going out. Lots of feasibility studies. I know that our engineers have been involved in a large one in PE. I know they’re currently looking a feasibility study for CT. That’s likely to be at least 10 times the size of Mossel Bay. Another one in Saldanha the looking to locate in the industrial zone there. So yes there’s a lot happening on the desal front.

All the desal projects that have occurred in this area were non-typical projects due to the emergency. Typically municipalities in this area are required to undergo an open tendering process. And because of the emergency we sort of were appointed directly by the muni. Why we probably got appointed for Mossel Bay project, was because we were working on the Plett Bay desal at the time. Therefore so they probably assumed we were best equipped in terms of the knowledge and skills at the time. Bearing in mind that no desal projects had been done in the country leading up to that. So we were probably the first from the sort of environment perspective. So I assume that it was from that perspective that Mossel Bay made a direct appointment.

In Plett Bay, similarly it was an emergency unfolding there. And we were busy with other water resource projects with the muni over there and they really just extended our contract to undertake with them the desal plant studies.

Similarly in terms of Mossel Bay, Plett also no tendering process, appointed directly by the municipality because of emergency.
what happened is first the edm, mossel bay, george, knysna, bitou, think outs collectively, they declared a state of disaster quite early on and local munis followed suit soon after, BUT AT DIFFERENT TIMES. So, plett was different in that the edm had decalred a state of disaster. Plett saw themselves in a very serious situation and needing To sort of get their desal plant up and running as soon as possible. so whta we did was we started a foraml ea process. so we looked at a couple of sites and we took it through to what they call the end of scoping phase. had a bit of public interaction tosort of just get a sense. and once the emergency kicked in and they were declared a state of emergency, then we kicked into another process whereby they needed to start building the plant whereby they had to have the plant functioning once the dams dried up. ofcourse its ILLEGAL TO START BUILDING WITHOUT HAVING THE ENVIRONMENTAL AUTHORIZATIoNs in place, SORRY NOT ILLEGAL, UNLAWFUL. there's also a distinction. What we are doing for plett and mossel bay is whats known as a section 24g application process. whihc differs from the typical process that one follows. in that you've already constrcuted it or you're applying for authorisation in retrospect. Which certainly kept me busy for the last 2 years. Its not a noce place to be. its not comfortable to ahve already built something and then only be doing the environmental assessment on it while the things being built. It does afford one certain opportunities at the same time. I must admit. So we've basically on both these plants being running since then one of these section 24 g application processes

In a normal process, one is required to first apply to the authorirites and say 'hey listen' we want to do this, we want to build a desalination plant'. They then issue you with a case number. We then engage with the public initially as part of what's called a scoping phase. you then identify any issues that the Public might have or direct neighbours to the desalination plant and then you draw up a scoping report. A scoping report essentially is a report that really identifies all the issues out there and that the public might have as well as experts in the field. and bascially sets forth the way you going to undertake your eia process. that then goes out for public comment. everybody makes sure that they are happy with you're going to study in the impact assessment. And that then gets sent off to the authorities and they basically accept or reject it, or tweek it or whatever. Then you move into the actual impact assessment phase. and thats when you have specialists on board to have a look at the specific impacts that you belive are going to be significant. and you compile the eia report itself. and once you've completed and all the specialist have had your input and you've assessed the impacts then that goes out to the public again and the authorities to make sure that they are all happy with what's being said and its accurate. you collect all their comments and that finally goes to authorities for their decision. HOW THAT DIFFERS FROM 24G is that you don't have that first scoping phase. Becasue its assumed under section 24g that whatever you're applying for is already there. So you've got a far better understand of what's actually there. You know, you don't have to SCOPE and GUESS what they might be. So you actually skip that entire scoping phase and officially you move direct to the impact phase. so you appoint your specialists and you get on with the work and you generate one fo these impact reports. Where we differed is that section 24g process ASSUMES that the project has already been built, whereas in a normal process it hasn't started building. This one, these ones fell in the middle. because we weere building and designing as we were going along. so we were tryign to do a section 24g but it wasn't standing yet. so we had to monitor it as it went along. So we varied our, the authorities required us to just submit an impact assessment report, but we recognised that it was
important that we do that sort of mini scoping phase. so we did go out to the public and sort of tackle them in terms of what their concerns and issues were with the desalination plant. So our report is deifferent from anything else you would see out there. In that there was this voluntary mini scoping phase, whihc is contained in the impact report, whihc moved on the impact assessment itself.

The building Mossel Bay I think went operational sometime last month (October 2011) and our impact assessment has only gone out to the public 2 weeks ago. timeline fo commissionning, based on reports versus actual they ran into a major problem. They were meant to commission far earlier in the year. Bear in mind this was against the backdrop of the dams were filling again, so the pressure was off all of sudden that they didn’t have to go operational. And they ran into a problem with their multimedia filters in that they had to strip down their multimedia filters. Now those multimedia filters are sizeable and each is about the size of this room and there are six of them and they had to completely strip and repaint and do that and so, I think this is probably the lesson learnt for the technical blokes in that this technology wasn't known in this country and then all of a sudden we had 3 of them happening at the same time and hye ahve major technical difficulties in getting this right. Each of the plants I must say have all had problems in getting this right. But in mossel bay it was around these multimedia filters and that resulted in delay. despite the public and the authorities all being notified 'hey we're going operational at this time'. Literally as they turned the plant on to try and test it they then encountered this problem. So the notifications had already gone out into the world at that time. emergency, construction, section 24g, commissioning delayed because of problems, but water crisis had come and gone without use of reverse osmosis? correct, same with plett. Eventually the drought broke almost just in time and when the drought did break then you know the dams filled up in a couple of months. And evrybody was happy and people were talking about you know why are we building desalination plants. and i think the FINANCIERS were startign to also get a little bit nervous about continuing to finance these projects that were no longer needed

I would say that it applies to all of the sothern cape. Our geography here, in that we've get thisvery narrow coastal plateau squashed between the ocean and the Outeniqua Mountains. We rely heavily on having all year rainfall. Now with climate change starting to happen and our rainfall becoming more seasonal. the rivers dry up very quickly. we dont have these big catchments that you find elsewhere in the world. So the rivers can be depleted very quickly. So this places all these municipalities in sort of jeopardy. If we miss one rainy season, thats it, they are out of water. and fortunately being in an all year rainfall, thats always been fine in the past. the rivers have never run dry. But we startign to see that happen. So we've got options. do we look at groundwater abstraction. That should be able to supply us in most dry years. But when you have a 3 year drought even your groundwater starts to dwindle. We could dam all our rivers and make sure therres enough storage capacity in our river systems, but nobody likes dams anymore. especially on channel dams. we've got a lot of sensitive estuaries especially in this section of the coastline. And damming all the rivers is just going to stuff that up. So desalination I think is a GREAT SORT OF ALTERNATIVE. IN THAT IT DOESNT MATTER WHAT THE CLIMATE IS DOING. the Ocaean SHOULD ALWAYS BE THERE. and full of water. so yeah, i think its expensive but I think its the right way to go specifically as one gives thought to resilience of these communities, our ability to
overcome climate situations and longer and longer drought

historical awareness of precariousness, alternatives planned
I know that the mbay muni basically since I think 2007 were already in a water deficit situation so our dwa at the time. Do look at these areas and make sure they have enough buffering. And MB was ain a dangerous situation. Report the Outeniqua Coastal Study looks at this area nd their bulk water schemes and where thye need to be headed and waht the options were. and from I would say 2002 onwards, Am desal you'd find in most of in these reports was listed as one of the options we should bec onsidering. but was fairly low on priority lst because of costs associated wiht. but everybody is well aware that eventually we'll have to go in the desal route if the population continues to expand. we've run out of rivers to dam and I think thats probably more true for Cape Town then this area. But I think we're sort of the same predicament. All of our river systems are fully utilised.

Captial costs I don't understand. PBAy desal, last time I checked had a capex of I think 32mill. MB being of a larger size, the large official budget I saw was R178mill and I believe its gone over the R2mill mark. You know, just with the costs running away during this construction phase. If you think of those 2. I mean there's very little to compare, if you had to comapre the capital expenditure versus installed capacity. there's virtually no relationship there. On an operational basis I think thats when people talk about desal being expensive. WATER FROM DDESAL IS ABOUT 2CE TO 3TIMES MORE EXPENSIVE compared to water from any other bulk water scheme and that cost should eventually be handed down to the end users. ANd ofcourse in South Africa where you have you know a sort of large low income group where your basic services like that start to become more expensive its a major concern. The municipalities ofcourse abve come up with strategies to mitigate that. in the case of MB they're actually sying that they are not goign to increase the cost of the end user at all. How they re going to do this is to detur high volume use, they use a system called a step tarriff. Where the more you use the more expensive it gets. As a deterrent to prevent those real high volume industrial users to cut back their water. The profit that they actually make on that step up tarriff towards the high end of the scale, they believe is enough to cover the desalination

Industrial user - Petrosa
Everybody will continue to pay the same tarriff. Bear in mind that Petrosa paid for one third of this plant and will buy one third of its capacity on an ongoing basis. I don’t know the detials of that arrangement, even the large water users wont pay more. ALL IT IS IS THAT THEIR ORIGINAL STEP UP TARRIFF IS NOW COVERING THE DESAL PLANT. My CONCERN IS THAT WHO THAT IS DAMAGING IS THE MUNICIPALITY AS ITS TAKING MONEY OUT OF THEIR COFFERS. MONEY THAT COULD POTENTIALLY BE USED FOR LOW COST HOUSING, INFRASTRUCTURE MAINTENANCE. SO YOU KNOW SOMEBODY EVENTUALLY LOSES OUT ON THIS SORT OF THING. ANd my feeling is that one shouldn't be too nervous about incrasing the cost of water. Especially in South Africa, its a hihgly undervalued resource ina country thats got dire water scarcity and we are going to eventually hit the wall and we can either wait or we can slowly start ramping upt the costs through time. And hopefully through that people will start CHANGING THEIR BEHAVIOUR, in the home even in business. JUST AN INTERESTING STATISTIC is that through this drough period MBay muni was able to cut back their averge water use by 49%. That to me indicates the massive difference between need and want. I think even if you increas the cost, people start adopting new
behaviours, start installing new technologies into their businesses and at home to conserve water and control their demand. They won't end up paying more. It's a difficult area but I think it's where we should be headed rather than focusing too heavily on keeping the cost of water down.

I think it's pretty much a given that the human population going to continue to expand and our overall water demand is going to continue to grow. Even if we become more conscious of our water use, the average man on the street. We are still eventually going to require more water than is required by our bulk water schemes. So yes we can look at a variety of bulk water schemes and desal is just one of those. Given that there's increasing global environmental pressure to stop damming rivers and you know to stop extracting water from the ground. THE SEA IS THE NEXT LOGICAL CHOICE, from a water supply perspective it's a virtually untapped resource at this point. And of course not to mention that 97-98% of the earth's water is in the oceans.

Well purely on that basis alone, you going desal, we're not damming, putting in weirs, affecting our river systems. River systems in the future are going to become more and more important from a food production perspective. Those resources will have to be directed more and more toward food production. And domestic use has to come more from sources such as desalination yet in MBay, petrosa was a high user and key driver of project.. One must bear in mind with petrosa is that while it is a major water user, it is also key employer and contributor to local GDP. So have to balance these things into each other. Petrosa also managed to reduce usage which is far more challenging as they had to clamp down on refining processes, which is much more difficult than teaching someone to switch off a leaking tap

I think we should be looking at demand side technologies in all our new developments. Possibly require them to do an annual water assessment. I think that where we should be heading. But I think in terms of short term management, I think that sits with the domestic users, but industrial users are easier to target. I think it's difficult to say where to focus, but I think it should be across the board why emerged as the solution?
I think a number of reasons. Key reasons, we were sitting in May 2010, with the expectation that water use in the December period will double because of being a tourist area. We were then looking for a project that could be implemented in that time. there's no ways you could go for a dam, many of these bulk water schemes. Not to mention that even if you build a dam what're you going to fill it up with you know? Whereas deal, the actual plants themselves are BUILT IN A FACTORY. So all you have to do you know is build a shell at the same time that the factories are working on the actual guts of the plant. And then you just bring these two things together and you've got water. So apart from groundwater extraction, I think it was the only alternative that one could build in the time leading up to that peak demand period in these municipalities. So that they could actually get that operational before that key demand period. So I think that was the main motivation. I talk about groundwater. Remember that none of these plants can supply the entire municipal area. They are just augmenting what's already there. So alongside this other schemes were also being looked at. They were also applying for licences to increase abstraction from certain rivers. They were sinking new boreholes or retrofitting certain boreholes that had been used historically. So there was a lot
happening around these desalination plants at the same time. This was the only focus.

I think water resource planning is an ongoing thing. So without a doubt I think the planning was in place. We're busy with a project in Plett, an off-channel dam. So I would venture to say that there certainly was planning occurring and there always will be.

I think there were plans to raise a couple of the dam walls, the existing dam wells, but which of the dams I'm not sure, on historical planning in Mbay you would have to put that to the technical guys. We came on board after desal had already been selected, the engineers had been selected and were designing it. At that point they were still looking for site options. At that point is was meant to be a 10MI a day plant. That changed when Petrosa came on board with the municipality and increased it to a 15MI a day plant it happened to have an industrial zoned erf in the centre of MBay where they could put this thing on, which you know worked out very well.

Public participation process? Purpose within a section 24g
Purpose from our side, is that it’s a tool for ourselves and the authorities to identify issues. Is to notify the public at large and say ‘hey we're doing this thing’ does anybody have any problems. It’s a very good way to identify what the significant issues might be. So straight away people came back to us and said ‘oh yes, what about, in Mossel bay we're very close to seal island, and important white shark seal interaction area, and a lot marine life moving through the area. So that was one of the first reactions, people saying well ‘we're going to be spewing this brine into the ocean, what about the sea life you know’. Then you capture all of these issues like that. 'What about the noise, what about how its going to look, what about all the bushes you kill?’ Nad that gives you an idea of what you need to take forward and study during the impact assessment. The cd, given to you, what would be most nb is that int terms of the ppp, we’ve compiled a comments and responses report, containing all the written correspondence comments received from the public and the responses impact of comments on decision-making and what follows, as decision had already been made?

WELL THATS THE INTERESTING thing the decision has not been made. I don’t think it will be turned down because I think the desal plant is in the interest of the public. But if the public are still unhappy with it and they appeal to government when we submit the application, it could be turned down in which case the MBay government would required to demolish the thing and rehabilitate the site. So yeah, in that case they're walking on thin ice as it were with these processes. Of course the risk is do you take the chance of an entire town running out of water, and sort of balance these risks off against one another.

channels through which to express is ppp, then documented in eis, to be reviewed by officials
Correct, all correspondence is in that report. Evrytime written letter received from public. That’s what the dea has to look at once they receive the report question of independence
Independence is something that you either have or you don’t. I think what you might be getting at is how do you remain non-biased or objective. And I think that’s a bit more of a tricky thing as everybody has their own personal opinions. Of course the neighbour doesn't want to see this thing next to his house, so his goign to be incredibly upset and look for every reason for this to not be built. So we've got to look at it from the perspective of the greater good. But you know that can be tricky. We're environmental
consultants and we've devoted many years of study in the field because we're passionate about the environment. And then when it comes to the EIA you've got to switch off all your feelings and just be totally non-biased about the information you're receiving and convert it into a written form that should be pure fact. And the ability to do that I suppose some do it better than others but hopefully the final sort of report should be objective.

criteria used to determine environmental soundness

Our job is not say if the plant is acceptable. We offer assistance to the authorities by making a judgement call at the end by saying you know 'this thing looks good based on what we can sort of see in terms of the ...' our job is to assess the impact - marine life, visual, noise - and to use a standard impact assessment methodology and to apply it to that and to say you know impact is going to be high, low, medium for this reason and then its the job of the department to actually make a decision. The benefit you know is that you get all this water for a town that needed water. On the other hand you know we're going to kill a couple of fish and the commercial fishing in the area might deplete and we might damage our tourism industry. You know, what's acceptable.

deal way of future (view expressed), yet independent consultant. How draw line coughs, well er... I'd have to say that desal being the way of the future is probably my own opinion. Its just that I see this country, this area, running out of options and I think its on that basis that deal has a significant role to play. Independence. Yeah its a tricky one. How independent is anybody from the environmental crisis at hand. Can you remain entirely non-biased? I don't know.

departmental links within Aurecon given that some are building desal, while environ dept is assessing plants. What of influence?

There's no influence. Much of the time I'm oblivious to what my sibling departments are doing. From time to time they might phone me up and say 'hey, you know, you've had a chat with the authorities. What process must we follow to do this or that. What was your feeling on this. so yes, there's a bit of sharing, but I certainly wouldn't say that what they're doing influences me or vice versa.

draft assessment report, to be finalised in December. In likelihood wont change much. The authorities to be sent to has just changed. Typically it's the province of WC, dept of Eaffairs and Dev Planning. That's just changed because section 24g, to sibling dept, eaffairs, dev planning, not land management now, but environ compliance and enforcement. they'll now be taking the decision. Bear in mind that an env i report aims at covers all requirements. environmental authorisations, therefore also water use licence from DWA and a coastal discharge permit from national enviro affairs marine and coastal. so all packaged in one document. its just a way to bring it all together into a single submission

communication with 'public'

What we typically try and do is just use email as much possible with the IAP. But specific requirements in terms of NEMA, posters on site, notifying where documents are available. All go on internet. All registered I&APS are then notified in terms of documents and where to access it. But in terms of where we are at in terms of the process. thats usually a milestone event

decision makers:

National DWA are responsible for water related issues. A large roleplayer since emergency declared as funding becomes available. So then many big wigs come into municipality on what they need to do. The municipalities themselves ultimately took the decision to go with desal, the engineers employed in all instances have been ssi. they've done all the civil and project management work. brought in specialists to advice them.
then the desal plant manufacturers themeselves. that group collectively would ahve planned the project. but certainly munis together wiht dwa.

relationship with ssi:
we often, as mentioned earlier, being independent means we cant do work for our technical guys, so we find ourselves working with ssi technical gus. So we have a … fairly good relationship. We're always running into each other on projects.

I believe so (on water usage since commissioning). There's a lot debate about frequency of use. I understand the munis intention is to use these things only when they need it. I've certainly made the recommendation to them that they consider running it full time. for a number of reasons. but on the environemntal side. the more you run the plants, the less water you're taking out of the rivers, the longer your dams stay full whihc is ultimately in the event that we do slip back into a drought. becasue you dont know at the start of drought that you're running into a drought. so you continue to use your water resources. the thinking being that the longer you can keep water in youor dams, the better you're going to be for longer. As well as the desal plantsa are made of multiple units. they might run one unti here and then, the more units you can run, the more economy of scale, so the water you produce gets cheaper, the more you run it. So that sort of made sense to use

env impacts
The impact itself is on your marine system. The plant uses a number of water treatment chemicals to pre treat the water then ofcourse you have the brine itself from the other side of the ro filters. These two things combined you know are not nice. And these are discharged back into the ocean. adn in their pure form they are not going to be very good for the marine life. In our specialist studies we had look at whether or not this stuff would dissipate back into the ambient levels quite quickly and we had a guy do an assessment of the design of what we call our diffusers used to push this cocktail out at high velocity to cause it to mix with the sea water again quite effectively. from this we now understand that ... I should also point out that the reason we inject it out vertically is becasue the brine is negatively bouyant. So the big problem with brine in open outfalls is that if you just let it run into the ocean it will stay on the floor, it wont mix, in that form its making it incredibly toxic. will somother sea floor life with chemicals. thats why inject upwards to enable it to mix. So our guys calculated that we expect to have a mixing zone of a 30 meter radius from the point of discharge. After that it should be back at ambient levels. and we're expecting from about a 100meters from the point of discharge you shouldn't be able to detect it. so yes thats the sacrifice. a sort of portion of the ocean you might find a die back of marine species. larger mamams might start avoiding that area becasue its unsuitable. BUT AGAIN this technology is not well known in this country or in this country's ecosystems. So what came out of the impact assessmentis how important the need is for a intensive monitoring systme following it. to have a long hard look at what the impact is on the marine system. And if we need to to adjust the methodology by whihc eject this brine and really optimise that as far as possible

We've looked at other parts of the wrold. The problem is our ecosystems are so different. The majority of the assumptions we've made have been based on the experiences of the rest of the world and their large scale desal projects and that's what we've drawn on and thats why we reamin unsure. Yes in the rest of the world this technology is very well known and in some areas it hasn't been a problem at all. but yes,
we dont know how our ecosystems are going to respond to that so we need to follow it up with this monitoring

in terms of law itself. Advertise ppp in local newspaper. Then notify residents within 100m of construction. Then certain i&ap that will have an interest: birdlife, marine, ports authority, environmental bodies, businesses. Identify and notify these people, authorities at local level. all ward councillors at local muni. through them disseminate or identify how this project may impact on their wards/ communities. that's the legal process. Because it was an emergency and the muni was running a number of water saving campaigns it was very well publicised in the local newspaper

HAVE A LOOK AT THE DOCUMENTATION

We certainly came to the conclusion that desal in MB is a good thing. It was better than the alternative. As an environmentalist I should say no development is a good thing. It's a lesser of two evils. But I think the municipality did the best they could under the circumstances.

there's a need for this new technology to be understood as early on as is possible and hopefully the learning derived from these can be embodied in new plants which are coming and they are going to get bigger. What we have now are babies. See plants in australia, they are big. and if not done effectively in this country, we are going to damage our marine systems. Plett is a different case, don't know its future. Plett took a wrong turn and we're still trying to get our client to recover from its decisions. as its and exaple of how desal can go wrong. plett is highly politicised. neck and neck between two parties. power change impacts on project continuation. projects tend to drag out for that reason. what's really nice about plett is the building itself. placed the plant on a tennis court and public was up in arms over the plant. they did a very good job, got an architect on board. did a good job with the building itself. just a pity about where they choose to extract water from. In mossel Bay they are extracting directly out of the ocean. In plett they sink boreholes into the sand, using the sand as a filter. that decreases the size if the plant because of the prefilter component is quite considerable. But technical, r.o. its the same.

grahamtech also abstracting directly from beach wells they may not need chemicals in that instance… would be interesting to see the differences in process. I beleive they have to use chemicals for cleaning in place. A strong acid and alkaline through ro filters to clean them... then discharged. also chemicals to demineralise water after you've purified it. because ro water distributed is dangerous as it strips the pipes etc. So if they're saying they aren't using chemicals at all. I think it should be questioned.
I'm just the chief financial officer. That's basically my job, to fund it. When it boils down to it. And when you get something like this thing that was DUMPED ON US when it was problematic. But the history to it was very simple… (walks to board) 4 Years ago, the THEN Engineer decided he needed a dam, a DAM, which is fine … But R30mill ok. He also needed a waterworks to move the waterworks from where it was. And that was about R40mill. And then there was a third element to all of this which was the fact that the sewage would link to this and the whole piping system. So everything would begin to work together.OK. And that basically came to, well call it the rest for want of a better word, and that basically when we looked at the whole thing was going to be about another R40-R50mill and that was what was coming up on the various plans. they were all being SOLD, because this is all about SELLING, they were all being SOLD individually. In other words, Sedgefield needs a dam, and then next, Sedgefield needs a waterworks etc. etc. I sat down, we were concerned with where this was going, and I sat down with the Chairperson of the technical services committee; councillor Andrew Finn who was the then engineer's boss, political boss. And we actually sat then and we looked at this and we went (connects the pieces). Very Simple, and the result was that this thing was costing R120mill. And that was the point. We then said NO. (chuckle). Becasue very simply this was a R120mill project which would give water to Sedgefield. Thats not an issue. It would give proper sewage, everything for Sedgefield, which is super and great and dandy, and it would do this for the next 20-25 years, so everything is there. The simple problem is that Sedgefield has 2500 tax payers and there's a popultation of about 10-15-20000, there's only 2500 who actually pay anything. And therefore that thing on its own was simply not sustainable without Knysna kicking in and cross subsiding. And Knysna had its own problem. So now you have to start to go back even further. So if you look at Knysna. This is the Knysna Municipal area. You've got the sea and you've got the Outeniquas which are essentially to hell and gone basically.

The only bit that runs is effectively this bit. There's Karatara and Rheenendal. There are 5 population centres, in this thing, each one of them has got its own distinct systems to make them run. so you are not looking at, when you look at the Knysna Municipality, you are looking at 5 towns within the Knysna Municipality. Therefore you are looking at 5 infrastructures. This isn't Cape Town with 1 major infrastructure or 2 perhaps that you can pull together. This thing is surrounded by 5 major infrastructures. They don't talk to each other. So you have 5 distinct systems running. And they're very expensive systems as a result. We have something like a hundred and something, whatever it is, pump stations, running through this municipality. And any engineers will tell you, if you're startign to run pump stations at that level, nothing in this place is sustainable. The thing does not work properly.

So Sedgefield to be wanting a R100 odd million and Knysna to be wanting a R100 odd million, and the Rheenendal's going to come and Karatara's going to come, and Buffel's is basically sitting by the sea there. The THING IS SIMPLY UNAFFORDABLE. SO we said no to that

And then low and behold the river stopped flowing. Now it would have stopped flowing anyway, and the dam wouldn't have been built anyway, and none of this would have been in place anyway but then Sedgefield had no water. So this was in the pipeworks of the then town engineer of the municipality, but it was a pipe dream, it was simply not going to work. The system we've got is a Heath Robinson system. Its basically nothing connects to anything. Sedgefield, Knysna, Rheenendaal, do not connect to each other.
The actual infrastructure requirements are close to a billion rand to do the thing properly for this municipality. Rodney and I have (?) many times about this because as far as I'm concerned the whole system has got to be removed from the municipality and be given to some sort of water board. get it out because this municipality simply cannot afford the capital infrastructures. Unless government is going to say, 'here's a whole lot of money, go and build it, go and build them'. It really is as simple as that. so they've got 2500 tax payers on a R100mill project. Wasn't going to happen.

Knysna would have had to subsidise this thing. That's not the issue. Sedgefield would tell you that they already subsidising Knysna. Because that's the nature fo the way a thing like this works. But to subsidise THAT, Wouldn't happen

From Sedgefield that was the only option that was put forward. Sedgefield didn't really have a particular, there was no suspicion that there was going to be a water failing or a drought. There was an awareness that Sedgefield needed to grow and this (dam etc.) was part of the growth strategy for Sedgefield. I mean there's not a lot there, and its already constricted. it cannot grow unless its infrastructure is grown. That we knew and to do things properly, engineer's always want to do things properly, so 'let's build a dam' type attitude

Our current new engineer wants to build a dam for Knysna and now I would say to him 'go to hell'. Because there's a dam sitting out there (refers to sea option?) and in 20 years time when you going to need that dam, the technology will be such that it will be an awful lot cheaper to take water out of the sea. In years to come the technology will have developed

No the R.O plant has never operated. But then the Sedgefield plant has only operated for one week. We never paid for those (chuckle). To be blunt. We've been given all this money and we've built in Sedgefield a desal and in Knysna a R.O. Ask me if they are financially viable or feasible, right now, No. We don't need them. Our systems are working perfectly well. HOWEVER, what the desl has done is that its given Sedgefield a guaranteed supply of water until whenever it is 2020-2025, and the R.O will give Knysna a guaranteed supply of water until probably 2020. Its currently not functioning. It doesn't need to function, because our current systems work perfectly well.

If the rivers flow the systems work. That's, it literally is as simple as that. If the rivers are flowing we don’t have a problem. That’s why, i’m digressing slightly, but there's a reason for it. have a ridiculously debate with provincial, national government and the auditor general and they talk about us wastign water through the pipe system. And my argument is very simple, 'yeah, we could spend a lot of money doing up that. that would be supper and great and dandy.  but right now the rievrs are flowing. as soon as the water goes over the wier it goes into the sea, its lost. I extract water before the wier and it goes into my pumping systems and into my pipes. Far more goes over the wier than goes into my pumping system. So you know its really now worth my while spendign a massive amount of money upgrading my pipes and stuff when far more goes into the sea. That Lagoon, is the sea. So yeah, there's a whole debate on these things. Provided the rivers flow, Knysna and Sedgefield don't have water shortages. In Sedgefield we had a water shortage for a week. That was it.

and in sedgefield they solved it by finding an off-stream dam, natural dam, which somebody must have known was there. Because it was only just around the hill, the engineers found it. This was right in the point when the water had stopped flowing, and they were all worrying about it. When two people around a hill and said 'oh there's
water there in an off-stream dam, natural dam, let's pump it'. Which they did

(question of forward planning)
what about it. There's a little bit of a lack there. That’s the forward planning (dam) the
engineer had done the forward planning, or was in the process of, the finance official
said 'there's no way we can afford that'. THAT was the only proposal on the table, there
was nothing about a desal, nothign like that at that point

Capital Budget
The Municipality has a capital budget of anywhere between R50 and R70 mill per year.
Lets take it at a maximum. Of that R70 approximately R40mil will come from
government each year. Provincial or national government, either through the housing
grants or through the mi, or whatevre those things are. So the balance I have to FInd.
and I hae to find i either through surpluses in my operating account or by borrowing.
Simple as that. At the Time, Knysna was the Highest Geared Municipal Authority in the
country. You can google that fact, one of the German Banks did a study on us. The
Institute of Municipal Finance Officers published this, we were more highly geared than
Johannesburg at the time. I dont have a problem with being highly geared. to me thats
high a local authority should work. i dont like having money in the bank, I like having
assets in the ground. You pay for your services, you expect those services, i have to
continually invest and upgrade those services and thats how the ssytem works. And so
Knysna built its infrastructures. The problem is, you've got 5 different towns here. So a
sewage works, or electricity works costs the same everywhere. So its basically 5 times.
So what you've got in Knysna you can basically extrapolate all the way through the set
ups and thats the issue. So its massively expen
sive from that perspective to put the
infrastructure properly in through a requisite agreed level. So we were already highly
geared. Which means that the probability of me being able to borrow to fund something
like that was nil. So, and government would a
have been giving us MIG monies. But MIG
money is not only for water, it is also for electricity, for sewage, for roads, its also for
community services nowadays. Therefore this project wuld probably have had to be
pushed over 8-10 years in any event. So it wouldn't have solved a drought.
Lets be clear there were options of raising the wiers and things like that, but that’s what
the engineers were doing. They looking at well 'we'll upgrade the water works etc.
R40mill'. But they were running them all separately. That’s why I said to you, when I
sat down with the technical chair and we looked at this thing and said hold on a second,
'all of these things are happening simultaneously'. Then we called the engineer in and
he said 'no, no, he's trying to link all these things together, he just din't sell it that way'.
Bits and bobs were done on the wier and the pumps. There were slight upgrades done
on the pumps. And there's continual operational work going on on that side fo things.
Not withstanding the fact that there's a desal.
In Knysna, we had a droguht here as well. We were never going to build a dam because
the eias and everything else was going to take far too long. Sooo, the short term solution
came down to, either we raise the wall of the wier of we look at the R.O. The R.O was
going to be much quicker, it was going to be paid for out of the national fiscus,
therefore I didn't have to stress myself too much about it. The only thing that we had to
do was link it back into our system. So that the water being extracted could be linked
back up to our pumping systems so that the water could get back to our water treatment
works and into the holding dam. We dont have a storage dam, we have a holding dam
up on the hill. So what we doing is getting the R.O to work and then you pumping it
back up the hill. Seems a dense to me! But thats the way we doing it, thats the way we
running the thing. It goes all the way up and then comes all the way down again. So
thats the systme we've got and that system will cater if its requiried. At the moment its not required

How desal became an option:
it was very simple, the real option of selling it was we were getting money and the guys that had built the desal in sedgefield were also RO people, therefore dwa and all those good people decided what a good idea. We have the technology and the opportunity here. So they went for it. I was involved just by basically saying 'YES', because I didn't have to pay for it. To me it was, I DIDN'T even know if we NEEDED it. The Engineers will have to tell you if they THOUGHT, they Think that we needed the R.O. Rodney is the best person to speak to on that one. But financialy it was seventh heaven, because I was getting something that I didn't have to pay for. Becasue this town couldn't have afforded it. So what a pleasure

Augmentation fees:
all local authorities charge - we call it an augmentation fee. WHAT THAT BASICALLY IS, IS THAT when private developers are wanting to put developments in, we ask them to contribute… About 15 years ago it became an inflation driven project, goes up every year. And that gets put into a certain fund for infrastructure purposes whihc is super, duper, dandy. The SIMPLE FACT of the matter is that it gets used, adn it gets used for infrastructure and it did get used for infrastructure and it was spent. So when the engineers say, 'ah, there was no money in the augmentation fund'. There was plenty of money in the augmentation fund. They SPENT it. Becasue they put projects forward for water there and pipes and the next thing. Upgrades to the waterworks. I WILL GIVE YOU A SLIDE PRESENTATION that I gave to council about 4 years ago where we actually tracked the augmentation and how much was in the augmentation. Becasue there's augmentations for sewage, water and electricity. Now you must remember that this town went through a huge growth spurt and local authorities work behind the ball. So when Thesen Island was built in the 90s, and the various infrastructures that took place in the Eastford part of town, the upgrades that went through the 'WEALTHIER' suburbs. They're the ones that pay the augmentations. Thats fine, but as soon as you oput those developments down, you have to put the infrastructures in, inorder to make them work. And thats where the money went. What's up on the hill, whihch is our poore areas' our 'black' areas, you also have to put infrastructures in there. And government pays for the top-structures not for the infrastructures. You have to put infrastructures in there. So THAT (Aug fees) supplements the MIG whihc supplements everything else. So its very simple. Which the engineers dont like, because they think its their money, which its not, it has to be used for the capital expenditures.

MIG:
The engineers put their requests into MIG basically 3 years in advacne, which is a floor in the budget process, because they - not now because I've stopped them now - previously we wouldn't even know about it and then we are told, 'no its for this and this and this'.And now we're chasing a project plan of engineers that hasn't been through a council. So now we've pulled all that in. Yeah, our town engineer knew how to operate the system ... We would have a serious go at each other for him not playing by my rules

Infrastructure decisions:
MIG pays for some of the infrastructure, because MIG is designed for the poorer suburbs. But Knysna Municipality kicks in about 5-6 million a year additional. Which you will not get in Cape Town, for example Cape Town is a flat piece of ground. The formula that applies to a house in Cape Town is the same as here, but here it costs R66k versus R60. That extra is our contribution. The housing programme that takes place in the Northern areas is a plan that has gone for 10 years and has another 10 years to go. So it's all planned out.

(NB) What I'm going to give you is our monthly SECTION 71 REPORTS. Detail of financial information, and we go a lot further as to how those are broken down.

Declaration of the Emergency:
There are 2 ways of declaring an emergency and there are 2 specific reasons for doing it. There's the technical aspect, where it's a disaster management issue which allows you access to external government funding, to be able to do things...to work with other local authorities, and that comes through the Disaster Management ACT and systems act, I think. THE Other one is actually in the MUNicipal FINANCE MANAGEMENT ACT where the Mayor can declare, that's the one I use, and that allows you to move money around in a budget. Because the way local authorities work is very rigid and difficult to move monies around. But declaring a disaster in the MFMA suddenly allows you to move money. SO it gets declared on 2 fronts. The financial one and then a systems one, if you wanna call it that. I think in this case we declared a financial one first just to get us the ability to move money around. Declaring it a Provincial one, you know there's a whole lot of other hoops and the Minister has to declare it and that, and the other. Whereas the Mayor declared it a financial one and we got the hell on with it. And this gave us the money to get the water trucks and bring the water in. A financial emergency and then it became a full emergency. Purely because of the way the legislation worked. Its faster to do the financial one than it is to do the other one. Seems a bit daft but it is.

There wasn't a shortage of money, but what it does is it allows you to move money without having to grow through adjustment budgets. Because adjustment budgets are legislated so that you can only do certain ones at certain times of the year. By declaring it an emergency, it gave us the money to move, it gave us the ability to move monies very quickly. And to dispense with supply chain procedures etc. etc. It works, you just have to do it properly, declare an emergency.

IF money was not accessed through national funds, would Knysna have had money in its own purse?
It would have had to start taking decisions to do other things. REMEMBER, Sedgefield was without water for 1 WEEK, so how much of a disaster really was that. My personal opinion is that it wasn't a disaster at all, it didn't have water for a period. Then, the on-stream dam was discovered, and then it was fine, the water was flowing again. Its never been a disaster HERE, we got down to some many DAYS OF WATER. But Again, its never been a major issue. You know I think I'm a bit of a cynic with these things. I think I'm probably the wrong person to be asking all these things. I think WE CRID WOLF, and we got away with it. In fact we got desl and R.O out of it.

What do you think the logic was in crying wolf?
I think engineers and politicians got into a panic. But I'm not an engineer and therefore I wouldn't be able to make that call. We put in water shortage measures which was marvelous, super, fantastic. IT COST IS MONEY. The river never stopped flowing, that's the point, it has never stopped flowing, maybe stopped for a day and the next day
it was coming back over. yeah, so I don't...

Look I think in Mossel Bay and Georges case, that was different. Because they literally have a situation where if their dam doesn't fill up then they've got a problem. And I find it quite hilarious Mossel Bay was saying something like they were 40% full and they had 40 days of water, we were 60% full and we had 6 days of water. Thats the difference in the dams. And they were gettign into trouble. The rivers there had stopped and I think thats the difference. They didn't have any other way of doing things. Whereas ours never really stopped. We have many feeding rivers.

It was declared an emergency purely to move money around in the first place, so we could get the tankers in and if necessary we could put pumps in.. That was why it was declared an emergency. But for civil defence type things. The other… That took a bit of time.

WE were looking at the water flow on a daily basis. And dire warning were being issued. One Week, that’s all it is ONE WEEK. That's actually a fact. And that’s why the desal at Sedgefieldl only ever gets switched on at Chrsitmas and its literally that week in Christmas where we have a lot of visitors. THATS IT. Apart from that it gets switched just to amke sure it still works. And its extremely expensive, because of the electricity costs. The thing is, its extremely expensive, but its never really switched on, so dont ask me to give you figures on it because I cant. All we know is thats when its pikes
The main costs so far have been the capital costs. The operating and maintence costs are to be carried by the municipality. You would have to ask the engineers as to how much maintenance is actually taking place, and I would not be surprised to learn that there's actually not a lot going on. Hopefully the money to pay for the fixing of the exposed pipes in Sedgefield will come from insuracne. But that could be an intersting dispute. So we're kind of parking that to one side at the moment. Because they are insurance claims.

There were problems with the pipes in the past.Where did the money come from for that?
No but it has cost that much. So it hasn't cost the municipality a great deal of money yet. I think when the maintenance contract stopped then its going to be a problem. We would have to talk to Rodney about the nature of the contract

Information on what money the municipality has spent and what came from national government?
AGAIN, we can do that, but we don’t actually run it as a separate cost centre though, So I'll see what I can do. I'll get my budget officer to have a look at it and see whats there On the R.O, we haven't had a problem with the osmosis plant. We've had a problem with the sewage plant. We've had a problem with the sewage plant.

Is the R.O itself functioning?
I believe so, I belive so, again its not needed. I think people have drunk water from it. But you know again Rodney would tell you. I think its actually been switched on. I don’t think its augmenting our system. And if it is, its probably by 0.5ML or something. Its supposed to do 1.5ML to 2ML. And I think its doing 0.5ML or something. but we don't need it.
This is a classic case in my opinion, don't quote me, of fruitless and wasteless expenditure, Not by the Knysna Municipality, because it wasn't our money. But I think province and national overreacted and they basically demanded short-term solutions to what is going to be a longer term problem. And that might have been the right way to do it. I just happen to think that in hindsight it wasn't really in Knysna and Sedgefield's case it was the wrong. They didn't have to throw the money at it. Here we didn't have that problem. Sedgefield is not a big town. Knysna is alot bigger. but its still not on... and we have 2 rivers that fly in and we ahve 2 dams, the glebe and akkerkloof and you pump from one to the other and literally you pump one out, you can balance and manage to a certain extent whats going on. And I dont know if the guys understood that the complexity of the knysna system was to our advantage becasue this thing works in all sorts od weird and wonderful ways. you could move the water around. I'm not against the osmosis plant, I actually think its a good idea. I mean the sea's there for God's sake. YOu kniw surely thats the future. Its not putting dams in place any longer. That's just the simplistic...
You said that national and provincial…
I THINK THEY OVERREACTED
It was a request. We were asked to put together pa$$s, Rodney put together the best plans he could put together. To get relief. And those were the two best and quickest plans. Whether thye were in the long term the correct ines, is where I'm coming from. BECAUSE the desal has been on for one week and the RO never has. SO you know, two years down the track. However long its been now you just have think you know hats going on here. We never really had a drought. you know people are theoretically still to water their gardens on every other day or something. We have managed to reduce the consumption. thats been successful. TOO successful in my opinion. But thats just me. We still give away 6kl of water free to evrybody. So I'm thinking what am I missing something here.
It had a finacial impact, but it wasn’t massive as far as I remember. But Rodney will have the figures. It moved the average water figures, but if I remember correctly they moved from something like 15.5 to 12.5 ll as monthly consumption. In the Knysna case that works out to about R1mill per year. Could be important, but remembering when all of this was happenign, the eskom price increases came at 30% lus, so whatever I was losing there I was gaining massively on an eskom price increase becasue all we did, and every other local authority. We just passed the increase on. Which as much increasing the price of electricity, it increased the surplus being driven on that. So it really made real great shakes. We also put in higher sliding scales for water, because nati and prov wanted us to do that. We already had sliding scales but all we did was to increase the scales. Thats fine, its working on the richer end. So from that perspective again it has reduced water consumption. So the thing has become doubly self fulfilling, But we still give 6kl free to everybody in Knysna.
water distribution:
AGAIN Rodney will have the figures. They put in bulk meters, but that was in the Black areas, the Northern areas, but that was to look at what the water losses were there. But Rodney will have the figures for each specific area. The Northern area is our black area but our coloured area is designed exactly the same as evrywhere else. The apartheid side of KNysna sits up there if you'd like. Its a very old way of looking at things here. For example in the Nortern areas they only have 20 amps of electricity to a arlge extent. Whereas the rest of the town is now working on 60 amps. A 20 amp will give you a kettle and an iron. Its a financial decision at this point tin time. Becasue to out a full
energy reticulation in... well it was run by two things, 1) Eskom didn't give us the power therefore we couldn't expand the networks. Eskom are now going to give us the power in the next 2 years in which case we will upgrade. Its all prepaid anyway.

Water, interestingly enough, now here's where the debate starts. Water in our Northern areas is not metered. BUT our bulk meters show that the average consumption is 6.5kl per property. Which makes you wonder why you should put in the proper water meters, as the infrastructure cost is R3-4 million. The availability charge is built in and here's a charge that goes through electricity. So its all being run through pre-paid electricity. And virtually if you look at any local authority in the country and you look at the make-up of their debtors, domestic debtors. You will see electricity and rates debtors have remained relatively steady; but water, sewage and refuse debtors have gone up. And the reason is property rates is a tax and electricity can be measured. BUT because of what government's done with this other legislation, that you can't cut-off water so therefore people are no longer.. THAT TAKES YOU INTO A WHOLE OTHER ARGUMENT AND A WHOLE OTHER DISCUSSION AS TO HOW YOU FUND LOCAL GOVERNMENT. But the simplest way to do it is you put in prepaid electricity as much as you can. We've basically scrapped our refuse tariff and put into rates. And a large part of my sewage tariff I've now scrapped and put that into my water. And my water availability I run into my prepaid electricity. JUST TO GET REVENUES OUT OF THE SYSTEM> That's how every local authority works. They won't say it but its how they do it.

state of township water infrastructure?
Very Good. Its being upgrade all the time. They are fuller reticualted within the houses and then there are stand pipes within the government norms in the shacks. We ahven't gone the Cape Town way of trying to reticulate shacks which I think is the wrong way anyway. But thats their decision. And we haven't gone that route. If we haven't got the monye, we dont do it In the wealthier suburbs the infrastructure was laid down. So in that case the money was available?
THEY PAY FOR iT. If you are in a new wealthier area you would have paid augmentations to get into that. If you want to upgrade your electricity you pay for that too. We haven't grown the town though in the last 3 years. Because we simply haven't had the money to expand our NETOWRK SYSTEMS. It comes back to our network systems. And as I said earlier, MIG is predominantly aimed at our poorer areas anyway. What we've done is we've rolled the MIG up into bigger projects. Like the water wroks, like the sewage works, stuff like that. If you rich you pay.
Infrastructure access and rate is determined by your ability to pay?
Yes
Rodney is also project manager for the Neighbourhood Development Partnership Grant which is a R100mill government has given us over period of time. Which is to upgrade economi areas of our Northern areas. But you're not allowed to use it for infrastructure. What you are supposed to use it for, I'm not quite sure, because its infrastructure we need. But rodney is looking at that. There's a whole lot of consultants running around at the moment, putting together a 20-30 year plan. But like I said Rodney's the project manager on that.
When you look at our payment levels (in Section 71 reports) it will begin to explain there's virtually no money coming in. But you don't see the prepaid stuff. Payment levels for the town are running at 95-96% and that's how we can keep going. What we don't need is to spend R100mi plus on a project of 2500 tax payers. We have desal which can run the whole town. and we should ahve a desal fro KNysna. Like I said the engineers would like us to build a dam in Knysna. But like I said if Sedgefield can run on desal, so can Knysna. YOu have towns all over the world that are doing it. Wht regrd to the electricity costs, electricity is a cost which is recoverable. That's the difference. These costs will be covered through the tarriffs. Like I said the water debtors are raising all the time ebcasue you cant cut them off. but the electricity, eveybody that moves into KNysna now and wants a connection, its prepaid. So our whole municipality is about 55% and will continue to expand.

do what extent do you influence a decision such as a dam? I'll do a cost-benefit analysis on it. It again comes downs on whose funding it. If givernment says heres' R40-50mill. I'll then say ok, lets have a look at the ancialliary costs and if it works out cheaper, fine, I don't have a problme with it. But to fund R40-50mil on its own. I'm sorry you looking at an additional 8-10% on the rate per annum. If you look at the water tarriff you looking at 300-400% incease. Its not going to happen. So if the money comes from the municipality you have to recover it. Yes, I have to recover it because I have to borrow it. If funded by government it’s the year on year operating costs. That’s also a probem, in that governenmt has thrown so much money into infrastructure projects but didn't cater for the year on year operating costs and then it sits back and says authorities dotn maintain. BUt what do you expect. All of a sudden you've shoved a huge R10mill project on a local authority which has got a tax base thats not geared to do r&m on this project and then authorities are blamed for it. National trasury though have moved away from throwing large amounts of money at single projects because they've understood that there's a problem coming down the track on this.

I think, and I come back to my earlier point. This whole area is crying out for a water authority. It doesn't have to be geographically or politically bound. Rand Water runs all over the place. But it’s the economies of scale. You need those authorities and the revenues that are generated, take them away from the local authorties, run a water authority and work this this thing so there's a cross-subsidy thing working. Similar to electricity. Whihc they wanted to do with ended with a disaster area. Water can function that way and does in most of the country. You've got the Umgeni Water Authority, you've got the Rand Water Board, these are two huge bodies whihc are operating pretty well all things considered. But you can't expect muniicipalities like Knysna to spend R100mill, we haven't got that kind of monye. You ahve to look at your tax base, whats paying for this. IF YOU LOCAL GOVERNMENT FINANCING STRUCTURE DOESN'T CHANGE YOU cant expect local authorities to have major capital expenditures. You ahve to pool unless you change your macro finacning structuring. they haven't done that yet, so..

Financial crisis: No it was an engineering knee jerk. The financial crisis was called so we could move monye, so we could put in punitive water tarriffs. Like I said the Sedgefield one lasted one week. The Knysna one never really satrted. It became an issue, but we don't cut people off. We had water tanks driving around, but most of that was probably caused by the infrastructure breaking down. So to me, wiht hindsight, what has happened has been an over reaction but it has allowed Knysna and Sedgefield to begin to grow again. So a lot of good came out of it from that perspective.
presence of plant gives security?
I think Rodney has had more dinners and lunches on the Sedgefield desal. And this guy was the head of water for the city of joburg, so his not a fool. But from a financial perspective its not a financial issue. But the dam was a financial issue. So in 5 years time, the desal should be operating, but then it should be a bigger desal. The seas are not going to go down, so the water's there.

I run the budget on a cash basis and each year the operating budget is run on a cash basis. So when it s a 95-95% paymenet level I've already removed from my operating expenditure the 5% that's non-payment. So you running on a cash so its back to 100%. On the longer term stuff, I know roughly local authorities dont change because its very difficult. I equate us to oil tankers. We are very slow, its very difficult to change direction and its very difficult to stop and thats what we are. So will know that the capital budget for next year is about R60mill, it will run between R50-80mill. If the town is growing, I will push. BUT I'm not seeing any growth in this town at this point in time. So I'm comfortable within my parameters, that translates back into cost and borrowing cost whic translate back into the cash I will be requiring. And thats how I run the town, all the way back to my cash flow. Thats all I look at ultimately. Where my debtors are, but they never going to be far from whats my cash. and thats a bank will ever look at and its all a credit rating will ever look at. treasury, provincial want to see ratios for this that and the other thing. Its about your cash. Get it down to a level, you see whre things actually are. I try to run in surpluses, put that cash aside to reduce my borrowing costs. Just like you running your budget. Its not rocket science. The metros are the same. and I've worked in two metros.

I only influence the decisions to the extent that this is basket I'm running on. All I ever say is these are the parameteres you working within, don't go iver those. I'm not going to throw a whole bucket full of money at them. That's why I've survived for 9 years, 4 councils, 6 mayors, the da just wont the elections now. The dofference in the da and anc is virtually jill when it comes to running an authority like this. Because we dont have the money for silly projects. and treasury backs me on that. So I've got evrybody in a straight kacket. I say each eyar to politicians. 90% of your budget is fixed anyways: salries, electricty, capital charges, interest, redemptions, for projects already started in capital budget. You haven't actually got all that money. When you explain that to them they are actually quite well behaved. Things like that (dam project) are what causes the problem. because that is probably a 10-12 year project. But the problem you put something liek that for 10-12 years together and its probably osolete by that time and like I said 2500 taxpayers in Sedgefield. But if you run it will the KNysna, George, Mossle Bay population and all of a sudden there's a 100000 people paying for this thing, then it makes sense. And you could actually bring in a whole bunch of water related projects. Thats the solution in the end. The solution is small authorities can't do things alone.

Without the funding we would have had to come up with a solution that would have cost a lot less. If the river had stopped for any great length of time we probably would have built the desal. Its mobile, you know that. It might have been a cheaper one, a temporary for six months and then government would haev had to throw the money at it. So it would have been an expensive bridging exercise, R5-6mill. It cost us almost nothing now though
consultant selection:
Full scale tender process, slightly truncated. I'm chairman of Bid Adjudication process. I'm comfortable with the process. It was donestraight up. Full reporting to council, was a very transparent process, the Knysna one became a continuation of the Sedgefield. In knysna the problem became a pipe from old place. one fo the contractors did a bum job. It went very very well.

I think in many respects it was something that was going to happen at some stage. I'm not sure the engineers thought it was going to happen in Sedgefield they probably thought it would happen in Knysna. The dam plan, what was so annoying about it, was that it was 3 component parts that were not linked together. So all we were ever seeing was little bits. And myself and the head of technical services were looking at it. Probably on this board for 6 months and then one morning we saw the connections. He was going to use the MIG monies for a 4 year period and was still going to be R40mill short, and then this thing happened and Neale said, 'told you so'. But this thing wouldn't have been ready anyway, no where near to it.

We have a sewage works built next to an environemntally sensitive estuary, when it should be over the hill.
Interview 5 on 15 November 2011 – Academic

In terms of South African Environmental law at the moment, it is a requirement that any development, whether it be a building, forest, reverse osmosis plant, desalination, any substantial programme; requires of course application to the dept of environmental affairs. and therefore it is the responsibility of those running the programme to make sure that the stakeholders/interests are contacted or notices given in the press usually that this is going to happen and if interested lease registered. And as far as my involvement, we have an organisation the Knysna basement project, which basically is a research project that has spent a long time in the basin of the river. And any contiguous catchment, for example in Sedgfield would be of interest to us. And therefore we would become interested and would apply to have our name entered to the organisation. That’s how I became involved because I’m the director of the Knysna Basement Project.

We have been involved in research in the Knysna River since 1995 and we therefore have a reasonably substantial database which is summarised in the Transactions of the Royal Society of South Africa. This was a summary, basically a set of papers that described the estuary and the possible impact of fresh water upon it. And that was later developed by the dwa, who then wanted to know more specifically about river flow and the impact of river flow on the upper estuary. So it happened that there was a further development of this that was published in the RDM series of the dwa. Of which there were a number drawn up, covering a large area of South Africa, and the RDM for Knysna, Sedgfield, they are all available via the RDM office in Pretoria. I have a number of them and I was involved in editing the second series of reports on for example Knysna and also Sedgfield. So the dwa wanted an independent assessor so they could feel their work had been adequately reviewed by someone who knew the subject.

That was the general thesis. Because in 20012, 2002, 2003, the dwa was alerted to the fact that there was likely to be a shortage of water along the Cape South coast and so they invited a large consulting civil engineering group in Pretoria to set up a team that would be able to deal with specific areas of concern. With the whole idea of water resources that make up the catchment of the South coast. And that demonstrated quite clearly that the whole region is in water deficit. And they divided the whole area between and PE and CT and we fell into the Gouritz Management area which is a very large catchment, the catchment of the Gouritz and a number of subsidiary catchments. And the result of that work demonstrated quite clearly there was a shortage of water. And that was in the period 2003, it was a period long drought, the coastal rivers almost stopped flowing. The problem with our area is that we don’t have long, well fed rivers, we have very short rivers between the Outeniqua and the seas and the catchments area relatively small. Knynsna, 400km2. So it follows that to survive on that amount of water, you have to manage it very carefully. It was very severe. The drought we have just emerged from, it was very active in
2009, 2010. Which meant people started to look for alternative sources. Borheoles worked, but the boreholes in this area is usually brackish because they don't come from the table mountain sandstone, but the lower floodplain is usually made of sands, inons etc, and is usually brackish. Sedgefield tried to live on this, but when the Karatara dried up, they were in trouble. The DWA had known about the shortage for years, the work was commissioned by the DWA, whether they liked the results or not, they were subjective not objective. The DWA had to accept the work of the specialists they had appointment through the consultants. Recommendations would have been made in relations to framing, irrigations, alternative sources of water, boreholes, desalination, dam building. There were sufficient alternatives. But whether those alternatives would be successful in responding to drought, is another question.

Regarding forward planning as prevention, I don't think so, in a sense it's a catch 22 because municipalities, some have dams, for example George has a dam built many years ago, Mossel Bay has a dam built to supply Mosgas, Knysna has no dam, neither does Sedgefield. Whereas the munis would have loved to have dams, they didn't have the money. The DWA made it very clear years ago they were't going to build dams for munis, they had to fund it themselves. Then you had the problem of finding a location and accessibility, then you've got to convince the stakeholders. Which in terms of SA environmental law, its not easy. So the municipalities are facing a fact where they'd like to have the dams where they appoint consultants to do geological, ecological, feasibility studies, very eloquent studies. But none of that is possible until environmental affairs say yes, or other stakeholders. And they may be so large or loud and in terms of SA environmental law, the stakeholder is very important.

The consulting engineers having been given the permission by the municipality for example to describe alternative areas/choices for water supply, eg. A dam, they would call up, many times we set for days, discussing/workshopping these ideas. So that every body both professional and lay had there say. Its a very democratic system. In the last century, dams were built by the department of water affairs. Panic in responding to the situation, and extent of the drought, was there a drought, degree of panic? I think the definition of a drought is subject to a certain amount of latitude. Its not that it didn't rain, it didn't rain enough. In the case of Sedgefield the river stopped flowing. That was a drought condition exacerbated by the riparian uses of the river. Dairy farmers use run of the river flow. They take water out of the river pumping it out of the stream. Thats ok if you have good natural flow. But if the base flow begins to give in, it means even these users would suffer, there would be an impact on dairy farming, or go for alternatives or simply 'pray for rain'. This is the sort for way we deal with these problems. In the case of the muni, the idea that we should go for r.o was a very
attractive alternative. Remembering of course that it wasn't long ago 2007, that we had floods, a disastrous time. The munis called for flood relief, which they were given, as to what was used for flood relief I cannot say. But one has to be careful with it is a drought or not. But I feel for sure the SA Weather Bureau would have info on drought. But if we have 6 months of sub-average rain it would certainly create the sense of rain. The area would begin to dry up. It would the rain was sub average for any given month desal, after river started flowing again:

Eventually George suffered, that was an extreme condition, the expense was enormous, for anybody to say it wasn’t a rought period is a bit crazy. You don’t cart water around if the rivers are flowing decently. I think the munis began to appreciate it, you know you’ve got this other story, global warming. You cant disentagle the two. I think the general impression here was ‘oh maybe we are beginning to see a drought cycle linked to global warming’. Now there was no evidence of that, nevertheless that was the perception in the minds of the administrators. ‘Therefore we must do something about it, if global warming is going to take this type of pattern of flood period, then long periods of sub average rain, then we are going to be in trouble’. Because our storage capacity is minimal. Sedgefield had no storage capacity, Knysna has a simple storage capacity off flow dam, like the akkerkloof dam that it filled, then it will last the summer holidays. So there was a real perception, I dont think it was a crazy perception, in the minds of councils, because I think if they called for the opinion of dwa or the weather bureau, they might have gotten an answer that ‘yes, it looks like global warming is having an effect upon our climate, and therefore we better do something about it’. So they built those 2 desal plants and I think that the difficulty, I’m not skilled in the engineering if the Sedgefield plant for example, but it has caused difficulty because changes in tidal patterns has tended to expose parts of the intake system, which is something which was not necessarily planned for. AND I THINK THAT DEPENDS VERY LARGELY ON THE DEPTH AND EXTENT OF THE TIME SPENT AT LOOKING AT THE HYDROGEOGRAPHY AND HYDROLOGY OF THE AREA, I’M NOT SURE IF THAT WAS GOOD ENOUGH, I can’t say but that is a problem area. And even oceanographers will not necessarily say, this will not happen because things do happen in our coastal waters, our off-shores waters, which are not all just able to be described by previous oceanographic events. So that could well, thats a problem that needs to be sorted out, because otherwise a very expensive plant stands idyll, and after all, once you’ve got a plant like that, then its a feature of your water resource. In other words if the droughts are going to become more frequent and more intense, then this is a feature you have at hand, and therefore you must look after it. And similarly here in Knysna, I mean the reverse osmosis plant was originally, the original idea was that we could recycle the effluent in the sewage works. But apparently, when that was put to the department of water affairs, i stand corrected here, they said ‘no, the quality of the effluent from the sewage works wasn’t good enough’. And that was why they
decided to drill boreholes along the side of the estuary channel and draw water from about 20m within the sand. While this had its problems and still does. Of course we're not using it at the moment, but there's no doubt that plant can be used as a source of water, drinking water in times of dire need. Because these plants are expensive to run, they are expensive electrical energy. That was the other problem. When those plants were being built, we were facing up to Eskom shutting down the power and if they shut down the power the osmosis plant stops. That was another constraint.

Concerns raised:
This particularly plant, when it was decided to use water from the boreholes, which of course was a portion which was dilute sea water, which was about 20 instead of 35g/l, then everybody got very excited, because they had all heard about brine being so much higher than seawater, that if released into the estuary, you could in fact severely damage the salinity profiles of the system. Perfectly true. So were concerned about that. Then I became involved in assessing the impact of the effluent the brine from the ro plant upon the ashmy channel, would it have an effect. Not only in terms of the brine, but the level of toxicity from the ro because the y use organic bromine as a microbiological inhibitor so that the filter membranes are not clogged with bacteria and fungus. Again these are used widely around the world, but they were new to Knysna. And everybody got very excited, and said 'oh, we are going to have slaughter here'. But everybody had forgotten, or if they knew, they had forgotten, which of course is a problem, that the final effluent from the sewage works is chlorinated. It has to be to bring the bacterial levels back to virtually zero. And the combination of chlorine, which is a very powerful oxidising agent, while in the presence of bromine, what sort of devil's big show is going on here. So this lab was involved in attempting to sort that out, and we went a long way down the road to demonstrate that there were many factors that could mitigate it ever being a serious problem, and there are many reports prepared for that. But some of the toxicity work is in suspension, because of course we have no reverse osmosis plant working, and therefore, and there was a reason why it stopped working because of problems with the raw water supply which produced all sorts of difficulties and then of course it rained and hooray, 'the drought has broken' and we didn't need it any longer. But its there as an alternative water supply. I mean no doubt about it, should these drought systems extend. I mean who is to say that in 2012 is going to be a wet year. We've had a moderately good spring, but December, January and February are usually dry months.

Best solution to the problem of water shortage, e.g. dam being considered?

It is a very real option, the muni has spent a great deal of money to get the consultant engineers in Cape Town and environmental consultants to really generate this, and these are still before the council, and the job isn't finished yet. So that we aren't entirely out of the woods as far as the preparation of the planning etc. You can't just stop, because once you've commissioned consulting engineers and environmentalists to
do a job, you can't just say stop. Well I suppose you can, but nobody like to do that until you have a complete set of reports and opinions, and recommendations and area able to sit down and take a decision. A decision of course is money. The dam in Knysna has been on the cards for years. The engineers, as far as I know it used be called, they changed their name the consulting engineers, used to be Ninham Shand, they were appointed, a whole bunch of them were appointed well before the... This drought is just ine of many and I think there's been an ongoing assessment of comprehension by the consulting engineers that you develop dams as an alternative source. In the middle of drought or not, i dont think it matters, just that if we didn't have an ro plant then you might say that a dam a very critical you must have it. But now you get stakeholders, environmentalists might say, 'no, we've got an r.o plant at great expense, why do we need a dam?'. Becasue they say the dam will influence the estuary, change the flow patterns of the rivers etc.

Public Participation Process:
Well I think what happened, I wasn't in Knysna at the time, but a public meeting was called and the principle of the R.O plant must have been put to the meeting. But normally these PPP should be done through a number of meetings not just one. But again I wasn't involved, except that we were a registered i&ap. It was only when I came back from Cape Town that I realised something was afoot, it didn't take precedence. It was only when consultants took a decision to build the plant that they called my practice in to advice and produce some results for the environmental impact.

Like in all, ALL towns, cities, one of the major problems in water supply is the management of that supply. And we have to admit of course that potable water when its delivered from the purification works into the main reticualtion system, quite a significant portion of that volume is lost due to leaking valves, broken mains, you name it. And very town and city suffers the same problems. I've heard it said that if you could fix the water management side of the supply, you'd have gone a long way toward sorting your problems out. But ofcourse in a town like Knysna which is quite old - I mean its reticulation systems goes back well into the last century - so to dig it all up and replace it would be enormous cost, so there are what, i mean there've been many studies on water demand management. And all cities have the same problems. Water thats purified at great expense and then put through a reticulation system that cant guarantee 100% that flow is going to be distributed 100% through the households or industry. Becasue we know that there' this serious matter of leakage. And every consulting engineer that I've worked with throughout the years, thats always been a factor thats been stressed repeatedly. You know get your water demand management in order. Defining drought: tension between supply and deamnd?

If you have a crisis where your river flow stops flowing. I mean Knysna depends on flow of the river. That’s we take the water from,
and we either take it into the holding tank from where it goes into the water purification system, or its sent to Akkerkloof off storage dam. Obviously the ideal is if you can do that knowing that your water deamnd management is 100%. We know that it isn't 100%. We are storing water on the one hand and losing it on the other. Its common to all socieites using reticulated supply.

With better supplay-demand management could the drought have been better anticipated/ responded to?

You can never anticipate a drought. One lives and hopes. You see our rainfall along the south coast varies very much between Mossel Bay…, but Knysna is bimodal system, not very strongly but uts there. Becaseu if we don’t get nice rain in March we begin to worry becasue we think July might be dry. If asked when you would expect the rains to caome, you would say Spring. Which you cant say... You know some of the most excellent work done was done by the Wits School that did an excellent jib of analysin the datasets of 70-100 years of the last century and came out with trends. Along the South Caost, it tended to be bimodal. The cyclicity in the East is about 20 years, you would have 10 years of good rising rain and 10 years of falling rain. that was the picture of the last century. What it is now I cannot say. But it was a model that tended to be predictable. It was a great advance in those days. All those skilled meteorologists, climatologists are recording and interpretign the data. In a sense there is an appreciation of the variability of the climate

Use of models by munis?
I think they would if they were accessible to them. You must remember that much of this is publisde in journals which is not always accessible to people who sit on councils and take decisions. You would expect the dwa to have that sort of accessibility and to understand it. But one can't say the same for town councils necessarily because they dont have access to the research literature. there is a problem there. It would be nicie if the dwa took the lead and said that we kno from previous work that this period is going to be dry. Thats not impossible you know.

Gap between scientific finding and policy and decision making?
I think the general feeling is yes there is. And as a scientist one is responsible for producing hopefully very objective work, based on sound scientific work and publishing that work in journals that act as a repository for that information. But I believe that there institutes throughout the country, such as the natural resources institute at the University of Natal, the Institute for Water Research at Rhodes, and the Freshwater research institute at UCT. There are number of them now that have in their databases considerable information that could be used and should be used. But you know its very difficult to get that across to people to sitting on council. They might ask you to come and give them an open talk on these sorts of things. But exactly how that is going to impact to direct policy is not easy to say.

Interview 6 on 16 November 2011 – Municipal Official
Remember the history behind the drought and it has forever relied on run of water in the rivers. The town is approximately 70 years old, It was 70 a few years ago. So its always had the peaks and troughs. With it having a mediterranean type climate, we get rain in the winter's traditionally and the dry summers. And its worked reasonably well, becasue it attracts the tourists here over the Christmas period and that when we get water stressed. Over the years, we've had varous degrees of water stress. In other words we've had water restrictions brought in. Apparently over the christmas period not to water gardens etc. But we've never had this kind of impact.

In hindsight everyone says its probably a result and an early warning from climate change where we're now no longer having soft rainfall at night, every night or two, to having harsh sharp short showers, at odd times causing flooding, hence the two floods in the past.

In 2009 when this all started, 2009, 2008, we had the normal rains and the start of the summer season nobody even gave it a thought. As to the water. Everything was running smoothly, the water was coming down the river and the tourists came and then on the morning of Monday the 18th of January, the Regional Manager said to me, 'we have a problem'. 18th January 2009. Popped in, he said 'we have a problem, the river stopped flowing', and I said 'well, you better report it to the town engineer'. The Town Engineer was on leave (small chuckle). Nothing unusual. He'd been there for the rush and then gone on leave. So we reported this to the Municipal Manger who immediately called a meeting. I had to go into it and said 'Help, We Have a Crisis'. The River's stopped flowign, the treatment works which relied exclusively on water in the river, there wasn't even a pool available, was runnign short. 'What are we going to do?'.

And we took some immediate decisions on rationing and the normal panic kind of approach. We'll provide water by bottle, and we'll stop all usage, and we put salt water into the reticulation system and those sort of thoughts came to the fore. We then sat down, we appointed a consultant to come in and help with the work and we ... The next thing we did was contact the Disaster Management at Eden, because we fall under Eden, and the Province, again we fall under the Provincial Administration. And emergency meetings were held to get the army and George Municipality to help provide water for us. And it was agreed they could provide water approximately 1ML per day, using tankers running 24hours a day. That was the process we were going to do.

So we called a meetign with the community, and I believe this was to our credit, that we didn't try and pretend there wasn't a problem. And I'm not sure, but I think it was a Wednesday, I could look in my diary. 18th, 19th, 20th January 2009, it all happened in a few days. We called a meeting with the community and said, this is the situation, we'd liek you to appoint a representative group that we can negotiate with. We told exactly what the situation was. We said that we managed to secure 1 ML of water, whihc meant that there would have to be a 50% reduction in demand. Questions were asked, all sorts od things were said. We turned and said to them, something has happened whihc we couldn't really plan for, we have a crisi, let's address the crisis, and then we'll address the recriminations afterwards. At that stage, we announced, there'll be the water restrictions, no watering gardens. By that stage, this was 48 hours later. We'd said to them that we'd be buying 10 000l Jojo tanks which we'll put on key areas, we have a lot of old people in the area. And we bought 6 of these and they'd be strategically positioned so that people in the old age villages and poor community would be able to go to these tanks and get the water. The idea being that we would keep them filled. We would fill the main reservoir and every now and again keep the tanks filled so that the community could go and fetch them by bottle.
There was nothing coming out of the treatment works, it had been stopped. We then, one of the councillors got very involved, the chairman of the committee, in charge of infrastructure, and the consultant and we found that there was another river flowing into the Swartvlei. the Swartvlei has four rivers flowing into it, of which the Karatara is the one where we have the treatment works. They found one of the other rivers which has less abstraction upstream because there's virtually no farming on it. Still had water in it. And we estimated, all of us went out there independently and estimated that there was enough for probably 6-8 weeks of water. So we decided to lay an overland pipe. We didn't have permission, we just did it. It had been tapped, it was pristine waters. It was 2.5km wide, so we had to procure the pipe, we had to procure the pumping equipment, we had to get the permission of the land owners and all these sorts of things, and within 6 weeks we had an overland pumping system working. 2.5km long, pumping from a weir on the Hoogekraal river to the Karatara River and we were using that to treat and that was then pumped into the system.

So for the first 6 weeks we relied on water by tanker from George ..Wilderness. What we did, there was all sorts of things, law enforcement officers were going around, advising, checking that people were not using water, we issues certificates to the community, because there's a large amount of underground water, and people had their own boreholes, people were saying ok, they'll use boreholes for drinking and all sorts of things. We were a little bit concerned and we issued certificates which they stuck on their front gate to say that they were using borehole water, so they weren't being ticketed for abuse, wastage of water. We also put up notices outside the municipal offices, outside the main shopping centre, stating how much had been used the previous day. It was measured daily so that everybody could see exactly how the impact was and people were getting involved in saving of water.

Ok, now we go half a step back, from that community meeting that we had, the ratepayers and a group, had identified a group of people that could understand the water situation and they appointed a group of 7 engineers, retired engineers and couple of other people to monitor and liaise with us as to what we were going to do. We were having regular meetings with them, weekly meetings with them, as to how the progress was going. Kept informed where demand was etc. etc. etc. ... erm, so that kept the community informed we were advised what they were doing.

We did manage to drop the consumption to under a 1000(l), so we were able to cope and we actually didn't need to provide water by bottle or bucket and I think the fact that we had the tanks on site .. The community was very scared. The tourists had gone home so weren't affecting the tourist trade because the schools had reopened. The community came to the party. We have a very divided, we had a very divided community. We have a retired community on the left hand side of the village, Western side of the village and a poor previously disadvantaged community on the right hand side of the village and historically its been developed in that way and we were very concerned to bring these two groups together. And I do believe that this problem, challenge helped, because everybody came to the party to save water. Everybody was doing their thing.

Ok, then we came to the 6 week scenario where we didn't need the buckets, we didn't need the water to come in by tanker, the army, the military, everybody helped and we now had the overland pipeline from the Hoogekral river. That was within week 6. We then were able to abstract 1.2 Ml per day from the Hoogekraal into the Karatara River which was then treated and pumped into the system. The construction of the overland pipeline began within the first week. The provisional work was done, a contractor was appointed the costs were determined, very very sketchy documentation because nobody knew what to expect there was no time to prepare full blown tenders and
adjudication. It was a case of a known contractor who had the resources available.

Who was this contractor?
I can't tell you off-hand, I would have to look in the book. A local contractor. We used an accelerated process, we asked 3 local contractors to give us prices and to give us times. Did they have the resources, were they able to get involved in the project. And the one that was the cheapest had the resources and had the ability to do it.

In terms of legislation, the Municipal Manager has the right to, in the event of a crisis, in the event of an emergency like this, provide it has been declared an emergency, the right to do all those things, (?) the concurrent activity, that was getting the water, getting the contractor on site and doing the job overland, so it was just on the top of the surface. The council had an emergency meeting to declare the area a disaster, a drought disaster, that was put through to the Province, and that in itself had a number of hiccups along the way because there had never been a drought disaster before. How do you declare a disaster when its not a fire, it cannot be seen. There's no flooding which can't be seen. You've just got no water. So there was a lot of concern and legal opinions had to be sought, as to what kind of disaster, whether it was a disaster or not. Because when does a disaster start. When the floodwaters break. But when does a drought disaster start, there was no starting date. It just didn't rain, so we had a lot of legal opinions for that. It was then sent to the Province and the Province had the superior legal team and they did the investigation as to how to declare it a disaster. And Provincial Government, the premier's office, in conjunction with the strategic team, dwa and disaster management, Dept of local governance and traditional affairs came up with this definition that it was to be declared a 'slow on-set disaster'. Which was the terminology which was used in the various drought reports, to say that we had to declare this a disaster. Because of that, the municipal manager was given powers to, I think its R5 million in legislation, to take emergency action. So although we didn't follow the normal procurement rules, we didn't just go ahead and appoint a friend of a friend of a friend.

The Declaration of the emergency happened within the first few days. NOBODY was aware there was a problem until the morning of the 18th. The visitors were here, the water was flowing, everybody was happy. The council was in recess and they weren't aware of it. The town engineer had gone on holiday, he wasn't aware of it. And it was just that, the regional manager may have taken a major gamble because he had hoped that the rains would come. Because he also hadn't experienced this kind of, 'when is a drought a drought'. And on the Monday when the river stopped flowing he didn't even come in in a panic and say 'Oooh, the river stopped flowing', he came and said, 'the river stopped flowing, we're going to have a problem in a few days'. And I've had experience of drought in Johannesburg and I thought it was a little more serious than just saying 'we didn't have water in the river', and we took it to the Municipal Manager's office. That was on the Monday, on the Tuesday there was an emergency council meeting, on the Wednesday we had the community meeting, and on Thursday, I think it was, the declaration of the Disaster took place. So in the space of four days, the council and the team were on board.

How was the decision taken to declare it a disaster or to explore the process through which a disaster would be declared?

erm, No, at that stage, the process WAS A DISASTER, we didn't have water. It wasn't termed a slow onset disaster at that stage, it was just declared an emergency. We had no water, and we had to take action.
How did that take place, the identification of this as an emergency?
REALITY, There was no water.
Yes, but
The councillors came out here, had a look at it
Yes, in terms of what you're saying in the tendering process and the selection of the contractors for the overland pipeline, prior to that certain things had to be put in place legislatively, but how was the decision taken?
Yes, and no. They weren't put in prior to that, it was concurrent. When we went to the Municipal Manager and said we have a crisis, he said 'what can we do about it?', and we said 'we're not sure, we will investigate it', and within hours we'd set up a JOC Centre within this room, and JO being a disaster management term for Joint Operations something or other, we then went back to the municipal manager within ours and said, 'we have found this source of water, we will have to appoint people to assist us' and he agreed that we appoint SSI Consulting Engineers. We then investigated further and said 'ok we need to lay this overland pipe, it's going to be approximately 2.5km long'. How do we do it, we told him, we said, 'lets find 3 contractors who could do it, we ask for price and we then close the deal'. They were given something like 48 hours to give a price and like I said by Friday the council had taken a decision in council that it was an emergency. It hadn't been declared a disaster because they didn't know it was a disaster, it had been declared an emergency.
A contractor had been appointed, a consulting team found, and a means of providing water for that first 6 weeks were available. That was in the first week of operation, and the Province were advised. During the second week and third week we then had a council meeting, that was an emergency council meeting, mayoral meeting sorry, mayoral meeting. End the end of the month we then had a full blown council meeting and the report was tabled then, to say it was a disaster and asked the council to give the Municipal Manager the powers to make decisions in the event of an emergency, to appoint councillors and so on.
How was this report drafted? Was it Drafted by the engineers? [Yes, yes]. Ok, so could you just give me a sense of who the main people within the Municipality were?
Yes, At that stage, the Acting Town Engineer, the acting director technical services was Rhydon Parry, who is the Deputy Town Engineer Water, stationed in Knysna. He was acting Director and he took responsibility for the engineering side. The Municipal manager appointed me to manage the process. The implementation measures that were there. Because I'm responsible for the project management unit I was given the responsibility. I had a reasonable amount of experience so it was. And I was able to ahve the time to put to it. So the engineerin team put the report together, the report was obviously supported by the financial team adn the corporate services to try and get it as legal as we could, and to get the potential procurement process as good as we could under the circumstance.
So that was really how the council approved the Municipal Manager, using an accelerated and abbreviated procurement programme and how we selected the various partners. How we selected SSI as a consultant is that they were already doing work for us and it was an extension of their brief.
We have to step back a little bit in that 2 years prior to this, Aurecon Consulting Engineers were appointed to design and off-stream dam for Sedgefield on the Hoogekraal River. Now if we look at a map, heres a map. You've got the Karatara on the East, you've got the Hoogekraal going directly North and you've got the Wolwe and the Silver(?) on the Western side, going into the Swartvlei that you saw crossing the river. The design of the offstream dam, the estimate for the design of the offstream dam
as well as the ancillary works to get the water into the treatment works and into the system was going to be around R35mill. The tender for the earthworks was awarded and that was R4mill or something and the next tender was called for the dam and suddenly the estimate had increased from R35mill to R115mill and ... the report was taken to the finance department, who took it to council and the project was shelved. This was in the, probably the August before, August 08 the project was shelved. And that was a few months prior. Fortuitously that's how it was. This had probably been going for 2 years. Getting funds, securing funds, getting the EIA process, the environmental process. It was at an advanced stage of having a dam, because it had been recognised that by 2025 Sedgefield needs 4.5ML per day. That's the estimate. And this dam being off stream would be able to provide that. The area's incredibly sensitive, environmentally sensitive, so it had to be an off stream dam with lots of controls on what we were going to do. However the consultant's 'boo-boo', because that's what it was, you can't hide the fact that an estimate of R35mill to R115mill is unacceptable. And the council couldn't afford that sort of price. They'd secured R26million out of the R35mill and they would be picking up the R9mill. Suddenly to be picking up a R100mill is just not acceptable. So it was shelved and the town engineer was given the instruction to secure alternate source of water for the town. That was in the August time.

And the council made the right decision, you can't justify going ahead with that sort of amount of money. It's unaffordable for a town of this size. A town of 10000 people, you can't spend R120mill on that kind of project. At that stage the consultants had done all their design investigation, AND IT WAS BEFORE I ARRIVED SO I WASN'T REALLY INVOLVED. They had done a detailed investigation and come up with this as THE Solution. The town engineer accepted and had recommended to council. So that was the process they were doing. The short time between the August and the January I think just happened to be coincidental. So there was this dam in planning, EVEN if the Dam had been BUILT, it wouldn't have been available for the drought. It would have taken another year to build, so it wouldn't have helped the situation. So that gives you the background on the situation.

Then we turn around and, within the six weeks, the other part of it was that DWA and provincial government the premiers office came and helped me prepare a consolidated water and sanitation plan for Sedgefield and Knysna and that was split into emergency, now; six weeks, short term; medium term, 2 years; and long term, 5 years. What was needed to achieve a 4.5ML per day. Water Affairs insisted that we don't build a dam. A) because we couldn't afford it, and B) because a dam wasn't ideal environmentally.

How was the estimate of 4.5ML established?

Population growth. The traditional population growth within the area has been 5-6% and using the statistics available they determined that would be the amount of people that would be here and the amount of water that would be needed. Using the traditional amount of water that the people were using, the traditional consumption figures. Because at that stage there was none of this need for water conservation serious demand management. There was water, there was adequate water.

Regarding the consolidated water and sanitation plan, was there any plan in place before that? [No]; and in the case of Knysna?
There were a number of ideas on the table for Knysna. Knysna being the bigger municipality with 60,000 people, they had done a little more preparatory work. And there were a number of ideas that were not consolidated, but ideas. All of these ideas were then consolidated into this plan. BUT AGAIN, all of these ideas, were relying on run of the river, flow of the river water, surface water. When water affairs insisted that we look for alternate sources of water, suddenly the whole impact of climate change was now on the table and we had to be looking at an alternate system. The reality for Sedgefield is that we have masses of underground water. We have Swartvlei on the West, we have Groenvlei on the East, we van gerwils vlei on the North, as well as the four rivers flowing in from the North and the sea on the South. So there's large amounts of water. The Swartvlei and Groenvlei and the sea are obviously saline, van gerwils vlei is freshwater. BUT its environmentally the most protected area in the Southern Cape. So it was an absolute no no to even go anywhere near that, it was a wetland. We then had a look at other options. We sat around a table and decided that 'where can we now look at other options'. This was all in the 6 weeks. From a municipal perspective the whole team was involved. All the Directors were involved and gave their input; community safety, the director finance, the director community services from a disaster perspective and the director technical services who was now back from leave. But I was still responsible for the project, as well as the municipal manager who took control over all of it. We were supported by the premier's strategic director in her office as well as a number of people in disaster management representatives from water affairs, agricultural affairs, decog cooperative governance or something, and deat. They were all part of the plan to develop this consolidated plan of action, long term solution to the provision of water. technically, I fall i report to the director of technical services so I had joint lines of responsibility to him as well as directly to the municipal manager for this project. the Deputy Town Engineer was appointed as my assistant for the project and he did of the contract work for me. Who else was involved, as I say, the consultants, and we appointed a number of consultants to assist us with the project. So we had this whole team come and help us develop this plan. We then came up with this solution, long term solution to provide 4.5ML per day. The first being that we would have to drill some boreholes and look for groundwater. Which again in this first 6 weeks, in addition to getting the tanks and in addition to laying the overland pipeline we appointed a contractor drill for groundwater. And we've drilled a series of 6 boreholes on the Northern side of Sedgefield on the dune and from those boreholes, we anticipate abstracting .5ML a day. They drilled in the town area. It is on railways land. railways has a reserve going through the middle of sedgefield and these boreholes were drilled in their reserve.So we got their permission to drill those holes and we used a geohydrologist, Roger parsons was the consultant for that, and we identified likely spots, put in a machine and drilled. In this instance the consultants were also selected using the accelerated process. In an emergency it's a case of who you can trust and who you know. Because a lot of the dots and crosses on the t's could not be done on time. You having things done within the space of 6 weeks and you couldn't wait for the letters to be sent out and replies to be recievved. We were having virtually daily meetings with the key team members as to what had to be done for the day adn where it had to be done. So we were drilling boreholes, we were laying an overland pipeline and we were investigating long term solutions. When the boreholes were drilled we weren't sure of the yields. We knew that there was water coming out of it and that was also put into the system. later it was found by the geohydrologist that we could rasonably assured of between .5 - .75ML per day. So that was brought into the equation. We said, now lets go back to the 4.5ML per day,
we need, we get 1.5ML per day from the Karatara River if we upgrade the treatment works, because the treatment works was old and it had not been upgraded because it was due to be replaced with the dam that was going to be built so it was allowed to deteriorate. Suddenly we now had to upgrade that plant to provide and acceptable quality of water, and the decision was not to abstract more than 1.5ML per day from the river because that's what the licence gave us permission to abstract. We upgraded the plant but we waited until things had stabilised and we were able to provide the water before we went out to upgrade the water treatment plant, we'll come to that as well. So we said that from the 4.5ML we can abstract 1.5ML from either the Karatara River or the Hoogekraal River, because they were now joined with this overland pipeline. We would then have to bury this overland pipeline to make it a permanent option. Whihc was done a little bit later, using normal procurement processes to get that in place. We then had 0.5ML, we couldn't be assured of more than that because you need to use these boreholes for a long period of between 4 and 6 months before you can have an assured yield, so we relied on the geologist statement that have 0.5ML would be reasonable. We then said we now at 2ML a day, we are now looking for another 2.5ML a day in the long term. And the long term may be 2025, BUT, and this is a very important BUT, that over the Christmas period, the population of Sedgefield can triple, it can go from 10 to 30000 people. Its full. There's a lot of people come down on holiday and the water demand can go up to about 3 and a quarter ML a day. So by the following December WE HAD to HAVE ATLEAST 3ML a Day. That was the decision that was taken by our council and we had to come up with a solution. And we had the 1.5ML, plus the half, which was the 2, we were still a 1.5ML short. We than set down. I'd been involved with water research for a number of years adn we thought, 'well let's have a look, what's the options of desalinated water'. All the reports said it was far too expensive, and far too unreliable and all sorts of things. And Conventionally the consultants and the Director of technical services didn't support the concept because it was new, it was a first, it had never been done before.

How did it come onto the table, desalination?

Exactly like that. I was talking to the Director of the consultancy, Hennie Erwee and we thought it sounded like a good idea. I done a little about it, I'd done alittle bit of investigation in the past. But more from an interest perspective, than from a serious perspective. That was the moment really that we made the decision. We teh thought, we've got so much water, it is salty, we've got to look for something else, what can we do. And that was how the idea came up for desalination. At the same time, we turned around and said, we also have a sewage treatment plant, which only collects water around 20% of the time and is around 1ML a day. We thought ok, lets now look, if we can use the reuse of effluent, that would give us another ML a day, so we're now going from 2ML to 3ML. But thats a long term project because it requires a major upgrade and time prevented that. Is it possible to do a desl plant at that time. It was in the morning, we were discussing in the morning and both went away with the idea of lets see what we can find out about a desalination plant. He asked, SSI is an international consultancy, and he asked his various players in his team. I contacted a few of my friend's in the consulting engineering field that had done work in Dubai and South Australia. I also contacted Rifka Kafir who is the CEO at the Water Research and I said to her 'help' and she said 'Speak to Jo Burgess', who is in charge of water for municipal services. I spoke to her, i also spoke to Kobus Du Plessis from Stellenbosch, and between all of us, we thought, 'well it sounds like a reasonable idea'. A day or two later we sat around the table again and said 'let's go for it, let's see what it can be'. We then had 4.5ML per day, we had a solution that provided 4.5ML. We then called a meeting with
the ratepayers and we sat around the table with the team and we said to them this is our proposal. And that stage we still didn't know if we were going to get it or could do it. We said 1.5 out of the Karatara, 0.5 out the boreholes, 1Ml out the reuse of effluent, and 1.5 desalinisation. And there was a lot of concern, a lot of the other civil engineers have vast experience of water and there was a lot of concern about what could or couldn't be done. We then had a meeting with council and said to the municipal manager that this is our only source or only likely source of getting water on time. Because by this stage it was the middle of February going toward the end of February and holiday season was 9 months away. Stellenbosch, water research, ourselves got together and said how can we do this and SSI was appointed then formally to prepare documentation for a desal plant. That must have been as I say late February or early March. The consolidated plan, I think the final was submitted in April 2009. SSI had never done a desal plant before. We knew the theory, we knew the ideas, we knew what we wanted. So we said, right, we're not going to have time, because a conventional tender of this nature would take forever, it would at least 3 months for a conventional tender. At this stage we didn't have approval from environmental affairs, we had as support from water affairs, and we didn't have any money. Water Affairs, said they would support our decision to go ahead with desal. We then had to source money in between this to find where we would find the funds. And we took the decision that we would call for tender based on what we wanted and what we had. So in the tender document we didn't specify anything other than the quality of the water. sorry let's stop there. We then said, where are we going to locate the desal plant. We've got Groenvlei on the East, we've got Swartvlei on the West and the sea on the South. Groenvlei is all privately owned around the area. We would have had major problems locating the site. We would have had even bigger problems getting rid of the brine. We then went and had a look at the Swartvlei and it was almost the same situation. We then identified the only source as the sea. I identified a piece of land where we could put it and we went with it. So we had now a piece of land, by this stage we'd done tests to determine the salinity levels of the sea and compared with the other areas. We then went to them and we said we want 1.5Ml per day and we want it to potable standard, and we want it operational and delivered by the 18th of December (2009), can you do this?'. This was the terms of reference in the SSI documentation, and they put this into the call for tenders. The call for tenders went out. We then went to the Municipal Manager and explained that we couldn't go for a conventional tender because you would have too many people coming and we didn't have the expertise to evaluate it. This was now March, April, May time, because the times were moving on. It was approve that we call for 6 tenderers. 2 multinationals, 2 nationals and 2 small local people were asked to tender. And out of the 6, 5 tendered and 4 were considered and they were each part of the evaluation process, we were able to put a panel together. So we had the procurement people, the finance people, technical people and our consultants on board, and Stellenbosch University and water research. So we had a panel, and how we did it was we had each contractor give us a presentation of what they were going to do and the kinds of issues of concern. In other words where would we discharge the brine and how would we discharge the brine, and where would they get the electricity and how would they get the electricity. We included in the tender document, the fact that we didn't have enough electricity in Sedgefield. Because we were at the peak of our supply. Is it possible to use alternate energy, and that was a question we asked all 6 of them and none of them were able to produce enough electricity through alternate methods. It all had to be main supply. We then evaluated individually and that was put into a report, and I've got the report here somewhere and that was put through to the procurement committee to make a decision as to whether they
supported our recommendation. And the recommendation was based on a number of factors. a) technical ability; b) timing; 3) experience; but the fourth one was the key elements whihc were new. ANd that had to be that we didn't have environmental affairs approval so that had to be portable and of a temporary nature. So that was if we didn't get approval we could pick it up and move it. We didn't have the money, so weren't sure that we'd be able to pay for it. And we didn't have any way to operate it, so they had to provide operations. They had to provide it in a temporary format; they had to provide it in a modular format so that we could use the whole plant, half the plant, something of that nature; and it had to be decommisioned and relocated. That was some of the extras. They then told us all the criteria and we made the recommendation; and our chief financial officer wouldn't approve the award of the tender because we didn't have the funds. I think its now a point where we can talk about the funding side of it.

From the previous year, the November 07 flood, we'd secured money to relocate the treatment works as part of the dam project. We'd secured funds to do all sorts of upgrades along the way and they were still in the process of being undertaken. Because the dam had been in the interim been shelved, we had an amount for the water treatment works of R14mill that was in the Bank. We hadn't used it. We then had an undertaking from water affairs that they would give us R5mill for the project. So we had an estimate fro the consultants around R15mill. The R14m, we used that money forstly to do the temporary arrangements; the overland pipeline, the borehole; payment of consultnats etc. And we landed up with around R7.5m available for the plant. We were then promised the R5m from water affairs which gave us R12.5mil, we were then told that Knysna would be able to provide the extra R2.5m, and that was where the funding was going to come. BUT, we then had to have this approved by national treasury because national treasury had given us the grant for the fund and we were not using it for the flood we were using it for the drought. SO it had to go through a WHOLE LEGAL process, to be declared in one of the DORAS, the Gazettes, that the money had been reallocated from the November 07 flood to the 2009 drought. You can't speed up treasury it took its time. Eventually when that decision came through. I think it was July the 11th or the 9th. Then we were able to know that we could award the tender. Then we went to the next stage. We'd had the technical evaluation bits, we then went through the final evaluation on procurement points and preferential points and so on and so forth. Then becasue we were only needing that extra R2.5m, during the next couple of weeks, water affairs pulled out and said they couldn't give us the R5mill. So were back to the situation where we didn't have enough money, and our CFO said, NO, we cant award the tender. Eventually the situation got critical and we were promised other money from all sorts of people and on the 2nd of October, the CFO agreed that we can award the tender because we had the money in the bank. According to treasury regulations the municipality cant enter into a tender unless they have the money secured and we didn't have the money secured. So legally the municipal manager and the CFO couldn't do anything. Anyway it came thorough at around the 2nd of October and we then, on virtually the same day we had a special council meeting. And where did the money ultimately come from?

Ultimately, the promises were R3mill from EDM as well, so we theoretically had enough money when we awarded the tender, because we had the promises of money. In reality, Knysna Municipality picked up around R7m for it. We got R7mill from Disaster Mangement, we got R3mill from MIG because that was used for the pipeline which had to be addressed, and the balance of the money, the other R7mill or R6mill, was paid from own funds at the end of the day. We didn't get any other support. It was managed with funds that had already been allocated. Ok, the estimate was R15mill for just the
desal, we had protected from treasury, for the Nov 07 flood, an amount of R7.5; we then had MIG money because in the interim I had motivated to get money from cooperative governance for the ancillary work. They wouldn't co-fund in terms of legislation, you can't use the money for 2 things. So we were able to get around R4mill I think from MIG for the pumps, pipeline from the desal up to the existing reservoir. So that gave us the R4mill, the DWA promised R5m; the EDM promised R3m, but in actual fact nothing came. The R15m, has become R11.5m; the difference being R3.5m at that point plus all the vat and the rest of it and the additional work that we've done on the brine discharge meant that we've gone beyond that figure. Of the R15m, there it is, R7.5 from national treasury for the flood, R4million for the MIG infrastructure grants and the balance from the municipal accounts.

Ok, and the amount that has been spent beyond that now with the problems you've had? Its being carried by the municipality. Its around R16.5m, R17m at the moment. We'll get to the problems. Anyway so that was where we stood and the deal was if we could award it on that 7th of October, Grahamtek who were appointed as the supplier undertook to have the water process working by the 16th of December. At that stage we didn't know what civil works were needed, we didn't know what sort of pumping capacity; we didn't know anything. So in the 72 days or so that the process took, they had to give us specifications of the site they needed as well as the capacity of the pumps as well as the capacity of the pipelines that needed to be put in. As soon as they'd given us that information we then planned the pipeline and the pump to the existing reservoir which was around 3km and we went out for a conventional tender for that and constructive civil were awarded that tender. We were very fortunate that we were able to use a servitude across private land to lay the pipes so we didn't have to go and expropriate any land. We did have to do it all by hand because it's environmentally sensitive, except the steep sections.

you spoke about 4.5ML as the long term solutions which seems to suggest that the 1.5ML and .5ML would have addressed your short term problems provided we had water in the river.

I'm just trying to understand if the extra amount was within the long term need, was the process of building the deal was within the emergency component of the plan. It was an emergency because we were still relying from the 1.5ML from the rivers and at that stage we still hadn't had rain. So although the overland pipeline was operational we were still only abstracting 1ML a day from it because there was still no rain the Karatara river was still not flowing and the Hoogekraal was drying up.

The rain came about July 2010. 6months

So was the river dry until July 2010?

The river was dry, yes.

So, from the start of 2010 until July 2010, now you're talking for 1.5 years, for the entire 1.5 years, what was the water source for Sedgefield?

The Hoogekraal provided the water in the off peak period, the 1ML a day, supplemented with the boreholes, and because we were still on water restrictions, we still aimed for 1ML a day, of which .5ML was coming from the boreholes, so theoretically we were only taking 0.5ML from the Hoogekraal, which was dropping. And because of the rain

So there was no rain from January 2009 to July 2010, the river was dry?

The river was dry. The rainfall data, the weather people, the dept of weather services are available to give you that data.
Another point that needs to be noted is that the mouth of the Swartvlei closed with the winds from the south west, the outlet to the sea from the Swartvlei was closed. So the trickle of water which was coming from the rivers was lifting the level of the Swartvlei, saline water. Which meant that as this lifted it migrated upstream. Which meant that the freshwater in the Karatara which was there as well as the freshwater in the Hoogekraal was becoming contaminated. Sanparks refused to open the mouth, because it wasn’t their problem that we didn’t have any water. So the saltwater was rising and contaminating water, and the Hoogekraal was at serious risk of being contaminated and the treatment plant couldn’t cope with saline water. It couldn’t remove the salt. So we were still in a very precarious situation. But because of from the 18th January up until December, it was low peak, there weren’t a lot of holiday makers here we were able to supply the 1-1.2MI a day and keep everybody happy. Gardens died, the punitive tariffs lifted so it became even more costly to use the water. Amd that’s why we had to do it. Because we could not turn around to the tourism industry and say, ‘cancel all bookings for December’, Because Sedgefield survived, that’s the economy on tourism. So if we took that decision, Sedgefield would have died.

So the necessity of the plant connects directly to the tourism sector in Sedgefield? [yes] that was a major reason why the plant...[ had to be ready at that time, ja]. Because the demand would have come directly from the tourists?
Ja, the people moving in and out as well as the people, we have anumber of permanent houses and temporary residents. So we have holiday makers as well as those who have made their way down for their 3 month sojourn from Cape Town and Johannesburg and you can’t really stop those people coming down. A seasonal rise in demand. And if that seasonal demand didn’t exist, we would have coped.

So in the development of the consolidated plan, the thinking was that the plant was necessary to meet the seasonal demand?
Yes, and again going on the statistical data, that peak demand, as the town grew and the permanent population grew, the impact of the tourists would be less. So by 2025, of the 4.5MI, less than a MI of that would be for the visitors and the tourists so that the permanent demand will be around 3.5MI.

What is that projection based on?
Well again the permanent growth of 5-6% of population growth as well as the likelihood at that stage of the growth in tourists. So we probably have the growth in tourists but the permanent residents would be hire. Yeah that would be the kind of reasoning. I don't know if you get can get information on that
I’m just trying to get a sense of where the figure came from and how it was calculated
The 4.5MI, the 4.5MI was what, we didn’t turn around and say look we need the 4.5MI for December but only 1.5MI for the rest of the year in 2025. We turned around and said we need to provide 4.5MI at that point, if we don’t need it, we will then switch off what we don’t need
Yes, I understand that was the figure you were working with, I just want to know is there anywhere where I can get a sense of where the figure came from
Yes, in the Aurecon report, on the dam, you’ll get it there. How they determined [right, and that was your point of departure]. That was the point of departure. It was no good planning for a lesser amount because then we’d have to do something else. We then turned around and said, if we need the 4.5MI and we are going to be using expensive mechanical processes to supplement the sources of the water from the river, we can always switch it off when we don’t need it. Which then goes back to the desal plant the instruction to them was that it has to be a variable arrangement, and we said we want it in .75MI and .75MI so we can run half the plant and in Christmas we can increase it to
1.5Ml. In the various reports we show how we anticipate this thing increasing to meet the long term demand.

So that at the 6 week point we discontinued the water by tanker and relied on water from boreholes as well as from the hoogekraal. By December 09 we would have a desal plant operating at 1.5Ml. Which would be the ceiling of what the community would be needing for December; 1.5Ml plus 0.5Ml from the boreholes; if we had to out in restrictions, we had to put in restrictions, but we anticipated not having to take out any water from the boreholes if it didn't rain. So for the season at the end of 09 we were relying exclusively on 1.5Ml from the desal and 0.5Ml from the boreholes; 2Ml. The previous summer it had gone up to 3Ml, so we need there would be restrictions. So we knew there would be restrictions and we would manage the restrictions. So we then move on and ..

Could you just take me through this high demand period, the tourists arrive, the desal plant is ready at that point?

Ok, I'm just going to draw a couple of lines here. That's day o, 18th of January. We said by December 09 we want to have 1.5Ml, and by 2 years later we needed 2.5Ml; going to 2025 we needed 4.5Ml. Ok

Yes, but you also spoke about the boreholes [that's the demand line, not the desal plant], yes also the desal, but you said by december [this is the demand line]. If I can just go back to what you said earlier [ok], you said in terms of the calculation being done in the consolidated plan, there was the borehole, the overland pipe, then the desalination. Adding up with SSI you said 3.5Ml, 4.5ML, the effluent was a possibility but you said that was a bit too complicated to explore [at that stage yes], so instead of going up to 4.5Ml, you brought it down to 3.5Ml, so you said there was 0.5Ml from the boreholes; then 1.5Ml from the river; then 1.5Ml from the desal that gives you 3.5Ml And this is, irrespective, that point is 2025

Yes, that's what I'm trying to make sense of. 1.5Ml is the desal, yet this took place within an emergency declaration, which allowed the accelerated process, yet this in fact from what you're saying was part of your long term process. So there's some kind of tension there, between [yes] calling it an emergency, pushing an accelerated process yet this amount was needed as part of your longer term plan

Yes, the tension is the reality that you can't rely on 1.5Ml from the river [but what was the situation] There was no water coming out of the rivers,[that's not what I've been told] thats how we survived [Is there any information I can get where I can actually see] yes, yes, we have the data from the treatment works as to exactly how much they processed everyday and the figure that came thorugh was exactly based on whether the river continued to flow, if the river stopped there was nothing. Thats' the reality. You know if I show you the Swartvlei, thats the Hoogekraal, thats the Karatara River, this is the pipeline that was taken from there to there, into the treatment works, then it comes into the system. From both of these we had licence to abstract 1.5Ml but this river had stopped flowing there was NOTHING coming in from there and it was a drought so we couldn't anticipate water coming in. This here was dropping and we anticipated that there was 18Ml in store there. So we had 80 days of water in that river. And we started that 6 weeks after that, lets say the 1st of March. 80 Days after the 1st of March, we would have had no water.

What did happen, say by May?
Reality is that we were able to abstract less because we kept demand absolutely to the minimum and we were relying on the boreholes which were over here. And some days we were abstracting 0.5 and some days it went up to 0.75. We were not sure of what the numbers were going to be. BUT we used this as sparingly as we could, that river, because we were hoping to get it to last. The decision was that if this river dried up, this plant would stop and by December we would be only having the borehole water, so that's all we would have. If the drought continued. And the salt water had gone up there, because the mouth had closed.

At the end of 2009 we still hadn't had rain, the karatara was still not flowing and weren't able to take water out of there, the hoogekraal was dropping but we were still able to take water out of it. This was December 2009, and when we switched on the plant then we used it. We ran it virtually continuously for the next month, we put 1.5ML into the reservoir from the desal, plus the half from the borehole. So we were putting 2ML into the system. That was it, there was nothing else. That was the reality and that's what we had it designed for.

But it was switched off after that, it hasn't operated since then?

Yes, because the peak had gone, the peak goes like that from the 5th of December to the 5th of January. That's why I was drawing this graph because that was the anticipated demand, if the river is flowing, the first ML will be from the river, the second 0.5 would be from the boreholes. In the longer term we will now have 1.5ML, so that will go from there to 3. So that will be a permanent supply, a 24-hour permanent supply of water. As the long term plan, and this fourth ML a day will be for the reuse of effluent on a permanent basis. But because we only needed that for the December peak period, for the rest of the year we would have to shut down and use something else. We didn't know what we would have to shut down or for how long. The argument being that if we needed 3ML a day for the population growth it would be the flow of the river, plus the borehole, plus the desal if needed and this is why the desal plant had to be a top-up instead of a permanent supply.

What happens when you move into a situation where your top-up becomes your essential because what is usually your available no longer exists (meaning river stops flowing), then in fact you don't have the 3ML, which means you'll still be faced with a situation where you have the 1.5ML from the desal, plus the 0.5ML, but if your demand increases, are there other solutions that are still being explored?

Yes, yes, for that December the plan was to have 2ML a day from an alternate source, excluding the river completely. Moving from the 6-months to the year solutions, the next level we had to start to motivating and putting all the plans together for the 2-year solution and a 5-year solution. Part of the 2-year solution was to cater for exactly what you've just said, we didn't know how long the drought would continue for. We said we had that December (09) which we would get through and we would have another year before this last Christmas (10) and going further. At that stage the rest of the area had been identified as a disaster area, so the whole of the EDM had been declared a disaster, and the common decision that it would have to be announced that there was no water and tourism had to be stopped. This was early part of 2010 when the other municipalities started to experience the crisis.

We then had the added complication of having the World Cup here in July 2010 which meant that whatever the scenario we had to keep the full demand available for July 2010 because at that stage every body was going to be coming to Knysna and the Southern Cape, because Knysna had 2 teams and George had 1. So three international teams were going to be here and everybody and their friends were going to come visit. SO WE HAD TO HAVE THE WATER AVAILABLE, because we don't make any slip-ups at that
stage. Because it was 6 months later we were able to manipulate a bit of time there. But going back to this scenario, we then said, how are we going to ensure this bottom 1.5ML from the river without building a dam because they were not prepared to give us a dam. What we did say was that we would build two weirs across those rivers. The initial application that we put through Sanparks refused to consider because of the sensitive environment, they said we should go elsewhere. We then said our concern is not to put a dam on the river but our concern is to prevent the contamination of the freshwater from the saline water, so it would be a reverse weir. Because when the river flows, the little bit of water coming down would be contaminated and it would be of no use to us. And we've got a model here somewhere of the weir that was proposed which is immediately downstream of the treatment works and we basically create a pool there of about 100 days of water. IF the saline water doesn't get into it. That will give us some hope. We also proposed another weir on the Hoogekraal River which will come with time. By the time we need the 4.0ML per day assured then the 2 weirs will be operational. And if we can get 100 days out of the Karatara River and 100 days outs of the Hoogekraal River that would give us a lot more assurance. Water affairs have also turned round and said, you cannot lift water restrictions and declare the disaster over until you've got 6 months supply of water available. So that's where the 200 days come from, so that's the next phase of the operation. We've received the funding to build a weir, this week from cooperative governance and the MIG Act. We still don't have environmental affairs approval to build the dam, the weir and we anticipate that coming through in January, February and we anticipate starting construction in July, August to be ready by December 2012. So we will then, both have an assured flow in the river, but we'll have an assured prevention of contamination of whatever comes down the river. I've got to be very careful with the words I use because if its called a dam for freshwater hten environmental affairs will shoot it down. SO THATS REALLY THE JUGGLING WE'VE BEEN DOING So I understand where you're coming from, if the flow of the river is there we're fine, if the flow of the river is not there, we have a crisis. And one way in which you're responding to this is through the building of the weir. Just to go back to the history of it, before the crisis in January 2009, you said that in August 2008 is when this tender was put forward to the council by Aurecon Consulting and the cost had multiplied [3 fold] and this option of a dam was not approved. You also said that this was the major option that was being considered to increase the yield in Sedgefield was something like this option considered (desal)? I doubt it, I doubt it, because this was based on 40% not being from the flow of the river, which was a new criteria that water affairs instructed us to look at. Up until then it was a case of just dam the river. There were a lot of arguments around this because if you have a drought you're not gonna, a dam is not going to fill. And in this instance even if we built the dam it would have been useless because there was nothing to fill it. It would have taken 18 months or so to build. We are in a very similar situation with Knysna, because we did a similar project there, we did RO. Well I was responsible for that one also. BUT the Aurecon proposal for Knysna is to build a large dam for Knysna upstream. A R200m dam upstream on the rover which the new council are not in favour of because of exactly the same situation we've already had. Climate change indicates that we may not have flow in the rivers because of having storm flow the chances are you're going to silt up the dams very quickly. he next part of it is that the Knysna river flows through some very important agricultural areas. So if you're suddenly preventing the farmers from taking water out of the river, you're going to be creating an economic crisis, a food crisis. The argument
hasn't been resolved. We're also looking at other options there. At the moment we've got some money to investigate a dam but we haven't got approval to go ahead and do anything about the dam. Because the criteria of 40% of water from non-flow of river sources is still a condition of water affairs.

Can you explain that a bit
They believe that because, the rain is not going to be coming down over a period of 6 months, from weather services and climate change experts, we're going to be having short sharp heavy storms, a lot of it will run off and not seep into the ground. Whereas there's going to be a lot of erosion. Unless you can harvest that flash flood you're not going to be able to use the water. So dams may not be attractive solutions because they are going to be silted up. We've had so many meetings its not funny. The kind of thoughts we've put together is that maybe you need to be harvesting rainwater, stormwater harvesting in the land. In other words recharging underground aquifers. and that would be by creating the kind of thing that farming practice has been doing for years, contour ploughing. Which means you're actually damming the water along the lines and there's not runoff. Something along those lines. But that would mean that it would require a massive change of thinking. But you asked the question about 40%. Where they got the 40% from, I doubt we will ever get the answer to that one. They also threw at us - all the municipalities - that we have to enter into a serious water demand management strategy to save 20%. If we can save 20% on flow of the river and 40% of other sources, we could basically get by on 80l per person per day. That was their goal and George achieved it for a period but that was the kind of reasoning that water affairs came to. We all bought into the water demand management cycle of it. So that was where we got to as far as the supply of the water is concerned. We have put the proposal, the 5 year scenario, as to when we are going to get the desal plant, theoretically it is a temporary solution because it still hasn't been approved by environmental affairs. So it can't be taken into account for the growth and development of the town. And at this stage in Sedgefield there's still a moratorium on development. It was identified in 2000 when Sedgefield was incorporated into the KNysna Municipality that there was a shortage of water and major developments were stopped. So really the population and everything else was stunted since that time. And the major response to this was the dam. That would have solved all the problems. As I say when the decision was taken to shelve it there was no time to investigate anything else, because it wasn't an emergency, there was no crisis. This was 2025, you know it was important, but it wasn't a crisis. OR lets not say it wasn't a crisis, lets say the Director of Technical Services didn't regard it as a crisis and probably had told the consultant to go and look into other options. But by the time the crisis hit, nothing had been done. TIME overtook us, the municipality.
So then we looked and said we are sitting in a situation where by 2025 we'll have a river flowing, we'll have boreholes and a desal which will be permanently available when needed. And if we look at the demand curve. On a general condition that’s 1.5ML per day. We would get 1.25ML from the treatment works and 0.25ML from the boreholes purely just to make sure they were operational and to keep them functioning. When the peak started we would have desalination used for that peak and when the peak grew to the 4.5ML we would have the reuse of effluent and these were all linked to time. So would only have to start looking at the reuse in 4, maybe 5 years. BUT again the technology, we were not confident about the technology of reuse of effluent. there's a lot of cultural issues around it and fortunately the contractor that we used for the desal
plant had done the plant in Malaysia (?) so he was able to get us the kind of issues that occurred. Which, because it has a large Muslim population, the reuse of effluent was even more of an issue than it was here and they were telling us the kinds of things they did to get it accepted. and at that point we realised that we're not ready for reuse of effluent the technology wasn't satisfactorily available. We said ok by the time we need it it will be, in 5 years time.

Ok so where do we move from there. We are now at a stage where in Sedgefield the brine discharge has been a problem, so that we don't need the plant. We haven't needed the plant for this year. On the 25th of September this year (2011) we had sever spring tide, which caused all the work on the desal plant to be exposed and the plant had to be decommissioned. Contractor started yesterday and by the end of this month (November) the plant will be operational, at least half of it. And we can go down the route of how we're deciding that. By this year, we will, we have had rains, we've got water in the rivers. So its iffy, we've got rains, we've got water in the rivers, we've got boreholes and we will be having being having 075ML available from the desal for the Christmas period. So we'll go through without challenges this year, we hope.

We have started to get consultants available to investigate the reuse of effluent, and the process we use … SSI were appointed initially to do it. We haven't terminated there appointment but we've just said that we want to look at a different process because what they were appointed to do was to upgrade the existing sewage treatment works with another module. We have said to them that technology has changed and we are now looking at a bogas type plant where we can reuse the effluent as well as the solid waste to create potable water directly. So again we are at the edge of technology. We don't know what we want, because we don't have the expertise locally. We haven't the funding approved as yet. I'm expecting the funding for the investigation, the first R7m to be made available by March next year (2012). Sometime next year we'll appoint a consultant and start the process of designing a biogas, stroke potable water plant. But linked to this, Sedgefield has grown rapidly, it doesn't have a sewer system. Although it uses the 3.5ML a day, it can treat less than a ML at the sewage works. So what we are aiming to do is put sewer reticulation for a large part of the town. Increase the sewer reticulation for 15% of the erven to round 75% of the erven. So we will be collecting the water and recycling it and making it into potable water and possibly going even beyond the 1ML a day at that stage. That's going to be investigated next year.

We have found that the fears of the high costs of the desal, were understandable but unfounded. The operational costs have been significantly less than anticipated because you haven't been operating it. And what we have done for the 18months that we've had it operational, because we don't need as much water, we've operated it at low peak times. We also have 3 electrical time periods. High (day); medium (start and end of day); low (night). And if we operate it at night the costs are very much lower. If we go to full 1.5ML per day for the duration, we're going to pay and we will pay the R7 or R7.80 per ML for the electricity charges for that. But as long as we operate it offpeak. That would be about R4, R4.20 per ML, sorry per KL.

So it could be about R4000 per day electricity costs?
But you've also got to think that we charge the public around R8kl for water. So although its only costing R4 or R4.80, theoretically we are still covering the administrative costs. If we get to the stage where its going to cost us R7 or R7.80 for the electricity we're not goign to cover the administrative costs. But when the decision was taken to go with this it was decided that they were not going to increase the tarriffs. It was a decision taken by the council. Becasue then it would be perceived that we could have done another option and we are now charging the public for our negligence. So so far the tarriffs have not increased. If you're not operating the water treatment plant on the river its not a lot of difference in the costs. hennie and I did an exercise at one presentation where the cost of producing water through the conventional treatment works, pumping it up to the resrerviors and doing all of those things would be around R3.50MI, whihc compared to R4.80 is not a major cost. That would be the kind of difference. But becasue we haven't done it over a long period, we haven't got reliabel data iwer an extended period. [becasue the R4.80 is at low peak, but when its running permanently, that would double. Then the comparison could be twice as much]. yes, yes. But in the first year, december 09, we didn't have the water treatment works working so it wasn't the extra cost. And becasue its for such a short period, do you change the tariff, whihc means you're goign to be penalising the tourists or do you penalise the community for the rest of the year becasue you're getting tourists there? So it was a very interesting financial debate.

So you become sensitive about which user you're peanlising in using the plant when the majority of the water is going to the tourists [yes, yes], so who pays the cost. So that debate was an interesting one, and we worked out over a year the additional cost could be absorbed at the moment.

So currently the debate hasn't gone further because the plant isn't being used permanently. [yes] But when you are faced with a situation where the plant is used permanently?

Its going to increase. Especially if the electricity tarriffs continue to increase the way they have been. So that debate we putting off until its necessary. The reality beign that althogh we say we need 4.5MI by 2025, the world economy being the way it is, it will probably take another 10years before we at that point. So although we will be ahving the plant and all these bits and pieces ready to produce 4.5MI a day, it may be mothballed and not needed. Whihc could be a very useful thing. The desal plant, the reality of using it a couple of hours a week, just to keep it ticking over, means that we wont have to replace theembrances in 3-5 years. we may replace them in 10-15years. The water treatment works, the pumps wont be pumping 24hours a day, we can cut those back. The reuse of effluent from the biogras plant we may put that into some sort of storage or we may recharge the aquifers. we will have to think about this, and then its very much a case of the economics because whihc would be the most expensive resource not to use. That debate hasn't happened yet. Its going to be an interesting one, becasue although we've had an economicst come in as part of the exercise to come up of a cost breakdown of the various services it was all based on usage. But then you've got to bring into the economic calculation that you've got people lving thre and you cant chase them away. So it was a very complicated economic exercise, but we've got all that data as well.

So that really takes care of the process to get Sedgefield to be self sufficient and self sustainable with water.

If we can now maybe move to Knysna.
Knysna, now to change thoughts. Knysna had enough water for the beginning and then all of a sudden we were having to put sandbags across the Knysna river weir because the level was dropping. And the small dams, Knysna doesn't have large dams, it has the Akkerkloof Dam and the Geleb Dam. I think the Akkerkloof Dam has a storage capacity of around 700ML and they use around 10-18ML. the average demand is around 10ML per day and the peak goes up to about 18ML. So that one we had a little more time. And when the drought continued and we had to put sandbags across the Knysna river to try to provide additional storage and abstraction rights; everybody got into the panic. It was probably around August-September 09 onwards. And it was the same in Mossel Bay and George. And because we were still having the meetings around the Sedgefield plant the other municipalities came on board and said the drought is spreading. The weather bureaus were saying that they don't anticipate the drought ending soon. It's probably the worst drought in 132 years so we need to all be taking the right sort of measures. And then each of the munis put in their request for funding - again based on this 40% being from alternate sources. We came up with the idea that we needed about R17m to drill boreholes and because we were feeling very confident that the desal was a reliable option, we brought into the equation reuse of effluent as an option. Because thinking its another year away, it will be there. We put in the request for R17.9m of which R7.5m was for boreholes and the other R10m was for reuse of effluent plant. Again it was numbers that was just put together because it was where we were going. And this report is for Sedgefield and Knysna in April (09). And for Knysna it includes for the reuse of effluent in Knysna.

Alright so then we had the situation, where we applied for money, sometime in the early part of 2009(?). We began to make lots of noise about the need for water. We secured about R1.5m from the municipal budget for groundwater exploration and were in the process of appointing contractors for that. And then all of a sudden we were told, and that was also the beginning of October, two ministers from Provincial Government came to see us, and they said 'if you can spend the money by the end of march, then the end of the financial year, you can have the money (2010)'. By last Christmas, December 2010, we had the Knysna plant operational, a year after the Sedgefield. We had the visit from the 2 MECS to say we've got the money. We then went down again. This time we had a little more time but we did it more formally in the sense that we drew up an abbreviated procurement process which reduced the time for various components. The appeal period was removed, the decision was that at the end of the tender period adjudication would done. By the time it went to the bid adjudication committee all the contractors would be notified, if they were going to be submitting an objection, they were given 3 days. So we reduced those kinds of times on it. and by that stage SSI had been appointed for the project as well and they had very much more information on techniques etc. [in this case was it again an extension of their previous contract?] yes. At that stage we were then faced with the dilemma of reuse of effluent, the director of technical services was adamant that he was not prepared to put reused effluent back into the system because of the issues the cultural issues more than anything else, the social issues let's say. If we were going to use reused effluent it would have to be pumped to the storage dam and then mixed with an existing system and then processed and brought in through the treatment works. Which is the double usage system.

So we had the situation where we pumped the treated effluent to the storage dam we would need another R40m because it was way in the mountains and it was massively high and we then looked and said, where do we actually do it physically in Knysna. Because we don't have access to the sea, we have access to the lagoon, which is mostly privately owned, but the only spot that would be municipal would be remote froma
treatment works. And water affairs it haad to be resuse, becasue the money was for reuse. Water affairs stipulated that atath was it. R7m for boreholes and R10.9 for reuse in the agreement. And once that was done, it was it. We tried a number of times to negotiate with them but if we had to go down that road we would have to apply for funding elsewhere. Becaause that was it.

The funding came fthroguh Disaster Management, and they processed it through water affairs
And it was as a result of declaring a disaster that the funds were made available to the municipalities? [yes]
And in this business plan we didn't identify desalination for Knysna because we didn't have access to the sea. But we identified reuse of effluent. AGAIN anticipating a long term scenario. Because we had hoped that we would get very much more from groundwater. We had hoped that the R1.5m that KNysan Municipality had allocated to groundwater before the disater would be sufficient to give us the amount of water we needed. When the dorught continued we realised that that amount of money wouldn't be enough and we had to come up with addiitonal funding. And hence we applied for R7.5m for Groundwater. The decision was that, we based it on 10MI a day of whihc we were looking for 4MI from alternate sources. So we said 2MI from boreholes and 2MI from reuse of effluent. EDM within a very short period of time came to the party and allocated R3m to groundwater, whihc they paid the contractors for groundwater drilling. There were restrictions that with a borehole you needed to be able to very simply take the water and lead it into one fo the dams or one fo the reservoirs. So it had to be near a powwrline because otherwise we wouldn't haev enough power. So we drilled water all over KNysna town, and also extended it to rheenendaal. This was taking place in mid 2009. The contractors identifed a number of sources of water. many too rich in minerals. some in rheenendal were too remote to be accessible. We then drilled in the Brenton Belevedere area. Whihc is on the other side, but water is taken from Knysna and pumped inot Brenton Belvedere. We though if we can eliminate the pumping more would be available for KNysna. They pump about 0.5MI a day. So it wasn't a big thing, by it is 0.5MI. So we founf one in Brenton, one in Rheenendaal and 4 more in the KNysan area. We've used the drilling monye before we'd found the 2ML a day. NO, we had tet results of 2.4MI a day but assured yield of 1.5MI per day and we took the decision should we equip them or not. The other 2MI we had to get from reuse. NOW this is where we have another problem that the Sewage treatment works in KNysna is no producing effluent of a consistent standard. It is out of spec, it was discharging unpurified effluent. And we were sriously concerned about designing a R30m plant to treat effluent that wasn't ready to be treated. So we turned around adn said 'ok how area we goin to solve this'. Water Affiars was not interested in a desal plant so we ... played mind games wiht them and we decided that we will locate the RO plant next to the sewage treatment works so that where the final effluent is discharged its discharged into a stream whihc will go into the lagoon. We then decided thats a good place where we will take the water from. So we drilled a series of 9 boreholes at the edge of the lagoon. In the area where the effluent is discharged. Basically stating that the effluent will be discharged, it will seep into the ground and we'll abstract it 10m into the ground. whihc is the case. Initially water affairs were happy with this becasue we would abstract the water, we would process it and the brine discharge from the reuse plant would be mixed into the sewage so you actually re linking it. So we aren't using effluent but we've made a connection. So the financial people were happy, water affairs understood us, and I say that avisably. Because right through the process they accepted what we were doing, they had been made aware of it. But once the plant had been made operational, the director
of water affairs said to us 'he understands what we did but we have got to put on our budget for future, a reuse of effluent plant so that when the membranes in the RO plant are due to be replaced - in 5 or 10 years time - instead of replacing them with the same membranes that we ahve, it will have to be redesigned to treat the effleunt. So we accepted that. He and I boht understood exactly what we were talking about. We needed the money, we needed the water, we got the water. in the meantime what we had done was I secured money to upgrade the sewage treatment works so that as we speak the plant is being upgraded to provide a consistent quality of effluent.

Where did this money come form?

from the MIG, completely independent of the disaster, the crisis, the emergency. We secured the R25m for that to upgrade the sewage treatment works and it is being done and it will be complete probably by July-August-September next year (2012). So by that sort of stage we'll be having effluent that is of a consistent standard, and this plant can start to be reconfigured. I've got to be very careful how we PLAY this because the funding is going to be very interesting. So everybody is happy and basically thats how we've done it. We abstract saline water from 10m down and the quality of water is poorer than we anticipated it to be, because we have a lot of fines getting into the water. we don't know why. it just is. Again we were not able to have the time to do groundwater exploration, we drilled and we used. We probably drilled 10 holes of which 9 were used. So it was not a case of picking and choosing whihc were the better holes. We used what we got. We have 2 spare holes which means we're not drawing from all the holes at the same time and the water is then processed. We have had to put in a pretreatment plant for the RO to filter out all the excess sand. We have not done that in Sedgefield because the quality of abstraction is very much better than what we have in KNysna. The plant here is Sedgefield was put in by Grahamtek, the plant in KNysna was put in by VWS Envig. Different process, different process, thats all it is. I'm not comparing the contractors. So we had to put that in and thats really - and thats a 2MI plant, there are 3 trains, each of them is 0.67MI, that sor of thing. We can operate one, 2 or 3 as its needed. And we brought this in because we will also only operate this plant when it is needed

Has this plant in Knysna operated as yet?

Yes, yes, it was used last year extensively. We had enough water for the world cup so by July 2010 the plant was operational. Not sophisticated but operational.

So it was operating during the World Cup? [during the World Cup]. It was commissioned at which stage was the plant commissioned?

probably at the end of April before the world cup, provisionally commissioned. So the construction began in 2009 [around October], it was commissioned in 2010, it operated

It operated, it it, we were able to say it was working. It was commissioned. From April 2010 to earlier this year, we were doing the upgrades and modifications to make it more reliable because by the end of March 2010 we had to use the R17.1m, which we did and that had to have it operational. So we were able to say that we achieved 1.5ML from the boreholes and 2MI from the effluent re-use. Unreliable. but we could do it. We had too many things operational and no standby and none of the things we should needed, it was too tight. We then asked for an additional amount of money, which then brought the total amount of money for the Knysna plant to R40.1m. So it was R17.9m, and R40.1 finally, so if you take the two its about R23m which we had to use by March this year (2011), whihc we did. That was the second trunch and at that stage we had the plant fully operational. Thats when we really commissioned it. We operated for a period of 40 days to get a reliable data and make sure it was operating efficiently. At the end of that
period we closed down the plant and put it into preservation mode until its now being opened up again for the december holidays so we'll have it available and operational for the peak period

So the conditions that were attached to the funding meant firstly that you had to go for re-use of effluent, even though you had concerns about the status of the effluent quality, so you found a way to connect the plant, and it can be modified in the future. However the condition was that the plant would be commissioned around March 2010? [that's correct, in time for the world cup]. Ok in time for the world cup. Which you're saying technically was the case? [technically was the case]. But there were aspects of the plant that needed to be addressed.

Yes we spent the R17.9m and then R23m in the year after and as you can imagine there's a lot of work for R23m was there a degree of pressure because of the money being allocated? Not a degree, a massive amount of pressure Did that then have an impact on the choices made and quality? Yes, yes, we didn't have time to do any of the explanatory investigations into techniques and processes. We assumed a salinity of the water for the tender document and when the contractor was appointed we actually found that the water quality was worst for the membranes had to be redesigned. The process had to be redesigned. Pre-treatment went into the second phase. The standby pumps, the additional pumpline was put in. Because again what we had done for the first phase, April 2010, we linked the discharge, the product line, directly into the distribution system. right there, 10m away from the plant.

And it was able to provide the whole of the Eastern portion of Knysna with water - Pezula and that area - which didn't provide water for the rest of Knysna. Which didn't provide water for the rest of Knysna but it meant that the treatment works didn't have to provide water there. So we took 40% of the area away and supplied it from the RO in the second year we built a pipeline to a new reservoir that we had to construct. Which was all operational by December last year.

The initial water that went into the Eastern part of Knysna was potable water but one of the problems you have with product water is the aggressiveness of the water. The langal index was too high. Which meant that if you provide people with water of that quality for too long it could have an impact on their bone. Which is why it was vital that it was mixed 50-50 with conventional water to bring it to an acceptable quality. Whereas by putting it into a reservoir, you're mixing it 2:1.

So of the 10MI a day, about 2MI is the usage of the Eastern part of Knysna?

Something like that, yes

And what is the population?
I have no idea of that

Its not nearly as dense as the other area primarily because it’s the more effluent part of town, that’s just the way it was. We were able to put the borehole water into the other parts of Knysna. 1.5MI, and this area coming off meant that we didn't have to provide that with water. The Eastern part would be from the N2 southward, so the south east corner of KNysna. If we draw Knysna, Pezula and HUnter's H0me and those more effluent areas. So all these areas and some fo Hornlee were fed by the RO. But becasue we were not taking water from that treatment plant it meant that the other areas had 20% more water. So it worked, we balanced it. So for that period the RO operated, then we closed it down and we finished the project and then we mothballed it. Well not really,
because its done little bits of pieces, but largely yes. And its now being opened. Plett, Knysna, George, Mossel Bay, they're all mothballed plants. And they're now opening them to operate for the peak. Sedgefield was different. We said we dont have any dam. if we have to upgrade the water treatment works, whihc I forgot to tell you, we had to do. As soon as we'd stabilised the supply and the tourist season was over. We intended to upgrade the water treatment works, whihc we did and that was operational in July-August (2010), in the next period. Whihc meant that was an assured 1.5MI per day. And during the period that was offline, the desal provided all the water. Its antiquated equipment, it was built in the 1970s and the idea was that it would be decommissioned and relocated elsewhere, linked to the dam project. When the dam was shelved the plant had to be upgraded. Becasue it was in a floodplain it also meant that whenever the river came down in flood the plant was swamped and you couldn't abstract water from it. What we did was we upgraded all the equipment and we lifted all the equipment 1.5m. Because we had historic data of all the floods, whihc we estimated to be the 1 in 100 year floods. We put all the sensitive equipment above that level and whihc means it can now operate under flood condititions. And we used the desal plant at that time. Because of this we decided to not mothball the Sedgee desal, we'd rather it go into a non-production mode and thats what we've aimed for. So that any stage we can go to the plant, push the button and the plant can produce water within a few hours. Thats really how we've managed it. Operational problems is another issue. The 10MI d=fom the treatment works is measured but how much goes to households is difficult to say. And for years we havea dispute between the technical and financial people. The say says they produce 10MI and the financial people say they receive payment for 6ML, never the 2 shall meet. I believe we are losing closer to 35%. This is due to leakage, the age of the system and illegal connections. Although the technical director estimates less and he will stand by that.Unfortunately the reginal sedgefield manager retired.

The actual emergency declaration was with the support of the province so that all the correct statuatory requiremnts were met. National treasury wouldn't accept mivng money unless it had been made legally sound. We had to go as far as to see which act takes precedence. Constitution, Finance Management Act, then Disaster Management. Once it was determiend that this had a higer making, everything else was subservient. Then we wre't particular interest in the position of environemtnal act. Once we knew we had the legal ability we then went to environmental affairs and thye pointing us to a clause that said that in an event of energency people thake priority. Whihc is the clause that we used and instructed everybody else to use. HOWEVER, 18 months later, in this year, we receievd a letter from environmental affairs saying that we acted illegally. And tht we had not followed the correct procedures and therefore they were goign to fine us. The CFO and I disputed this and ssaid it had been resolved and we had not acted illegally. Because in terms of the Municipal Finance Act, if we had acted illegally then the whole R50m that we spent was abortive expenditure, whihc meant that it could be reclaimed by the officials involved. So thats why we had to wait for the dclarations to be legal. Eventually the fine was reduced to R1000. I cant tell you what the various clauses are. I'm sure if you spoke to Melissa she'll gve you all the caluses and arguments used. The new form of open transparent governemnt worked in this instance.
The significance of declaring an official disaster was that we could then get the money and we could implement an abbreviated procurement process. Because the municipal manager had the right to do all these bits and pieces. We could then, it wasn't necessary for us, it meant that punitive tariffs could be introduced. Because according to the Municipal Structures Act you can't change the tariffs for services unless its approved in an annual budget, except in the event of an emergency. So by declaring an emergency, regardin the EIA, it meant that by declaring an emergency we could follow this escape clause. It wasn't an escape clause. It meant we could do it and then wait for the thing to be condoned. We are currently still waiting for that decision (November 2011). The lady from environmentnal affairs arrived virtually the day after the spring tides and saw the plant in an inoperable stage, and asked all sorts of questions. We answered them and her comment was that she can't foresee anything. Because the process of talking to the public resolved many of the concerns fo the community. There were major concerns that we were going to destroy the marine life and it was going to be an noisy plant, adn it was going to be an eyesaw, etc. The units were soundproofed. THe marine life. the abstractions was through a well system. We drilled wells 6m deep, we then put the 200mm pvc pipe, we then a sleeve with slots and a lining, a type of bidderm sock around it. And the sand material was such the quality of water had virtually no marine crustaceans so we could settle it and put into the plant. The brine discharge however was another story. We thought we could do the same system. Put it into a beachwell, pump it out and everybody would be happy. It failed for one or other reason. We aren't exactly sure why it failed. We then had to re-layer the system and we re-layered it with a piping systme just .. we have one pipe coming out and 5 branches to distribute the water. It wasn't ideal because we were finding that it liquified the sand where discharge took place. So what we've done in the interim is we've layed the one pipe onto a terminal point and then put a 'u' onto the beach so that its visible. The fact that we're only operating at night means that we are not creating this liquification during the time that the children are there. So everything is working nicely. We have asked R2.5m additional funding from disaster to address the brine discharge. That os where we are at the moennt. We have 3 options on the brine discharge. We either formalise what we've done, or we put an outlet 3-400m into the sea, which is a massively expensive operation, because if you are pumping infrequently the pump will tend to raise, which means it has to be weighted down. A third option is a pier. We haven't odne the full 40 day test here, but we've operated individual components for shorter periods. And we believe we are not going to be able to get the 1.5ML, we'll probably get much closer to 1.35ML. Probably the longest period its operated was over that first December, 30 days, because there was no water. But weren't doing a test at that time. The quality was easy, but we weren't doing a test on electricity used at that satge and how much man power had been used, becasue the contractor was on site and managing it, becasue it was in the maintenance period. There were 2 many variables at that stage. We said to them that we have to do a full blown test in the off peak, becasue we dont have the interruptions. Again over that christmas period we had a number of major delys. The power went off because it was also in that stage when we didn't have enough power into the national grid. So that contributed to the fact that we didn't have very much reliable data. Bit we got througuh it, that was what we said
We didn't cut the participation process at all. It was just that application was done with the right clause. And we followed that process. The statement we gave in the env report was that we will comply with all requirements of the ROD. We tried to mitigate prevent potential issues. For one we put in another transformer, we sound proofed the containers, we containerized so it could be operated on a modular basis or moved. We used plastic piping so it could removed without impact on the beach. We had the community involved in deciding on container colours, and they were very involved on an email basis. All the stakeholders were asked to give feedback to Melissa. We put it next to the toilets so it had a small footprint. Grahamtek came up with an energy saving device which the other municipalities copied, which saved us 30% on the electricity by recycling the high pressure water. And we're using to drive a turbine. It wasn't solar driven which we'd asked for because the water demand was just too high. We had a number of stakeholder meetings with the community. But we didn't have them as per normal. In other words a panel standing on the stage answering questions from the public. Because in this area we have a number of retired experts who would, have asked a number of extremely complex technical questions. And if you have somebody on the floor asking that kind of question and you have a technical answer, the rest of the community thinks he's talking down to them. And if he speaks in a language the community can understand, the technical people think he doesn't know what he's talking about. So I've had this experience in Alex and Soweto, it's a failure form the start. So what we did was we used the hall next door and each of the contractors and each of the consultants set up a desk. So they had a desk, they had audio visuals and the public were invited to come to the meeting and they were actually talking to the various groups on a 1-1 basis. I think it was an 8 hour day, from lunch time to about 8 at night where all the experts were able to interact with the suppliers and manufactureres and it worked extremely well. And I've recommended we used that in the future.

Yes, the decision had already been made to go ahead of the desal. So the purpose was to make sure that all their concerns were addressed. There were no objections to the plant as the choice. There was there is no other choice, you know where some very strict, serious environmentalists in the area. So the fact that we didn't go to the conventional sources was very appealing to the community because we were not damaging or risking damage to the existing inland water. We had serious challenges from the marine community which is why we abstracted the way we did, 6m below. The brine discharge we said we will address this and this is the situation. But the choice of the process, no we didn't have a lot of resistance. Again one of the reasons for that was because when we had the community meetings and the ratepayers meetings we advised them on the whole situation, the whole gambit of the 4.5ML. This is how we are going to do it. We had one of those particular individuals actually tendered for the plant, which wasn't successful, so we had serious challenges on the quality of the process we were choosing, as opposed to the plant itself. When we said to them that we're going for effluent reused but not now, that also made them very happy as they agreed that the tech wasn't ready at that stage.

Representivity... I don't know really. Melissa was given a free hand to try and keep as close as she could to a normal process. So we didn't so who to speak to. We just tried to preempt the concerns. The fact that the ratepayers and newspapers got involved at quite an early stage, meant that everybody and their friend knew what we were doing. The poor communities as well. A number of people from Sizamile came into town. Its a street. the one side is Sizamile, the other isn't. A number of the poorer people did get involved. We used labor intensive process where we could. The high tech stuff was manufactured in cape town and brought here. The reality is that when people hve the
threat of water from a bucket they are willing to accept anything. We had experts from
everywhere coming up with everything. We have borehole water, but the quality is not
good. And when the community said they were going to use it we were not happy. So
when we got these 6 boreholes we were very happy with the quality. Rainwater
harvesting is not a reliable option, we investigated it. Again it only works when you
have rainfall. Everybody gave us suggestions but eventually you come down to desal,
reuse and water conservation. We monitor usage on a daily basis now.
I think the reality that the town engineer had put a plan forward which then got shelved;
scotched all his forward planning. I believe he was let down by the consultants badly.
He wouldn't have asked a budget of R35m if he knew it was going to cost R150m. The
drought itself, they have had droughts before, there's evidence of it. But the evidence of
the drought coinciding with the high holiday period hadn't happened before. And the
evidence that the drought was of a severe nature - 132 year drought - exacerbated the
situation. Again the drought didn't start on the 18th of January. I'm not sure but I guess
we hadn't had rainfall for months before that. So yes, maybe the September-October we
could have said 'oops we're going into a drought'. But that was the normal pattern, next
week it will rain. As we sit here now, we haven't had good rains. Friday afternoon we
had a 15min rainstorm. Before that and since then we haven't had too much Do I say its
a drought? You know this is why the question of a drought emergency took major legal
minds to resolve, because when is it a drought? It became about legal definitions
There was no blame apportioned to the town engineer for not having done something.
Yes there was blame that he hadn't made the council aware of the cost of a dam. But the
reality that if there was a dam it wouldn't have done anything, mitigated the fact that it
had been stopped in August that year. So in the four months it wouldn't have been full
and wouldn't have been rains to fill it. so there was no blame apportioned to that.
Up until that stage the impact of climate change on the Southern Cape was seen as an
issue. It looks good but nobody knows just what kind of a drought it is and When its a
drought.

The reality that there was a moratorium on development which means that very few low
cost houses were built since 2001. There has been a serious influx of migrants in that
time and the informal areas have grown. Because its such a small area if we look at the
N2 again, Smutsville, Sizamile fits between 2 major sand dunes so there's no space to
develop. the informal settlements ahve occured within that area where there is a water
reticulation system. So the water is available. Not of an adequate nature. Similarly, the
area has got sewer, it has been serviced. The rest of this area, ahasn't. I dont know when
it was done, I do know it wasn't done correctly. They put in a small ball system. In an
informal area where you have less educated people the chances are very good many
things get flushed down. If you have small pipes it fails, it continually blocks. There are
chemical toilets are being put in, to make sure atleast the most basic service is being
provided for the community. And this would be 1 toilet per 20 I think it is. I think thats
the number. And water within 50m or something. Most of the water is reticualted to the
erven. There are additional standpipes put in. No, there are busy redoing a water plant
for this area. Becasue fo the moratorium nothing has been planned for. that has been the
attitude. The focus is on Knysna because that is where most of the development is
taking place. You also have to look politically that with the original demarcation
Sedgefield wanted to be independent of Knysna. So very little money was allocated to
Sedgefield. The other part of it is that for the last years the ruling party has been from
Knysna. Sedgefield has been DA for donkeys years and they've been in opposition. So
politically very little maoney has been put in. This election is the very first that the DA
has won, which means that Sedgefield has 3 councillors. Which means that the focus is coming back to Sedgefield to address the problems we have here. And the informal areas, the situation is that there's no land, that's it, there's no land. The dunes can't sustain any development. If there's any excavation into them, they just collapse because its sea sand. Something's got to be done to find housing and the municipality doesn't know what to do about it. Because across the road of the N2 there are stands available which could be used for RDP housing. But then you're splitting the community, are they going to be happy about that. Secondly, the schools are right here. You are putting people that having to cross a national road., not a good scenario. Politically it's a major nightmare. How to address this. Another option is in the North East area to put a new development there. But again, you're creating another poor township. Up until recently they haven't been discussed but in late last year I managed to secure money from the Neighbourhood development grant from national treasury and we are doing a revitalisation study of Knysna looking at economic opportunities, looking to address this. Trying to look at it from a different perspective.

Question of crisis conceptualisation: The national department will only see it if its. Again looking at it I don't think we can really say the quality is not the same. But what I can say is that you probably find there was less saving in the poor areas. The usage may also be different from the normal. Although the stands are a lot smaller, so no gardens are watered. In the island/town generally probably 2 people in the house, so the usage may be a lot closer per erf., but not per person. Then you add the cola beach, the swallows, that just confuses it. I don't think anybody's done any of that investigation. In the more effluent areas, the savings were more people were aware of it. In the poorer area, maybe they were aware of it, but the usage was what was needed. So that's why I say you don't have the dramatic difference in total usage.

**Interview 7 on 17 November 2011 – Interested & Affected Party**

Wessa, our mission is to promote caring for the earth. We are a national organisation, 8 years old, we are the biggest green organisation in South Africa. I cover the whole of the Western Cape, I'm the conservation manager or director. Basically it's about encouraging people to care for the earth and become more aware of their actions and raise awareness around environmental and cultural issues.

I was the person that caused Pinnacle Point in Mossel bay lots of problems, took them to court. There are caves beneath the golf course that house human remains dating back 164000 years ago and they were likely the only homosapiens on the earth at the time, 800 individuals. So it's likely that the whole of humanity came from 800 humans in Mossel Bay, which is pretty amazing.

The golf course was busy eroding it at the same time, so we took them to court. But for most part its land management stuff, eia's, setting up a biosphere reserve for the Gouritz and now we are looking at a biosphere reserve for the Garden Route.

Wessa didn't, haven't and probably won't get involved. Although my bread and butter for 10 years was eia's and eia involvement and that's one of the interesting things you could look at. Wessa has been considered one of the primary NGOs that government and organisations contact (along with Botanical Society). But nobody
pays the bills and when we do comment our comments are usually ignored either by the politician or the decision maker. It's a number of steps. Just in terms of our involvement, we haven't... primarily because nobody pays the bills. They'd rather get lawyers involved and spend R100k. But that's just the way the eia process has evolved or devolved. So unless you somehow directly involved or there's a NIMBY aspect the eia public participation process is flawed to say the least.

I WORKED FOR GOVERNMENT FOR 6 YEARS AND WHEN I JOINED 10 YEARS AGO, I WAS BRIGHT EYED BUSHY TAILED. I THOUGHT THE PROCESS WORKED WELL, WITH INFORMED DECISION MAKING. I'm realising more clearly over time that developers choose consultants and their specialist who will push through something. They'll surround themselves with the consultants that will give them the reports they want. They're the applicant, they've got money that needs to be spent, they need to solve the problem by providing water because there's supposedly a drought so they find people that will make that happen. And the consultants are aware that they are operating on tight budgets and they've got constraints etc. And its in nobody's interest to generate a report that says actually it's a bad idea to have a desalination plant because of this... And unless you've got a neighbour who says we are going to sue you because of noise, or my property is going to be devalued; they take the path of least resistance. And land up with a report that says sharp, minor environmental damage, but we're going to mitigate and on a scale of 1-10 its very low and with mitigation everything is going to be green. And that's what you land up with time and time again.

And a group like wessa that comes and asks hard questions, what's the real social impact, the real environmental impact, what's the real particularly cumulative impacts. If you look at the CUMULATIVE IMPACTS in addition to abstraction and the dma, rather than the isolated impact that the desal has here and now. Then one looks holistically at the overall ecological state of the marine environment. You see that of the rivers of the Western Cape, 76% are classified as critically in danger by the State of the Environment Report. And 19% are endangered. Something not adding up, yet these these authorisations are still taking place, or built illegally and then authorised later.

Real meaningful challenge yes. So people might put in an objection, but it can be ignored or overturned.

The Botanical Society did a very interesting study looking at the impact of their research and input on the final decisions in EIAs. They found that something like 80-90% of the input they gave at the primary level was ignored, and then it was completely ignored at the political level. So within the department there shouldn't be much political influence, so you are getting decisions that are sort of iffy but not clearly biased. At the political level you're getting political decisions. And unfortunately the way the EIA works is that the
decision that gets taken by the component official, the Director of Water Affairs or whatever, when its taken on appeal its goes to a political figurehead, the MEC of Environmental Affairs or the National Minister of Environmental Affairs and they're political animals so they'll take decisions that will benefit them politically. If this is denied than the questions is why is the environment it is in currently. If they had considered the environmental implication of their decision, if they had done so, they would have realised that cumulatively this approval would add to the destruction of the river, then they would decide to not approve it and decide to look at something else.

So the individual impact of a desalination plant is very small, but if you've got your desal the demand just goes up to meet the output of the desal. So in 2 years time, they say 'ok, we've got the desal, now we need a dam'. Which is exactly what's happening in Knysna. SO all of these have to be understood cumulatively, the part within the whole.

In the municipal districts as a whole, if you take that map there, and you look at MB, George, Knysna & Plett, the majority of the water being used is either by agriculture of alien plants. Urban or residential use is certainly less than 30% of the total water use. In fact I can't think of an example in the Western Cape, other than Cape Town, where it would differ much. Wietsche Roets is a good guy to talk to, possibly environmental Affiars guys Provincially, its all on Cape Gateway. Really the national provincial and municipal structures that should have that information. For means I side I'm fairly deslaination as a lesser of two evils so to speak.

Wessa were just registered, I don't think I gave comment. There's 3 levels of Wessa, the branch level, provincial and national. You might find a letter or two from the local guys. But none of them came to me specifically primarily because we're all jaundiced and cynical and when they see a section 24g application, they know there's less of a chance of our recommendations being taken seriously.

It would unfair to compare the processes. If we just take the normal EIA Process, what the law specifies and what happen son the ground is vast, from consultants that listen carefully and present objectively. But from my experience most of the consultants put an advert in the most obscure newspaper, cut the participation period to a minimum.

So there's an enormous range and exactly the same applies to section 24g. And there are some good consultants.

The significance of section 24g is that it gets fast tracked. And of course the legal activities, we joke that if we want to do anything illegal, we can do it, get it started and then claim to have not known, then do the section 24g application and you get your approval. The plant, project can be up and running and then the guy can say 'sorry I didn't know'. Thats the depth of the cynicism of people engaging in illegal activities. You've to be smart, if you started an EIA and then started the activity without authorisation, that doesn't work. But if you started the activity de facto and some bright spark comes along then you throw up your hands and say you didn't know, what can you
do it to fix it. Then they authorities say put in a section 24 g. And because of the way it's structured the section 24gs can priority, can pushed through, get authorisations quicker.

An impact assessment is a proactive comparative assessment of alternatives including the no go option on socio-economic and environmental impacts. There's no way you can do a true eia on an activity that has already commenced. It's a farce. Its not the same tool. To do a good EIA of alternatives, requires careful thought of the alternatives etc etc. Considered in conjunction with or alternative to a desal plant. It just doesn't happened. They'd rather put it up, say they've spent the money, how are they going to mitigate.

Yes, that's the political spin, that's what they're told to say (consultants comments on the section 24g as legitimate)

independence of env consultants. As usual there's a range. I've met consultants who've lost a lot of money because they submitted a report not to the liking of the applicant. And I've meant those on the other side of the spectrum who will do anything to work with the applicant to make sure its been approved.

The legal theory, legislation is wonderful, but even the best practice seldom works. I don't envy consultants I must say, because where one draws the line is very hard. Given that it's a business and they are operating on a shoe string budget. They don't have the luxury of listening to one person, it just doesn't work. So even the best consultants have to be pragmatic. They look for the easiest way of getting to the widest amount of people and usually that involves dropping it and putting it on their websites and then leaving it up to the public to decide on the amount of involvement, criticisms, presentations of alternatives.

Legislation underpins the process, particularly section 24 of the constitution, that's the umbrella for the eia process and any decision taken by any sphere of government, I think. With EIAs there are very specific requirements that must be met. And even in the best instances it has to be come a tick box exercise.

It functions (participation process). Again its that spectrum. I can tell now after 10 years of dealing with consultants and applicants whether the process itself is going to be good and whether the decision at the end is going to be a wise one. Some consultants I just know its going to be a dodgy process, and other consultants, I know I'm going to have to give comment because they'll pick up the phone and ask for something, and it will be recorded. There's a whole spectrum. it works sometimes and unfortunately doesn't work a lot of the time. I would challenge the view that its works most of the time, by asking why are most of the resources in such a state.

In terms of the EIA Process there should be a good thorough PPP initially and as a part of that, a full spectrum of alternatives should be considered. Form the no go to what is proposed. Other alternative options, different sites. All that kind of thing should be put out there in a safe trusting environment. then recorded, then after that ppp, should come the specialist observations, put back into the public
domain, then public being allowed to comment on the specialist opinions. I'm convinced thne that following that, the legislation is crafted well enough to allow for a wise decision. But it doesn't happen like that most of the times.

Money is the primary factor for anyone, any NGO, private individual, even government, knows how expensive it is to challenge a big corporation. Water is the most interesting case, because its so important, and I feel government needs at that carefully and recognise it as a strategic resource and take people to court to set good precedent. But the sense of entitlement, that I can do anything I want with water on my property, requires so much mind shifts, that its not happening (challenges to the process)

THE APPLICANT IS THE person that has the money - can either be private or government. The municipality for the desal plants has had to look at their funding and then in order to make it happen they appoint a consultant to run the process. And then other people with money - ratepayers, poor NGOs - either observe this process and decide to take legal action for example, But in terms of the balance of power and money, its the applicants who have the most money. In terms of the balance of power and money its interesting to see in larger projects like power stations, the stakes are high. The projects are big money. So they would be ready to go as far as the constitutional court to defend their project and the challengers would be aware of that. Thats all money, thats all money.

In order to participate in processes, you've got to have a lot of knowledge and have time on your hands and have access to the internet. So the vast majority of pop doesn't fit in. It’s the old retired engineer, politician, that’s got money, time on their hands. That form I would say 99% of the i&aps. You get the rented crowd where the developers will bus people in and their hands are guided over the document. And then you have 300 signatures, and thats the community. And I've seen that happening twice. So its sickening actually the amount of an illusion is created by developers, not so much municipalities. On the whole, the % of the 50mil of us that truly get involved in eias, is miniscule and getting smaller. The consultants and government officials are involved. The developer appoints the consultant, signs the declaration of independence etc. But to me thats 5)5 of the equation. The other 50% are the ngos, the disadvantaged communities, the green ngos, the disabled, alot of that is miniscule.

If one looks at it, as three rolesplayers, the ngos as one, the applicant and 2 and the department/ authority as 3. Then the balance of power is sort of a see saw between the second 2. Very rarely does civil society come in and participate.

On the homogeneity of civil society, in a community like Geore, NGOs cobs, should be able to sit around a table and make a collective decision. And I've tried to do that when I was in government and the developer flatly refused to come to the table. So its like any realtionship, there has to be a degree of trust and all parties should be willing to come to the table.
Without a doubt the registered i&aps can and should influence decision making. They can and should, by often don’t. There is the using to their own advantage, trying to convince the politicians. Ideally there should be a lot of varied interest groups with different perspectives. Then I think, and I have seen social impact assessment work done as part of the EIA process, whereabouts the social impact assessor has been very good at teasing out particular the poorer community interests and impacts. Where the developer has a certain idea, about job creation, and bursting that bubble and teasing away those layers. And saying ok, the application says a desal plant. is that really good thing. Lets look at it carefully, the implications. But that happens very very seldom. The other problem with the EIA process is that the process I descried earlier of the detailed ppp, approving what is called a scoping report in the old days. and then formally commencing the second phase of the eia, only happens for mammoth projects. For section 24g for example, its all condensed into a quick and dirty, lets make it all happen, the bare miniumum. And I dont believe one can make wise informed decisions for something as important as water resources on a quick and dirty bare bones kind of thing.

The benefits of using a section 24g approach: The developer gets what he or she wants. Water is provided if necessary. If there's now ater in the taps, dams, no rain in site and there's communitires having to walk or drive to collect water, or having it bottled and sent up pr using taners, then its has its benefits. There are benefits to be derived. But the more important question to ask I think, as an authority or developer, is did our short sightedness call this emergency, and our lack of vision exacerbate what could be called a dry period. It was just a few monhts, no ways can it be called a drought. There's dofferent ways of defining a drought. But just when George Municipalty was bleating about worse drought in 130 years or something; I was interviwed and I said, just wait till we have a real drought, when there's no water for 3 years and the dams are bone dry. Then there'll be talking drought. And even that is not a drought, because if one looks geologically it simply a cycle of rainfall and episodic dry areas that characterised Southern Africa. Particularly the Western part. But they get really angry with me, municipal officials, when I explain this to them. Then they say then all this emergency stuff can't be blamed on a weather event and thats extreme. Its not extreme, its our poor management that has exacerbated a dry period. ANd that to me is very very important that we get that message across. Becasue its goign to happen again, sure as nuts, probably in a year or two. Knowing that lets work together as a society to prevent a situation that has us going to find another R50m to build a crappy desal plant that doesn't work and cause us more problems.

I like the notion that would have, should have and could have are poor excuses for words, but in terms of what we can do and should do now as roleplayers. I think this is where civil society's power can come into effect in terms of ratepayers and tax base. We should be getting together and saying its our monye. Lets get together and look
at our it can be managed more wisely as part of that restructuring of budgets. And as part of the awareness of climate change and likely drier periods and people like Wietsche coming to the party and saying there's an array of alternatives that can be implemented if one is proactive. Aggressive alien clearing, wiser management of water resources, water resource use via the agricultural sector, looking at the bigger picture, for the agricultural sector sit around the table with us. We're in a water rich area, but its being squandered, we're a busing it. And if we were manage our water wisely, we'll definitely not end up with the situation that this is beyond our control, and its a crisis, what have you. But people aren't prepared to take responsibility. But they turn around and blame climate change and anything else but themselves.

If you can find a way, as part of your PhD, of influencing decision making in your small way, so much the better, towards, wiser management of resources, at all levels, that we can collectively manage our resources more wisely, then you would have done some incredibly valuable work. As I said my PhD was on saline and hyper saline environemnts. And in history there were wars waged over salt and now its the cheapest commodity on the market, and water is cheap. If we don't make some radical changes things will get ugly and its not necessary.

**Interview 8 & 9 on 17 November 2011 – Consultants**

Note: I failed to record the interview, which was a lengthy and important interview with the environmental consultants. However, as soon as returning from the interview and realising this error, I made notes of all that I could recall from the discussion and my own reflection on this. Below are the notes made and the reflections on these. The information provided in the interview was further verified by other reports and internal communication reviewed.

An environmental impact assessment (EIA) for the augmentation scheme in Sedgefield, conducted by the environmental consultants. While the EIA for the larger water augmentation scheme was planned to be completed by April or May 2010, the Desalination Plant was planned to be constructed by December 2009, with the contract signed in October 2009. In order to enable the go ahead for the construction of the desalination plant, prior to the completion of the EIA process for the larger scheme, Section 24 F(3) of the National Environment Management Act (NEMA) was drawn on, which makes provision for “an activity to either commence or be continued with in response to an emergency so as to protect human life, property or the environment”. According to one of the interviewees, in a meeting held in September 2009; between the Municipality, SSI Engineering (project manager), Cape EAPrac (environmental consultants), and representatives from the Department of Environmental Affairs and Tourism (DEAT) the decision to employ Section 24f (3) was taken. From which point the EIA process for the Desalination Plant was ‘separated’ out from the EIA process for the larger augmentation scheme. For the Section 24 F (3) process a Motivation Report was submitted to the Department of Environmental Affairs and Tourism in November 2009. The decision to employ the clause in the case of a drought was a first for South Africa, prompting the interviewees to describe its use in this case as ‘pioneering’, mentioning the need to ‘learn fast’ in terms of the relevant legislation in their role as the
company conducting the EIA Process. Following the use of the clause, to push through the implementation of desalination in the case of Sedgefield, the clause was then used by the environmental consultants in Knysna, Mossel Bay and Plettenberg Bay.

According to interviewees a ‘Normal’ EIA Process begins with the submission of an application, followed by a public participation process, a scoping report, further public participation, and the final development of an impact report against which a Return on Decision (RoD)/ Environmental Authorisation (EA) is issued. It is then possible for an appeal to be lodged by parties interested in delaying/preventing project implementation (assuming authorisation was given). However in the case of the Sedgefield Desalination Plant, an application was submitted in May 2009 as part of the larger augmentation scheme application. A draft scoping report was also written and released by October 2009. However by then the decision on the Section 24 f(3) application had already been taken. Therefore, instead of an impact report, a motivation report was submitted on November 9 2009. Construction on the Desalination Plant began in November 2009, during which time the environmental consultants were present on site as an Environmental Control Officer (ECO). Finally in May 2010, post plant construction, a Section 24 g application was submitted to the DEAT.

The application was deliberately submitted post implementation as the clause employed is an emergency clause concerned with rectification after implementation. That is, it is based on an assumption that the activity had to commence in an emergency, with the clause drawn on to address the ‘illegality’ of the implementation having gone ahead prior to authorisation. In sum one main difference between the ‘normal’ eia process and the process drawing on section 24 F (3) is the order of the process. That is while the overarching order of the former is investigation – authorisation – implementation; the order of the latter is investigation – implementation – authorisation (while recognising that these are representative schemes). Secondly the time span for the latter is significantly accelerated. A strong critique of this ‘accelerated’ process is that it has the effect of making EIA processes void. As applicants can proceed to implement a project and follow this with the submission of a section 24 (g) application, claiming/ motivating that an activity commenced in response to an emergency. A counter to this critique was offered by the interviewees, in the case of the Desalination Plant, explaining that although the order of the process has been reversed, should authorisation (post construction) not be received the removal of the entire plant and associated infrastructure could follow. Explaining that the plant in Sedgefield is designed to be implemented and/or removed (all its components) without considerable impact. It is interesting that this supposed ‘mobility’ of the Sedgefield plant in particular has been mobilised by consultants and municipal officials in a few of the interviews conducted thus far, when pressed on the issue of accelerated implementation, and the long term importance of the plant for the town’s water needs. What has been implied is that because of the uniqueness of the process, the stakeholders involved aimed to anticipate potential concerns and critiques from the outset. However, since it’s construction, there have been problems with both the inlet and outlet pipes of the plant, and it has operated for approximately 3 of the 24 months since its construction. Despite its minimal use (due both to operational difficulties and a lack of ‘need’), the municipality has invested in fixing the problems encountered, possibly suggesting the increased ‘fixity’ of the plant through increased financial investment, as well as the gap between claims of ‘mobility’ and action.
In continuing the reflection on the implications of the accelerated process, desalination was previously identified as an augmentation measure in the case of Sedgefield and Knysna. However, in both instances it was a future measure, due to the high costs of production associated with the technology. Hence, even if considered and put through a normal EIA process, it could be expected that this would be a lengthy process. This was therefore the benefit of the accelerated process for a technology such as desalination, which is still relatively new in the South African market. Now that a number of plants have been constructed along the Garden Route, in a relatively short period of time, it could be argued that the ‘crisis’ opened the door of opportunity for the desalination industry.

Finally, in considering the implications of the accelerated process on Public Participation, in interviews (conducted with the environmental consultants, the Knysna Project Manager, as well as a few registered Interested & Affected Parties), it was stated that public participation was emphasised. Both because of the significance placed on accountability as well as the necessity of demonstrating in the Section 24 (g) application that the Municipality has made every effort possible to comply with the EIA process. Furthermore, both Knysna and Sedgefield have a number of retired engineers as residents. In fact, in an interview with a Municipal official he suggested that he leveraged the technical expertise of the resident retired engineers to push forward the desalination solution and obtain the buy-in of the local councillors, who are politicians and not technical experts. In this case, the question of ‘public participation’ emerges as an interesting one on a number of levels. Firstly, Sedgefield and Knysna would seem to be somewhat ‘unusual’ in the number of retired engineers and the implied ‘technical’ knowledge base in the area. This is significant in considering power relations and influence, as these residents could potentially engage through officially established ‘public participation processes and/or could exert influence through other channels, and possibly at earlier stages of the process. This is significant to consider given that project implementation was a ‘foregone conclusion’, with registered I&AP only able to influence issues such as plant design and structure, and could lodge a challenge post construction. However, when read in relation to point one, this highlights the importance of exploring the wider spaces of influence. Finally, this examination of spaces of influence implies the need to consider which ‘public’ and what ‘participation’. That is, what about those who are neither participating in the ‘informal’ or the formalised spaces. This is significant to explore as it suggests that environmental Impact Assessments (normal or accelerated) serve as tools to legitimise, that is to prove participation, and to simultaneously border off the spaces and issues of contention and participation.

**Interview 10 on 18 November 2011 – Politician**

My personal background, I'm currently councillor for the last 16 years, and I'm the political representative and I'm chairperson of the technical services and tourism department. That’s my portfolio. And because of that I'm closely involved with water, sewage, roads, infra, town planning. So that's all under my department. I've been the chairperson for the last 10 years. But remember that councillors are elected to be councillors, and we have 27 councillors on the council. And this year in May (2011) we had elections cross the country and that is why I'm still here. The DA was in power and continue to be in power.
The ANC councillors have changed, they've got 7 councillors of which 6 are brand new, and previously they had about 9 councillors. But the demarcation board. We had 12 wards before and now we've got 14. So we had 23 councillors and now we have 27. Everytime they see howmany registred voters are in a ward, if the population grows. The demarcation board does that, and we must give inputs, and eventually we all agreed on this. But it takes the political parties into consideration. Not that it helps much. Dick Naidoo is the Director, but I'm the chairperson. I'm a political figure, chairing this department. Somebody like Niko Liebenberg has been an ebngineer for many years, his well qualified, has his hands on the infrstructure. Mbay did planning in advance, our infrastructure was kept in good conditions.

Before the drought we were advised by all our -people who give us advice - our consultants by 2014 because of the influx of development. We were told that we would have to provide extra resources. We've got the Wolwedans dam, we sharing with PetroSA, our main source of water. And that qwas seen as not sufficient by 2014. So planning for extra resources by 2014 were on the books. These included boreholes, which we did, We sank lets say 16 of whihc 4 gives reasonal water whihc is not sufficient.

We had consultants, and they had plans to put some kind of warm into the ocean for electricity, that’s still on the cards. For the water we talked of the desal. But something very interesting about the desal, because we were in a drought crisis situationa nd MBay was declared a disaster area. Instead of burdening the ratepayers with a R210m plant; PetroSA bought in and NAtional Government bought in, and in the end, MBay only had to contribute R30m. So we had a bit of a good fortune because of the drought. There we've got the plant giving us 15ML per day of whihc other parties also contributed to.

We didn't follow that route ofcourse, because if we had to do it on our own we would have applied for funds ofcourse. But what that outcome would have been I don’t know. But the disaster helped us in many ways. You know to have a plant like that, you need a very wide and depp EIA process. Now one of the advantages for declarign this a disaster area. That process was shortened. We call it a scoping insteed of a lengthy in depth EIA. We could get things going quicker because of the diaster.

Oh yes, deslaination w was discussed before with consultants. But these were not the same that then got involved with the plant. You get these fly by nights. So before the drought we had many of these fly by nights. Because all the plans were ready for us to start and be ready in 2014. And also what put a break on this was the econnomic crisis. Suddenyl the economy in MBay also started stagnating. So that was also a dmaper. If the econocmic crisis would have reduced demand for water and electricity why was this pushed forward?

No, no it wasn't pushed forward only when the diaster came upon us. It was that we knew sometime we would have to do this. Without an emergency, it would have been the same process, it would have been slower. You'd have to get it on the budget for the next 5 years. I really don't know if we would have been able to get money from other departments. It would have been the same process but much longer and outstretched. So the drought was kind to us.

The disaster declaration, you have to apply for that through the EDM to declare us a disaster. Because if you're disaster area you can enforce strict water restrictions, heavy fines, you can use water restrictors. There are many things then we could of done and did without harrassmenet by the ratepayers because there was a disaster in place. Firstly the water ing of gardens, we started with even numbers and as it worsened, we say no watering of gardens, no hose pipes, no washing cars. Then in terms of restrictions we said if its 30kl per month over 3 monhts then we send a letter out and then its restricted
to 15kl. And you know by applying these measures we came down by 50%. The best in this whole area. By the 14th of October 2010, our dam had 14% and we had other measures ready for the season. Because the last thing we can do is tell the holiday makers, you can't come, we close our caravan parks. Because that's the heartbeat of the town. So we had plans to have water delivered from George by train.

One of the biggest impacts was the water revenue. I think we lost about R10m. So it's a sword that cuts both ways. And another problem was that the effluent was getting less, which we need for the Waste water reclamation.

We had the volume of the dam posted on notice boards all over the area to show the position. But Nicco will give you those graphs, also the household consumption.

Public Participation process: There was a wide public participation as you must do with everything today, you consult. The company who did the EIA, they had quite a number of meetings with extensive coverage in the town hall, it was widely publicised. And people could come and familiarise themselves with that at ask questions, there were no shortcuts. The public were informed all the time, what was going to happen. So there were no sort cuts on that one.

Status of the plant: Its working full steam (Nov 2011) and the water is very clear and you won't taste any difference to any other water.

Funding? Costs: PetroSA will contribute to the running costs. They actually own about 1/3 of the plant. And they will also help us with the costs of that. But that's the burden of the ratepayer. Its produced at R6.08c comred to R1.50 of water we get from Dwa through the Wolwedans. Of the R6, the R3 goes to the electricity costs. We had a normal increase in water tariffs. At the moment our dams are full, so we don't use that water, we don't need that water at the moment. That plant is going to be mothballed from time to time. But I don't think our tariffs has increased because of that. But there's a difference in the cost per kl.

But it makes sense because we have to have water. So for now we have water for the next I don't know how many years. So it's you know either more expensive water or no water.

The boreholes are not so successful, you have table mountain sandstone running through. The George area is more successful for boreholes. I think for the boreholes we may get 2MI per day, but they are sealed at the moment.

But the dams are full at the moment, at least greater than 90% at the moment, versus 14% last year. Which is quite a difference.

No councillor is allowed in any tendering process. It's a supply chain management process, which the officials do. The law is very clear on that. I don't want to mention Malema but I think he got more insight in those things than we have.

Chair's role: The politicians they make the rules. If the politicians decided against that plant it would have been quite disastrous but it would have been possible. Because they must take the town forward, they must have a forward plan, do we want a desal plant, what are we going to do with tourism. Then the officials must see that its done. So we can't say the plant should be here instead of there, because that's technical things. So the political role and the officials role is quite different.

In choosing desal, decision making: We sit in, I was in all those meetings, I was chairing them. Its an overseeing kind of duty that politicians have. Asking questions which I take back to my caucus. The technical people around me provide us with those answers, its an overseeing kind of job. Because how can a teacher give advice to a Director like Dick Naidoo. I can ask him for example about the building, the height of the building and if people's view would be spoilt. That's where the politicians got involved, not ton the technical things. And then the consultants were asked to create
another design. Because the costs were enormous, and it was difficult because of the technical issues. So as politicians we said we can't find against them, we have to take the middle road. We sit with the ratepayers on one side and the engineers on the other side.

You'll always get those who've got objections. Never have we had 100% buy-in. You know there are always a few. I sit here with an application, the process and the complaints. You'll always have complaints, then the politicians have to decide. The whole community of 120000 people of which maybe 1% have an interest. Usually it's the ratepayers and the conservationists, people living close to the plant, the fisherman, what effect its going to have on the fishing industry. The white shark research had concerns about this. But the normal resident, not really. It all depends on whether its going to have an effect on them. Whether it's the population or the view, or whatever. The meetings are all on record, you should be able to get it.

In the meetings we had many concerns, you know, are we going to finish in time. The first, this plant should have been in commission by the middle of January this year (2011). But we didn't because we had rain, and then there were strikes overseas for importing the cylinders and parts, and they had problems here with the cofferdam built into the sea. The desal plant is there between Harrenbos and ?. To the Mossle Bay side of the tanks of PetroSA. But you won't be able to see anything. The pipes are buried. They built a cofferdam to do the construction of the pipeline and then there was a high tide that was not expected which damaged the cofferdam. So that was again a delay in construction. But we went in a hurry because we had water. And some works had to be redone. And we said, you've got time now, redo that (for example the painting). The dam was full, we had enough water before the season started and before the plant was commissioned. Because these companies were fined every month if they didn't ... We don't call it a fine we call it a build penalty, by the engineers. Because we were really in a tight spot. I'm not too clear on the dates.

PetroSA - Carel Steyn - Michelle Graz - walks in and I mention that I'd like to meet with her. She will email a presentation she prepared for a conference, as well as a 3 page abstract she wrote. She'll then ask Tanya to contact me to arrange a time.

It was quite hair raising scary this time last year. Because the public looks at you as the councillor, they want water in their tap. Some people were angry with us because of their gardens. Some people don't understand. We had a team in the field also to secure the water losses were under control. We sent a team into the black, other areas also, where people can't afford to repair a dripping toilet. And EDM was also a roleplayer. They donated money as well. In the EDM we were engaging with Gerhard Otto, the disaster manager. He will supply you with the necessary information.

Interview 11 on 18 November 2011 – Municipal Official

I'm the civil engineer. 24 years. Since I finished my studies in Stellenbosch. My experience is more, I was a consulting company for 7-8 years. Then I came over to the municipal side as the head of project management and support services and Mossel Bay Muni. We have three heads, roads and stormwater, water and sewage and I'm responsible for planning. On the civil side. Erik Louw is more toward the project management for the execution of the capital projects.
We came to a point where the water sources, we talking about water quota, water affairs allows a certain amount of water to be used for the town. And we came to the end of the allocation of the quota. We haven't come to the end of the consumption, but say about 60% of the quota has been used. So for the last 2 years there was very little town development. So we did have, there was a the Outeniqua Coastal Study done by dwa to determine if we could expand I current rivers. If we increase the dam wall then we have to go through environmental process, and the environment process is going to give more water allocation to the estuaries. So in the end, anything we'll do we'll shoot ourselves in the foot. So we did plan by 2015/2016 to put in a reclamation plant to bring in 5ML per day, treated sewage water, then its up to drinking standard basically. But with the drought, that whole process was brought forward. We started with a reclamation plant, 5 ML per day, but we brought it to a standard where we could give it for industrial use. Its sort of quota swap from the raw water resource from the dam. So we purified 5ML per day, gave it to petrosa and then we could use 5ML per day from the dam. So the idea was to swap quota, but in the end it turned out a bit different. The idea was to increase the total water quota for the town. Petrosa contributed some of the money, disaster management, water affairs I think gave some of the money. That is for the reclamation, and in the end we purified for petrosa to the raw water standard. It still had to go through the reverse osmosis because their processes dont allow chlorine. So the water was treated to ultra filtration R>O standards and then it was blended back because the standard was too high. So the facility is there for us to use the water for drinking purposes, the upgrade will cost about R4m. But at this point you know there's still some negative feelings about that. I know in Bwest they're drinking the water without any problems. But in our area there's still some negativity about that.

Our dams are full at the moment so at this point we don't have to discuss right now to mothball or to stop the plants you know for the next 1,2,3,4,5 years. We have the facility now. So the quota increases. So we don't have to spend money on maintaining a more expensive water resource. So we can expand the town. We do have evidence that we can supply more water should we need to.

Very severe drought, 132 year frequency of drought, and this whole area, riversdale to plett, also bwest was in severe crisis. We had monthly meetings with the national disaster management team. They came down, had meetings with water affairs and in the end government also decided to give us another I think R92m for the desal plant, petrosa also gave about R80m. And the ratepayers had to pay the rest. Which was not much in the end. Because the desal came to about R175m, from our side we had to build a pipeline toward the reservoir, that was a nether R20m. So it was about R200m in total. Petorsa funded between half and a third, because from their side they need 5ML per day, from our side 10ML. But 10:1 we are going to use the 15ML because its not really up to their standard. For drinking purposes its fine, but from their side they need very pure, chlorine free water, and the water produced at the plant is not chlorine free. But that doesn't matter to us because the drinking standard is good enough to supply to our residents.

From their side, the dam was lowering. AND SHOULD THE DAM COME TO BELOW 10% ALL THE WATER WOULD COME TO THE MUNICIPALITY, and they physically can't shut down their plant. If they shut down their plant they're going to lose billions, so they had to prepare for something to atleast put their plant in idle mode. For that idle mode they would need 5ML per day. That is why they provided for 5ML per day.
I'm not exactly sure why in the end they came to the party. It’s a long story, with the water levels in the dam going down. There was a lot of pressure to save water. The municipality saved about 50%, petrosa didn't really save any water. So they paid toward, 5Ml per day and then a second 5Ml per day. The first one, the reclamation, they paid R22m, and that was about half the price, in the end I think it was about R40-R50m. But the desalination plant, sea water is much more expensive. Its much more expensive to get the water from that side. Also the operating cost is higher. But its now an unlimited resource should it really stop raining then we can survive and they can also survive.
The operating and maintenance costs, it is shared. We are busy with an agreement between the Municipality and petrosa as co owners, we busy compiling an agreement between the owners and the service provider. We already have a 3 year operating tender in place. But just to define everything more clearer.

Emergency declaration: It is a council decision, because it has got a lot of implications. Th e one if you declare it a drought area you can have access to funds, but it’s a bad refelction the municipality. Declaring your area a disaster has negative connotations for people wanting to invest in the town. But the decision it was submitted to the council and the council made the decision. But all the towns decided to do it at the same time. Its more a political decision, we made the recommendations. The executive management took the recommendation to the mayor. We didn't have much of a choice. we had to do it. I can tell you the background. At one point, politicians wanted to send out a letter to people, to the holiday makers at a time when the dam was going down, not to come to MBay. That is suicide. So then if you have to choose between declaring a disaster and doing that. Then its much better to declare disaster. Because there's a very big problem, but that is also, those 2 weeks the economic injection to the town, carries many businesses right through the year. So you cant really scale down on that activity. The savings, the water restrictions was more toward the residential people. To stop people from watering gardens. But the businesses were not really affected, or limited business damage. We first started with the water restrictions, while as a back up getting things ready, hoping that it would rain but it didn't rain. So we proceed, the desalination plant was meant to arrive last december (2010). So it did rain but the idea was to build an emergency plant, pipes standing in the air. To have that ready by december and long term very high standard plant. ANd because we did get some rain during the time, we didn't get to a point where we needed the water. But we had to run with it, we didn't have a choice, because if it didn't rain by december, then its bad news. We could see that the dams were dropping, steady straight line dropping, and then it started raining and it carried us through the season. Like I said the reclamation plant was running at full speed, the 5Ml per day. We put another pump in one of the rivers and pump the released water in from another dam into the river and we dumped this water into our purification plant. I think we sank about 30 boreholes and we did get some of that water. But I think the total yield from the water was about 3Ml a day.

Why not earlier measures: You see we never had problems with a drought. We did plan the reclamation plant for 2025-2016. YOU SEE YOU CAN'T SPEND MEONY IF YOU'RE USING 60% OF YOUR QUOTA. POLITICIANS ARE NOT GOING TO FORK OUT R50M to build something when there's not a need for that. So when it was dry the money came quickly.
You see the planning was for 2015-2016 for the reclamation plant and maybe 5,6,7 years later for the reclamation plant. Depending on the growth. So at one point the town expanded drastically and also with the economic downturn in stopped. Last December
there were very few houses sold. Generally, globally everything is standing still.

You see you're constantly reporting, but there were lots of developments that had taken place. So there was a lot of house buying, land buying opportunities. But its not really a case of we should have done it earlier. Like I said the reclamation plant was expedited by a few years and the desal would have come later. But we were also waiting for the dwa outeniqua coastal study, looking at the water yields of the differetn resources. That would have determined can we extend, increase water consumptin from the wolwedans dam. Our total budget this year was R180m, so you can't spend R50m if its not really crucial. So should the outeniqua study determin that we could use more water from the wolwedans dam, then this plant would have been further delayed. Our total capital budget for this year is R118m, so to throw in another R50m doesn't go very easy.

Rainfall patterns in reports over the last 5years to suppor to development earlier: In retrospect yes, but as I say the municipality is so focused on bread and butter issues. I think if it was Jhb for example and the persons job is to anticipate raw water expansion its a different story. In our case I think we were proactive enough, the drought was totally abnormal. There are many factors, the influx of people varies. even our projections for the future, we project 1-6% growth. We also look at the rainfall, you've got so many cycles, you can have lower rainfall for 5 years and extremly hihg rainfall for 5 years. In a theoretical world it would have been possible to predict.

What we do, you have the long term plan… the dams, its not municipapl dams, if the outeniqua coastal study, we couldn't even consider increasing dam sizes until that study is completed. So it had to be done by dwa. The primary dam is the wolwedans dam, owned by dwa. So the forst answer is to see can we increase it. And we waited 3 years for that document to be produced. that document did increase the allocation from the wolwedans dam quite substantially. But was the initial allocation to MBay but we didn't have it in hand. So after that study they said ok, 'there's another 2.5GL in water'. That could ahve carried us a little further. But once the study was completed, we were in the swing of the drought already.

You see what happened was, initially when the dam was built they said that the dam would deliver 13Gl per year. 6Gl was allocated to petrosa. And the rest was sort of hanging in the air for the municipality. And then with this study they actually said that they overestimated the income into the dam, maybe it was brought down slightly. So we said that when the dam was built we were allocated 5.8Gl and we want that. We dont want the estuary to determien the growth of the town. What I see now I would much rather trust the eralier calculations of the engineers of the run off. I think they did bring it down from 13 to 11Gl but I think it was sufficient for us...

Desalaination why: the forst alternative is to build dams, theoretically it’s the cheapest, then you'd go for boreholes, but its not really sustainable. Then you'll go for reuse, but you have to work with quotas of surety of supply. Sometimes you can say it is acceptable every 1in 50 years to tell people not to water their lawns. But the TOTAL WATER QUOTA COMING IN OF THE VOLUME IS SET. So what you can do is take some back, the second water bring it back to the system. But once that's finished you need another source, whihc us the sea. there's no other source.

The decision making was not focused on the river environmental needs until the last few years. I had a meetign with CSIR yesterday and as part of the study's done by NMMU, they did a study of the water quality in the estuary. It can be very easy to say you have to release 2GL per year into the river to the detriment of the ratepayers or the establishment, but it didn't make any difference. The migration of fish is the only reason
I would say you should open the month once every 2 years. The dam has the negative effect in that there's much less water going through the river month. But it can be done controlled now to wash out the basin. I think most of the estuaries in the area is really building up sand. You can call it global warming, but in my opinion os climate cycles.

Emergency declaration: I don’t the law has changed in that regard. I think it has always been a stipulation in the NEMA, if for any reason you are unable to do the EIA, that you report yourself. To use the 24ff(3), g clause we didn't havea choice. We had the regional disaster management meetings, then we had meetings with petrosa, there were meetings everywhere. Witht he sever water restriction sin town as well, it touched verybodies pocket adn was at the top of everyone's mind. So we had the water and dam levels published on billboards all over. So the whole town bopught into this problme we're having. So at a meeting in George it was decided that we would delcare a disaster. But each municipality had to still go back and get permission from council to declare a disaster.

The NEMA is totally separate. We made this decision, we proposed it and council accepted it. I think the municipal manager also played a very big role, because she would be held accountable if anything goes wrong. So she was the link between us and the council. But like I say everybody was so hyped up about the drought that it was not much of an issue to get it throug council.

Then the decision was made to build the plant. The environemntal affairs guys, had them here, they said 'they can't give us permission to build a plant because it hasn't gone through the processes. The planning was to make sure that the salt concentration was not goign to be high. From our side we did what we could. We went through the environemntal awareness campaigans, we did all the studies we could. Obviously we didn't get permission yet. Environmental affairs undertsood, we just proceeded, they said, go ahead but report your contraventions. So the politicians don't really ahve anything to do with the 24f, they received the money for the ratepayers. Because the money was not on our budget either. The role of the politicaian is more toward policy making and from our side its more to get things going, the overall strategies, compiled by the executive management and they would propose it to the council that would then use that to align to the budget. All the bylawas are submitted tot he council and they then sign it off. The politicians role is to sign it off.

Everybody knew what the options are. There was always open communication from all sides. So I don’t think there was any pressure from either side. Like I said, people felt it in their own houses.

Participation process:
Again public meetings, plans by experts. Basically the prescripts of the NEAM regulations, instead of 10 years of discussions, open forums, the whole process was done in 3 monhts. The whole process is just shortened, but whatever back up rprocesses we did put in place to minimise any risks.

The plant started running full time now, then they had to do sound tests. I think the official submission of the application, I think it should be in the next few days. The plant has been commissioned on 4th October (2011). We're scaling it down now because the dams are full, because the productions costs are higher. R3.5, normal water, R3.80 reclamation, R4.50 for the desal if you run at full operation. But if you scale down the plant, then the price will go to R8.50 per kl because the fixed costs are constant. So the rate per Kl is based on electricity costs and fixed costs.
Tendering process:
I was not really involved at that specific point. It was not like an open tender advertise for 6 months. You know I think all the major role players in the industry were approached and they submitted a tender and construction, we were talking about build and operate. You get different versions, eg. build own operate. In our case its build and operate for 3 years and then we can decide on whether to extend up to 20 years. But before that period I'm going to shut it down because the dams are now full. But the infrastructure will still be in place. You see a problem with a plant like this is that you can't really stop it 100%, so we have to see how we are going to shut it down. If the pump is not used it gets stuck. There is a cost component that we have to face it. In my opinion, the way to go is to take all the pumps out and clean and dry it and put it in a corner. But we will see what the best way to scale it down. The costs in this case, we've got a sliding scale in water rates, the less you use the less you pay. The first 6KL free, and a sliding scale going above 80KL, R24 per KL. Petrosa is also on a sliding scale but a different sliding scale. Business is almost the same as residential. Then you get to the larger consumers, 0-200KL, R5; then the the bulk users 0-2000KL is basically on the lower rate, then greater than 8000KL is R24 per KL. Thats where petrosa would fall in.

Interview 12 on 21 November 2011 – Press

We keep abreast with current stuff happening in the area as a newspaper, we stry and stay involved with all sides of the community. The edge was a the sedgefield advertiser, a bit like action ads, we decided that it would be a lot more interesting for us and the community if it became something of a news platform.

There was always sort of calls from the municipality to conserve water. We were sort of the go between between the municipality and the public. But I think, the real hit came in January 2009 when they ran out of water. That was after a very busy season. Prior to that they talked about putting in a dam for Sedgefield. I don't know if enough money wasn't allocated, and that fell through. But the real crunch came when they ran out of water and started trucking it in. Thats when it became a headline thing. Thats when we took it on.

For Sedgefield I think they were discussing plans. Sedgefield historically had a water shortage problem because of the december season. Because of the phenomenal growth of the town, the water plant struggled. And I think much of the time, Sedgefield people didn't know how close we'd come to running out. Because I think the former engineer just kept it going.

You know Sedgefield used to be its own municipality, so in 2000/2001 it was taken into Knysna. And there was a lot of political shifts going on, between the different parties. That’s been the last 10 years. I don't think they've spent a lot of time looking at long term planning, I think there's been a lot of short term planning. I think pressure from local groups, the ratepayers association, I think there was pressure on the municipality to plan. He dam, I think there was even an EIA done, but because of funding issues it was stopped.

The dam was meant to be the thing that was going to save us. We've got the Karatara river but the storage capacity is virtually nothing. There was also the Hoogekraal river that was used in the emergency time. I think they still have that pipeline in place. That also saved them from continuing to truck water in. But that I think was also a short term solution.

The decision, obviously was a municipal decision, I think because of the dams situation falling away. I think they had to come up with a fairly quick decision. I think a lot of the
decision was political. O supposet hey had to make a political decision.

They basically had to solve the problem. They had promised to solve the problem by the next december, so it had to be a quick solution, which a dam isn’t. It was also an innovative decision, the biggest in South Africa at the time. So I suppose it was good for Sedgefield.

It’s a strange thing because we've got this equipment, but it's expensive and we aren't using it all the time. What I've had from the engineers is that a plant will run better if run frequently. I wouldn't call it a white elephant, but it was a lot of money for a short period of time. So maybe it was more of a political decision.

I think the trucking in probably lasted about a week and then the hoogekraal pipe was put in and I think that saved. Then the next thing they did was sinking boreholes which I think are still there. Whether they are operated or not I don't know then later in the year the desal was put in time for the season. The actual disaster was only a few weeks. I don't think it was solved with rain. They made all these plans to solve the problem. But once again it was a stop gap. I believe they should have done those well in advance. In stead of tretign the wound, and maybe thats what the aim of the desal. But there's rain again, so I don't know if we'll need it.

Request for articles, to trace it through....

I think they had managed to get us back on track with the water but it certainly wasn't over. There were still hosepipe restrictions, there were regular meetings with the council with the media, there were notices all over town saying water stressed area. So it certainly wasn't over but it wasn't as bad because of the hoogekraal and the boreholes. Still there was a water shortage it was a bad year then. And the whole area was bad. They knew that season was coming. Sedgefield is very reliant on tourists so they couldn't have even an inkling out there that sedgefield would battle for water.

I'm not an expert but I think the desal was a quick solution and as I say it was a very good pr solution for the party in power at the time. Which is not to say that any other party in power wouldn’t have done the same thing. It was a good project in that it put us on the map and also it was a fairly quick solution. But whether in the longer term it was the right solution I don't know. But I do think that for the last 10-12 years there hasn't been a long term planning, more patch ups.

Status of desal: we believe it was running over december but we're not really kept in the loop as to when its needed and not. They say its an expensive form of water and that’s why they use it selectively. But the only time we only really hear bout it is when they find pipes on the beach and people start asking questions. So in this last case, there was a heavy tide or something that exposed all the pipes. But I suppose thats also a good thing. Because there were a lot of people worrying about the effects of the desal. You know there's no major noise, no dead animal carcuses. We know its there, we'd like to think it will work when we need. We Don't know when its working or not. But there's sort of a general feeling that, er, this town full of retired people so alot of retired engineers and their sort of thing is 'is this going to work if its not running on a permananet or semi-permanent basis'. We don't know

Look we have a very good relationship with the PR people of the municipality. Usually I'll contact them and then they'll ask the municipality and then its sort of an investigation and they'll sort of explain. Also CapeEAPrac also kept us informed. It was also a fairly new thing for them as well. But now its usually as a result of tdigging. You know if we see a physical change and we can investigate. But during the year when there hasn't been enough demand we dont know if its running or not.
Over the last 2 years since its construction we've been told very little. Just that its working. One wonders, does it have to pay for itself. There has been comments from residents that we now have this water supply why can't we use it. But I suppose the cost factor, especially electricity is a factor. So we don't know if its working or not, we just presume that it is. I suppose the general consensus is that we hope that its working.

Political Pressure: I think there was, and I do stand to be corrected here. I think the dam story, I don’t know if it was handled badly. Suddenly it was going to happen and suddenly it wasn't. Yes, I would say there was pressure. I suppose the situation of running out of water in January then gave them a bit of time to prepare for the next December period. But, I would say there was definitely pressure put on them. You know a town running out of water is kind of unacceptable and especially when, you know. Most people in town knew that the water situation was getting tighter and tighter. And it wasn't like there were any clear solutions, like the dam was busy being built when we ran out. It was like ok, we knew this was going to happen, now its happened, now what are we going to do about it. So I think there was pressure to come up with a quick solution. I would think it was long term (though quick) because of the cost implications.

Actors: Agriculture I don’t think is involved at all – other than using the Karatara further up stream - specifically for Sedgefield there are various associations, the ratepayers association, and the tourism putting pressure on them. I think there's always a political input motivation in this.

Participation: Residents of Sizamile, very little. I don’t anyone was really, I think we were kept informed as to what was going on. But I don’t think anyone was really was asked ‘do you think we should do this?’ SO it was more like, ‘wow, we're going to do this, its a great idea, and this is the time frame within which its going to be done’. So I dont think there was much inout from locals at all. I think everyone wanted it to works. There were a few residents from Cola Myoli that were worried about noise, pollution whatever. But beyond that I think people wanted water. You know they fast tracked the EIA process, so other than one or two residents sending letters. If I remember correctly they had one or two meetings to explore alternatives, one of which was reclamation. I wouldn't have said there was much public participation. But I don't think that would have affected the outcome. It probably would have delayed it a lot, but I don't think anyone wanted delay. But I don't think it would have been stopped. I don't think there was too many other options. And you know if there's something to complain about people would find it. I think the decision to fast track it was a good one. But to answer your question I don't think there was much public participation aside from people expressing that ‘we want water’. And that's across the community as a I say. The ratepayers association, which is sadly mainly Sedgefield, they would have had more sway I'd say. Maybe they would have been involved a bit more. It may be handled a bit differently in the future, because the wards have been split, which is great. The nice thing is that its been split so that Smutsville and Sizamile are not an island on their own.

Service delivery protests: There's a few of us that have taken this on. There's a lot of people that have believed that these protests were just politically motivated, because the DA has only recently come to power. But you only have to drive around Smutsville and see a lot of the areas. You know there concerns are SO REAL. ITS not fair that people have to live like that. So ja, the infrastructure is bad, in some areas its very bad. The one figure I was given was 17 people using one toilet. A few RDP houses have been put up there, people have complained they aren't that good. Because we had 5-6 years of boom in the construction industry, people were coming from far and wide to work in the industry. There are some crazy things. You know that fire station is down here, its like the opposite end to Smutsville/Sizamile. ‘WHY’, you know its needs to be moved. There
was talk of it but it hasn't happened yet. The governemnt clinic is closer. There needs to be a high in Smutsville. there isn't one in greater Sedgefield. But there needs to be one there, because of the cost of having to go to school then in George or KNysna. I'm sure there's a law that says that the governemnt has to provide transport if you can't make your way to school. YOu know if there's no high school within a close proximity.

There's a few RDP houses going up here and there. Thye've been working on a 30 year plan for greater knysna, but I only heard of it 2-3 years ago. But I think it’s the council just wanting to show they're doing somehting. I think the concerns are very very real. Talking politically, the D.A certainly didn't deliver, the ANC didn't deliver and now we're back to DA again.

The housing in Smutsville Sizamile Is so informal that they all have to go and find a tap somewhere. I don’t know about the plumbing. They certainly don’t have electricity. We've actually, a group of us, initiated a solar project.

Jules would be able to give the history, Certainly when we ran out of water he was a key roleplayer in working towards resolving it. His been nursing Sedgefield's water for a long time.

Obviously you've got the residents who live here. A large amount of retired people that need water as well. And also on the tourism side, many are ratepayers that come here, they have a holiday home here.

Service Delivery Process: I would suggest, now you're talking politics. It’s a bit of a tough one because we're going through this whole thing at the moment. From what I gather there are 3-4 people who have their own following. What we're tryign to do is remove the sense of 'them' and 'us'. I get quite upset when I see the municipality blwoign money on silly things when there's such a desperate situation. The service delivery march became multi racial whihc is a great thing. I'll give you a brief illustration of why we getting involved and how it might help. Its actually sad, but I'll give you a brief illustration. It was our second march, and the mayor arrived, and she didn't handle it very well. She sort of scuttled behind this row of policeman. And the head of Sanco arrived and wanted to give her the petition and the police would n't let him through. But one of the Sedgefield guys who had been involved in the march, a white guy was able to just walk by. Its crazy, but we realise we must take advantage of that. What we've realised is that there are 3-4 people that have a following. The names of the people I would speak to Bongani Djani, Annie De Waal, and Irene Grootboom, she's the ward councillor. Bongani is the Sanco chariman. The problem is he was also the candidate for the ANC in the recent elections, so him and Irene don't see eye to eye. He swears that now his just Sanco. My personal tho[362x215]ughts are that the DA is stopping Irene from having any contact wiht him, whihc is very sad. So she's being sort of kept away from the community. What we're trying to get everybody around the table. There's a long history of non delivery and I must admit that they've only seemed to have started marching now that the DA is in power, but they say that’s not the reason, its not a political thing. But the needs are there. Perhaps they've just been pushed to the fore, for whatever reason, I don't know. I dont believe politics and local government should mix. As to the timing of the issues being raised thats a matter of opinion, but the issues are more than legitimate.
I'm not aware of major efforts to respond to service delivery issues in the past. I think the problems the councils have is that there's no middle class of any size in this area. So you've got the wealthy and the very wealthy and then this huge gap and those that are impoverished. I suppose they look at where their money is coming from. But as government thye are mandated to uplift the impoverished areas and I dont think its been addressed in any major way, I think its just filling the stop gaps.

I think with South Africa's hisroty presumptions are made. Some parties have more influence than others. I suppose its even down to the basic cimmunication things, its very easy for me to drop an email whereas for many of the people in Smutsville, Sizamile its not. So I suppose there's different levels of influence. There's lots of stonewalling also going on. So for example the DA said that the march was entirely political. So just boom, its political, so why take it seriously.

Conceptions of emergency:
Exactly ja, why they don't see it as an emergency situation, I suppose because they would have emergency situations all over the country. I wholeheartedly agree with you. Yes, it was an emergency, but this is just as bad if not worse. I suppose the actual physical thing of the town runnign out of water, adn the trucking in, the cost factor was huge. I suppose declaring it an emergency meant they could get hands on funds played a big part. And I'm fairly certain they used parts of the funds for other things. I think they laid another pipeline from the island for all of those things. So I suppose it could be that they recognised that if they declared an emergency they could get the problem sorted without dipping into own funds. ANd I suppose there was also egg on the faces of the municipality, so I suppose that was political as well.

One of our dreams, this group of us, is that it would be very nice if at a ratepayers meeting with the municipality, somebody from cola beach for example, stood up and said what's happening with Smutsville/ Sizamile? When are they getting electricity? But certainly when you've got 5-6000 homeowners sending letters, there's goin to be a lot more push in this sense when their family's over for holiday and they can't shower as often as they want. Its sad.

Too of the most vehement meetigns I've ver seen, a golf cart development, and another was people was trying to stop people walking dogs on the beach. People ca be so passionate about that but they can't be passionate about people living in squalor. But really you can't change people over night. But I agree wiht you, its the major voice in the village with influence isn't really behind the service delivery at the moment. All thye've got in Smutsville Sizamile at the moment is marching.

Influential people: Mike Young (ex mayor); Louise Hart (head of ratepayers, now a councillor); Richard Batson (engineer) his a very outspoken local engineer. His most vocal has been in the flooding. Those are the only real roleplayers I can think of.

We spoke about tourism being a big influence on the water thing. One of the things that has really suffered, because of the water and the economic downturn, is development. There's been almost a moratorium on development. But I don't know how much influence that had on the desal plant simply because there are lot of people specifically in the Sedgefield community don't want any development. Whereas in the Smutsivlle community, they would want development for empymnt creation. The construction industry has died a slow death really.

Interview 13 on 23 November 2011 – Municipal Official
My job title is the director of planning and development so it deals with building control, environmental management, housing, basically built environment, the natural environment as well. The role comprises environmental management, Integrated development planning, town planning, building control. That's basically the functions that fall within the directorate. As directors we are sort of responsible for the strategic direction of the municipality.

I became involved by virtue of the environmental management department which falls within the directorate and basically my role was within the water demand management campaign, a public awareness campaign. That's what I worked on.

History: As far as I'm aware WSDP were under development, but I'm really not clear as to the level of planning. So I would have been more involved in the public campaign. The technical aspects were managed more by Rodney. At that stage we had a team put together, sort of under the then municipal manager, to deal with it. Rodney was responsible for technical oversight. Some of the technical staff were dealing with specific issues. Then we also had our community safety directorate involved from a law enforcement perspective. And my involvement was sort of from a publicity campaign.

Any new developments had to sort of go out to the public domain and the water levels of availability had to be communicated as well. So on that level there was quite a bit of communication.

Rodney dealt with a lot of the public campaign as to what are we doing technically. My role was basically to get the message out there, we are water stressed area, manage your water. And we were using various methodologies. So there were billboards, posters, loud hailing, radio, whatever tools were available to us to continuously make people aware that they needed to conserve water. It was also at a time at our tourist peak season. So we had to make sure that when people came into the area they understood very clearly and very quickly that we had a problem. So we had a range of campaigns with the tourism industry. For example all hotels were given little stickers to put into their bathrooms. Each establishment got a full pack of information on Knysna, what it means to be water stressed, what it is they can do. So basically publicity material.

And then it was also the end of the school year so between exams and the kids leaving we managed to get in many school campaigns through the school environmental clubs. We developed a DVD, as well as a play for the schools on water management. So that was the level of my involvement.

It was exceptionally successful. We were in a position to monitor high end users, and there our technical guys went up and spoke to people. We also used information from our income department. Assessing peoples history, year on year, month on month. Every ratepayer basically got one. It was on quite a high level and there was also quite intense engagements with individuals.

We made things like flow restrictors and hippo bags freely available. And we had people available providing guidance to residents calling for assistance.

What I want to say was that there was a marked improvement, and as I indicated earlier, we could track it individually per consumer. At the same time we did apply for permission to implement step tariffs and we actually found that even when we implemented the step tariffs the financial constraints didn't have the same impact as the public campaigns. Because high end users who have always used could afford it. So even increasing the tariff doesn't make much of a difference as they can afford to pay.

We were able to track usage per consumer, through the finance department and we linked it to our GIS system. If we found in a particular node water usage was quite high we could look at why in that particular node.
You would be able to get the usage through the finance accounts. The income system is very sophisticated, so we had another system and took the account details and were able to create maps of usage per consumer.

In sedge at that stage I wasn't involved, they just basically put up billboards indicating usage at shops. So there was some campaign but not as highly geared as the one when Knysna got hit by the drought.

I can't answer what gave impetus for that, I am aware that after the Sedgefield issue a business plan was done by Rodney which it much easier for us to access funding.

The tracking from the water meter on the site, then goes through to the accounts, is the most accurate way of tracking usage per consumer. For the period that we ran the process, it took quite a lot of manpower as well. The publicity was run from about November 2009 to May 2010 just before the World Cup. Once we got over the tourist season, the world cup became a focus. So we did a lot of pubnincations in various lanaguages, particularly in Danish and French, in adance. Also the kits that went out to the accommodation establishments were appropriate also for the world cup period.

We targeted the top 100 business and individual users. And then high business users that were high because of the nature of their businesses were also monitored but you don’t want to impact on their businesses. The top 100 was dealt with by Rhoydon Parry. (083 399 3124). (Neale Perring: 082 556 9667)

Neale Perring was here for 20 years so he can give you a good idea of the history. He was here in 2004 when we first started with the water restrictions.

Current Status: We terminated the campaign only as recently as August (2011) took down the posters. We left it until dwa had said that the droguht is over. But you'll still see some billboards, which I think is important because it keeps people aware of the situation. Also council recently took the decision to relax the restrictions, but what this means is that we're goign back to the restrictions we had before the drought since 2004. Which means you have to have permission to fill a swimming pool and the watering hours. We are going to putting a press release on the current situation. What is the storage capacity, what is the supply. And that we should be doing within the next couple fo weeks. to explain to people what relaxation means and to make people understand that if we're in a drought again and dont have water demand management in place, the chances of us getting funding is very minimal.

Rodney dealt with the supply management side and making sure that the information went out. He had a group of local engineers he met with. They also the most vocal if you're doing something wrong regarding civils or infrastructure they're very articulate. And he had specific engagements with them as informrations meetings. That is this is what we're doing. Just to make people aware. We would put things out into the media, but it wasn't the same as this specific engagement with these engineers who had a far more sophisticated understanding.

I'm not sure, they're mostly from Sedgefield, so I assume they were his bridge buddies (laughs). You know his been living there for a couple fo years and I suppose he would know them. They could intepret it for lay people and we really on that intepretation because you dont have that level of certainty with the media.

In Sedgefield because it’s a small community there were a number of advertised official town meetings. But that was only in Sedgefield.

The top 100 users. If I remember correctly Rhoydon ran a list for domestic and business.
Unmetered users: there is a significant amounts particularly in the townships and informal settlements where we don’t have metering. Obviously in this case we couldn't get the dat because there wasn't a means of measuring. But my strong feeling was that the townships weren't the problem. The problem was the hihg end users in town that could afford. Impoverished people are used to being sparing with whatever they have. Thats my personal view on it.

Whatever we were doing, the data went out in 3 languages. It was particularly in the informal areas that we used a lot of visual media and the plays.

Emergency Declaration:
The disaster declaration did enter into the public campaign because it’s a very powerful tool for people to actually see it’s a disaster. And we've had 2 previous disasters on floods, so the broader community's aware of the weight of declaring a disaster. The other stuff (NEMA) didn't enter into the campaign, so much, no.

Request for campaign information

Participation process:
The campaign referred to the participation process, but we focused across the municipality. However there was media, thourgh the local newspapers and Rodney's engagement thouruh the engineers put information on this. But we weren't really focused on this participation through the campaign.

Once the disaster was declared there were regular district wide meetigns. And that was about reporting on progress with projects. And I would say that our publicity campaign was a bit more sophisticated than some of the others. The meetings with all municipalities represented, and eden.

Interview 14 on 24 November 2011 – Press

Interview 15 on 25 November 2011 – Interested & Affected Party

Interview 16 on 25 November 2011 – Consultant

Interview 17 on 26 November 2011 – Consultant
Interview 18 on 26 November 2011 – Municipal Staff

Interview 19 on 28 November 2011 – Consultant

This was an unplanned interview which took place at the home of a contact that I had met twice previously and proved to be a very important for introductions to other key informants, including decision-makers and Interested & Affected Parties. This brief interview was a case in point. I was contacted and told that the interviewee had agreed to stop over at the home of the contact, been told about my research interests and was willing to meet with me. I was unprepared for the interview but agreed to the meeting nonetheless as I had previously heard about the interviewee and was interested in establishing contact. The interview was very brief, involving an introduction to my research. Followed by the role of the interviewee in both the Sedgefield and Knysna projects. The key outcomes from the interview were the mention of a few future potential interviewees – most notably interviewees 30, 32, 33 & 34; a suggestion that the borehole water quality of the Knysna plant was problematic as a result of insufficient time to test the water source; and that the desalination solution may not be
the ideal solution. I noted however that the interviewee may be biased in his view toward desalination. We agreed to meet next in Cape Town once I had carried out more research and had more specific questions to ask. Whilst brief, it was clear that the interviewee was key in opening up some of the plant challenges, as a key actor in the process, who was more willing to vocalise these then the main project managers and municipal actors.

**Interview 20 on 29 November 2011 – Politician**

I actually got a medical background, I’m an occupational therapist. But I’ve been involved in Sedge since we arrived here. Member, vice chair, chair until dec 2010 when resigned as chairperson of RPA. But still stayed onat that stage. But, because put in place as councillor as one of the portfolio charipeople and portfolio in townplanning, development, local economic development. And the townplanning and the development clashed with what doing at RPA, so stepped off committee all together. But still in close contact with the, go and report back to them, what's happening in council and that sort of thing.

The RPA the relationship later with the old sedge council bacame very good. The relationship with the actual muni has always been on a fairly firm footing. Since we were demarcated that we had to be part of Knysna it took me a while to get into it because now you had to get the confidence of the people. We had a very good working relationship with the muni per se. We were literally there eyes and ears here. Because its not easy for a muni to pay attention to detail here. They haven't got the time to drive up and down the streets and we've got our members that report to us if there's a pothole, traffic sign, leaking pipe... So we've got a very good back and forth type association. Its far better to work with the actual administrative part of the muni, when you deal with council its at a political level and completely different story

We used to attend all the agendas, we use to work through the agendas and comment on things. I used to attend virtually all meetings, section 80, council meetings, mayoral committee. Particularly the townplanning and development meetings hich was my portfolio on the RPA ad also the community development section 80. I didn't always attend the finance, one of the other memebers did. We were very ofe , proactive. The relationship with the muni has been very good

The section 80 is special committees that’s established by council where you have a portfolio councillor, like I'm in charge of townplanning and development where you have a meeting. First of all all the stuff for the agenda comes to the section 80 and there the ourcillors and officials sit together and discus whats being suggested. Theres always documents with comments and recommendations. Then the only committee to make decisions is townplanning and development. The minutes are then sent back to councillor and officials then sent to mayoral committee- mayor and portfolio councillors - then goes through to council. The main discussions are in section 80 meetings. All the officials present in section 80 can out in comments, a free flow of information.

As a member of the RPA I coud sit and listen but not participate. But I attended to know what was being discussed, if the issues we've setn in has been taken on. What we used to do is in our RPA committee meetings straight after the section 80. So we have this information and we have time then to respond if there was something we didn't like. We still have the time to send in a letter to say whatever. In later years in fact the chairman of the section 80 used to discussed the issues with me before the meeting started which was very nice. that was town planning, development and infrastructure at the time.
He used to discuss it with me before the meetings. Because a lot of the stuff that comes to the section 80 has been advertised and people have been given public part to comment. So at that stage we would have commented on stuff related to sedge. Sometimes Knysna asked to comment on stuff related to them. But I wasn't terribly keen.

They always took note of our concerns, we didn't always agree. But that's fine, you give a little you take a little. But the decisions were usually on a good level water:

15, 16, 17 years ago when I joined the RPA on the committee. The man in charge was Mr. Kok, an engineer. He trained me and the big problem from day 1 was the water issue. Because you're looking at a community that was always, at that time, dependent on the rover. If it didn't rain there was a problem with supply and there was a problem of storage. It the river mouth was closed and you had a lot of rain you also had a another issue, because the salt water from the lagoon pushed back and the water where pumped became salty. So another issue was to take the salt of the water which was very tricky and expensive.

The Sedgefield Muni then got in some consultants and at that stage the DWAF doing dams in rivers so they started with a off-channel dam. This went on, then when we went to Knysna. They looked at the money being spent and the amount of money being spent for the size of the village. To them didn't make sense. So they stopped it. And in spite our warnings. It almost went to the Knysna Municipality at the end. Anyway, we warned them at the them and said 'you've taken this off and put nothing in place'. And most of the time we had water restrictions because of the situation with the potable water. And damage to the intakes because of flood in the mean time. Because here its either drought or flood.

If the river mouth is closed the community is at very high risk. Anyway, then the man in charge here, phoned me and said to me 'you better do something, they won't listen to me, we've got 4 days water left'. And then I raised merry hell.

It was a December.

Then we created mayhem. I must admit the Knysna Muni swung into action. A committee was formed and eventually … They had trucks from the army, from everywhere. The community met frequently. There was also a temporary pipe taken from the Hoogeekraal - it's still there - into the area where they pump the water and the actual running out of water was averted. Then they swung into action. Then it was decided looking at the desalination. Which was put in at a rate of knots. Yes, we are actually very happy with the desalinator until we had this last disaster but.. For the first time the Sedgefield residents actually had water security.

The first person I phoned was the councillor in charge, then I phoned the muni. And said to them, because most of the people were away on holiday. And then Andrew Finn, the chairperson of the then development and infrastructure was fantastic. His also an engineer and he swung into action with Rodney Nay, one of the engineers thats on the contract with the Knysna Muni.

And the decisions were made very fast and was then set into place and ja. And unfortunately, as you probably know, until very recently the sea destroyed the intake wells so we are now re-looking at that. But fortunately for us, there was also boreholes put in at the same time so we've got the river, the boreholes and the desalinator. We haven't got the desalinator now, they're hoping to get it working before the influx of visitors because the town also escalates say from 6000 to 30000 people for a short period over the holidays. Because a lot of the houses, 30%, are holiday houses.
The water consumption is in … have you spoken to Rodney yet? (yes). Because the actual water consumption we monitored very well during that disaster period. And we went up to 1.9kl per day, but that is with very severe restrictions. We registered all the spikes, because the water table here is fairly high so you don't have to put in a borehole you put in a spike for irrigation. This we restricted for after dark. Rhoydon Parry is the engineer at the muni dealing with the water and he will be able to give you exact consumption figures. He was also here at the time of the drought, though he was fairly new. The muni has got the rainfall patterns. I unfortunately lost mine when my computer crashed. We watched them very carefully at the RPA, we had them from 1979. The rainfall figures is also in all our documentation. The other one you should talk to is Jules Hartslief, he had all the rainfall figures etc, etc. I'll give him his phone number. He was the depot manager here. His very good.

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His one of those people that knows water backwards, he would also be able to give you the core history from the sedgefield muni onwards. But the rainfall figures when we were looking at them at the time was coming down by about 100mm per year, some years up, but mostly coming down.

The upgrading of the water treatment plant was also done after the flood and water affairs gave us the money for the upgrading (ok because what was stated in the BP was that the money was obtained from national treasury but the money wasn't used, so as I understood it the wtw were not upgraded)

No it was upgraded, jules would be able to tell you. The big flood was 2003 and 2007, 2006 was really, though the water came up very high. Although it rained more in 2006, the river month was open.

The weir is Sedgefield, I'm not sure if its still in the council chambers, but that Is now being raised by 2m. We said 1.87m, but Sanparks always knows better. They insisted on 2m, which I think is absolutely ridiculous but nevertheless. The implication is more storage. At that is what the DWA now insists, is that especially in this area, we have 6 months water stored or the possibility for the 6 month and by raising the weir it just gives us the extra if you start adding the desalinator and boreholes to it.

The weir is a form of water storage because it's a huge pool, the water gets stored in the river, but regularly pumping and filling up the reservoirs. Because I'm not sure, the reservoirs will give us under normal circumstances 1 week of water. You should confirm with Jules, he knows everything.

The storage is in the river, and that you can factor in the boreholes and desalinator, so we've got 4 prong, reservoirs, larger pool with weir and you won't have the problem of salt water pushing up because of the weir, the boreholes and desalinator, and if its really a pinch, the Hoogekraal. The pump is a mobile pump, so its easy to connect and start pumping.

The issue of water supply in Sedgefield has always been paramount and every year, this time of year (dec) there's always been water restrictions.

The off-channel dam was investigated, which Knysna then took off the table and didn't anything in place until we had this crisis.

The off-channel dam was THE PROJECT, and it was too expensive for the amount of people per capita. Whiich I understood afterwards but at the time I was as cross as a snake.
But you know, without being rude, you need people that think out of the box when you look at, a lot of people that’s been dealing with water for so many years … And the minute you get somebody thinking a bit out of the box, things suddenly become clear and things are happening.

The off channel dam at the time was the best idea. I don’t think desal was even an option at that stage. You have the small plants, but not to that extent. I think this is the biggest one that’s ever been out in.

I mean people didn’t even consider it at the time. Anyone who made that suggestion would be a little bit… But that suggestion only came up really when we were in ‘stuk(?)’ (How desal came to be put on the agenda?)

Well it was really, without being funny, the only option. I get very nervous when people start pumping out of aquifers because if you keep pumping you never know what you’re going to end up with and if that constant pumping can be sustained. Because in 1995 the csir did a research here specifically on water and the one thing that came up are the aquifers. Because Sedgefield has got a lot of aquifers, but some of them have been polluted. One of them is in the dead centre of town. So you can imagine that’s not kosher anymore. And the other one is under the previous dump. And the csir at that stage said, you can pump for 9 months and then you’ve got to shut down for 3 months before you can pump again. But I think now if you use your common sense, now you’ve got a drought that’s been going on for 3 + months and you keep pumping I mean what is refilling your underground water, there’s nothing to replace it. It’s only my idea, I would be very uncomfortable about it. To have it as a dependable source of water, as a full source of water for a town such as Sedgefield. (Question of schemes earlier, avert situation?)

yes and no. everyone was very excited about the off channel dam, because we are very conscious about the state of the Swartvlei. That is why we are very conscious about the raising of the weir because the amount of fresh water that has to go into the Swartvlei, because its not in a very condition. Now with more knowledge and looking back, yes, but at the time, that was the best option. But in fact if at that stage they had come with just the boreholes we would have kicked and screamed like banchees because you never know. If you come from a farming area, if you keep on pumping your boreholes run dry or you end up with rubbish water. Then you can fill up that borehole and forget about it. You’ve got to monitor boreholes very carefully.

(extraction licences?)

That is also the story of the DWA, they won’t give extraction licences to private people anymore, its got to be licenced by the municipality and if the muni isn’t keen on licencing, that’s it.

There’s very poor monitoring on upstream users. Some of the farmers are very responsible others are not. The long term effect of the fertiliser leaching I don’t think has ever been established. But some are very responsible others very selfish. The only one that can address the monitoring is the DWA and they are not the most active bunch. They are very good at pointing fingers. The licences are awarded by the DWA and it becomes very complicated, because of certain functions by other parties that sometimes puts a spoke in the wheel.

(extraction contributing to drought?)
yes and no, the people have responsibilities for their farms. Whose going to tell who what's more important. Even strict monitoring at the time wouldn't have made a difference because there was nothing to pump. Because when the river stops the river stops. That's it. Even if you had out in monitoring devices before that there was not even storage space, the weir wasn't high enough all these subsequent things that have been out in place. You get to a point, its happened to us more than once, where the water is so much below the intake pipe, that they have actually got a submersible pumps that they use to use. And this every december I can remember as long as I've been here, there's been the same panic and then the rains used to come and this time the rains didn't come. I promise you, its almost like, we're in a crisis and the rains used to come. It's been like this all the time. Jules shows me the pictures and the intake pipe and this much above the water so they've got the submersibles. So the warning ah's also been there.

What we did though is we insisted they stop all developments in Sedgefield in 1998 or 99, a Moratorium on dev. It was very strictly enforced here. And Knysna wouldn't listen to us initially, eventually we got it right. It took me about 2 years.

My interaction was with officials only, I did not deal with the politicians, because them and I were never around the same fire. Now as a politician I've also learnt many lessons. You have to listen to your community.

The RPA during emergency was on the committees, worked with muni, kept locals informed through email base, encouraged people to attend meetings. They had initially 2 a week and then 1 a week. Andrea Finn and Rhoydon did a fantastic job. But we were involved from the beginning, ushering, screaming. They take the RPA seriously, believe me. Because we don't squabble about petty things. We always use to go in and say 'what can WE do'

We've been consistently there, we were informed, attending meetings, we used to ask. It was a very good to and for process. I think its also a trust that developed over the years.

The membership base of the RPA is disgustingly small because things run well in town, unless there's a disaster. But they tell us we are doing a good job.
The criteria to belong is R30 p.a., only one member in family can vote. We were very keen to involve the people of S&S. We focused on the involvement of all communities. But if the S&S communities had problems and when we could we used to sort it out.

(ward change) They divided Sedge into 2 wards. Ward 1 where Irene Grootboom is, is S&S, Cola Beach, the island, Myoli Beach The rest of Sedge, farming community, karatara is my ward.
The demarcation board had the demarcation as we've got it now, which we approved and the ANC wanted to change it.

They also looked at representivity in the wards. The Sedgefield, people are fairly comfortable. Whereas if you look at karatara, very poor people, a lot very mentally challenged, because karatara was initially built for the mentally challenged. Ward 2 is sedgefield and karatara. I actually spend more time there, then hee. Because the rpa send emails. Whereas the people in karatara I dont know that well. The difference in infra is none whatsoever. Its just a political line, but the rest.. Irene and I work like this.

(closed)

(development plans for S&S)
We have been trying. Our sewage plant is running at capacity. The big fear is that they will come and shut us down. There are progressive plans to update that but in the meantime some measures have been put in place but will take about 3-4 years. The Mor on dev is not in place anymore but we can't approve plans currently. Its all stuff we desperately want...There's very little development opportunities at the moment in the town.

(record of infra in S&S)?
yes, it was out in way back when. I don't think it was very well thought out. In the future we might have to look at replacing. The person who might have the info is Jules. They went on water borne sewage before the rest of the town. Then we went to Knysna (CIP?). laughs, I heard about that before we went to Knysna, I dont think its evr seen the light of day. A lot of it is very adhoc. they were put on waterborne sewage first to get rid of the bucket system.
The only standpipes you will will be in the IS.

(policy dev in IS)?
The problem here is that the one IS which we would like to formalise are squatting on a dump (?) so we may not develop there. muni hasn't got suitable grant. Also part of the rules is that you may not built under 3msl. because of flood story and high water table. So a lot of the grant that is available we cannot use for housing because its in the flood plain. And we cannot fit in anymore. And the empty erven there, either for a church or somebody bought them way back when. so the problem is ground. We went with a plan to Knysna, again it was wipped off the table. We are still tryign to find ground. But also Other things we can do. Get permission from household owners especially older initial municipal houses,weren't not very well built, if we can flatten them and replace with more dense innovative housing. Some erven are large, can put 3 double story houses next to each other. because there are families of 16-17 living in 1 house because there is nothing.

Initially there were very few backs and what happened after first election. They came and dumped busloads of people. The EC is very badly run so you get a huge in migration. I was at t workshop the other day which looked at migration figures and apart from Mossel Bay, Knysna has got the highest migration figures. SALGA has done a migration study and Knysna is 14, MB is 15 and we are the 2 highest migration areas. And the biggest migration is from the EC to the WC. Because I mena their hospitals are an absolute disaster and George hospital is fantastic.
The rproblem in Knysna is that there's no work. The industrial area in Knysna is virtually non existence. The biggest mistake that was ever made was when they shut theseis's down. 2000 people lost their jobs and it has never been replaced. A lot of people lost their jobs. And Knysna has a very good credit control policy and a very good indigent policy, and you know word gets out.

(problem of migration vs infrastructrue capacity and development?) No, We are busy with a mega infrastructure plan, the ndpg and what we've decided as the new council. We're literally looking at infar and planning 30 years ahead. That's what the ndpg is all about. It's a plan going 30 years ahead. Wherre infra has been looked at in an adhoc basis whoh really doesn't function. K and R can extend but Sedgefield is encased by rivers and sand dunes and sitting on the edge of nature reserves, sanparks what have you. (Because recently in the area you've had service delivery protests)
That, That, Don't, chuckles, that’s not really service delivery protests. The one was a protest that they say is service delivery. Its people living in the national road reserve. Now there if people are squatting on other people's property we may not go in and do something about it. We can go to the periphery and put taps on the periphery. But we may not put in even toilets. Its not municipal land and its against the law. We will be cut to the quick if that is the case. So yes its service delivery, but we, what I find is its also a political thing because all these things has existed for the 15-20 last years, but now that we come in as a new council within 3 months they expect us to wave the magic wand. despite the fact that we made no specific promises. We didn't say we would build houses etc., etc., etc. I mean anyone who promises anybody they will build them houses, really, sighs, but anyway. Ja, we're looking, we've had meetigns with sanral, we're working very closely with the ANC councillors nad we've made it very clearly to them, that YES we are DA but... It's a political thing.

I tell you about for example the onderste gaaitjie in Smutsville been there for many years because that was the only vacant land. And we've been telling them and telling them, we've had Helen Zille here, people from the ANC here, everybody, you name it, we tell them we cannot develop on a tap dump because its very unhealthy. But there because its a municipal land we've put in toilets, waterborne toilets there. Not buckets. We've been trying to negotiate in other cases. We've just had a meeting with sanral again - we eother buy the land or give permission to put in services. Now they said we should send them a proposal whihc we have.

Challenges are always grants. We were in Cape Town on a training course and there's some magnificanet townhouses, which in the long run works out less expensive. So you save a lot of money and sapce, so you must also think about Africans have certain traditions. Rituals for death and marriage. But they've also overcome it with building backya... Some of those places are absolutely magnificent. The funding would come from government combined with private.

A lot of things have happened so far, and not. A lot was adhoc. You want houses, we build houses, and the infra, pressure in pipes not so good, that sort of thing. When it comes to infra you build the best you can. The other thing is Knysna is a very old town with decaying infra under the town which you've also got to address very soon.

Interview 21 on 5 December 2011 – Interested & Affected Party

When I arrived in Knysna I started keeping stats of rainfall because people said things I didn't actually believe. I used a rain gauge and what I did was I ran mine in parallel with the munis. And it was a bit different but not much so I was happy. So I built ot up from 1994 onwards. I've got the daily rainfall. For each of the years, where I record the rainfall

(backend questioning the drought. More info?)These are just the figures for 2009.where they said we are in drought conditions. If you look at the summary page here in 2009 we had 654mm against the average of 806. so its low but not that low. Because in 2005 we had 550mm and in 99 we had 646 and 636. Both lowerer than those. In none of those years was there any mention of drought. Our record is 1242 in 2007. What happened in 2009, when they satrted talking drought I started visiting the pump station where Knysna draws its water from. The GOuna, its upstream from the Charlesford but on a different river source, the Giuna River. I watched it and actually took some photographs na d gave to Fran. But she said they were not informative enough. But it shpwed the river was flowing strongly throughout the year. So I questioned whether
there really was a drought and that was the article I wrote with Fran. I took a very political slant on the whole thing and I said that the reason they declaring a drought is because they want to increase the water rates because they're running out of money. Which is what they did you know. They said they going to temporarily increase the rates and then when we back to normal we'll bring the rates down again. And of course we way back to normal and they never brought the rates down. And the reason they ran out of money is because all the augmentation fees that came from developments such as theses island. Simola, Sparrebosch should have been spent on upgrading the water infra, got spent on other things.

(muni officials said tarriffs were not raised, proof?) I'll have to go and dig back and see if I can find them, maybe I've kept water bills.

(Augmentation fees, been told they were charged to developers in these areas and so spent specifically on infra in the projects spent on) They're lying. I've got proof from Simola. The developer paid aug fees but then had to provide his own water supply lines. Despite having paid fees to the muni. He got a reduction of the augmentation fee. I think it was something like R20k to R16 per plot but it certainly wasn't paid for by the muni. And theses I know was the same. developer, supply lines and sewage. In return muni said we'll give you a reduction. You see the muni are never going to admit that they didn't spend the aug money on infra. But for instance I know that an audit was done by the muni on the h20 infra I think in 2007. they would have all the info. Can't deny, public info. People who did the audit, id'd 110 places where pipes were leaking. Gave report to muni, and muni did nothing about. Then they said there's a water shortage. I'm sorry, I'm very cynical. The golf course has a 99 year lease on the land and has another 20 odd years to go. But clause is that if muni decides to use the land for strategic purposes they can take the land back. The muni tried to say they need it for housing and the golf course said thats not strategic. Now the muni actually took golf club to court to fight over this lease and golf club won. They then tried to get water supplies, they the last user in the chain, and they tried to increase their allocation and muni denied. So they got permission from dwa to sink a borehole, which provides so much water that they think they use about 10%. They have such a huge supply. Which keeps indicatign to me that we don't have a water problem, what we've got is a water delivery problem. The garden route was id'd as such a big development area in s.a. and this development is allowed to go on unchecked with an increase in the infra. There's plenty of water. The infra hasn't accompnied the growth and suddenly people say 'oh my gosh we haven't got water'. We do have water, but haven't collected and developed it.

When we first arrived in Knysna we built a guest house on Leisure Island and we had some people come stay with us. One guy, Mike Taylor, his job was to build dams. He was raising the height of the Akkerskloof wall. He was a consulting engineer. And over a period of a year he stayed 3-4 times. And he kept saying the muni is wasting money because this is not a collection dam its a supply dam. Because they pump from the Gouna to the Akkerskloof and then supplies to the town. So it doesn't collect water from anywhere because its on top of a hill. So its not collecting rainfall. And he said they don't have the oumps to pump water into the dam, therefore why are they raising the height of the dam. Its stupid. And he was very critical.

But it was in 2009 when all this wohha started about drought. I went down to the Gouna to have a look. I took photographs. There's a pump station right next to the little weir, where they pump water out of the river. And from the pump station they've got the
suction line coming into the water. And the suction line was going up and the delivery line went into town to the main water treatment plant. And on the delivery line the first joint was leaking so badly that they had put in a little collection pipe to feed the water back into the weir again. Laughs. I took a photograph of this. I sent it through to Fran. But it keeps drawing me to the fact that the infra was bad and nothing was done until 2009. Maybe what they were trying to do is get a state of emergency declared so that the government would then give them the money that would then allow them to upgrade the infra. I must check back on the water rates.
Thye glebe dam, if you look at the akkerskloof water levels. They have ever since 1999, when mike taylor came and did raising. The dam level has been 17-19%, just hiviering around that. Then they got the glebe dam pipelie in 2009, late, and suddenly akkerskloof % went to 100%. Thats all they needed was just to get water into the akkerskloof. and I think they did upgrade the pumpstation at gouna river. The other thing about Charlesford wier, was studies done that if you raise that wier by 1m you'll provide Knysna's water for 100years, and ofcourse environmentalists have always said, you can't do that. I keep saying we dont ahve a water problem, we ahve a water delivery problem (referring to infra keeping up with the development of the town) (extraction licences?) Sparrebosch get their water I think they use all treated sewage water I think. They tried to get permission to pump out of Noetzie, refused. Simola got permission to draw 1000l /day from Knysna, which was an old right for farms which now make up Simola, now exercising that right. They've got theor own dams as well, they do pump out of river to top up. They put in infra to pump out of river into holding dams. Don't know if they use it or not.
I guess golf courses would be the biggest users, agriculture would all have their own water. There are lots of tributaries coming pass the farmlands. Here I think the guys just pump, I think there are any quotas.

(Original what I was interested in was to see what the trend was, rainfall wise. TO see whether the rainfall pattern was increasing or decreasing and when we got about here (?) in 2008, a 3 year moving average was 850, going to 1000. 3 year moving average every 3 years you just looking at the trend. I just did it to see how the trend was moving, started with global warming and climate change thats what I was interested in.
If you look at our figure this year, second highest on record, that's quite a high figure. Climate Change claims are rubbish. 1 l of rain is a high figure.
That article that I wrote for Fran was to say what drought are they talking about because the figures are not backing up that we are in a drought position. Drought means less water supply than water delivery and that wasn't being evidenced not at all. Andrew Finn the councillor in charge of technical issues kept saying the groundwater is drying up and I kept thinking Knysna is dependent on river supply. IN the mountains, I will guarantee there's no statistical collection of rainfall in mountains, where our water comes from. If you look to the mountains you can see the rainfall. And we dont get any here. Thats why the rivers are flowing even though we aren't having any rain. Sedgefield is boom or bust. They they having flooding, slightest bit of rain and they've got problems. So to me the issue is that they didn't track water adequately. And everything I read about climate change is weather extremes, therefore you have to have means of trapping water when it falls to store. But the patterns we have here is that the rainfall is consistent throughput the year so there's no sign that we're going into heavy drought. Maybe this year is exceptional I dont know, but we've had only one month
where we've had less than 20mm and 5 months where we've had more than 100mm.

I can send you the spreadsheet where I've got all this in. The muni will not give you the correct info because they will show them to have not spent what was allocated in the most appropriate places. I think that the desal plants, I don't know whether they are cost effective. But I think that kind of thing is necessary. What everything is coming back to me as is politics and economics. Its not a question of water or rainfall. Breaking through to find out the political reasons is going to be very difficult.

**Interview 22 on 6 December 2011 – Consultant**

SSI is a multidisciplinary engineering consultancy. There's a full range of those services including environemntal consulting. But this side has come in as merger with a company we had connections to. The history of ssi comes from very traditional civil engineering consulting with the additional of some process, mechanical and electrical engineering. we deal with transportation, energy and resources, buildings and structures, airports, rail & harbours, and the environemntal side. there is also a project management unit. even in cases where we haven't done design and reporting we can get employed to implement projects. its quite a broad range

In the KM we've bee involved here for about 15 years now in the area. It started off as just having a very small set up to monitor site work on projects we had been appointed on from pe or coct, and we built it up over he last 10 years and a design office as well as implementing projects, doing roads, stormwater, water and sewage, assisiting muni to do wsdp and water and sewer master planning. we weren't that involved previously in their raw water supply but we did get quite involved during the disaster period. so over the last 10 years we've had a steady growth in KM. 2 main services: roadds and stormwater; water and sewerage. Our focus before the crsiis was from the point of water treatment. we did the upgrade of the wtw, bulk distribution, internal reticulation systems, pipelines, pumpstations for upgrading or new ones.

(Map of the infrastructure plan, starting from the wtw, to the pipes and distribution and flow, is this available)

yes, certainly the actual networks, the water resources work on KM has been done largely by what was NS, no wAurecon. Mainly the guys in CT through the George office. Planning of a dam, process of getting approvals, KM raw water supply, up to storage in their off channel storgae dam and up to getting the water to the water works. we've been more involved from the water works onwards.

We can provide you with on th ewater sewage side, especially for the Knysna basin, karatara and rheenenddahal are basically villages, sedge is the other substantial centre. Sedge from the water works ave the basic water systems layout. We don’t have as much detail on sedge as we mostly have worked in Knysna. but we've got the basic outline fo the Sedge layout as well. we can give you that as well.Once one has the info on the drawing its not necessarily linked to the project that was implemented, its now just become part of the system.

since 2004/2005 was the first time we did a wsdp for Knysna. But I think there hadn't really been one done beofee that. The wsdp, dwa had developed a format that they wanted munis to report in. it’s a set format to just fill in. we initially battled to fill all the blocks. so it goes into quite a lot of detail on where their water comes from, what treatment works treat it, sewage works, where the return flows go, revenue generation,
what their billings are. Those basic things and also list of projects. so it could be quite useful. if you're doing a very high level study you'll probably find stuff that doesn't quite tie in, but the basic picture is there.

Aurecon are still involved. If knysna want an update to their bulk water augmentation plan, specifically for knysna. Probably with this emergency thing we put a bit of a spanner in the whole works because we ended up implementing a scheme which wasn't part of the whole planning by NS, now Aurecon was. I'll tell a little about that later. but it was under emergency conditions and we implemented a short to medium term plan which will slot into the bigger plan. I think either us or aurecon will carry on with the work.

The Aurecon plan, Sedgefield had an augmentation plan. We can come back to that, because there's a whole story about Sedge.

(Change from Aurecon to SSI as centrally involved in crisis)Well, basically when the drought happened, you have to understand the situation in SC is steep short rivers without big cathments in good rainfall areas. We get quite good rainfall along this section of the coastline and historically there hasn't been enough hassle with getting too much water. In the past there hasn't been that much pressure in the rivers but as there's development and growth there's a lot more pressure on run of river. Sedge had no storage, in knysna there's a very small weir with no real storage. Just the body of water they pumped out to offchannel dam storage, the akkerkloof dam, 900ML, effective storage is probably closer to 800ML, if you're using 10ML a day, 80 days. which isn't a lot, 2.5 months, we are basically in an orange to red alert all the time. so when the river stops flowing you're in a deep crisis. But in the past, the river had been fairly reliable. Between the rivers, we pump about 3ML out of the gouna and about 7-8 out of the knysna daily. so when there's a lot of water in the river you want to pump and keep the dam full, thats how the scheme was designed. They should be able to keep the dams full and during the peak time draw out the dam when you can't get out of the rivers and in the peak time make sure the dam is full. the next step in knysna system was to augment the, pump up the pumpstation and pipeline size to be able to pump more out of the knysna river when there's water. There's also an ecological reserve that must go through and when the flow is below that they must stop pumping. That's the instream flow requirement. The DWA, having done a reserve study on the river and estuary have arrived at a reserve flow. In sedge that, it wasn't as much of an issue because the Karatara river seemed to flow fairly consistently and there were other rivers as well feeding that whole Swartvlei lake system. So I don't think there was as much vigilance and pressure on looking at what reaches the system from the karatara, but there is still a environmental flow requirement. Sedge, when the river ran very low, Sedge couldn't pump anymore from the river, it went down to a level where they were pumping saline water from the lake system which has got a tidal influence, sometimes its not well connected, the river mouth sometimes is closed so that whole lake system raises in level and the salinity drops because its freshwater flowing in and if it breaks through the sand bar at the mouth then you get much more tidal influence. So Karatara river got very low, they couldn't pump saline water, and it was immediate crisis. We went out and looked for alternatives. At the same time Aurecon were asked to look at their projections and the scheme they developed with the muni as part of their long term augmentation plan. so with the muni coordinating we had to trash out an emergency plan. So the big picture is still there. But this emergency plan was developed into probably more than was initially envisaged. Initially they had to solve a very short term crisis but it developed into a bit more of a plan to even deal with the medium term issues. So our involvement came in as we were basically on the ground and quite hands on, checking out the rivers, looking
a the next river along the way, coming up with an emergency plan. That's when we got more involved at the raw water level. But even the BP was developed with the broader augmentation plan in mind. Especially in Knysna, but some emergency measures came in. We were working more with the Muni at that stage, especially Sedge. In Knysna probably more interaction with Aurecon, but it was through the Muni, we didn't form a joint task team. It was coordinated by the Muni. Aurecon had a Sedge and Knysna water augmentation plan, I can give you those electronically. The BP refers to the NS bulk reports for both Sedge and Knysna. That's the overall picture. I'd say they will probably be an update coming once the options on the Knysna river are nailed down. Funding always being the big issue.

Jan 2009 is when... ja the history there, I think in December 2008 we were already saying that we've had a dry year, then in Dec, I'm not sure of what was exactly raised within the Muni but I know there was an awareness that it was dry and the rivers were low. In Jan the Karatara basically stopped flowing, we can look up the dates. I think by the 20 Jan we were called in saying we've got a disaster, we've got no water. And in Sedge they were using water tankers to stop the town from running out of water and then there was a big public campaign to limit water use. Then we and also Aurecon were asked, 'what can we do, what can be implemented a hurry'. The first real intervention came when through DM, the Muni procured 4km of HDP pipe to lay on the ground from the adjacent Hoogekraal river, to lay a pipeline and put a temporary pump at the point which where there is a little causeway and weir which separates the river flowing into the vlei. SO that the more tidal saline water, there's a drop at the causeway between the two and that's where the temporary pump went in with a 4km pipeline to the Ruigtevlei WTW. And delivered in the region of 8-10l per sec, close to 1ml per day. Which was enough for Sedge to stop running tankers. So our first thing was to assist with implementing that. It was a bit of a combined effort. It wasn't even that original. The push came when Andrew Finn asked why weren't we looking at the Hoogekraal. And the NS scheme was based on pumping out of the H to an off-channel storage dam, released to the WTW anyway. So it wasn't original thought. It was just that we could lay an HDP pipe above ground, temporary pump and just pump, no permissions, no anything. Just this is an emergency, just do it. NS was at that stage in a process of obtaining environmental approvals, sort of doing the ground work on the scheme, they had gotten to a point where they would have to start getting stuff implemented on that scheme. And just to step back to their original plan, it was based on doing that, getting off-channel storage dam, fall out of the H and augmenting the water out of the K River, changing the WTW, scrapping it, making it a pump station. So the present pumps and pipes would have been upgraded to pump to a new WTW on the Cloud 9 Hill. That had been on the cards I think it had been developed in 200 and they reached a stage in 2006/2007 where they reached a stage where they went out to tender on the WTW component of the scheme. I think the approvals were in place to do that. But the Muni didn't have the money. I think they needed about R70-R80m. Or actually maybe not that much for that part of the scheme, WTW was a bout R30-R40 with the pump upgrades etc., and the rest of the scheme was a bout another R30-R40. Its in those reports. Then what I give you is, when the problem hit in 2009, they were in the stage where the WTW had been shelved because of lack of funds. But the problem in 2009 was that the schemes to source more water hadn't been implemented. Effectively the yield of the system wasn't more than previously. Aside from the little bit of help from the Hoogekraal.
Leaving the accelerated plan aside, I think the Aurecon have been involved in one of the projects which is to do a better weir across the Karatar river. I believe at the position of the present causeway and separation. But at the moment when there's a very high tide you can actually get contamination upstream from that into the stretch of river that the wtw abstracts from. So there are times, even when there's enough water available in the river that that pool of water gets contaminated by very high tides. Which is a bit of disaster, because if you've got a very high tide, which the wtw doesn't deal with. They are involved in that at present with the environmental approvals and implementation of that I believed. I don't know the latest on off channel storage. But from what I understand the implementation of that has been delayed by the emergency scheme - the emergency boreholes and deal. Subsequent to that they had a very high tide, the pool got contaminated and could close off the works and run sedge on the boreholes and on plant. And supplied all the water that was needed for sedge for that time period. So I believe that the augmentation plan is still slowly and steadily going ahead as plan and off channel storage is not out of the window. But I think it's a much longer term plan. And I know people like Sanparsk and those managing the Swartvlei lake system are trying to minimise waters taken out of the lake, especially the Hoogekraal. With the accelerated plan we estimated that we've got about 10-15 years of water supply for sedge fairly assured with this plan.

(The decision making of this plan is what I'm interested in. Why the components were selected. Short and medium term. But short term from the plan were not necessarily implemented)

I think desal and waste water reuse were kind of at the bottom of the list of augmentations. Aurecon always had them in. In Knysna as well. They always written them out as, you probably familiar with the term URV value. The URV is a value that's calculated if you take the life cycle of a scheme, all of its components, its actually for comparing different schemes lets say. So if you say, ok we're looking at the next 30 years, you compare schemes over the next 30 years. The URV takes all those costs, discounts them to present value and also takes the amount of water produced. So you put in the costs when they occur, when you would build that component with its capital costs, you programme that in, you discount it to present value, with the amount of water that you would use, now this is the important thing, only what you would use. It doesn't matter what you've implemented, what you need is the value you get and out of it, that goes into that calculation, this discounted back to present. So your demand and whatever measures you using to meet that demand. So your augmented value you using there, with all your costs there, all discounted, plus your running costs, electricity, o&m. All goes in. Then your total cost over that period of time with your total water used gives you a urv per kl of water. And as long you're using the same assumptions for all the schemes, its not actual cost, its all predictions. Its for the lifetime for the schemes and you use the same assumptions financial, usage, electrical equipment will have a maintenance amount, mechanical, civil, so the running cost of maintaining that equipment is put in. You put all those components in and you come to the urv per scheme and you compare the scheme. And you only take the demand. Basically in the sedge case what we did was we took the capital costs in the NS scheme which were all clearly reported on and used the same financial assumptions etc, to say that scheme will produce 4ML per day, with these costs, over time, meet the demand up to 2025. At that basically based on Hoogekraal, Karatar, combined with off channel storage from H, pumping to new wtw. What we did was compared the refurbishment of the wtw and protecting it from flooding, as this was a problem. The wtw is exactly where it is, but the equipment has been moved upwards. In a big flood you'll stop producing water for a
while, but with a desal plant and boreholes, you can deal for a few days to clean up. But it's been raised up to get out of the 1 in 100 year floodline which is a normal place which you would place a water works at. So the urv value, the emergency augmentation scheme was based on refurbishment and protection of the wtw and design capacity of 2Ml per day while was less than was needed for the augmentation scheme to get to 4Ml per day, that it could comfortably do that. Combined with... is that right? Sorry its 1.5Ml from the two rivers. Also what we did at the time is said that H is a non-preferred source to tap from and has a small pipeline in this scheme so we'll limit that to emergency schemes. (What was the reason for the limiting the amount from the H in filling that 4.5ML?)

There was no approval yet to put a permanent pump station on the Hoogekraal (given that you pushed the other schemes in the case of an emergency, could you not push that in the same way?)

Ja, it's a good point. We felt that it wasn't, there was some resistance to that and we said we'll leave it to Aurecon to carry on with the work they are doing on the overall long term scheme. But to not go for a short term emergency approval for that which is a limited amount and not in line with what they are applying for on the whole scheme. It was a question of not wanting to disrupt the larger scheme. We decided to leave the H as an element that would remain an emergency element until the whole scheme had caught up and it could be implemented as the full option. I don't know what specific instructions Aurecons got at the moment but I know that was put on hold, but we've got a plan that then caters for the next 15 years. The way we proceeded was to go for what was easiest and quickest to get implemented now in the emergency. Although its a good point if we look at what the overall scheme says about what we're going to take out of the H, as a component of the scheme for the next 15 years. In that case its a bit of a strange component as it still has to be treated as a temporary and emergency thing. But we left it at that. I don't think it was as conscious to say don't interfere with the big scheme as the emergency scheme completely interfered with that. I mean we had on the scheme, implementing the weir on the karatara, but the muni decided Aurecon were better positioned to do that. We were quite tied up with the desal and work in Knysna. The H element we left as a small piece, fairly temporary infra that can be used when needed. The boreholes and desal plant, initially we put out a request for proposals as an emergency. There was a bit of a review and because there was just enough water, they were maintaining and winter was coming and they hoped winter would produce more water, especially late winter we usually get quite nice rain. The foot wasn't taken off the gas completely, but there was a bit of reviewing. It was felt that we would get proposal for desal, review it, look at urv values then make decision on deal. The original request for proposals was quite early and those were used to do the study, then the selected guys were asked to do the implementation in September. Then they started then with the desal. It was decided that the desal and boreholes would see us through a drought but anything coming from the karatara would be bonus. It turned out December was quite doable with a bit of desal, not much, some boreholes water, and then the karatara. Then because reuse was included in the plan, the environmental process to get that going was also gone forward with, those applications were made based on report we had already done with the wwtw to move towards reuse. So our proposal which actually came just before that drought, was based on starting to get reuse firmly on the table. So it was fortunately done. The muni paid for that as they were interested on doing a feasibility on that plant, as the wwtw was long overdue for an upgrade. The desal plant was implemented and produced water by the middle of December.

(decision to put out request for proposals for desal, request for proposals. How did desal
We proposed that the one assured one to get 1.5ML per day if the boreholes become stressed and river stays dry. So a worse case scenario was looked at, those 6 boreholes if we pump them as hard as possible, we could produce 1.5ML. That’s what you can pump out of them but you don’t know until you’ve used them for a few years, you don’t have a decent idea of the sustainable yield. That’s why we adopted a figure of 0.5ML in consultation with R Parsons, that what he felt was a figure that the boreholes could comfortably deliver. Of course we’ve got the capacity to pump more out of them, we just adopted that figure as a long term yield. With the deal, let’s say the rivers were dry, we had 0.5ML or more coming from the boreholes. At the moment sedge uses about 1.5ML per day, going up to 2.5ML in season. With restrictions you could bring that down to 1.5ML or 2ML and still keep the visitors here. So big peak in December, up to 2.5ML or more. We were just aiming, if river runs dry, we take 0.5ML from boreholes, What do we need to get through December and that was desal. Let’s say that’s a sure way of getting that water if you have no other options. So that was the logic of the sizing, and also the peaks and the dry periods in January. Which is very hot and dry, to avoid being back in the 2009 crisis.

(By the time the desal plant was accepted and implemented the supply to the town was not absolutely threatened)

There was boreholes and there was a bit of water from the K. They used mostly because that was the cheap water. You see the boreholes are the cheapest water supply option. If you look at the figures, we split the URVs as well. It’s like money in the bank that you want to keep. That decision to implement was an emergency decision made on the basis of I think our reporting and where we were in the crisis and it wasn’t looking that promising as we went along. That crisis went all the way into 2010. The muni had to consider if the same thing happened that year, they wouldn’t have made it all the way through December 2009. Going into December 2008 there was more water in the system than going into December 2009, so were planning that it was going to be worse for the end of 2009 than 2008. So the decision was made. We can’t go on with a plan that looks like we are going to run out in December (So was it more in anticipation of what could happen that desal came?)

Yes the decision was made that we can’t take the chance if we are going to run out in December and January. So the decision was made and then the process to get approvals was started. You going to go back to Rodney from time frame, I can tell you my understanding. Initially the muni declared the emergency, the EDM DM team was involved in providing resources for the H, and the initial emergency the drilling. My understanding is then that the muni did get - I don’t know when that approval came through, the original scheme that got shelved, had a certain amount, I think it was about R10m allocated to sedge water augmentation. While they because it wasn’t enough for any component of that scheme, it had been rolled over. But they were then in danger of having it taken away because they hadn’t used it. You know in a budgeting process if you don’t use money that you’re allocated it gets taken back. So that money I think as mig money. So its not money while gets channeled through the province and muni to provide implement infra, its generally aimed at providing infra for the poor. So you won’t find mig money allocated to new reservoir for a fancy upmarket area. But on a scheme supplying a whole town that has a fair number to people who are indigent or in housing being developed for poor as part of government housing projects, obviously that money is available to do bulk infra for a whole town. So there was mig money that was rolled over and then allocated to the emergency project. I’m not quite sure of when all the rubber stamping was done and the money was actually released. But I think the muni
wnet forward on the undertaking that they could use that money. however they financed it, they knew. then they at the same time ahd applied for emergency funding in addition for the desal. so i think the H and boreholes and even the pipeline from the desal to the town reservoir, i think all that was covered by that money and upgrading of the works. because that money was already fro the wtw. so i think all those allocations had that money sitting behind them. i cant tell you the actual tiem of approavl it was between april -july 2009. that whole bp was, then it was expanded, where the sedge aug plan became part of the bp together wiht the knysna bp. mainly rodney and ssi worked on that plan. look mig funding in the past could go from anything, from raw water, to reticulation. big funding i only became familiar with it at that time. big is the bulk stuff. thats my understanding of it, i think its still a bit of a grey area. but the guys at dwa who apporose funding, ahve a point at whihc they would go one way or another. 

In Knynsa, ther was R40.1m that was allocated for emergency augm for greater knysna. Whatever other money was put in from Disaster management and Mig at sedge, it, there is money there that was put in as well. But rodney will have to tell you exactly. the R40.1m was all spent in greater knysna, on the borehole and ro project

The funding was thorugh disaster managemnt and dwa, I supposed approved it. R40.1m was applied for. It was in 2 pieces, R22m and R18. something, the one financial year and the next financial year and that ended up being R40.1m excluding vat. That was ued in the caseof Knysna, emergency boreholes, there's some infra where the boreholes pump into that was also upgraded, u=just to cope with the extra boreholes flow and to make sure the system can bring the water into the Akkerkloof Dam. it in the mountains beg=hind the AD, over that watershed, so its get pumped over into AD. whihc is quite nice, instead of pumping from the Knysna river whihc is close to sea level, you are already up at 200m above sealevel, pumping over the top of the watershed and then to AD whihc i think is at 220m or something. so its ncie to have water you are harvestign up there and not pumping all the way.

(In the case of Knysna you said the ideal was for the pumpstations to work in such a way that the dam was full. But that was not the case when the drought became appaarent)

I think the low point was somewhere in the 20%. I think it was a combination. The guys had had a lot of hassles with the pumps, some he infrastructure, pieplines. So quite a lot of pipe breaks and pump breakdowns and stuff. So not being able to harvest water when it was available, not being able to keep AD full. and one or two issues when the town ran purely on AD water. so when they should ahve bene banking water they were actually using water. so it was bad luck and bad timing, and possibly even - one has to be careful when talking about your client. i think sometimes the guys dont get on top of it quick enough and the crisis becomes a crisis.

When you've got that NS report you'll see some maps and layouts of that infra. But in a nutshell, the main source supply is Knysna River. There's no dam, theres a little wier, its only for the purpose of pumping out of. There's a pump station at the river, quite a tricky pumpstation, has had some problems because the motors and panels, sits about 20m above the river and there these special pumps that were reently changed to submersibles. whihc pumped out of the river into the pipeline which then goes about, I think, its a bout 6km to a booster pump station, whihc is across the Knysna river tot he town side and that then gets boosted up to a thing called the balancing dam. its quite simple, you've got the river, pumps over to Eastford booster pump station, whihc pumps up to the balancing dam, form that dam you can either feed down to the wtw directly or theres an outlet whihc has a pumpstation on it whihc pumps up to AD. the balancing
dam sits at about 150m above sea level and AD is at 220m. So the pumps station there, when there is excess water, pumps up to AD. The second system is the Gouna River, which is a tributary of the Knysna. The Gouna River has pumps that also pump to the balancing dam. So Knysna and Gouna River water comes to the balancing dam either goes directly to the WTW or up the AD. The same pumping main that pumps to AD can also be used to feed back to the balancing dam, so if none of the pumps are pumping you release water from the AD into the balancing dam, a 6MI plastic lined earth dam. So its got about 1/2 days water in a 12ML day. We vary here between 8 and 16ML. So that's what the scheme is based on. And when you need it you can take out up to 20ML per day to supply the town. Because if we had a house on every erf proclaimed and there were a lot of people in KNysna during holiday season we would use about 20ML per day. We are not quite there. The original curves of demands before we had these droughts were taking us up to 15-20ML per day by now.

In terms of demand probably the most detailed thing would be the breakdown of demand, from the billing, bear in mind that represents only a certain portion of the water, if you look at those rates: sub economic, normal residential, industrial and commercial and not really separated. Those figures would give you a fair idea. I've got about 5 years of figures of that I think. I can give you in spreadsheet form. I can send you what. Its divided into Sedge and Knysna. In the subeconomic areas the guys don't read meters. They say you'll get 6kl water free per month. I think in those areas they don't even read meters because its not worth it. Generally those areas don't use that much, as long as you keep the reticulation from leaking. Generally the low income areas don't use a huge amount of water. I've also got just overall figures, for Knysna, Sedge, 5-6 years of monthly figures of the totals and estimates of what's unbilled. That gives you a good idea of what's being produced and what's going out.

Unaccounted for water and anon revenue water: Unaccounted for water is an old term that was used, if you took your total billing, versus total produced, the difference is the unaccounted water. But in fact here are uses that are not metered, fire fighting for example, sports fields, and communal stand pipes. In the past they weren't metered, they now have a meter but they are read monthly. So in those figures you'll see an estimate of what has gone into standpipes that's not billed. Generally the informal areas, which are slowly being formalised or they're trying to get people to move to serviced areas. Originally people were using pit latrines and the bucket system. The higher level option that generally people couldn't afford to do was a septic tank. In the informal areas often you'll get a densely populated area in an area surrounded by serviced areas. Often you'll get standpipes, because the government undertakes to give every citizen at last a standpipe within 200m. So in those areas it would be a pipeline going in to a couple of standpipes. But in Knysna and Sedge that's a very small area. Now the shacks are mainly backyard shacks. Look, the township networks look similar, just denser in places because the erven are smaller. You've also got to be careful with the terminology. So low income areas, which are generally the old group areas. Ao in KNysna now it's probably more integrated than maybe other towns. In KNysna its more mixed between black and coloured people. Due to the old apartheid planning it was the coloured area was closer to town than the black area. So there's more of a mix, but the segregation still largely exists. So the township areas, the reticulation more recently is of the same standard. Its being upgraded to generally be of the same standard to suit the amount of water that people use. So in a high income township where the demand is higher the sizing of the system is bigger, but you're getting the same pressures and flows. Pre paid water meters have not been very successful. I think they're in the low income townships but they don't feed back info. But I know they've taken out a lot of prepaid meters that weren't
working. RNay and RParry would be the best guys to discuss that with. RNay may not even be that up to date on exactly what's been implemented.

I don’t know where MIG stands now, the Knysna and Sedge wtw were both funded by MIG monye. There's even RB1g now for joint schemes. But in my experience the BIG money has been raw water supply and up to the water works. Even the MIG money wasn't spent on the final street by street water network, the housing project allocation for civil services would cover the internal reticulation, so normally the MIG money was used for distribution and connect the services. in informal areas, they won't lay down reticulation, its often used as a mechanism to move people, obviously the IS don't get layed out in town planned ways, pften as incentive to relocate, is the incentive of getting an electrical and water connection on a serviced erf, the muni doesn't just go in and provide whatever people want, the layout and the pegging of the proposed erven and roads will then be followed by services, not if they sitting in the middle of a road reserve, often the incentive to move is that you’ll get your connection once you've moved, thats often how it's done.

The Sedge wtw needed upgrading and still needs upgrading and as part of the report that we did as part of the proposal to upgrade that works we included a proposal to use a mbr. Wich produces a high quality effluent. Its more suitable for reuse, produces a higher quality effluent but there wasn't enough room to expand the plant. the upgrade of the wwtw in sege, there hasn't been much progress. there has been a project done under the dwa to look at artificial recharge which is one of the reuse options we proposed, that if you've got a decent quality effluent coming out of the works, the present effluent discharge is into the dunes in sege so that obviously feeds a larger freshwater aquifer under dunes, which has been investigated and modeled and the next step is to actually test it. so the dwa looked at a feasibility, so the next step is to drill boreholes and test that water, its mixing a bit with the general groundwater, because in sege because its so sandy and you on a system with lakes around it, some of which is saline, so if you go too deep you've got saline water, with a band of freshwater on top of that saline water. so where the wwtw discharges, the general gradient of the freshwater is making its way to the sea and at the wwtw there's a dome of freshwater going down to the sea. so the proposal is that between 500-800m from that you get into that lens of water that has now passed through 500-800m of sand and harvest the water there, so its indirect reuse using artificial recharge, so they've done 2 models, the last thing is a little desktop exercise on what nitrates, phosphates, discharged from that works, what its area of influence would be, its very local, its naturally being taken up, so thats what the modelling is showing, the funding has now been applied for to drill and test boreholes to do that, the indications are that even with the present works discharging the lower quality effluent, you still have a massive sand filter, unless you had nasty pharmaceuticals or industrial effluent, thats got to be tested and analysed, these days the main scare are endocrine disruptors on recycled water, unfortunately the testing is not easy and cheap, so you eliminate all the other things you can test easily and then you test for that when you targetign the specific area you're going to focus on and its liek that on any reuse project.

(given the high urv of desal, would it be safe to say this option was taken because of the emergncy nature?)
I think I must explain about how that Urv was composed in that particular scheme, from a URV point, it was evident just empirically from when the larger scheme, the original scheme for sedge wasn’t implemented because of the cost, the increase in raw water supply, relied on the whole original scheme being implemented. so even the wtw, which was the first phase of that scheme was not done. that scheme wouldn't yield anything until the whole scheme was implemented. because the yield of the 2 rivers only increased once you had off channel storage and a pumpstation and new pipeline and all that stuff. and that was actually its main downfall when we hit the emergency including the fact that all the environemntal approvals were not in place when we hit the emergency. so you couldn't fast track getting more water, you could fast track getting a wtw. so that was where the whole thing fell down, because in terms of that URv you were having to put everyhing in place in year 1 to get more water which would last you 15-20 years, whereas the emergency scheme was more a of a phased scheme. so the desal plant is very expensive water because you are only using it when you need it. the desal plants urv comes in at about R16 per kl because in the first few years the desal is only making up the surplus in the peak season. so it would ahve favoured that scheme or the desal plant to run it all year round. I cant rememeb the figure off hand but the borehoels were cheapest, the rivers surface water was about R1.20, the desal plant comes in at R15.90 I think, the reuse is about R8. then the bundle, all those components together, total water used when its needed. so you did have at the beginnign quite high costs, all upfront, first year, then the running vosts whenever you're goign to beising them. so the running cost for the desal plant is only when its operating, apart from an annual maintenance figure. only when you need water to pay for the electricity, chemicals whatever. [talks about the urvs for the big scheme and a phased approach with this scheme makign the urv higher, because total money not available at outset] the actual upgrading of the wwtw wasn't included in the urv for the scheme as it was going to happn anyway. But the articial recharge was included. So if you go innot he urv values you'll pick up that the cost of the wwtw was included but it is in the cost of the actual project as its a component of the actual project but its not priced in the urv as you wouldn't be comparing apples with apples. comparing the NS schme to the emergency scheme.

I think the main reason for the desal in a nutshell was that it was the only option that could be implementd in the time scale that was needed, with a guaranteed water source. The desal was included because it was soon as sthe only option that guaranteed that option of water. in practice that wasn't necesssarily the case. in 2010 there was one period in which the saline contamination from the high tides closed down the wtw for 1-2 weeks so without the desal plant that would have been a major disaster. with the desal work, only those managing the thing really knew. also the wtw had to be upgraded anyway. apart from lifting the equipment up from the flood level, there was certain work that had to happen. so the wtw was taken put of commission for 2 months and during that time the borehoels and desal plant supplied all sedge waer. they had been limping along, but because of having no other option they never had a proper overall of the wtw in the last 10 years. so it bought that time and it also bought security. until well into 2010 the situation hadn't changed very much. there was only pretty decent rains in the last half of 2010 that people kind of relaxed a little bit. so KM was on a very level. EDM DMan had a monthly rating and Knysna has been almost always the highest. adn Knysna doesn't really get out of the orange band because of a lack of off channel storage. a dn that is what both desal plants provide, that doesn't come into the URV, its like buying insurance. and i think that was the thinking at the time. thers no doubt. there were meetings in whihc one sat and the guys said forget about the urvs,
how do you guatantee so muc per day, tell us those options, dont tell us about the studd that doesnt happen. i remember those meetings. give us the options of what to do if it
doesnt rain and the river flow doesn't come back. there was an emergency declared and
after sedge, knysna was emergency declared and national funding was accessed and
environmental approvals apppened after an option was selected as an option that would
save the day.
Sedge' scheme has got more of a status than just an emergency it has developed more
into an augmentation option. Knysna is still as an eme4rgency. When they've had a
probelmw ith the wtw, the re plant has been run. 2 of the 3 units have been run, I can
tgive you off hand, when. i can give you those figures of when they were run. the sedge
plant ahs been used more regularly, the knysna plant has been used infrequently and not
at full production, theres still issues wiht the knynsa plant when running at full
rpduction. the filters dont really cope because the water quality is less than waht was
anticipated. this is basically a big pilot plant if you can call it that. we had a target that
we must produce waer a t a certain stage. but when the plant then lets was say
commissioned at pahse one we werent getting enough raw water out of the boreholes,
and the quality was quite difficult water to deal wiht and the. pretreatment filtration adn
stuff was battling to deal with it. so in the second pphe, when the next trunch of
money was released that system was improved. 2 more boreholes were put in, the
filtration system was improved slightly and modifications weree made to the plant to
give it more protection. so it can shut down on bad quality water. so you'd ahve clean
water enough to rinse and close down normally. so it was designed on a better quality
raw water. So the symtoem of implementing something liek that in this way. i mean
normally something liek that would have pilot study. you'd put in a small trial unit,
inside a little mini container, down near your borholes - 1-2- now we've got 9 boreholes,
producing enough water but good quality.
The 2 plants, to all intents and purposes, they both desalinate seawater. So they are both
swro plants. We didn't, you have to talk to someon at the muni, the dwa wanted that
funding to go into a reuse project. That's why Rnay will stress the reuse aspect of the
knysna plant. initially it was to take sewage effleunt, treat it and produce potable water.
the problem this was very difficult to design with the effluent produced at the plant. its
currently undergoing an upgrade which wasn't even started when we were in this cr
Aurecon, doing the upgrade on that works, they said that they dont believe in thisi short
period time, produce better quality eflfuent. we lookeda the processes involved and we
said we cant come up with a reuse plant that we think in time allowed can produce
potable water. so you'll see in the reporting thaaa was an ultrafiltration wiht ro option
costed, but it came out expensive. so the option of drilling boreholes at the edge fo the
lagoon and using that. the important point about the knysna ro plant, is the difference
with sedge. in sedge you re using beach wells and discharging the brine back into the
sea.At the moment its actually discahrgering right on the beach. you must mny if funding
to take the outlet into the surfzone is actually approved. there was just a whole lot of
problems with the discharge into the sand. it was even supposed to be in the sand belwo
the low water mark. but there were so many problems with that. that we brought it back
onto the beach where its in sight, can be mniored and controlled and witht the ultimate
plan is to take it into the surfzone and discharging. In Knynsa you got boreholes on the
edge fo the lagoon, you've got the ro plant whihc you pumping that water to. you've got
the www right there, which the final effluent is discharged right next to the ro plant,
under the road, out to the stuary. right here is your borehoels that you pulling water into.
it was proposed we go for that option as the option that was implementable.bear in mind
that was the emergency thinking, not comfortable long term plannig. the boreholes
weren't tested yet. there were a couple of spikes put down which is low boreholes, pumped like mad, started to get pretty saline water, decision was made that we can access saline water. if we go 20m we'll get a decent amount of saline water in. the decision to go with the RO plant was made on that basis. the testing was done on the shallow boreholes, because there wasn't time. look the risks were pointed out but at the end the decision was made to go ahead. but you know in effect. so now I think some people might be uncomfortable reading in your report that this is a big pilot plant. because the thinking is that now that amount of money had been sent it must become part of Knysna's permanent water supply. so that's an interesting conundrum that effectively the plant is only used now and then it's got to be brought in to be part of KNysna's permanent water supply.

Dwa, I think there was a big push and there's still within the DWA to seriously investigate reuse, indirect and artificial recharge. there was a big push by DWA and the initial funding, my understanding is that it was based on the understanding of reuse. now remember this RO plant is producing brine, which you can't put into an estuary. but we've got waste water effluent which has got water salinities. so you've got more than twice the water you can feed in brine, you've got treated sewage effluent. so we combined that at the maturation ponds of the WWTW. and seawater is self disinfecting. so you put brine into water that you normally chlorinating. so we proposed, and it all hung on the fact that we could use the waste water effluent to combine with the brine to have lower salinity than the water in the estuary. so we could release low concentrate waste water effluent with brine. so we proposed that was beneficial to the effluent. the studies are still undergoing on that. whenever the plant runs, they monitor, the waste water was then part of the part. its words, smoke screens, but the DWA was told we're doing. so it was stressed that the RO plant is using waste water, but its using it through discharging the brine. also indirectly we are pulling the discharged water through the boreholes. but its a fraction of that water. that whole channel, called the estuary channel has a huge recharge every day. there are millions of ML going through that every day. so the discharge is quite small of the tidal exchange. Prof Allanson, his consultancy firm, together with guys from NMMU, they've been doing the monitoring and testing. but they've been far more involved in the sewage works, they've had a whole disaster there. the activated sludge in the process was lost. they lost the process for a while. the biological treatment. certain bacteria is the main mechanism by which the food, the nutrients that get into the sewage need to be processed and taken up. now the activated sludge process used here, you drain up a certain amount of the sludge and pump it back in. all the stuff gets eaten up, settle out in settling tanks and the treated effluents gets decanted. then released [continues to explain system in WWTW - 1h19min]. That whole process was being monitored. when that happened they had to quite highly chlorinate the water. they lost the process and it takes a while to get the process fully reactivated. its up and running again. about 2 months back there were severe problems there. the plant and animal life was severely affected in that area, and that had nothing to do with the RO plant the main thing was that the WWTW wasn't producing effluent that you could design a decent process. These plants are quite high tech so you can just have varying levels of effluent. You can deal with it but with time and money. So the SWRO was the option in the time available and money. 

Electricity is quite a big component of SWRO because the higher the salinity the higher the pressure requirements. [compares SWRO to reuse]

And the other part of the decision would have been cost, so it was immediate, disaster, what can you do now, and cost.
The Flebe to AD pipeline was done, I think almost immediately after Sedge main push. Its at about the same level as the AD, but also to pump over this watershed, its on a river which is a tributary of the gouna, which is a tributary of the knysna. The nice thing about glebe is storage, about 200Ml. when it rains it fills up and overflows so you can pump like hell when it fills up so its ready to catch the rain again. so if you do that 4 times in the year, you've filled AD. prior to this there was an old channel that delivered by gravity water to the Arch Dam - which is the Dam the borehole project fills into - which fill the AD. the Arch Dam had less than 0.5MI per day, between 5-8l per second, 12l per second is a MI per day. very old channel, constant maintenance and you couldn't put more water through. so the glebe storage wasn't that useful because you couldn't get that much water through. so this pipeline that was put in, no power supply out there. very far from the closest power supply, wiht a diesel pmp.so pumping up AD at about 65l per second, about 4MI per day. it didn't increase the yield to the whole system, it got water to AD, and pumped 70m over the hill. It wasn't explored earlier just because it wasn't really needed. they never got into a situation where they really needed it. and also there was n't power out there so you had to go to that rather unsatisfactory option of a diesel pump with diesel tanks. it constantly gets broken into and the diesel stolen because its out in the bush. so its aslightly unsatisfactory option but in an emergency its a good option.

You see part of that scheme as well. I'm not quite sure if all the funding comes through. Knysna also funded some emergency generators for the Gouna and Krive pumpstation, standby generators, that gives them security of supply when there are power problems. you know we had those couple of years of eskom power being very erratic and we were on loadshedding which took 4 hours out of a pumping day, whihc was a disaster. this happened just infront of the drought. so they went into the drought with AD quite low and they never got on top of it. because once the eskom stuff stopped there were still problems with the pumps so they jsut couldn't win the battle. so i think that experience has also, luckily the town didn't run out of water, its increased the level of awareness, monitoring and also maintenance on those critical elements. Nowadays you can go to AD just about any time and it doesn't go down very much. But that Dam is not big and its all pumped out of the river.

(Question on the capital, O&M costs of the desal plant. I've looked at the latest report submitted to the technical services director, which looks at the actual, projected O&M costs. There's a an O&M costs per klwhihc is then broken down into electricity, consumables, maintenance, operating, whihc gives rand per kl cost. then operator contract, with 3 different options)

You see the tricky thing is that the muni has to decide how much to operate the plant. They don't know because they don't know whether they going to need the plant for longer periodds or the peak season. SO the assumption is that they operate the plant for 5 months and then have it in standby mode for 7 months of the year. thats the 1st assumption. most of the stuff is based on that. but obviously other options ahve to be looked at. In that report an option was done on producing 1MI per day for a certain tiem period. so those costs are given separately. here's a service provider who was the contractor who designed and installed the plant. they've got a certain amount that they offer to operate and maintain the plant for certain times of the year. So I sort of separated them becasue thats an offer from a company that can do it. we've tested it against certain other models. say knysna. There are various contract options you can enter into. So the estimates which give a per 1kl cost are sort of based on those assumptions of using the plant for a certain period for the year. in the future we would say we're goign to ush it up to 1.5MI at the full capacity of the plant. in any case they
will do that if needed. Also what's tricky is this time of use electricity tariffs. That was quite an exercise in itself. It's quite a simplified analysis there. You've got to choose your hours per day. You've got 3 categories, and high season is different to low season but its different to holiday season. High season is based on country wide winter increase, then there's peak, off peak and standard, I think. There's 3 rates, and if you can stay in completely off peak and lower season then you getting your electric cheapest. But if you're running the plant quite a lot better to just go to an average rate. The thing is you've got to change your rate by applying to the electrical dept to get your account based on one or the other tariff. So you've got to make a decision, so depending on the tariff options that's how the plant will be billed for its electricity (O&M costs?)

Basically with the contractor you could choose to have the contractor to still come in and do some maintenance. If it's in preservation mode I think it can stay about 3 months in preservation mode. Then you flush it out. Put in some new preservatives. You can't leave the membranes on normal SW or FW for months. They need to be preserved. Then when you want to use the plant again you flush, rinse and start the plant up. So the options are that the contractor can come and do that in the preservation mode times, for which he would charge you. Then you get him in to run the plant. I think there was an option as well where the Muni would continue to run the plant and that's what we call sort of a standby mode. Where they would weekly run each unit and once its run its hour it does a flush, get freshwater in, switches off for the week. You run the other unit, flush, rinse. You don't preserve it though so then you can start up, by giving it a flush and pumping it away. So standby mode can produce water straight away. These plants, every instrument, valve has to work. They using SW, it's an aggressive environment and quite a lot of instrumentation. So if you've been running the plant every week, you picking up everything, its being attended to. Whereas if you're in preservation mode, even though that should be more friendly, when you start up there are always issues. So the one option was for the Muni to keep it in standby mode and provide their own operators to do the weekly running and only get the contractor in for 24 hours a day full production. So were those various options discussed in that. We've recommended to the client that its not advisable to have long periods in preservation mode. Even the beach wells can get clogged up regularly. You don't have to spend money paying for expensive electricity, its worthwhile if you want it as an insurance. So we've advised this way. In Sedge they were running it in that mode. Sedge is more likely to stay in standby mode because they don't have a dam. In Knysna, its a tricky plant, you need operators there everytime its running, its got feedwater that you've got to stay on top of, the boreholes, keep the pre treatment running and the ro plant. Its a tougher plant and you dont, its running cost is higher because you've got more pre treatment, more chemicals, a bit more power. Its all in all a plant that, what we've recommended is that they put the ro units in preservation mode but they run the pretreatment every week. Because that's the most problematic part. You don't want that side of it to be idle and getting out of shape.

You can be pretty sure, especially the Sedge plant, its such beautiful water that comes out, the plant was run at a time for 1.5 months without changing the filter cartridges. In Knysna we've had days where it can hardly run a day without having to change the filter bags, so that gives you an idea of the difference. The Knysna plant at the moment is really an emergency plant but you should at least run the pretreatment. There's quite a difference between the two. In terms of augmenting water, those are very quick options. But the more you use them the better they'll perform when you need them to.
At the moment Gtek have completed one year of O&M. At the moment the contract is to go for another year. The contract document, they've proposed another 3 years. The muni is busy deciding whether they are going to sign for 3 years or 1 year. There have been problems in sedge with the intake beach wells. They are basically like shallow boreholes, there's a perforated sleeve pipe into the sand with a gravel pack and geotextile that's porous around it so its like a sock with a pipe inside with slots, the slots are small enough that sand can't get in. Then you've got a submersible pump in, about 6m below sand level and it pumps to the plant and those pipes and power supply cables tun about 1.5m below sand level down onto the beach and into the well. We had a situation where we had quite a lot of beach erosion, about 1m of beach erosion and we had a situation, that has baffled everyone, where the active equipped wells worked there way up by about 1m, so you had sand going down by 1m, pumps coming up by 1m and all the wells stuck 0.5m above the sand. And those, pumps, cables, the wells lifted. There were 5 wells equipped with pumps and another 4 wells put between them as backups, and all 6 equipped worked their way upwards somehow they developed buoyancy. So now 3 have been put back in with concrete columns attached so that was a bit of a disaster.

2011, so far the plant has been used even less. It operated in standby mode, with some quite big intervals where it didn't operate because those were those issues with the discharge. But basically if they really needed to run the plant, they ran it, because it was unsatisfactory, but the plant could operate for that time. It was unsatisfactory so it was changed. It was in standby mode for most of 2011 and only run once a week. And one of the units had a pump problem where it wasn't run for a couple of months, so this year usage, we can go and get the figures, but we've hardly tracked it. I think in the book at the plant you can see how often it was run, and also I'm not really involved in running the plant, I don't get paid to run the plant so I take a step back and only if there's an issue then I get involved. So with this thing with the beach wells I got involved again and got up to date again. The beach wells took 2 months to be repaired. So just been repaired. It is running again but only one unit at a time. That was the target for now, to get one unit running to provide 750 per day for the peak season. We've had good rains for this year, there's no immediate crisis so there's no need to go into the beach. Just to go into the picture, of the 3 wells in, you need 2 to supply the plant to run one unit, we've now recently drilled boreholes at the carpark. We've drilled 2 test boreholes, 70m deep, but from about 30m down we're getting good saline water, direct connection with the water. And of good quality, it being tested, we are waiting for those results, we have to check that the quality is actually good because we don't have dual filters and a pretreatment section at sedge. In knysna we have that because we didn't know that the water wasn't incredibly good. We don't know how bad it was goint to be. But in sedge beach wells was considered low risk, you'd get good quality water. So the tests are being done, if good, the initial idea is to equip those 2 boreholes, with the 3 on the beach you'll still have enough to run the plant full throttle. And with any problems on the beach we would decommission a beachwell and commission a borehole. The beachwells are difficult to get to [explains why 1h:59], so if you have to recover a pump its a major operation. So the intention was that the emergency scheme would use beachwells and if it was considered the desal would be part of the long term scheme, we test the boreholes, you know its still getting water, but at the moment we are also testing all the people using irrigation spikes in the houses around there, and atest borehole in the playground at the carpark, its monitored. We've actually got a guy testing this afternoon again on the spikes. Combined with the water quality testing, if its good then we go into planning and equipping those boreholes and getting off the beach. And the discharge pipe is to be
taken out further.

the costing thing is not simple with these various electrical options and also the way the plants are getting run now is very expensive water. Because even those options that we looked at were based on a certain amount of usage. Now if they don't actually use the plant but have got to do the maintenance and the flushing and stuff like that the water that they do produce is going to be even more expensive. so its probably going to take about 5 years to develop decent figures on what the plants costing. but what we've got so far is still interesting to look at.

I mean there weren't any other options that could supply the water at the time. [] I think in the future we will have a conversion. But this plant can be easily converted to a reuse plant. A reuse plant could possibly be easier adapted. But still in the layout of the knysna ro plant there is a plant next door to implement a reuse option. that space has been allocated and ots not determined which way it will go. its possible that plant will be converted. I think again, a little off the record, because dwa was so keen on funding a reuse plant, other people have taken a more optimistic view on conversion to a reuse plant. but there will be a big cost to convert but it will still be less than starting from scratch as you have some infra thats reusable, but the membranes will be different. maybe its better to sell the ro units and dual media filters and use the buildign and infra. but that would still be a study to come, if the reuse option is decided. but i think there's going to be a lot of pressure to do that. in a nutshell i dont think this ro plant ahs a good long term prospect, as a opinion from me. based on the water quality issues. the lagoon water has a lot of plant and animal life coming through.

In Knysna we are getting a mixture of stuff in, and there's freshwater on top and dissolved organic material in the water is also being pulsed in. water had got a total dissolved solids of 35000mg per litre. when we talk about salinity we talk about 35000. the water we're pulling in is about 20000. we know its seawater but theres also freshwater coming in. but ther's lots of dissolved material that we are trying to get out through pretreatment works, which is chemical dosing with a feric chloride, then gravel and sand filters - dual media, and then the cartridge filters are the bags that get blocked up all the time. they are quite expensive bags. we're about to start recycling them. so in knysna in future if we want to access the water, if we go directly to the lagoon, we've got to pull it through something to clean it up and whatever gets through we've got to take out with the pretreatment. but its battling with this fine muddy stuff. if the filters are battling and starting letting stuff through on the bags you get this muddy stuff on the bags and thats clogging them. I think in future the knysna original options, we are still on track for those to be implemented with fairly reasonable urv values. this thing i dont even want to go and recalculate the urvs on that thing. no one will want to admit that. the sedge plant i'm happy is part of a larger augmentation option. the plant is the expensive part of the scheme. but if you run it at full steam you could get it down to R7l per kl which is less than knysna charges people per kl. because of the emergency scheme the tariffs went up quite a big jump. they were brought up as part of the emergency regulations. punitive rates for high consumption. but of the tariffs are too high, it drops your revenue because consumption drops. they tried to balance by reducing revenue and maintaining revenue. but none of this is exact science. adn you cant ring fence that situation. i think the only decent figures you'll get is when you back to the end of the financial year. []thats longer term stuff, would be nice if you do it [2h 19m relisten]. its
in my interest to keep up to date and figures in, but i dont get paid for it. the ro plant is relatively easy to ring fence because we've got power consumption. sometimes its a horrible figure. if they started the plant for a short period of time, produced very little water, but ran 2-3 high pressure pumps, your peak demand for the month implements your monthly demand tariff and you get charged for your kwh. so once you've triggered that monthly demand tariff, you get charged for that. also there's 3 things: network access tariff, which just means that the electrical system can supply the plant, you pay for that monthly, thats the fixed cost, you pay that monthly just to have the capacity available. so you'll see the bulk electrical upgrade in sedge about R1m and in Knysna about R2-3m. there was a new minisubstation, transformer, they had to buy inot a new substation at the boreholes luckily shared with lighting for the world cup, cabling and bulk infra to bring the power to the plant. then ther's the demand charge, lets say you use 200kva, thats the rate at which you are using power, and then the kwh are the actual consumption. so there are 3 costs. So if you turn on your plant and use 300kva you'll get a R30 000 bill just for running for 5 minutes. luckily things like the pretreatment are quite low, we use about 50-60kva for that system. thats another reason we wanted to recommend just running the pretreatment, and the consumption to run it for a few hours for that system isn't that high. So you can use it as much as you'd like, but if you keep the kva low, you're only paying for that. You 4kwh per kl of water is the worldwide figure but now the huge plants in Australia that they are controlling down to the nth degree are getting lower figures. the basic plant, the figure it keeps coming back to is 4wh per kl of water. So its quite an easy figure to get a feel for on the electrical costs. so if you're paying 50c per kwh you can have a sense of what your consumptions costs for the electricity are going to be. its about R2 per kl. thats just for the kwh. so now if you produce a huge amount of water the monthly charge becomes less significant and the consumption charge is the main cost. If you're not producing a lot of water, its the other way around. if you produce 1kl of water and you've triggered a R20k bill, you're going to be paying R20k per cubic meter. So you are not going to want to run the plant until you need the water. and the demand charge is based on your demand, it depends on your maximum per month. the maintenance cost in the document, is based on the estimate of what maintenance you'll have to do on the plant. change the odd valve, service pumps. so either we work on a figure thats given to us by the manufacturer of that element of the plant or we work on a figure for mech and electrical equip of 3-4% of its capital cost per annum. on other work like pipelines and buildings we normally work on a figure of about 1-2% per annum. for things like reservoirs, like 0.5%. So in the munis operating budget they should always ahve an eye on the total value of the equipment in their pump stations and their budgeting should ahve a maintenance figure in thats a certain % of that. they should ahve that and spend that. what you're funding in a lot badly rin munis is that getting a certain amount on the budget for that and they're just paying a whole lot of fat cat salaries. for that money and doing very little of the maintenance. or if the system is absolutely buggered they are using all that money to fight fires and are not doing proper maintenance all the time, just fire fighting, crisis management.

(IN Knysna's case, when the dam was quite low and reduced rainfall, was that a case of fighting fires?)

You're not going to quote me on this… like I said they had problems, but the speed at which those problems were dealt with at that time caused much more of a crisis then. They are going to know someone said this. But it is the truth. Lot of people know it, I dont know how many will say that. It would be interestign if you give me that feedback, just numbers. obviously its history and a lot of money has been spent and nobody wants
to really go there in too much detail but as I said, on top of all those problems, the speed and urgency at the time, could ahve put more water in the dam. and you cant blame that poor guy whose spending his w/ends in the bush fixing pipelines. by the time everyone was looking, they were looking there, but its not them
In the emeregncy terms, if you look at it in terms of an emergency. None of the options were based on schemes that wouldn't yield if it didn't rain. Even an option that’s not entirely short term rain dependent.. I don’t see that there was any other option, aside from reuse. the time that you had available was dependent on that crisis. and it was dependent on getting water in the river. the longer term schemes, like this proposed dam, is a 5 year project. even getting more water out of the river, which is now slowly beign implemented is a year project. in that situation i dont think there were any other options. I’d also be interested to hear the feedback on whether there were other options. I think people would have been taken extremely seriously if they’d raised them at the time.
The emergency borehole scheme was implmented, a large number were drilled. I think about 15. only 3 have been equipped, and 2 could still be equipped, bringing the yield to the target of about 2ML. At the moment the 3 are producing just over 1 ML per day and are still being monitored and will only be licenced as production boreholes once the monitoring has been completed. So they are not actually down yet as assured yield into the raw water system. with the ro plant we can say its assured yield. if we need that water, we can switch it on and get it going. so the water's available and the river system has got a certain yield, we talked about the glebe - akkerkloof. and the arch dam whihc gets the old channels water from the glebe and the boreholes water has been upgraded to pump to AD. then emergency boreholes at 2 main pump stations - Kriver and Gouna River - standby generators, another thing is the bigai spring. a perennial spring up in hornlee. that was one of the very pld original supplies for KNysna. along with the glebe arch dam system, they supplied most of the original water for KNysna. then they needed more and started pumping more from the Gouna, then the KNysna. Its goes through chorination and to the closest reservoir.
(what was the extent of what was termed a crisis. Given the other measures in place resulted in the filling fo the AD and KNysna has essentially pulled through this crisis with almost no use of the RO plant)
Ja……. Look in terms of comparison Sedge definitely used the plant, but to the entent envisaged. And there was another crisis, related to that low flow in the river, but also to that tidal contamination which out the wtw out of action for 1-2 weeks. because the river flows were low, that flushing out process took a while. So in the end, along with the boreholes, they ran the plant for about a monht. becasue yo didn't wanted to start processign water until it was completely flushed out, adn there was no need to do it. so there've been a couple of say 1 monht periods. the actual closing of the wtw for refurbishment, and the saline contamination, adn a bit of a december peak into jan. so its probably been 3 monhts in which that plant has been used in meeting Sedge’ demand. in whihc Sedge would have had a crisis if they didnt use it. In knysna the plant ahsn't been sued to meet a shortfall, it was put in place as an insurance (was there an investigation into to what extent was the supply in relaiton to demand crisis?)

Look it was all based on assumptions. Hindsight is perfect vision. At the beginning of 2009, KNysna was very low dam levels, river levels. Noone quite knew what the next year would bring in terms of rainfall and one interesting extra factor was that KNysna was hostign 2 WCup teams. KNysna didn't want to run out of water during the WCup! Actually those projections that we did, and in one of the reports you'll see a graph whihc...
shows the level in the AD coloured in, and drops into the red etc. now all those predictions were run at the time: What if there's no supply into the river, what if its a dry year, etc. we had a s/sheet model which took different scenarios into account and if you looked at a bad year coupled with an increasing demand for WCup, plus present levels in the dam etc - and the dam at that stage was about 40% or something - we wouldn't make June 2010 which was WCup time. At that stage we were doing about a 7 month look and it included July. and the worst scenario was always that the RO plant and boreholes would see us through without running out of water. And that was based on using 100% of the environmental flow, as worst case. If we let the full environmental flow through, we crashed and burned in April at the stage. we were doing those things since November, December, January or 2009/2010. so it was April 2010, if environmental flows came through, and June 2010 otherwise, based on the assumptions made. they were assumptions, but we did use figures from previous years, in which the river didn't stop flowing. 82/83 I think. we used those low flows to model the monthly flows for that year in the river and either let through the environmental flow or not, then we ended up with the situation without the emergency measures, or maybe just the boreholes, without bringing in the RO in. At the time it wasn't a major hydrological study, it was basically, what is the water consumption, what is the demand, how much are we saving, what kind of year are we having and then what kind of augmentation are we putting in. the assumptions also included how much we could save with restrictions. but most of the assumptions were based on saving 25% of consumption from that year which I think was fairly reasonable. quite a lot of measures to save water and in the end I think the town did come down by about 25%, we can probably check on that. but what clouds the issue a little is that the original consumptions in Knysna had a bit of a drop when the waterworks was being built. there were restrictions during the buildign of the waterworks, which created a dip. Its interesting though, if you put a town on restrictions, after the restrictions, unless you publicise the fact that people must now use water, the consumption doesn't just jump back on that line, pre restrictions. so that was quite interesting, that little dip. it was a case of 'ok the waterworks can't cope, we've got to upgrade it' and during that upgrading there was a dip. it was severe restrictions, the town was supposed to watering the plants with the shower water for example. in the assumptions made, I got historical data, looked at what NS did and did a bit of short term prediction over the time they were working on the waterworks. what I found was what NS took the figures up to the time that there was data, then they took my predictions and used them going forward. and I thought that was a bit silly, because in my report I had used their data and then done just a little projection which wasn't based on, it was based on past upward trend. I was a little bit conservative because for the waterworks you want to just overdesign a little bit of capacity. so it was quite interesting. anyway NS has now got figures which are back on the general curve of what does the town need. it wasn't based on how much commercial development there's going to be, or which areas are going to develop. it was just on historical trends. we are trying to work on some figures now for Knysna on actual developments. then we aim to marry those two

bulk water
bulk sewage layout
wsdp
bulk augmentation scheme aurecon
billing
overall water data
updated consumption trends with the master plan exercise

**Interview 23 & 24 on 20 March 2012 - Consultant**

On the Sedgefield project we did submit a bid but we were not successful and the second opportunity came out with the Knysna tender and we then tendered to the consultants responsible and we were successful with that tender.

I think it maybe started earlier, around 2006/2007, Veolia did a few roadshows in the Southern Cape area because of frequent problems in each catchment area. So the unique situation in the southern cape is that there's no connected infrastructure. Connected in different catchments with each area. So for example you can sit with a local crisis in George but Mossel Bay is flooding or Plett is running out of water but Sedge has got a lot of water. So you have micro climates. So a long with some of the consultants in the area we had a roadshow just presentimg different technology in 2006/2007. Then it went quite quiet. So I think there was atleast some kind of awareness amongst the municipalities for the potential for desalination and they already had some of the cost figures.

Now typically when it comes to a choice of technology you either look at reuse and reuse has got some stigmas as potable water. And I think desalination was just the logical choice for the different catchment aras, munis in the area.

It was a logical step because I think it has less of a public participation. Re-use you're starting with, for the countries that have implemented re-use from waste water, like a Windhoek for example it has been a very long process with EIA process, public participation process, public awareness that has to be generated. Desalination is a cleaner solution, in other words there's not a public perception that this can be harmful to my health. So the desalination option I think for them was more straight forward also because desal is a limitless resource. Its not dependent on the amount of water coming through a waste water treatment works. You can essentially take as much as you need.

Also from a modular approach, all the cases had a very fast track approach. And internationally you get different package units for different sizes for different and thats also what we as Veolia have managed to install a packaged unit from one of our sister units in Europe. procure it, Bring it across, and store it, do the pre treatment design and installation of the package and get the plant producing water in a very short period of time. Which is one of the advantages of desalination.

Especially for small capacities its possibel to do that. With large plants like MB. Sitting with large plants its more difficult to fast track, you sitting with big instead of smaller pipelines. With a longer construction of the plant because of the sheer volume of water treated.

Veolia is one of the internatioanl groundbreakers, with some fo the earliest references. In our case we have a small plant on Robben Island. Wee have a lot of plants on brackish water desal in the Northern Cape, Botswana, groundwater desal. We've got a long track record since the early 90s in South Africa for installing small modular but also manufactured plants. So its not a case of us not being involved in desal beforehand.

Even in that area we've done a lot of tenders and even assisting developers. In the early 2000s there was a big bloom around golf course developments in that area. and each had the constraint of limited water. So the logical conclusion was to look at desal so from 2003/2004 we were involved in quite a few local enquiries for desal plants. And that actually lead us to the next logical step to say lets try and educate the munis about the technologies. Then we spent some time in the South Coast just seeing munis and...
municipal managers and just to introduce them to the option of desal. And I think everyone is aware of the desal but didn't necessarily have the figures in their heads as to the cost of water, production, operation and maintenance and at that stage it wasn't such an unattractive offer compared to what they were paying for their water and selling it. It was quite comparable. We also talked about the bigger picture trying to connect the different infrastructures because paying capital for desal, let's try and make it available to a few munis, connect them to each other. So there were a few ideas thrown around, to think outside the box. So I can't say that was the direct reason they went for desal, but to say that desal was not that far fetched to connect the different munis.

I would say in the whole area - riversdale to plett - we had about half the munis that showed interest (during road show) but in general you didn't get the impression that everyone bought into the idea of a shared infrastructure of large desalination because they didn't feel the heat at that stage. Everyone had plans, largely related to upgrading dam capacities. So obviously once you stop having rainfall the plans and all big dam walls extended doesn't mean anything because there's nothing to catch. And that was when they went to the next logical step.

In Knysna it was different (when approached) the options were one was reuse from WWTW the other was desal. So the consultant appointed to manage the contract rated the secp and design for both options, both sited on the wwtw site. So it was for the contractor to offer both or one of the options to make the decision. In that case - for George we tendered on the re-use - in the process of comparing prices we decided just to offer the desal process for knysna muni.

The link to the WWTW is two. Firstly the feed water wasn't pure sea water, it was taken from the lagoon so you could say it wasn't directly the outfall of the WWTW but you could say it was in the same vicinity so there was a measure of blending from re-use outfall and sewerage drawn in. About 50/50 blend of sea water and treated effluent could see in the organics as well. And the brine from the desal plant was then joined to the main municipal works. So there was ground, the main physical location was adjacent to the municipal works and then there was a measure of blending in the feedwater coming in.

(This design specifically in relation to funding?)

We basically came in at the point where the muni worked with the consultant what they basically want the consultant to put out to tender and that then called for either options on the same site. And decided because it was a very short program and comparing design, program, price and the aim to win the project the most competitive proposal we could put forward was desal and that's what we offered. Many contractors quoted, I don't know what the others submitted prices for, but our desal option was basically accepted. But also for those emergency projects you must remember there's a very short time for tendering. I think it was also run around the Christmas period, or just before christmas with just 2 weeks to tender. So you couldn't realistically do 2 complete designs in parallel so you had to basically select the best horse to back in the time frame allowed for tendering and execution and go with that.

I think it was around 14-15 dec (2009) where we got the letter of award. I know just before christmas we placed some of the crucial purchase orders that we had to get in place just to meet the programme. There was first the design phase and I think the construction began in February. I think the muni appointed the borehole contractor very early. And they started work before we arrived on site and they did the civil works and the muni had a separate contractor that did the civil works and there was delays in getting access to the plant. Most of our equipment we only had on site in April/ May, somewhere there.
Can't comment on funding and phases. I can remember there was funding for other projects going on at the same time. But I can't remember about it being specific. Maybe I've known about it but I can't remember separate stages. Typically for the design and build environment the client doesn't bring us up to speed on what's happening with funding. So we just work on deliverables and then we can claim. After commissioning we claim a portion. I think the plant was commissioned in June 2010, the four months test was in July 2010.

Yes, but the beachwell water was bad water so it was struggling to filter that water. If I'm correct we ran about 2 months and stopped because we have a contract that says we run during the dry summer months. We ran 5 months in the year and then the 7 months the plant is idling. So I think we commissioned in July, month or two continued to run, thereafter stopped, 1 Dec (2010) started again, then ran the 5 months and then mothballed. But most of that time it was not running full capacity because of the feedwater from the boreholes as high turbidity water. The boreholes in the estuary. That is still the case. So I think the plant is doing well with the water it is receiving. We've done some changes, it was the beginning of last year (2011), there was some directive they received, releasing more money to do some improvements which we did for them. There have not been major changes but it will improve the plant. But what I have found since is that the water quality is actually worse now, in the beginning of 2010 it was bad, in 2011 it was better, now since Dec (2011) it's been very high turbidity, so its difficult water.

No, that's very difficult especially if you have an emergency project you have to make a decision about where you draw the boreholes, make some decisions and then live with the outcomes. That's unfortunately the case.

We have our meters on the skids and there's a totaliser.

I think the water quality has a major impact on what the plant is yielding for the municipality. What has been invested compared to what is being produced. If you take Plett, the desal plant has got beautiful clean water, same with Sedge. For the same investment you're getting full capacity out of the plants. If you take Knysna the problem is the water quality and organics of the water. The consequence of that is you have to remove the turbidity for your RO membranes. Typically you would want your turbidity at 0.5 (NTU?). And the tender specification was saying the water was going to be 1 NTU but the actual water quality was 20 NTU. And its a logarithmic scale so its much worse. So you install the sand filters as the method of removing the suspended solids and to some extent organics out of the water. But if you design for 1 NTU and want to reduce it to below 0.5 then you can do it with the sand filters we installed. But now you sitting with 100 times more of solids to remove. The plant performs well in that the design was to backwash and say once every 24 hours we backwash the sand filters. In Plett we do it once very 2 days. [C] - We started 24 hours but that water is so clean [A] - on 1 NTU water you can do it probably every 2 days, but we had to do it once very 8 hours. And then you can't take the full capacity in because the amount sand area is not sufficient for that water. The limitations of the filtration system is of course not designed for that turbidity water. It cannot take the full volume water and get it to the right quality to feed it to the RO trains. The result is for example is that the bag filters we have to replace.
frequently and they take heavy load. And sometimes the bags last 8-10 hours, we replace all the time. Then you have breakthrough of some of that particulate matter into the membranes and you have to do chemical cleaning of the membranes. Under emergency conditions the decision was taken to go desal and have the beachwells there. But its resulting in a lot of operating problems with the plant thats there to the extent that in Dec it was close to not operable so it has produced very little water in the last 5 months (2011-2012). Basically our recommendation to the muni, it was sitting at about 40ntus, basically it cannot be treated with the system as it is.

So you have to look at alternatives like pre-treatment but there's limited space on site. So the other alternative is to decommission the boreholes and relocate to another site. Which has infrastructural constraints or to take water out of the lagoon which has other constraints. You linked to more floating organic material so its not an easy change. We discussed it at length. Even the decommissioning. I was attending a meeting with the consultant, throwing around ideas, what can we do to improve the feedwater quality and every which way there's significant cost involved. The long and short of it is that with the current plant the overall feed quality, water coming in, the water produced is low. lower than conventional plant. So for plant we running at 45% on seawater, in Knysna probably 30-35% so for chemicals, power consumption, salaries, everything contributes. Its very expensive because you producing less for the same amount of water that comes in.

(Take me through the cost?)
I think the original award was about R13m and then with the modifications done at beginning of lat year about another R3m. The civil works are not included. Its probably double that value. The ccivils and boreholes were separate contracts. The operating costs, we have a contract with the MB muni for example where they pay us per month for operating and maintaining the plant and they pay per cubic water of water produced, the same at Plett. But in Knysna because It was I assume the first - not sure how the Sedge tender is compiled -. It KNysna there was basically the contract included for 3 years of operator, so its basically R5000/month paid by the muni to us. And for that cost we provide operator on site. We provide support to that operator, then the muni themselves are responsible to buy the chemicals, bag filters, pay the electricity, buy the spares and maintain the spares. Price is mostly sitting in the muni. The cost on our site I think is R26000 per month, to provide a trained operator. compared to bitou, we carry all cost there, typical bill of R190k per month. Have 5 operator, 24/7 operation. We supply the chemicals, the muni has to add electricity costs paid to eskom.

(explain electricity costs?)
It’s a complicated calculation, cant remember details. You pay for infra, what could potentially take, and what you do take. Fixed and variable cost. If I have a transformer next to the plant eg 1000kva then fixed costs linked to that. If I only use say 200 kw electricity, then I pay on that peak that I use. The fixed costs are linked to eskom tariff. Also have a scale for peak and off peak. Each area has a different formula, and differs in differs geographic areas. Therefore need to have the right tarriff scale. Typically for desal plants theres an acceptable norm of power consumption for every 1000l of water produced. For your larger plants its typically lower - economies of scale - for the smaller plants 4kw/hours for every 1000l produced. At Knysna for example lots of backwashing and large pumps so get quite a bit of extra kwh clocked because of frequent backwashing and low recovery of water. So all contributes to a higher electricity cost.
5-6 years ago it wasn't an issue. You worked on a straight 30c/kWh tariff as an average. And so all the values, all the consumptions, operating costs were based on a simple straight cents per kWh model. But now things are different for each muni, depending on whether they work on peak or off peak and which tariffs apply. Calculations can work on typical average. The average we work on for the west coast is about 4kw per cubic meter (per kl) and there's a figure that's been around and typically quoted as your electricity costs for desal. Doesn't vary too much from that. For us where it becomes important is on the O&M side. So many of the tenders that come out have a 3 year operating and maintenance contract attached to it. You have to guarantee your electricity. So it's important for us to get the facts correct so we don't under cost. But it depends on the tender.

SSI did on all the contracts they run they have lifecycle cost spreadsheets to be completed by the bidders with elec consumption and chemical consumption costs to calculate lifecycle costs for the muns especially where they receive funding. In the case of KNysna the munis costs are not part of our contract. But in the tender doc the tenderers had to provide their calculations for estimated costs.

(how has that changed given problems?)

More difficult in Knysna because if you take the last few months, very little water produced, costs involved, but very little water to support those costs. So you'll get very skewed results.

The desal plant in MB was mothballed end of Feb (2012) and re-use end of Jan (2012)

(Implication of mothballing?)

From a physical equipment perspective it's better to have running instead of standing. If pumps stand for a long time you'll have problems with the bearings, they can seize, you can reduce the overall lifetime of plant. From a capital perspective every year its standing, it doesn't extend the overall plant lifetime. You design the plant for a 15 year lifetime, so every year its standing you reducing the operational lifetime of the plant. From an overall lifecycle cost its quite expensive overall water produced versus amount invested. IN MB the reuse is producing water only for petrosa and petrosa is now drawing from a full dam so doesn't want to run the plant. I think if it was also for potable water the plant would still be running. Desal is more expensive to run, typically when it comes to capital and operational costs a reuse plant is less expensive. Typically worldwide they go for reuse first but its got a stigma attached to it. Indirect reuse means that its more expensive because you taking the water back to source and it has to go through conventional water treatment again. So you actually doubling the cost of the treatment. Whereas if I reuse it and redirect it back into the network its a cheaper alternative. But there's very few direct use installations. In most cases its indirect. If you do that then desal comes back into the picture as you add another R2-3 per cubic meter water treated to that. What has changed, eg in MB, the impact is profound is the price of electricity in SA. The frequent tariff hikes.

(over last 5 years, since roadshow, environment has changed, how now promote desal to munis, why the choice?)
Changing weather patterns means that you can’t really bargain on surface water, by
default also groundwater. What promote to clients is to first look at reuse, to look at a
source of water that’s already available. And then to look at desal, that’s the only
guaranteed source of water that we have currently in South Africa. Either water in a
loop, WWT loop or to look at water from outside. The dams capacity or future
development potential, we’ve bascially got as many dams as we can typically handle. Its
all about guarantees. MB was a situation where they were 10 days away from having no
water. So there was really panic stations, they talking about closing down petrosa which
would ahve lead to a big fuel shortage in the whole of the Southern Cape area in order
to save on water and the daily consumption of petrosa is quite high. So getting to place
where a big city is running out of water is quite a scary place to be. So most of the
munis are actually looking at desal. Now its how do I overcome the problems. So a lot
are looking at co-generation, power generation, wind farms, so there’s a lot of big
picture strategic thinking going on, especially for larger munis on how they can
overcome the power cost problem associated with swdesal. I dont think we can really
get away from it. You see it in the Middle East and Australia, have got massive desal
plants and I think they’re sitting in essentially the same situation as us. Desal I would
say in Sydney are mostly self sufficient, with wind farms. they include the bigger
picture of power generation with the desal plants. And economies of scale means that it
makes more sense to look at a bigger plant to provide water over a larger area vs. small
localised areas. Thats the way the country is going I think.

(In garden route they are small, used seasoanl?)
I think the original idea is a more feasible one to have one large desal plant which caters
for a larger area, not just one catchment area. We faced with in 2006 was a big water
shortage in George, MB had a lot of water, 2010 was the other way round. So because
of the micro climates it would have made more sense economically, instead of putting
in small localised plants, to have a large plant. But then to also upgrade the
infrastructure. So either Plett or Riversdale, essentially the whole southern coast region
you can service by joining the infrastructures. There is where the EDM comes into play,
the bigger picture thinking. There was where we had a problem in 2006, those guys
were not involved. We tried to get the municipal actors to come together to reach
agreement, but there was no specific district input.
The Provincial authority, to now link up the small plants to other towns I think is not
feasible where we stand now. But you never know in 2-3 years time there could be
another dry spell and then…. You have more developments.
The point is about being proactive and not reactive. Right now we are being very
reactive. On the emergencay releif you've got a fast trac programme. You sittign with
skid mounted, lets say modular units. And for that you pay a premium. If we had a more
time you would design a plant with more studies, and testing. More studies on the
feedwater source. To make sure that you optimise your overall water recovery. The type
of energy recovery for example on desal plants is important. One of the constraints we
had at the MB desal plant is that the type of energy exchanges was not the most efficient
but was the only one that would fit into the time frame. So we had to go with a less
efficient energy exchanger to fit in with the programme and execution. So FACT
TRACKING AND EMERGENCY HAS ALWAYS GOT SOME DRAWBACKS AND
ITS AROUND COST EFFICIENCY. Economies of scale, the big desal plants
internationally are running at below 3kwh per cubic meter because there’s optimisation,
years of installing these plants is getting more efficient. Also the power generation
factor can blend into the capital costs to atleast offset some fo the power used from the
local network. There's no time for any of that in emergency cases. There's no time, there's no time. There's barely time to get a tender in and decent costing and from day 1 you need to start placing orders. There's no real time for...A typical design and build you would have 2 months for the basic engineering design then start preparing the long lead items. So you've got time for design and optimisation. But if you on a fast track basis then you have orders you need to place a week before you get the contract. (sense of urgency has an impact on types of plants one can construct?)

(correct)

(emergency, area was declared an emergency, funding made available and EIA was fast tracked. Veolia in establishing extent of crisis?) Not from my side. The consultants would ask us for technical input for the EIA, feedwater quality, brine discharge rates, chemicals dosed during the process. Giving input into the process. But we were never involved in the bigger picture strategic thinking.

The drought condition, you could see in the papers, the town consumption relative to the dam level, the water saving programmes and what they're achieving. We were not close to that. You know in the market there was a drought, see it in the papers. Then we submit proposals. There's a tender that come sout and you tender, you not directly involved.

You get contacted from time to time by consultants. Those workin in the South coast, also other areas, PE, Durban, WC areas to ask for technical input. But the bigger picture planning we were not involved in.

(Interest in eestablishing extent of drought?) Obviously it is our interest because it is our area. And we would like to be involved in planning sessions because we've got the …. Many times consultants, clients have got the right understanding of what technologies are applicable, what the electricity costs are. So its good to give input into the, you know even if its just on a factual basis, what they can consider. So we are always available for that. the consultants also speak to us during their conceptual design phases. I'm not sure to waht degree there's been overall strategic thinking vs. everyone muni for himself. The feeling I got was that it was every man for himself. and not a lot of collaboration and strategic thinking of how we can impact on the guy next door. Its just 'we've got a crisis, now how can we manage it'. They had there own plans, every MM made their own plan to get through the emergenecy.

I think its very difficult to get funds from Provincial Government. I know the munis had a difficult task to submit their reports to water affairs and then to get money from central government. So I think thre's quite a game of checks and balances before you manage to get R20m or R10m or whatever (when second funding released, in February 2010, the dam was filling and rain predicted. So would appear moving out of crisis. Yet went ahead with plant..?) That’s the downside of being reactive so that award was in december 2009 so at that stage there was drought all over, so you not sure if its going to rain. Then you get the rain and suddenly the crisis is over but you've already made the commitment. So most probably, I don't know by the time decision made how serious the drought was. It seemed intense. So I'm not sure of the dam levels and so forth. They were battling with the peak load in Dec so it was more to make sure they could deliver in dec jan season. From a strategic point of view it might make sense to spend time with stephen miller in hermanus. Its one of the few munis where they have a clear strategy for the future. They are also loking at ground water. Then they will be looking at reuse in 5 years time, the desal. So its already planned to look at the cheapest, the second cheapest and then the
more expensive water, based on growth they re expecting. SO its a clear plan, not reactive but proactive so already setting aside funds. So they not running to Water Affairs to get funds in an emergency

**Interview 25 on 21 March 2012– Consultant**

Ok desal contains machinery which potentially makes noise which can impact on people in the area. Usually one takes about people. Usually most documented is human beings response to noise. The plant generates large amounts of noise and if you have them in the open they would impact quite severely on the people in the area. Now the Sedge one was about 100m away from the nearest houses, businesses etc. So one needs to establish the level of sound radiated by each of the sources making up the desal plant. Then with ones knowledge of mitigation measures, in this case one encloses it in a container. And ensures that's sufficient, since when you're outside in areas surrounding this, the noise is negligible. And that is my role in Sedgefield, Mossle Bay, George, Plett. All of them I've been involved in. Sedgefield was the first one and then the others in close succession to that. And being in Sedgefield one is approached to do the others as well. And human nature is such that we think its going to be huge. Most people find it very difficult to understand sound and how it affects us. So normally there's a negative, knee jerk reaction. But in the end everybody was very pleasantly surprised because you couldn't hear anything. Normally you only get an open house public meeting once the first scoping has been done and sometimes only once the whole EIA phase has come to an end. Then you address everybody's issues. Now I'm dealing with wind energy farms the public response is a bit over excited. But very understandable because most of us do not appreciate what is going on. But there is also a syndrome in that 'you cannot believe what THEY say'. That stems from legitimate situations. But through the EIA process one tries to go through an ordered procedure and address as much as one can the public that may be affected.

(EIA Process, in this instance fast tracking. Talk through?) One is approached, we want a desal plant and please we want your input yesterday. That's quite typical. So a fast track is in that case… But one deals with this so often, 'there's a situation, and from your specialist position, what are the key factors and what is the surrounding area'. If the land is impacted on you impact on its value, private land is impacted on more. So the fast tracking is more a relative thing. But the process is the same. And you need the information as fast as you can. But that is not always available. The noise impact study, needs to be an objective study, based on qualitative data. In Sedgefield, the first desal, they don't have the noise data, but in this case in Brittania Bay there was already a desal plant so one went and measured that as quickly as one can. And there because you measured yourself you know the confidence of your data, then you determine whether a container would be enough. So the fast tracking is really just 'get a move on'

(Spoke to consultant - normal EIA investigation, authorisation, implementation; in this case slightly different) Didn't impact my recommendations. Your task is to ensure there is no or negligible impact on the area. In this case one was under greater pressure to ensure the process … there's no change to that at all. No cutting of corners.
Until that time I didn’t have a clue what a desal plant was, so you have to familiarise yourself very quickly, i.d potential noise problems, be sufficiently informed with noise data. In the acoustic world one can predict quite accurately the impact with the data. What the whole process was had no bearing on what one did.

(you would have findings followed by recommendations, but in a situation where implementation has happened before authorisation. How were your recommendations?) I was able to do it fast enough and I was checking what they were actually implementing and it so happened that what they were implementing, it all worked greatly. The choice of enclosing was correct as it so happened. Again in this case it didn't impact on it. Compared to another project where I was brought in half a year too late because they were realising they might be acoustic issues. They had already designed the building so if I said its the wrong shape its difficult to change. So thats an example of things not being ideal. But in this case it didn't impact at all.

(So your recommendations were included?)
correct, some of it already without my input. So I was just confirming, 'oh what are you doing, that’s fine'
In my case the clause wouldn't affect it at all. In my case somebody wants to out 100s of noise sources and we can say the plot of land is too small. Thre are just physocal situations, and you cant fight physics. So at the scoping phase one can say its going to be an issue and start rethinking. But at that stage there's normally insufficient quantitative data. Its more a case of beginning to get the data, so in scoping phase you can inform what you need to come up with a confident result. Because I can't start my work without the data. So my clock starts when I have all the data I need to do my job correctly.

Sedgefield and Knysna, when brought into the process?)
Was brought in by the consultants and by then they had decided on the desal. I was brought in as soon as the EIA people. I believe I was brought in as soon as they could. I cant answer all the questions because I don’t know when the EIA people got involved, but I believe I was brought in. But they had said that a desal plant was going to be there. As it happened in the Sedge case, what they were doing was parallel to my work. It so happened that had I not been there it might have also been successful.
In Knysna there was more time. Potential was to increase the sound insulation if necessary. An dthat was a less hurried project. But really the whole exterior timing and process didn't really bother me.

(What happens with the recommendations?)
I'm in contact with project engineers and at the design stage already, the report comes at the end. But at design stage already you are communicating with them. But the investigation is to a certain extent also a design process. My input is at the design stage of the engineers. So the actions have already taken place before my report comes out. Even in Sedge I was in contact straight away. The Sedge one was my first intro to deal so it was a really sharp learning process. But the process is the same as any other. Id noise sources and establish how to ensure they dont impact on land in surrounding area. But less of a design process involved in the Sedge case. I checked the proposal they made. Very often that one is interacting. So you dont wait till th end of the EIA and the EMPPlan, because its all being done concurrently. O as soon as possible I motivate that they establish what they thinking is going to work at all. To warn the client. So what the public sees as a document is an abridged version of the actual work.
No I wasn't at any public participation in all the cases. In all cases my report indicated. Hopefully it was clear enough. Also a problem as its technical and you have to communicate to a laymen. I was at any of those public participation. In other cases yes, but not these. Report submitted to env consultant, then not that involved thereafter.

Another case, official body then responds, and you say 'please read the report as para … deals with exactly what you say you haven't found'. Because it’s a technical language it then becomes complex and difficult to clarify to the reader. Its highly complex computer processing and there are many variables and sometimes difficult and I add in certain cases several pages to explain. Then you think do people read it, they go to the final page and read the impact summary. That’s all they look at. I just read a response, was a certain body 'you didn't do that' and you did, you say 'its on page..'. then you worry sometimes about the decision makers. So that is the larger problem in this country where people are not aware of the impact of noise on people. The specialist can do his job but the decision makers very often do not have sufficient education and awareness. I've been asked by the city council to do a course for environ noise for local munis. People are uneducated in understanding the issues to inform their decisions.

(the level of influence of a specialist report, which informs an EIA?)
The environmentalists have to try and take in the various specialist inputs and balance all of the inputs in terms of the proposed developments and that’s where these impact tables are suppose to help. Because the en consultants have to read all the specialist reports, they can already then gauge what factors are important and then to try to put in the summary report trying to rate the relative significance. And I don't get involved with that.

(Based on your experience, independence of env consultants?)
Yes, I'm involved with certain projects where they're engineers, not construction firms, not the people putting in a tender. That to my mind should not be legally permitted. But you involved with consulting engineers, but not the people that will be the contractors as part of the construction of the facility. I haven't been involved in that. But if there are, for them to have something like that, that would be a conflict of interest. Yes in the end you are paid by the developer. But my task is to inform for all I&APs. Another point is that you go via the env consultants, and not directly to anybody else. I see as my task to inform everybody about the pertinent aspects.

IT WAS realised it could be an issue in terms of noise so it was tackled as oon as possible. So Sedge was an extraordinary case. There may be other issues regarding brine etc. that’s also a learning process locally. But that’s beyond my area of specialisation. Regardin my area, my understanding is that I was brought in as quickly as possible and we got going.

I don’t know the section 24 clause. They env consultants contact the specialists as is deem required. There are some projects where there's an almighty pp process. In a recent case there was a very hot pp process and what you see so often, they've already mde up their minds and they believe you cant trust the consultant. So in this instances I have to be carefyl about how I put across my findings. You have to conduct yourself as professionally as possible and not be drawn in to subjective areas. But a lack of
knowledge has created huge distrust.

(Question of influence (while recognising own processes)?)
In my reports its quite clear. But the alternatives were not feasible. They in a corner, but they left in a position where from the noise point of view there's no good solution. That's where the public must put in their pressure. Its other people it's the DEA or local authority. But I must put into an understandable language but that makes the report longer, so often the summary table is just looked at. So its possible that the details are not taken into account asn the people looking at the report may be overwhelmed. Which means the process has to be modified. Hence the request for training courses to overcome 'uneducatedness'.

(Do you think the technical nature of the reports and issues has an impact on the extent to which people can respond?)
I'm now reminded of another thing where a whole residential area is fully against a project. The types of factors where people jump to conclusions, but the calculations based on physics don’t support this. But people don’t understand. But the problem we have is that there's not sufficient education on noise on the broad scale.

(the process itself is designed systematically, by design it appears to function, but the actors don’t necessarily have the skills to respond effectively?)
Absolutely correct. I said we should not need to have EIA, it should be incorporated in the normal planning procedures. In Weurope there is no EIA, one has incorporated it based on past experiences.

The EIA procedure is a good one but falls down at the decision makers who are ill prepared to understand the information given to them. The specialist are those that in there area should know the area. This desperately between specialists and the rest is huge here.

**Interview 26 on 28 March 2012 – Consultant**

**Interview 27 on 4 April 2012 – Consultant**

Zlh is actually the company we were born from. They've been going for the last 25 years and in the last 5 years the company base split in 2 and we had a renaming about 2 years ago. The old Zlh now consists of Zaa engineering which is now next door to us and they focusing slightly different aspects projects to us and the remaining directors formed rlh. So its still the same core people just housed in 2 different companies. We work together on a project by project basis if we need each others skills. It had a lot to do with the type of direction certain directors were going in the business and the other director wanted to go in another direction. So we first worked together with zlh as a brand with 2 zlh beneath that. But then the direction split so much that we decided to create 2 completely independent companies. Thats how we became rlh, and the other is zaa and zlh has formly stopped trading.

I joined zlh 8-9 years ago as a director/ equal shareholder and basically when the company split I'm an equal director in this company and one of those zlh companies formed zaa.So at the moment we're four directors/shareholders and I'm one of the majority directors in rlh.
When that started up we were still zlh consulting engineers, 2 companies under zlh brand. Completed that project as zlh consulting, just a timing issue. The sedgefield tender was put out on a design and construct tender by ssi which I think was the sedgefield municipality and I tendered with the desal group grahamtek. They've also renamed. We went in with grahamtek for the intakes and collecting of brine and disposing of it. we were basically the designers of the project on the marine side and Allan of Southern Oceaneering was doing the marine installations. We basically worked as a team together on a design and construct tender basis. We won the tender and basically designed and installed the marine infrastructure.

We've been pursuing many projects over lst years especially in s.a. Sedge was the first to really come off. Because 1 the perception of desal vs. normal water. In the beginning there was massive confusion between state departments on whose responsibilities, what licence, with dwa and marine and coastal management being responsible for different licences. So there was a bit of confusion on the ultimate department to sign up on these. We've done a lot of conceptual work BUT EITHER THE FUNDING WASN'T AVAILABLE OR THE PROJECT GOT STALLED BY EIA PROCESSES THAT WAS JUST TAKING TOO LONG. So none of those actually went further into construction Sedgefield was the only one I was involved with Grahamtek and ALSO the only one where I was involved in the contracting team rather than just a pure design function. Although other desals from there on we’ve been the marine consultant on the client side providing the design for another independent contractor implement.

The difference in roles: basically the sedge tender went out as a functional tender. They gave us a plant location, a peak production capacity and an area in which the infra should be. They DID NOT SPECIFY WHAT THE INFRASTRUCTURE OR TYPE OF INTAKES OR DISCHARGES SHOULD BE OR SHOULD NOT BE. They didn't specify pump, pipe sizes, except that they wanted potable water at a max rate of 1.5ML per day. So it was a performance spec tender rather than a construction tender. the normal construction tender where you produce specifications and drawing that the tenderer needs to meet in order to base his construction methodology and price on. And it was done that way because of the lack of tim to get the infra in place. I think the tender came out in march pr april (2009) and we were appointed by June and the plant had to be operational by that dec. So there was no time to go through a tender process with consultants and follow that up with full design work and then go out to tender for contractors. SO IT WAS MORE A PERFORMANCE TENDER THAN A SPECIFICATION TENDER.

This case was very unusual. Its usually not that vague. If I take plett and mbay where we acted as the consultants. Mb was also fast tracked so also slightly different. But with plett, what we did was we did all the ground investigations before we went out to tender. then we designed, specified the pumps, pipe sizes everything and produced specification, book of drawings, formal tender doc and then for plett we approached 3 marine installers put those docs to them for pricing. All three come back with prices. you do evaluation based on cost, method, compliance with specs. then appoint dedicated contractor with fixed budget and timeline to implement a design spec. Whereas in sedge there was no design spec, just a water need. And ther I worked as the contractor and not the design engineer.

The normal way that things work especially in SA is the client will appoint an engineer who will do the design work and create sepcs , drawings and quantities. That will go out to contractors and the tenders specify what the returnable docs should be based on price, quality, specs, timing. Based on that it will come back to the consulting engineer.
who will go through all docs and make a recommendation the client who will appoint the contractor. But the consulting engineer will control the process. So the consultant becomes the quality manager to make sure everything gets implemented as designed. That's the more traditional role we play. But a lot of these things because they were fast tracked didn't follow that path.

SSI were the engineering company in all of the ones I was involved in. The first was Sedge where I directly worked for the contractor - Grahamtek - there was a contract between gtek and SSI on behalf of the muni. In the others I worked more as a traditional engineer where I worked as a sub consultant to SSI to help them with the design specs before we go out to tender.

The responsibilities in each case were similar but the parties I was responsible to were different. If you act as a consultant you're responsible to your client. If you act as a design consultant for a contractor your responsibility is to the contractor. What we've done is very similar, just who you enter into a contract to is very different.

The one was a performance tender and it wasn't prescriptive about how we get the water in and do with the brine as long as within environmentally acceptable norms. Which was part of the adjudication criteria - how, environmental and social impacts. That was SSI's call to differentiate the methods, prices, select on that basis, but one selection criteria. In other cases we designed the system to be compliant and got prices from marine contractors to install.

The reason for the approach in Sedge was pure timing. They were running very short of water so there was no time to go through a design process and then a tender process (note: but the design still had to happen after the tender, i.e. still time?). And the plant is fairly small. So the bigger the plant the more you very minor design aspects become. So cost and type of plant and running cost becomes a major factor. You would have to ask SSI why Sedge was put out like that. But I assume it was just the timing.

The EIA process I'm not a great guru in terms of EIAS. CapeEprac was the consultant for Sedge and I think Aurecon is the consultant for the others. I'm not sure in MB if that was a retrospective EIA because of the drought situation. There wasn't time to go through a fully complaint EIA before hand. So we had to present the info as become available, then after completion of construction the formal application goes in for a licence or for environmental permission. With the rider that if there's anything deemed unacceptable the client will remove the infra that doesn't comply in accordance with what they want to see. So the EIA was pretty much a parallel process to the design and installation.

Sedge was approved without any conditions (EIA). I think it was signed off. Pletts retrospective report is going in sometime next week (April 2012). I think they actually had a meeting about that yesterday. Amid MB I think the final documentation when tin also last week sometime. the final application and both of them has been constructed, commissioned, running for a couple of months. and the environmental permits will come after the evaluation of the final EIA that went in. If the application is not approved the client is under legal duty to remove, but again you take the dept through the process. In all of the cases you have a lot of part, maybe more than normal, to keep all the people involved. So if there is anything you're doing during the construction that is a major issue that it can be addressed during the process or during construction. So you're trying to mitigate the risk to the client of not having something that is unacceptable environmentally. And the type of infra that we put in and the brine is well known. there are specs you have to adhere to. If you adhere to the specs there's no reason why you should not get authorisation. So the risk is pretty low. And unfortunately the clients are also slapped by a fine by doing this because obviously the dept doesn't want everybody
to do their EIAs retrospectively. But in this case because of the drought situation it was accepted that that's the only way it's going to work.

In this case implementation happened before we had the permission to do what we did. (how legit?) The whole process you go through as far as I know is the same process that you do when you do a normal EIA. No difference in process, pp, experts, the entire EIA gets done. It just gets submitted after construction is completed. And the client does have the negative of a penalty and the risk, if the EIA, there's no more onus on the state to approve the EIA because its already been built. So if the state says no, the onus is on the client to remove the construction. So it is at a much bigger risk to the person implementing or building and if there's not a good reason for doing it that way you'll also get stopped before construction. There's not a.. if there's not really a valid reason, you won't be able to do it the other way round.

(Why in these cases was it permitted?) Basically pp before we started construction we had in all of them public open days before anybody got on site, to say this is what we do, this is the reason we are building it this way. This is what we perceive the impacts can be. Specialist studies will follow and there's an undertaking to remove if it's found to be unacceptable. And it also gives you a lot of input into design. Some of the things you can deal with through design changes and other things is just purely emotional. So luckily in terms of these type of things the rules are pretty strict in terms of spec standards. so visual impact is something you have to deal with. But things like brine dispersion there's certain licences that are ongoing through the operation of the plant and your design has to conform to the standards or else you'll never get the licence. So ja there are initially better position through the process and all of them we didn't have forums. all people involved would sit around a table for a day and people could go around and talk and all their comments got integrated which we found worked quite well. certainly in sedge and mb that's what's been done.

Even during MB construction we had inspections from the green scorpions to make sure we were sticking to what we said we would do in the emergency application and Patrick was the controller of all those docs.

For Mb and Sedge it came down to a risk of no water in taps if the plant is not running by a certain time. It got to a real emergency in terms of social implications. Hence the applications (EIA) went in as emergency applications. Where they made use of the retrospective clause. but again talk to patrick and them.

When we were brought in the decision was already taken to go with desal and the retro applications were already lodged even though the designs weren't done yet. Basically informing the dept that the applications would have to be done retro because of the situation.

The zone was declared a disaster zone so already they created a precedent that it was a disaster zone. If that wasn't the case I don’t think it would have been accepted to do the retro application otherwise it would be stopped.

(involved in establishing extent of crisis?)
No that was purely ssi. They did the risk assessment on various technologies. So ssi was solely responsible for the entire water resource investigation and then under that management. We were specialist consultants for the marine side of these things and nothing else. the only decisions we had to make was how to get water into the plant and
take it away.

(problems?)
In MB I don’t know too much, with the plant commission I wasn’t there. don’t know exactly what’s going on. Please talk to Ssi about that. In Sedge our initial discharge designs didn’t work well and we changed that over. And we’ve had some minor issues with the pump supplies but it might be because of the pumps being delivered in a hurry that some of the motors were substandard. We had a few burnt out motors. But it’s been replaced. For the rest, no real or major issues. A little bit mechanical but that’s normal for this kind of stuff.

(detail?)
The discharge, what we had with the discharge, we wanted to downhold the discharge in Sedge in particular and to avoid, to get an open ocean discharge out because of the shallowness of the area was very very difficult. So we tried to have borehole basically discharges down boreholes in the sand and those unfortunately got blocked. It was a little of a communication problem probably between us and GTek that their discharge protocol into our lines weren’t quite right. So they allowed air to come down the pipelines and a lot of air were discharged with the brine itself. Which makes all the pipes negatively buoyant and makes the whole thing works itself out the sand. The interface wasn’t very well defined and I think that was more about the speed at which it needed to happen, so we didn’t really specify exactly what quality of water, with what air we wanted to receive from them and they didn’t understand the implication of what they’re doing on our side of things. So its basically just a lesson learnt that you need to actually specify or understand what you getting at the interface and what the implication is if you don’t get what you need at the interface. It wasn’t designed to have any air into the pipelines, which I knew and we basically put in air release and valves on our drawings and when they implemented it they didn’t put in those valves because they didn’t understand why they were there. So it was more a communication problem than anything else and the result is that the wells blow out. (current situation?)
What we’ve done is just basically put in a shallow water diffuser just below the low water mark so it was the only alternative. So we’ve replaced the original system with a little bit more robust system that can handle air and all that stuff without having a problem.
(You said in your design you put in an air..?)
An air escape valve so it can escape before it goes down the pipeline. Yes, again it was the safer option to do what we did the second time around. It was less chance of having the operator put air into the line. So we decided not to go back to the original idea because we were also aware that Gtek is going to ram this thing for 3-4 months, not sure of the contract, and thereafter the muni would run it. So we wanted a more failsafe system. That if somebody makes a mistake it won’t lead to failure. Hence we changed the system to something a little more robust.
(What I’ve seen in Sedge is a pipe on the beach and that’s the outlet?)
Yes, Ssi subsequently did that. I don’t know exactly why, I mean we gave them alternatives. Ja, then we just got an email that they going to change it to that. Speak to them why they did that. The second option was implemented. it worked well. The problem we had was that sometimes the beach is so dynamic the discharge would be on dry land and they felt there was a risk that somebody can.. that it fluidises the sand.
around the discharge (it creates a quicksand effect?) a quicksand but there's so much water coming up you can't really sink into it. But the muni felt that was undue risk and I think that's why they went back to the system they've got now.

(Did fast tracking influence the designs provided?)
Yes, it had a huge influence on the designs. It was basically the only thing that you could do in the time period we had available. If we had time and little more budget we would have taken the diffusers further offshore. And also weighed down the intakes quite a bit heavier. Because again with the intakes 2 of the 5 started rising out and we can still NOT UNDERSTAND HOW THAT IS POSSIBLE. So but they being reset now, but.

(Yes, when I was in Sedge Alan (SO) were busy with those pipes)
We couldn't understand. The only thing we can think is that the non return valves on the pumps itself failed and again it got air in the line and the lines become positively buoyant and flat so every high tide it tends to pull itself up. But the pumps went back to the manufacturer. I haven't had any feedback whether the (?) is still working or whether that was the cause or not

(What would be the solution?)
The solution for the intake pipes is just to weigh everything down so that even if there's air in the lines its negatively buoyant. So it doesn't want to rise it will go deeper rather than come up

(I've also seen they're drilling boreholes in the parking lot)
Ja, what they want to do, probably got to do more with the quality of the pumps in Sedge we've lost. We had 2 shorts and 2 burnouts on the motors and its everytime a huge impact to go and dig the whole to get the pump on the beach. So what they want to do is deep drill boreholes next to the plant and extract from there. But they first need to drill the holes and do the tests to make sure there's proper connectivity to the sea to make that work. So that's why they're drilling at the moment to see if there is a possibility to extract water in that way.

(Why is there a problem with the pumps?)
We don't know. We've had problems with the same supplier with those type of pumps. We had trouble in Plett now, Sedge we've had a few burn out and ja the pump goes back to the manufacturer and they haven't really told us why. It's the first time we've used them. But they are the only guys that I can get those pumps in SA from. Grindfast, they are just big German company. They do specialise in these borehole pumps and its not the pumps that are the problem. Its the motors that are the problem. So we don't know. We sent them back, we want to know what's going on but we haven't had a straight answer from them, so..

(Was this the first time that your company was involved in the design for a component for a desal plant?)
Yes it's the first one in SA. We've done really big power stations in Malaysia and stuff like that but I mean the engineering is just a complete different scale, its not the same type of system. It just doesn't work the same. You design for what you know about the natural environment. But in any location you've only got so much data and if you have to implement in a very short time span then you've got to deal with what you've got. So its not the ideal situation but that was the situation we were presented with.

(At an earlier stage you spoke about with gtek previously?)
Yes it was just conceptual. The stuff we did then was following the traditional approach. Its big developments its planned 5 years from now. You go and do depth and sediment surveys and do the EIA application as you should and the whole implementation plan is a 5 year plan. So it was very different to rushing, to get something going so you can get fresh water.
(So ordinarily where its not fast tracked the process takes a few years?)
depends on the size. I would say MB could have taken up to 2 years longer. Its all about
the size of the system. Even the ones we've done the normal way, for blyde dale we did
actually get the ROD. So it wasn't that we took short cuts. You have to design
responsibly. the blydedale construction is not going ahead because of financial issues.
I think it's a lot to do with the sliding scale used by munis to sell water. Yesterday
sitting in the environmental meeting in Plett. The council is quite happy with their desal
plant and they plan to run it 7 months out of the year. And we asked them what about
the cost of electricity and they're saying they're getting more for the water than the input
costs. So I think thats a perception. yes there are cheaper supplies but especially that
area surface water is pretty much done and gwater is being developed but not that much
and desal is the failsafe option. In all cases I know these plants are designed to run in off
peak time.
In MB I've heard rumours they are going to mothball for a few years. You would have
to ask. From the marine side the procedure is to remove all the intake towers, seal off
the pipeline, give a high dose of chlorine to shock dose all the marine growth potential
within the lines and then the lines just get sealed off. So they're left there with
chlorinated water and everything opened to the ocean gets closed off. The valves to the
pumps get closed off, and they can take the pumps out if they want to.
I think there wasn't any other option at the time they made the decision to go for desal.
They run out of options already. Again speak to ssi about it. But in the first year of the
drought everybody said don't worry it will rain again. we can go on for another few
months.In MB when we got appointed we had less than 5 months worth of supply left in
the dam. So there was no other way to get water in sufficient quantity to the people. I
don't think they had any other option. In Sedge they trucked in water and that is just
weigh too expensive.
SSI have got the records of the plants that are running. We've got quotes of such a wide
range of consumption. SSI have got the data, though I've never seen the data. SSI will
atleast give you a range and there's different technologies in each of these sites so it will
give you ideas of running costs kl per kwh. We are purely on the marine side, the inlet
and outlet. We had nothing to do with the filtration systems and energy recovery unit.
But there are ranges.

Its been a quick learning curve but its been good. The smaller systems I think needs a
bit more thinking. How to do a smaller plant with smaller costs. To give you a
comparison MB for the inlet and outlet structures we ended up at R48m for 15ML.
Sedge we costed R1.5m for 1.5ML. If we had to do it to the same robustness as the MB
plant we would have been looking at between R15-R20m. The amount is so small but
you still need the vessels, the divers. If you want to do it conventional marine, safe as
houses type. But for a very robust design you pay for the vessels, divers, but the small
plants can't afford that. Its basically money versus risk. With a larger plant you need to
make the intakes.. All of this we've done in agreement with the client on what risks we
are taking on intakes and discharges and if they want a zero risk approach they need to
find the budget to pay for the zero risk approach. Very often its better to design it
slightly lighter and replace again then paying 10times more money once off when you
dont have the budget for it. So yeah there are different things but small plants are
difficult to make work.

(so there was an awareness of the risks?)
Yes the risks were discussed, also with the public during the eia process.
Gtek - I will email you the guy I usually deal with. His working with Nuwater in Cape Town. But basically a subsidiary of Gtek. Have you spoken to Alan of SO? And M&R were our marine contractors in MB - (contacts SO, GT, M&R). I'll email those to you.

Interview 28 on 16 April 2012 – Interested & Affected Party

I've been holidaying in sedge since 1992, coming down here 3 weeks a year. Then in early 2004 I moved down here and started my own consulting engineering form. When I worked in CT my work revolved around water. I come from a stormwater and water supply background. When I came down here in 2004 I attended a meetign which is called the Wilderness Lakes Catchment Forum. Now the aim of the the forum is to as a non municipal bidy to look after the water supply of Sedge. And as time went by I've also been involved in the Knysna forum. And at the moment I am chairman of the WLWF. In times of drought or flood the forum is very important and people attend. But when all is goin well like now we've got ample water suply and there's no floods people tend to lose interest. For quite a long tiem the Forum would also look at new developments in the area. For larger developments the WLWF would normally object on the basis there's not enough water supply. but the reason is really that the people dont want further development. So they use water supply as a way of fighting against development

The history of the towns water supply is that the WTW was built in about 1986. I'm unsure of the exact date. The person with the date would be Jules Hartslief. His the kingpin of Sedge water supply. He came here as a junior in his late 20s put in charge of the sedge water treatment works and he would go out there and he would dose the water and so forth. And as time went by he ended up beign essentially manager. He knows the water systems inside out. At the time of the flood in 2007 he was at his computer establishing that the WTW would be flooded, determingnin what to do. His the guy who knows the most about the Sedge water supply situation. Up until 1986 I think they had a small WTW and most of the people would get there water from spikes, essentially a small borehole. You would get your shower water from it and possibly drink it as well. Historically there was many boreholes. After the upgrade of the WTW in 1986 there was a water pipe in town and you could just connect and get shower and drinking water. The water quality has been quite good. People might argue its necessary to buy bottled water. i dont agree with those people.

Before 2004 there were 2 boreholes in town used to top up the water supply from the Karatara River which is about 8km as the crow flies from where we sit. When the river goes very low the water quality decreases. Theres an issue that the water from the downstream Swartvlei will creep upstream into the pool from where they take the water out and the Swartvlei water is Brak water. And the WTW is not capable of treating Brak water. So there is now a project under way to install a wier in the Karatara River. And that wier is not to store water. that wier is to stop water from the downstream flowing into the pool. But when the water stops flowing they've also got 2 boreholes in town. those boreholes are pumped directly into the reservoir. Ther's a little bit of dosing of chemicals that goes into it but not much. I'm not quite sure of the exact date of the drought. The water from trucked in from the Wilderness WTW. The water was extremely expensive. The cost to the muni was about R7,50 per cubic meter. I dont know the data but they were selling it in the order of R1.47 per cubic meter. I felt at the time that if the water is costing the muni R7.50 a cubic meter they should be charging the consumer R7.5 per cubic meter. Rather than saying not we not goign to charge for it but at the end of the day the rates and taxes pay for it. So the ratepayers are paying for
it. So whereas consumers pay the price of R1.47, its costing the muni R7.50. SO if they charged R7.50 then people would be saying, 'oh you've messed up', so they probably kept it low. But th ratepayers were paying for it in any case.

There were trucks coming past this office evry 15 minutes. So it was very obvious what was happening. But the pure facts of the cost was known by a few of the informed people but not by everybody. They never actively tried to hide the problem. They never hid it but they'd rather charge people the normal cost of water than recover it through the rates and taxes.

Then the drought came. There was huge panic and they got emergency funding. What I think is that the Dept of Water Affairs wanted to have a pilot desalination study. So they dept sponsored the cost of the desal plant. Rodney Nay will probably have more info on that. But the muni had to pay for the pipework to the reservoir. The pipework was done in the rush and the contractor never did a good job. In fact I heard that the last pipe burst. in fact I heard that the anchor blocks -blocks of the concrete that support the pipe, that bends - The pipe was done in a rush and not done properly. By the time they got the desal plant operatin the water crisis was over. So my take was that the rush was more to spend the emergency money then.. Because you cant spend emergency money slowly. If its an emergency you eed it quickly. To justify emergency money you have to do it quickly. So you have to do it quickly knowing that the water will probably down the river in time in any case

(can you say a bit more about that. That’ what I’m trying to establish. The actual extent of the crisis. You're suggesting that by the time the plant was constructed the crisis had past)

Iwould verify what I'm saying by establishing when the trucking in of water stopped and when the desalination plant started producing water. So that is the way that I would. You would see is the emergency over. Say a month before there was enough water in the treatment works, you couldn't say if there was going to be water in time, so you had to.. so you must now put some boreholes in. You dont how long you're going to wait. If you looked at the rainfall cycles, but you cannot rely on that. So I'm sayign that the crisis was over when the finished the desal plant. I dont know if the crisis was over when they started it.

(ok, that would then have to be verified by looking at when they started)

Yes, when was the plant delivered to site. The pant wasn't made in sedge it came from somewhere else ok. Then the next question would be asked, 'was the plant ordered before the drought was over'. I think the plant was ordered before the water was trucked in. You would have to look at the TIMELINE of the decision to order the plant, The ACTUAL order of the plant, The actual Supply date of the plant, when the plant supplied water, when the plant had problems. At the moment the plant can supply water but theres problems with the outlet. Theres a problem of seawater pumped out from the sand, about 40% - and the number Rodney nay will know and Calvin Jephta will also know. Calvin's the new Jules (laughs), there's a guy Andre Petersen who's area manager (looks for contact details). he wasn't here at the time of the drought. But his now the area manager . Calvin grew up, his dad was an operator at the WTW, Calvin is now in charge of the Water supply and sanitation of sedge - Ok we spoke about timelines. I think water affairs wanted to have a pilot plant. They wanted to check the gains and used sedge as a town to try it out
Desal plants, we heard about them for a hellava long time. What we knew about them was they very expensive per cubic meter of water. So a place like Kuwait, with oil money, its probably justified. Our costs per cubic meter of water for the desal plant is still very high. However it is claimed it is a cheaper source of water. I think why that is is because it is only used as a top up water suply for about 5 weeks a year in december. And if you had an upgrade to say the Hoogekraal, you might find that your cost per cubic meter is quite cheaper but your capital cost is more expensive. So they think its cheaper to have lower capital costs and high costs per cubic meter, but only for a month. So say if Sedge's water supply is 2500l a day over the peak season, whereas its only up 1500 the rest of the year. So you only need 1000l in the peak season but only for 5 weeks.

The dam was discussed but when the tenders came in it was about twice the estimated price and they just never had enough money. It was scrapped because the amount of money allocated to the project far exceeded the amount available.

Many people in Sedge have there own boreholes they use for watering the garden etc. I don’t know if they use it for drinking water. After the drought they did put in 8 boreholes on the cliffside behind us. The boreholes are operated in dec only. If the river runs dry then the cheaper source of water would be the boreholes before the desal. The desal plant was built in a rush. And the pipes from the outlet works were washed down the beach late last year. So the whole thing failed. And they still haven't solved how to get rid of the brine. You know people talk of having a pipeline out to sea. There's no protected bay so the sand moves a lot.So any pipeline they build would have to be extremely flexible. The beach profiel changes tremendously.

(minutes of the wlwf)

There were floods here in August 2007 and the catchment management forum became more concerned about floods than droughts. And all the talk was about alleviating flood and no talk about supply. When the drought came about it was almost as though the forum was caught unawares I felt. You might speak to a guy Mike YOung - his a bit of a politician or atleast he has a political side to him.

(Nb to get docs and minutes from Alistair that was lost on the flash..)

Chairmans: Alistair, Mike, Ray Barrell (2007-2009), Dave Jones (also a reporter)

(you mentioned that your feelign that when the drought hit, many members were taken by surprise. Could you say more?)

It wasn't highlighted in the press. It wasn't an issue until it ran out. I don't recall. There was a group called the flood action group. And there was some silly plans about making the perdespruit a big river channel you'd deal with flood. So the focus was more on flood.

Factors that lead to the flood was an extraordinary amount of rainfall. There were floods here in 1996, 2003, 2006, 2007. The latter two flooded houses. If the water level in the estuary, if the river mouth closes, water builds up in the estuary and the water level is higher, higher, higher. The parks board for the sake of the river say you musn't artificially open the mouth. However if you happen to open the mouth before the flood comes you've got a better hance of not being flooded. So if to stop being flooded, open the mouth before the excess water comes. And then when these excess waters arrived, if you take 100% of the floodwaters coming down - flood lasting 36 hours - of 20% of it could be stored between the lowest level of the vlei - the level of the vlei is never less than sealevel. lets say if the parks borad want to open the river mouth at 1.7m above
mean sea level and the sealevel is 0.7m above mean sea level; you've got that meter of depth like a buffer volume. That may just be 20% of the floodwaters coming down. But as a buffer volume, before you cause damage. The water can't go out the mouth. You want that to be a buffer volume. (????????). It takes about a day or two for the level of the vlei to get to the level of the sea, so you have to make decisions before the anticipated floodwaters. Allowing enough time for the water to reach equilibrium after the mouth has been opened, before the floodwaters come. It doesn't mean that if the mouth had been opened 4 days before the flood than the houses wouldn't have been flooded. They may still have been flooded because of the narrow opening to the sea, acting as a throttle. So its hard to prove that with the mouth open the flood would have been prevented. But you would have different chances. (In the case of the drought how would you assess that? The decisions taken historically that lead up to the point?) I don't know enough about that. But if there's a drought and the taps dry up, something went wrong. But you can find that if there's no problem, people get complacent. If there's no problem, they don't spend money they won't get return on. There's a lot of complacency. (Flood relief funding used consequently for the drought. Wondering what the implications of not upgrading the wtw prior to the drought and also what would have been the implications of raising the weir earlier?) The WTW have since been upgraded, to get pumps for example above the flood level. There was an upgrade to the WTW I think about 1 year ago (2011). It didn't increase the capacity, it was just an upgrade. I don't know, if the river level was low. I don't think the wtw would make a difference at all... Now there is a plan to put a weir across the river. But that weir is not to store water. The reason for that weir is that in Nov-Dec 2011 they opened the river mouth because the water level was getting to a height where it was going to push back water into the pool of water. So to stop the downstream water from contaminating the upstream water they opened the river mouth. So the weir is to stop that happening. If we had a weir at the time of the drought it would have made no difference to the drought at all. What you could do is build a weir to height of about 4m above sea level. that would store a much a far bigger pool of water. But if you did that you would cause houses to be flooded. So those people would object to you making that area into a dam because they would get flooded. (necessity of desal, given the 8 boreholes?) [the muni would have more info on water consumption] [proceeds to look for minutes of meetings and then supporting documents] You should speak to Richard Batson. He has got a huge following in this town and people think he really knows what his talking about and they're quite passionate. About the fact that the (?) causes flooding. He in fact went on his own bat and took away stones around the railway line bridge because he thought it was a good idea. Imagine taking away safety. They even put it in the paper that they had done that. they called it the rock party. Him and Nick Sweet and Terrence Cockroft. And that was done to say really up yours to the parks board to say we think you causing the flooding. His been taken to court for this and he was told it was an illegal action, but he believes he was right so his appealing it. Parks board, Ian Russell and Rod Randall. They know a lot about the vlei but are probably reluctant to say too much because of the followers of Batson. Also they are held back from saying too much because of the corporate rules. whereas the retired people can write to the paper and say what they want.

DWA haven't been very involved in this area.
I was left wondering.

I think Calvin Jeptha would have that. He would know about the yields of the boreholes.

Here we go [shows document, minutes of lakes forum]

(I wanted to ask about your open of the need for desal given that the boreholes may supply)

A lot of Sedge could put in a spike for a few Rk and they could use it for washing their cars, that sort of thing. then you would probably find a cheaper alternative than the desal.

(Why do you think they went ahead with the desal?)

Because they were given the desal plant for FREE from the DWA, with Sedge as a 'Test town'. The wanted to find out the problems with it so they gave it for free. So that’s why they took it. (Source?) This stuff mainly comes from WLWF meetings and you also get a bit of a response from the RPVA. In fact another contact from the Sedge RPVA is Marten Taal and his got quite the same viewpoint.

(public part and the EIA process?)

The desal and boreholes were put in as emergency measures so there was no EIA done. The EIA was done after the fact, I think they call a section g application. The EIA Process, public part and so forth. It might have happened but never seemed a huge affair. Because the desal was already there. It almost, i think it was reasonably unnoticed. I dont know if its complete or not. There's a lot of thought that it would be better tp put it in Gericke's Point because its more protected.

Do you think things were rushed?

Yes, very much. Emergencey money has to be spent fast, because its emergency money.

I don’t think these guys have a terrific amount of influence. I think it was more a case of rather have them in instead of out. But I think it was more a public relation exercise

(Role of water forum. What is the mandate?)

The mandate is to look after the water supply of the area. Which in this case would be Wilderness and Sedge area. But the Wildeness area is absolutely inactive in the area.

We are there look after water quality and water volume. Knysna's forum is also very involved now in looking at water quality. Their WWTW discharges into the estuary, their town discharges stormwater into the estuaty. Transofrming pollution into estuary. Also the IS has improper sanitation, so the first bit contains a lot of ecoli coming down. Sedge doesn't have a water quality problem in that there were only 3 pipelines from the town into the lagoon and almost go through a reed bed. So we dont have rubbish transferred into the lagoon. Also in Knysna some places the sewage is connected to the stormwater system so you get sewage in the stormwater system. So they've got a problem whihc can be fixed, but its quite a procedure.

(Involvement of forum in relation to S&S. Participation)

No participation at all. Every now and again you get a person or group coming in maybe for a meeting. They maybe last one meeting. Its typically.. The forum is very pae ok.

And the people we would bring in is typically a person who is is.. Within the DA ok. So ja, there interest is more is the water flowing out the tap. If you go into Smutsville and you look around, people might be supplied with a toilet and pipe. Thye dont have knowledge as to how to fix the leaking tap. So you'll have a leaking tap, blocked toilet. A lot is in a bad state of repair. So as far as the Forum goes they're not involved at all.
May 3 of the 30 I've been to they had rep of those communities.

I think, I think a lot of the people there don't have transport. Secondly are they going to make a difference. There's a huge amount of latent racism around ok. Probably on both sides. And are they taken seriously at these meetings. As a very generalisation statement, there are different needs and the one group doesn't understand the needs of the other. They probably find they go there and people become patronising.

(can you say a bit more about the different needs?)
I can't speak for what the needs of Smutsville are. From my perception, it's that the community has many needs, one of which is water supply and another is to get the sewage away and live in a healthy community. Now a lot of the people in the pre 1994 sedgefield, the white communities. They have water supply, sewage, means to fix their toilets. So their on site water supply and sanitation they can sort out. Whereas people in Smutsville I'm presuming are more concerned about their on site water supply and sanitation. The people in the pre 94 areas are retired and like to come and have themselves heard. Also I would presume the Smutsville people would be very keen on development as an employment creator. Whereas for the retired people they are against development.

(have any of the S&S needs been actively addressed within the forum?)
No, not that I've known of.
The forum has been more of a monitoring organisation of what DWA is doing. The muni and DWA come to the forum and tell us what they doing. As the forums got smaller in numbers, more technical than political the muni has started sharing more info in a matter of fact way. They've changed from a lobby group to sharing info and monitoring. They haven't been very effective in changing what the town is doing. But if you took it away you take away a watchdog element. But they haven't directly influenced any decisions.
I think in a DA controlled muni they are very effective because the RPVA were criticised for being a branch of the DA. If you look at their membership composition then you could say that they look that way. They are not a branch of the DA. But their members socialise with the DA councillors and their members, there is pressure from the RPVA during times of a DA controlled council. In times of the ANC they have influence but are less effective.

**Interview 29, 30 & 31 on 17 April 2012 – Municipal Staff**

A Calvin I think you can go ahead on your background and experience
I'm CJ I'm working for the muni for almost 25 years. I'm the superintendent here. I worked under Jules and now under Andre. I look at the water and sewage and also the reticulation. The outstation also, the farmers and

C Ruigtvlei.
Yes we've got the maps
My background is that I've been employed by Knysna since 2007 as area manager for Belevedere, which does not include Sedge. But since Jan this year I'm also managing this area. Since Jules has left there's a gap. So I'm

A temporarily filling this gap. As I say most of the questions will be fielded by
these 2 gentleman.

(begin with a context)
Very very briefly, Sedge in all these years before my time in '82 was reliant on the one river. The Karatara River. As our only water supply for the town. And in the holiday little town started growing rapidly, and before we could say Jack Robinson we were in a position like they've got in the UK right now - I was watching the TV last night that a couple of droght seasons, following one after the other. And it was around december 2008 when this real hard hard drought hit us and our river just packed up. Absolutely no flow in the river and you know they introduced these crisis measures of startign to transport water by truck from George Municipality and for something like 3-4 weeks, 24/7 we halled potable water into our reservoirs. We also introduced severe water restrictions. Similarly to the UK right no. Also the council didn't have the funds. It was by council resolution that the area was declared a disaster area and disaster funding from government became available and 2 projects was launched immediately. First of all the possibility of sinking boreholes was investigated. We knew at the time that we've got plenty of underground water in Sedge is situated on one of the most prominent frshwater aquifers in the country. Its called a primary aquifer. In other words the water's not bound up in quart or rock, it just sits in the sand. If you look at the hydrological map you'll see it stands as one of the most prominent aquifers in the country. So we were sitting in 2 positions. We could sink a few boreholes and extract as much water as we want to on the one hand. On the other hand you had the environemtalists very much against us extracting too much water from the aquifer. All sorts of fears it could affect the Groenvlei. 2 cut a long story short we went ahead with sinking 6boreholes. the boreholes gaev us very good water. And it allowed us to extract around 1.5ml per day whihc was our daily demand with the sever water restrictions in place. Simultaneously we were looking at the establishment of a desalinator. Because of a lack of time we couldn't go through a whole procurement process, because of the time constraint. We had a deadline. The possible suppliers were given the instruction, 'whatever you can do we need that plant running by the 18th december of that year'. That only left us with 8-9 weeks to get such a thing. One of the manufacturers, then known as Gtech came to the table and said they could deliver such a plant to us and they ahve it up and running by the 18th dec. So without giving too much history of the procurement issues, and people accusing us of not following the proper procedures. this supplier was given the go ahead to put that lant together. This company is based in Somerset West and they built manufactured the plant and put them in two containers and trucked them to Sedge in record time. It was offloaded at the Myoli Beach site on 18th december. I think it was the 19th-20th we got the plant running. And Sedge's water problems - we had a few logistic problems - but the water problems have been solved. We had fresh water by the tpuch of a button. By pressing a key on your computer in your office we could start the plant and produce 1.5MI per day. We've also got the boreholes. In the meantime the water treatment plant was renovatet, it wasn't upgraded, at a cost of about R4.5m. But it was also downscaled. We decided we wouldn't use the full capacity of the plant of 4 ML per day. We would scale the plant down to 1.5MI per day in order to produce better quality water. Also not to drain the water, so as to not drain the
environemtn. So the plant was scaled down and the production was at 1.5ML per day. And should that amount be exceeded, at the moment we've still got the water restrictions in place as far as I know. Should the river be able to cope - which is also a cheaper so - we would also fall back on the boreholes. Whihc could be activated from the laptop. And should that not be enough we could as a last result kick up the more expensive desal plant or the more expensive water.

Approximately, we've had a couple of drawbacks with the logistic problems with the design and extractign the water from the beach. 6 beach wells were sunk on the beach. 6 vertical pipes, like a conventional borehole, and set about 1.5m under sand. covered up with no environmental impact. Unfortunately they lasted 1.5-2 years when after a huge storm the tops of these pipes started to get exposed by wave action. And we were facing another crisis now. What to do now. At the moment its not completely solved. We are now in the meantime appointed consultants to relocate 3 boreholes for us closer to the plant in a safe area. Not on the beach but just North of the beach by Myoli. 3 new boreholes were sunk and water sent away for testing. I belive from the consultant that its quite good quality water. bearing in mind we were looking for beach water not seawater. You can't run a plant on freshwater, its not designed for it. Thats one thing you'll find in your research on desal, the plant is size specifically designed for the specific environemnt salinity of water, temperature of the water. The colder the water the better your production and ven as little as 1deg celcius can make a big difference. Thats something I also picked up in my studying of this. 

YOu can't just say I want a desal plant, take this one and go put it there. Its not goign to work. So ja, at the moment its still running. There's a few snags you know. Its been 2 years in the making theeres a couple of snags here and there but it is functionning and its ready to go whenever we want it. I dont know maybe Calvin can fill you in on whats happening with the new boreholes I dont think they've been hooked up yet. [not yet]. At the moment we're still utilising 2 or 3 of the existing boreholes thats still survived the onslaught of the sea. And at the moment obviously cant run the plant at full production. So what we do just to keep it ticking over, is try to run the plant once a week just to keep your motors and pumps ticking over. Or it freeze up on you and thats bsically where we are at now. There was no need since the drought to really on the plant as pur only source. Fortunately the river has kept up and ... But like I said its a consolation, you sleep easy at night. Knowing that if something happens tomorrow you can just press a button you know. Provided that ofcourse this borehole problem is sorted out in the mean time.

(You said 2 projects were launched immediately, boreholes and desal - Lin Archer walks in - what I've been trying to undrstand is how desal became such a prominent solution so quickly. Because the boreholes yield 1.5ML) You see with the boreholes, although we know the yield is 1.5ML, we couldn't guarantee it. It’s the first time in Sedgefield that such a large quantity of water was extracted and we couldn't rely on those boreholes to give us 1.5ML for 18 monhts for instance. and also the environemnt wouldn't allow it. Water affairs for instance restricted to the use we rely require and not to exploit the aquifer to its fullest potential and 18 monhts from now we now discover we're pumping seawater. So this was an interim first backup, cheaper than the desal. The desal you've got unlimited supply of water, its slightly more expensive but you could
run a plant and it wont impact on the environemnt. Whareas you could easily
overexploit your boreholes. Whihc we didn't want to do given that Sedge is one
of the most prominent aquifers in the country

(You also have the Hoogekraal River, why the choice not made to make the
pipeline permanent. If you make the cost comparison it seems it would be
geraper)
At the time it was envisaged to do that. We looked at the pros and cons of
doing that. Remember that water also ends up in the Swartvlei and again you
didn't want to overexploit that. The pipeline is still there. It was just felt at that
time that there was no real dire need for that water at the time. We were also
looking at building dam. Plans were very far advanced in building a 400 000
cubic meter dam but that also fell through because of all kinds of capital wants.
Capital was something ridiculous like R40-50 to build a dam adn you were still
relying on the river, and off channel dam to fill the dam. So the general
consensus was why risk all that money and you end up in a dorught and you
can't fill the dam. So compared to R16m for a desal, compared to a R40m dam.
The idea was to let that water from the Hoogekraaal to the existing wtw via
pipeline and all sorts of fany electronics. To first exploit the Karatara river
whihc is a much smaller river and not a perenial, it dries up regularly. Whereas
the Hoogekraal even in the driest of periods still had some flow of water. But
the environmentalists you know were not in favor of us tapping all the water
from the rivers, leaving the swartvlei devoid of freshwater. The Environmental
Reserve was more a stipulation as wasn't 'our' water. You know you cant
satisfy the town and let the environment go down the drain. So we need that
water for the environemnt. And it was just thought at the time, you've got a
pipe, should we run into a crisis again it could easily be used again without
investing huge sums of money infrastructure because its going to sit there for
maybe the next 5 - 6 years and never be used again and you've got to pay
eskom for the power and all those things. Like I said, everybody was coming
up with ideas, we need water now, there's no water in the taps you know. You
get water wherever you can under emergency regulation, We didn't even do an
eia or anything. There was one done for the dam and we used part of that to
get this emergency water. But I like I said the intention was never to use it on
a permanent basis. Maybe in 10-20 years, who know how sedge is going to
grow, then we'd look at making it more permanent.
(from what I've been told in other interviews, the dam in sedge was the main
option being considered, then it was turned down because of the cost
implications..)
Yes, huge cost implications and also with meetings we had with water affairs
we could sort of read between the lines that that was not their first choice> they
said desal. they said 'look you've got the sea. Use the sea, less of an
environemntal impact. use that.
Il the options were discussed, water affairs at the time was very adamant,
saying 'we'll back you up with a desal plant', but were not very much in favor
of going to build a 400000cubic meter dam in one of the most pristine areas in
the garden route.
(What about the possibility of building something smaller, something smaller
than the dam proposed?)
Apart from regularly upgrading our reservoir capacity we've got 3 reservoirs in town, one 4ml, one 2.5ml, one 1.5ml. And that gives us enough storage under these restriction conditions to have enough water for about 4 days. And if we run into problems we just press a button for the desal.

(Yes but what I'm trying to get at is that historically before the drought, given that you knew potential risk of water shortage as the town was growing, was there no other storage considered?)

You must remember that at the time we built the first reservoirs Sedge was a one horse town. When I came here I knew all the people in town and the money was scarce. It was thought the river supplies us with enough water so why go and build a dam. When I came here we had one 1.5ml reservoir and eventually council built and second and then third reservoir. And that relieved the pressure for us. So I think that should something like that happen in the future we'll more than likely build another reservoir. Its on the cards, its on Andre's long term.

The site of the existing reservoir was actually selected for two reservoirs, and it's very much cheaper. You looking at R4-6m for a reservoir as opposed to R40m for a dam

(Yes, Exactly, that's what I'm asking why was a reservoir as opposed to a dam not discussed. Because I don't think it ever went beyond a few weeks of bringing water in from George. And I don't think the boreholes were used very much. And in fact the river did come to provide as even the deal was not really used. So the river did come to provide, so you had a few weeks when they was in fact a real crisis. So there is a question why a smaller amount was not invested in the past to prevent the situation which arose in December 2008 -->

There was also another aspect to these things. Water affairs had also looked at our raw water storage capacity and they got a magic figure of I think 6 months. You have to have 6 months storage capacity. And none of Knysna, talking about greater Knysna, there's no such storage. And with them not giving us the dam. And to put that into perspective, Knysna has been asking for a dam for quite a long time. And I think it was the previous 3 water affairs ministers all said 'no'. So we still investigating a dam for Knysna but its always been 'no'. So its only recently that they looking at approving a dam but its also off-channel

A

You see, Knysna is a considered a class 1 lagoon, the most pristine lagoon in SA. That's why they've also got a desal there now. Because the water is available.

J

(In the case of the Knysna desal there's problems with the quality of the water?)

It has operated, there was some. The same as sedge, at the moment its in preserve mode. But we've also operated it just to keep it ticking over.

(I've done interviews with people involved with the construction, and from what I understand the desal plant has been problematic from the beginning)

It has been. I mean the quality of the water is very much worse than ours. I mean we're taking pristine water from the sea, running through large natural sand filters. The water came out into the plant like crystal clear water. Whereas they were drawing water from the lagoon. Unfortunately they didn't have the luxury of putting a plant on the beach, because there is no beach there basically. That's why its more problematic. But if you've got no water its better than nothing. Rather have dirty water which goes through the purification process first and then into the desal plant. Basically they're using ferrichloride to flog the water like an ordinary wtp plant. And then only does the water go into the desal plant. Obviously with more problems associated with it. But it is
there. If the worst happens, you've got it.

(I was told the components of the system actually have to be replaced continuously because of the quality of the water)
ja, it is a problem. Erm..... The current state of that plant is that it can operate. There was quite a few adjustments made. Like new boreholes sank and new storage tanks for feedwater put in but the idea with that plant was never to desalinate salt water. Water affairs want that the feedwater must be the effluent from the sewerage works. But the reason why we did not do that was because the effluent did not comply to the standards that we want. But seeing that its (WWTW) is now being upgraded thats now the next step.

Ofcourse you've got the hurdle to cross of people's response. I mean we've got the same problem in sedge with our wwtw. Its completely underrated, we cant. We supposed to deliver water at special standards we cant do it. One of the options was to upgrade it to a mbr plant and recharge the aquifer with potable, in brackets, water. Theres so much opposition within the town that it was scrapped. In singapore and those places they use it. They talk about Nuwater.

Even the term Nuwater has been patented. Since they changed the perception of the people from sewage to clean water. But I think it's a long before Sedge goes that way. Because there's a lot of other sources. They say look you've got the damn desal plant why the hell do you want to purify sewage water. So that wonderful idea, which we all thought at the time was a wonderful idea. We had a DR. Ricky Murray WRC, he did intensive studies and Sedge was one of his pet projects. He even indicated to us where we could put 2 recharge boreholes to recharge the boreholes with the effluent water. And he assured us that that water would migrate toward the sea. And even so the council was not in favour. They shot the whole thing down unfortunately, this was 3-5 months ago. The consultants went quite far down the route. Then all of a sudden the council said no.

(Knysna deal, was it a similar instance of DWA pushing for the plant?)
You'll have to get someone else on this. We missing Rhoydon here. His in charge of water in Knysna.

There's lots of reports available we can make that available for you. Plett is another scenario. They've also run into problems. With boreholes failing and then they realised they were pumping the river dry and that has stopped. So they've also got their teething problems. Which is a similar plant to Knysna. The same manufacturer.

Goes back to your other question about boreholes. You know with boreholes you're never guaranteed. You know as part of our emergency scheme for that drought we looked at boreholes for the greater knysna ara. And if we look at the Rheenendaal area, we sunk boreholes and we've got yield but we cannot use that water. Thats the problem, you dont know exactly what you ging to get until you've sunk the borehole. The proof is only once the water comes out.

Did you find that the R.O membrane was specific to the borehole quality so as the borehole changes the membrane has to change?
The membranes were site specifically selected for this plant. You cannot put any membrane into any environment. You've got to know what your water quality is like. Because based on your salinity of your water and the temperature of your water, obviously the quality as well; the membranes are site specific depending on how much water you want. Remember you looking at 40:60 recovery, 40% recovery, 60% goes back into the sea. You cannot use the membranes for the Sedge plant and stick them up in Durban for example.

I'm just wondering with borehole water where the water quality is going to fluctuate. How does a RO plant cope with that? The Sedge plant we don't have a problem because its filtered sea water. It's a different story if you've got boreholes elsewhere. Then the quality changes all the time. Then you've got to either mix them up and then decide on the membrane suitable for it. But we knew from research of the quality and temperature. We can guarantee pristine water because you've got no better filter than the sea sand. That's what the membranes were selected for. If you want to up your flow or down your production you've got to change your membranes. you can't change the plant pressure. In fact our membranes was already replaced once for a better quality suited to our water. free of charge. At the time Mr. Graham realised his got a better membrane for our situation. If ever we have to abandon this plant we have to look for new membranes. Unless you can find exactly the same type of quality

(Because I've been told that the Sedge plant was designed to be mobile, so actually even though the eia was fast tracked, made use of the clause, it can be taken apart and moved if the ROD is negative..)

Arghh, you know I think that was sort of a ploy you know Look, its mobile in the sense that you can move it. So the bulk plant you can move but you'll have to change the membranes. Also there's a lot of infra around the plant. You can uncouple the pipes on the outside and lift the containers up, but you leaving half the.. Its not that mobile, its not like a caravan hooked to a car and you can just drive off with it [Ja, Ja (A)]

One of the ideas was, the construction and eia ran concurrently and the argument was that if at the end it was found undesirable we could move the plant. But it wasn't designed to move the plant from place to place. It can be done, but it's a lot work.

This was also one of the early designs of gtech - also now changed to nuwater (laughter) - their latest concept now is they build exactly the same plant on a trailer. You know your bug furniture removal trailers. Exactly the same size. Unfortunately that development only came after ours was built.

At Umgeni water that's exactly what they're doing as we speak. Ours is 1ML. I don't think its Nuwater, I don't know the company supplying it. We only comment from the environmental side.

We've had the problem, where we use 2 units and the one springs a severe leak. The guys are sitting in Cape Town. Shut it down, use the other one. Its giving you .75ML atleast. That's a better option especially if something goes wrong. Because something goes wrong you know. Ask me and Calvin who run the plant.

How intensively, is there someone there permanently, how do you operate it? operate it weekly, just for preventative maintenance on the membrane system and the pumps Jules told you earlier. And just clean up
There's no need for the plant at the moment. You've got 2 choices. We run what we call an offline mode. You've got 2 choices when you take the plant out of production. You've mothball it. It's quite a process. You've got to put a whole concoction of chemicals in the membranes. And one you bring it out you've got to take all that muck out. It takes you 2-3 weeks to get the plant up and running. We just found that instead of going that route. You just start the plant - one unit the one day, then the other - just run for an hour, to get the motors ticking over. It's much much cheaper. Also very nb is we are running the plant on the eskom offpeak hours. If you run it in peak time. For us when we just got this plant it cost us R25k just to press the button. Eskom work on a demand basis on large equipment. The maximum demand you draw from their supply. They charge you on that demand, whether you use it for 10min or a day. Once you start the plant it has a needle that stops at a certain demand, lets say 250kva. And you pay for that, whether you use it for 10minutes or not. Now, you apply to them for the off peak, and they give you a tarriff scale, between 2pm to 10pm you pay reduced demand rate. Then your demand rate per kva is very much cheaper. So if you not that pressed for water production the off peak is something to consider. The whole weekend is offpeak. But from Monday till Friday there's a peak and off-peak period. The term is time of use, which you can find on the eskom website. But you've got to apply to them from your muni for that special off peak tarriff. Very much cheaper. That's how we run the plant even during peak season time. Then we make cheap water. Its something like R85 per kva versus R14 per kva, the unit costs you can see on the website. The electricity is the biggest cost on the deal plant. The operator we use is an unskilled person. And then people like myself and Calvin overseeing the plant. So you dont need a hihgly skilled person sitting there all the time. And we've got a programme that allows us to see whats going on with the plant from anywhere. If there's a problem and we sitting in Jo'burg we can switch the plant off. And the plant itself switches off. If anything goes wrong. If a valve close. Lots of safety measures. Each and very parameter has a set point and if exceeded the plant is switched off. The thing is called team viewer, the little programme you can download. At the moment we've got 3 pumps in the beachwells and only 2 us operating. We don't know what the problem is but its cheaper for us to leave it there. Its too expensive to open it up. You rather lose that pump. You need an excavator, and as fast as you dig the water comes, it’s a huge operation. The guy who specialise charged to consultant about R80k to come down here expose that well, take a pump out, put a new one in. The problem we were facing is that we knew on that on the beach there's plenty of water. we were not sure of what was goign to happen on this side of the dune. If you can do your homework properly. Unfortunately they did test wells on the beach only. A good idea would have been to do test wells on the carpark. They stuck to the beach area because the consultants told them there's no problem here, you'll never have a problem. Big mistake. The car park wells have been drilled and capped and we looking at the feasibility of the water, the quality. A consultant is doing a full report adn then the council will have to decide. That
process is still on the go, but at the moment we've still got 2 pumps on the beach, its still operating. But we can't run the plant and produce water with it. But its enough for us to keep the plant ticking over. unless the council comes up with a resolution to move to the carpark if the water quality is suitable. We waiting on that right now.

They did a lot of experimenting, the consultants. It was a fist for them in this area. they worked on a was a hit or miss basis. The first design was a complete failure. Pipes bursting, pumps not pumping brine into to the sea. The initial design was to have a discharge pipe, 2 pipes exactly the same as the production valves. Instead of the feedwater you suck out. They were going to pump the brine into a similar structure under the sand and the whole out it would just go into the water and dissipate out. What they didn't realise that in your brine generation you also get a lot of bubbles in the water As soon as they started pumping this water into the discharge pipes they started popping out of the sand. Then they realised, we getting wise now, lets lay them flat and it would go good for a couple of days and then you would have water bubbling out and the water pipes burst. Then they went to another design. The latest was what they call a duckbill. Put these pipes as close as they could get to the low water mark with stainless steel uprights to the pipe. then the would have something they call a duckbill. The rubbers were imported from the states. Then these things would cause a lot of back pressure on the pumps and they would blow off. And then I came with the idea once..(?) Then they wanted us to take the pipes all the way out into the deep sea behind the breakers. We got a quote for something like R0.5m to do that. Then I said for the mean time I tell you what just cut those pipes off, put an elbow on, bring it about this high above the sand, put an elbow on and just leave the damn thing like that. You the see the other problem was when it was lying next to the sand dunes it started causing? and the dunes started collapsing. We woke up one morning and there was a 6m wall right next to the dune for hundreds of meters! Some people said we going to collapse the dunes and what have you. Then we took it halfway between the dunes and the sea and put a riser pipe in, coupled the 2 pipes into one. And that worked very very well. The other problem with these duckbillings is that it started creating quicksand. Guys would walk there and see this water bubbling up about 1m around the outlet. the force of the water keeps you afloat, so you pop out. ...So we said look it is dangerous. We actually had signs up there.

J Real trial and error once the water comes up it doesn't want to float to the sea easily, it takes the path of least resistance. It comes up and turns the whole thing into a quicksand effect. Because there's and air discharge and a brine discharge.

A Keith was the guy with everything. He was saddled with everything Its interesting that since there's such a huge recommendation from water affairs and such huge organisations such as umgeni water are investigated these. But its based on very little research.

J (Do you think that the sense of emergency impacted on the decisions made and the design of the plant, where you were then faced with problems at a later stage?}
Ja, Ja, I think if we had to build another, a second desal plant we would approach it in a completely different way. There's lots of drawbacks on this plant. The biggest drawback is of course the financing. Consultants were told, look disaster management will give you R16m and nothing more. I'm sure they cut corners to get that plant up and running on the R16m. We didn't sit down like the consultants did for the Plett plant to draw up quantities and specify. We just told the guys, we want this thing, we've got R16m, go ahead and build the thing. And of course we were really disappointed a couple of months down the line when we realised this is a bit of a 'gaga' think you know. If I had to design it I would have asked for at least a damn stainless steel valve. Not a mild steel valve. Because you know you pump seawater through that valve, within 2 weeks you can't open or close it. We had to put a 3m crow bar onto the valve just to try and close it. But they say sorry you know the financing was the biggest issue there. So do it again, we would specify what we want. Obviously its going to cost you a lot more money. So money is a big issue.

The reason I asked about the reservoir is because they were in fact a supply, the Hoogekraal and had there been funding available at an earlier stage to go for one option, other than the larger dam

Let me just put it into perspective. The funding only became available after we were declared a disaster area. We couldn't access that funding prior to that. There was no money in the municipal budget. If we had to fund this project out of our own pockets we wouldn't have been able to

They say hindsight is 20/20. Had we known we probably would have done it earlier. But we would have ever thought this river running for 25 years was going to dry up

That was 2008 and we had a flood in 2007 so it was extreme conditions that you getting

We haven't had a problem with the river since. Aside from getting saline water from the sea if the river mouth closes and the wave action goes over. But we addressing that problem with the weir. But you don't go and buy a mercedes if you can get by with a Volkswagen. It was one of those things you know. We didn't have the money for the desal plant let alone the bloody dam. That was the cheaper option and also the preferred option by DWA. If you by the sea put a bloody desal plant rather than put an eye sore dam in a pristine area.

Whose the bulk water provider in the municipality?

We're. We manage our own bulk and reticulation. We're the water service authority, we're everything.

Umgeni water is wsp, the wsa is ethikweni muni. So the district munis are the wsa. We buy water from DWA

We aren't that fortunate. DWA says we must have 6 months supply. We have it in sedgw with the desal. Knysna not yet and are also looking at building a dam.

But you don't want to mess around in pristine rivers

And also this plant had not really increase our water resources. On the one hand it has. But its still a temporary plant. We must, council must still make the decision to make it a permanent plant. Only then can we add it to our water resources and that will then affect any development approvals in the future. At the moment we not adding that to our water resources for development

The funding was received in an emergency situation, so the funding and plant were seen as necessary to meet the emergency. Although the plant itself has not really contributed to the water yield.
No because the approval at that stage was for an emergency and not for a permanent plant.

(in the case of Knysna the funding was made available as emergency funding, for the water to contribute, yet its not done that yet?)

No its not done it yet

It broke ground the plant let me tell you. From the moment we had the plant we had people coming from all over. From Kwazulu Natal wanting to see the plant and find out how did you get it right. We were considered the frontrunners in establishing desal plants in the area.

It would be worth writing almost a WRC study on it, documenting the lessons for others going the same way.

What would prompt you using the RO plant again? first of all if the river were to dry up. First of all we would go to our first backup the boreholes. You don’t to over exploit them. We don’t want to take 1.2 out of them for months on hand. So we would pump the boreholes for a few weeks, then shut them down and let them recharge and go to the desal. Run the desal for a month or two and then switch back to the boreholes. Because we also don’t know the full potential of the boreholes. Therefore we are restricted to 1.2ml, our licence application is for this. Without restrictions we could do 2.5ml per day easily, but with restrictions we’re doing to 1.5ml. So we know the boreholes can provide us with enough water for the town but we don't want to exploit them. Once the river recuperates we'll shut the desal down and go back to the river. That's the whole intention. We just want to rest at ease at night. Calvin also runs the boreholes regularly to make sure they produce then shut them down again. We chlorinate that water and pump it into our reservoir. The water treatment plant is our first option, we'll leave the boreholes and desal as the second and third.

The licence for the WTW was 4ML but that plant since inception could never produce that. The council wouldn't believe me and we got this expert up and he did tests and he confirmed that. He said the upflow velocity of the plant is more than 1l per hour, ideally you want 900ml uv per hour. You're exceeding and in order to keep your uv at 900, you have to chloke the plant down to 2.5ML MAXimum. Not the 4ML of the licence. But even with the 2.5ML we would still get these isolated instances of the water turning a bit brown. So once we got the boreholes and desal we came to an agreement to not exceed 1.5ML on that plant and get good blue drop quality water. We agreed, the council and us agreed. The borehole water doesn't go through a purification process. We chlorinate it, to disinfectant, from the ground, into the tanks and pumped into the reservoir. The desal is discharged in the same way. The R.O plant we chlorinate at the plant and then is sent to the reservoir. By nature desal water is extremely corrosive. We also dose some sodium carbonate because desal water after purification is very corrosive. By itself if you rely on the desal for long periods you have to prepare to stabilise the water or people will start losing their teeth. You spoke about hindsight earlier, if you had more time would other options have been better?

If we had more time and money. Remember the council couldn't afford things on their own. We had to apply for government money. There's no ways we would have been able to do all that. And even today we would have been without a desal plant if we didn't get disaster funding. The funding changed the whole ballgame. And yes we do plan. Andre and his team are working on 25
year plans. But that’s long term you know. At the moment we just don’t have the money. And Sedgefield is still paying the costs of the drought. The money we got we didn’t get the full R16m. The RPayers is still paying through their noses. Another dam is out of the question at this point in time.

You have to balance the income you can get from residents. You can’t overtax them.

I think there’s also an interesting case for development and its link to other development. The U’Shaka airport was a major development and all of a sudden we were caught. We have a whole planning dept. Basically we were caught with our pants down in order to supply.

With lower income there’s no revenue there. It’s not a development beneficial to council. It’s socially beneficial but not financially.

All the erven are reticulated. We have a couple of squatter sites with standpipes and toilet blocks. But all the formal erfs have reticulation and water borne sewage.

In Knysna a few areas where we’re struggling. The main thing is again, something we say every time. Whenever you have a low income housing development they basically look at reticulation but not bulk services. So all the plans don’t address the problem that the bulk infra can’t cope. We’ve had a study done for IS and backyard dwellers. At the moment we have 33 IS in Knysna. Quite a few people to be housed. Its a backlog and its a problem and you have to put money there and you not going to get the money back but its our responsibility.

We simply don’t have the land. The property is so expensive the council can’t afford to buy property to relocate Squatters. We stuck. The planners in Knysna just haven’t got the land. And in Sedge we’ve got a unique situation where we’re surrounded by water. And each and every person has got a spike and you don’t want to pollute the water. You don’t want to go and build a huge township here just on the banks of the river. We just don’t ahve the land. We’re battling, really battling. And that’s what’s causing all this unhappiness, marching, stone throwing. Can’t understand that we haven’t got the money the governemnt must give us the money for housing, we can’t build houses for you if we don’t have the land. So it’s a big problem.

In terms of water yield, do you find if that was more controlled you’d have more water.

I think in terms of the forestry and agricultural sector were more controlled in terms of water affairs, we’d have. And this is something that we’ve been discussing at our water forums in detail. The Dept of forestry is handing back large areas. So yes there are moves ahead.

Unfortunately it’s come down to enforcing laws and bylaws and that’s where water affairs are falling flat at the moment. We don’t know how much the farmers are extracting. I know for a fact that they are extracting huge amounts of water and they just transferring it from one dam to another on their property and even other properties. A nice example is the Karatara river. As soon the farmer starts pumping the muni doesn’t get any water. We are right at the same point.

We require large volumes of water, they can just continue pumping and put a suction right on the river bed. We can’t put a suction right on the river bed. When the water stops flowing to the extent that we can’t extract they can still pump and keep pumping 24 hours a day. We brought it up with water affairs.
adn they said ja sorry we dont have the man power

L Tjoe, so you basically on the same level as a farmer, as a muni? That’s unreal
A Not on the same level. A farmer doesn't get regulated but we do
C ja, we must have water meters on our lines but they don’t have.
Yes it was certainly a factor in the drought. They pump 24 hours a day and we
cant pump. We get slapped with a reserve and they don’t get slapped with a
reserve.
A Jat various rivers they’ve got these monitoring stations. It tells you what the flow of
the river is and you can go on the internet and download it live from the website. Tells you
flow at moment in time at karatara wier. What happens downstream you don’t know.
Unfortunately we don’t have more monitoring points. We’ve got one way up in the
mountains.
S Sounds like there was a degree of shock on the day when the 'river dried’?
A Yes, because it went down very quickly
That’s incredible, so the farmers will still pumping (yes). So where was the
L authority here in terms of the controls. Surely there should be a pecking order.
J They expect the water forums to control this but I can’t see how it ever could
L So there's no water user association on that river?
S There’s a water forum. We were thinking of doing it but its so much hassle and
there's so many pros and cons
In this area you have many people with their own agenda. When you start to
use terms like water users association the farmers know its going to come and
bite them because they can’t continue doing what they’ve been doing. Its crazy.
They get all these lobbyists and you get bogged down in paperwork. And that’s
why the stuff just died down. The farmers have a lot of power. If you look at
you’ve got the different government depts. They don’t talk to each other. So
they don’t know. we had very severe water restrictions. The dept of social dev I
think came out and provided some residents with water tanks and hosepipes to
grow gardens and its not raining so the water came from the water tap. Its
crazy. That depts do not talk to each other. We’ve had cogta now for a few
years but I don’t know what they’re doing.
A One fo the major problems at DWA is that they've got a heck of a staff
shortage. People are resigning faster than they can appoint new staff and they
just tell you 'sorry we don’t have people to come and check on the farmer and if
his got a meter’. The water forum has got no teeth. The
J You need a water users association because they’ve got statuatory powers so
once they’ve got statuatory powers they can make rules in terms of abstraction,
they can make rules in terms of a heirarchy in a drought, they have a drought
management plan, a strategy
I think Dwa have lost the appetite for the CME
Two of the officials designated to this area, both resigned from DWA and
joined the CMA. Ever since then you don’t see these guys (DWA) anymore.
J There's a gap, they just disappeared.
Doing the drought we had an drive to get all the spikes registered. It was a free
process because up until that moment we had no idea how many spikes we had.
But its never been revived again. We’ve also done it all over in the greater
knysna. It helps tremendously to reduce municipal water use.
More on boreholes 1:01 (not typed - can return to)
There's no control. Again how do you control it
Our sewage treatment plant is not geared to deliver special standards effluent. They won't renew our licence until we upgrade and we can't do that until we have the money so it's a catch 22. We're looking at R18m to upgrade. Only 50% are hooked up on water borne, the other are using septic tanks.

L Would you recommend going the desal route?
J Yes, for the simple reason that you've got a secure source. If you don't have seawater obviously you won't go that route. George wanted to go the same route but they've got to pump the water about 30km so they went for the re-use. But if you are close to sea like us its your option. The major issues are the electricity use and the discharge is still ...

S Who carried the cost of all the additional costs?
A We carried it for the first year grahamtek because it was in their contract. From now on we are busy negotiating some sort of a deal with them for a maintenance contract. For an amount per month they will maintain the plant and also provide and operator for us. At a price of R40-50k a month provide you with an operator.
J We've got a few options in that respect. The one is that they will run the plant with their personnel as a maintenance and then we pay them a maintenance fee. The other option is to let them run the plant and take full responsibility and we buy the water. The other option is to have our own operators and they just give us the backup service with a call out fee. Most of the plant is mechanical electrical but there is some patented stuff that only they will know.

A Major items, they don't want to touch those membranes. There are various options

J In terms of the o&M costs, is it fair to say that the muni is carrying these costs ongoingly, regardless of production?
S Yes, corrosion. But running the plant apart fro the bag of chemicals and of course your electricity you don't really have any major. So day to day running is not a big deal its when a pump for example packs up.

L Do you have to give the DEA a report?
S What is the status for each on the EIA?
J I think the Sedge one is solved, we had to pay a small fine because we went ahead without an ROD. I earn what was the option, let the town run dry?
L I'm surprised with coop governance they were allowed to do that. That was the shield munis had that with coop governance the dea wouldn't care.
J I think it's all to do with the approach. We were open about the Situation. We were upfront so it was a bit surprising that we got the fine. It was just somebody who had to do their job.
A I'm not sure with Knysna. I know the EIA process is still ongoing. But that plant is definitely a permanent plant. Its got a permanent structure. But like I said the initial approval is to purify effluent to drinking standards. That's is why we are spending more than R30m on the sewer plant to upgrade that and get it to standard and the money for the sewer plant came from an infrastructure grant.
L In umgeni they are building the discharge while I'm away. What worries me is the air discussion that you just had (shows picture in paper of the quicksand effect)
C That was a shock because he was curious and he comes close to where the water bubbles out.
L We are in the sand behind the high water mark. I don't think our engineers, he was forced to design a structure. I know he came and talked to you guys and his just produced a design. We started constructing before the ROD. It wasn't
declared an emergency but it is an emergency from the water users perspective. We sunk a borehole and the second is very good to the point tp the extent that we questioning if we need the plant. But anyways,

(Leaves - be in touch)

I think a big thing for Rhoydon, and something we haven't looked is your efficiency in terms of your power usage and how that impacts on your cost per kl. Its just that we haven't got the time. On Sunday we've got power outages again. It's the upgrading of the line, its gpign tp cost us probably R150k just to hire generators again. We're hoping its goign to go ahead otherwise we're goign to have to spend another R150k on the 13th May

A
S That was the problem faced in the past pump stations. The generators were..
A Hmm. What we did the previous time is we had the honey sucker there (??) I'll send you what I've got via email
Consumption per area we've got that. We've got spreadsheets with everything. Big spreadsheets with everything. Speak to a lady Lorien McCarthy on the top 100 users.
J
I think what would probably be best is to get that presentation by SSI. Thre was a presentation looking at the Sedge aug scheme. Looked at the drought, decisions made and implementation regime. Speak to Keith. I know that presentation was presented in quite a few forums and in the various institutions.
A Keith has lots and lots of info.
I think it would be good for ssi to get an outside perspective of the work they've done. With your report it would help them also.
S For me to generate a meaningful report I need to have as much detail as possible.
A Once you take that letter that you've got, you can speak to anyone You'll probably get most of the roleplayers in your ssi reports.
Pandaram for disaster. On the disaster side there's the eden disaster manager Gerhard Otto. He is the one who coordinated all the disaster issues. The whole area falls under him. The EIA was in the library.
We had several meetings with Rashid Khan in this boardroom, even on a Saturday. He was quite instrumental in this whole issue. He was the one pressing, to twist our arm to go for desal
Unfortunatel many of the guys have left Jackie Pandaran from Provincial Disaster Management and also Dr. Hildegaard Fast.
There's a whole world of information in this file as while. You could sit here and page through it.
Th WTW has flooded 3-4 times in my lifetime already. And we ahd to go and beg and borrow to dwa to get some of the money to upgrade the plant after we got the desal. That could also be a problem you know they may not want to support us on any further upgradings there. And if we do upgrade it may have to be the boreholes or the desal. They will now allow us to upgrade on tha tplant unless we got to the Hoogekraal. Because thats the challenge. What do we do in the next 20 years if there's more development. We're ok for say the next 5 years. So thats the challenge. I think one would be sustainable water supply. Affordable and sustainable water supply. The desal site was situated so we could double up on the plant.

Interview 32 on 19 April 2012 – Interested & Affected Party
Interview 33 on 23 April 2012 – Municipal Official

I was quite fortunate at that stage during December 2008, just before the holiday started the rivers were very low. During that stage Jules came to us and said he was a bit worried, but you know it’s a perennial river so we thought we goig to have a few drops, that didn’t come. When we opened around the 12th. we went to river at it was critical. that was Juaniae 2009. There was still a bit of water because the pool keeps quite a bit of water but you get that the saltwater intruces into the freshwater pool up into the catchment where we would draw water into the works. So at that point the salinity went quite high, more than the allowable I think. The allowable is 200ppm conductivity so it went above that. hen we know that there’s a bit of problems. At that stage there was a few things we had to dispose of. Sedgefield has got reservoirs thats got about 4-5 days storage of potable water. So that perspective there was a bit of water storage in the reservoirs. OR to go a bit back, 2 years before that there was a proposed schem for Sedge a dam and a pipeline, in fact the eia work was done to get a favourable rod for that. Then when the scheme was proposed to council. And all the dynamics about funding. It was, I would say a huge project for Sedge but KNysna runs the Greater Knysna. You know you must see what is more NB, so the sceme was uneconomical and couldn’t afford. So when the drought happened they couldn’t blame us whihc they wanted to do, you know from a political perspective. There was a proposed scheme, council declined it, they couldn’t blame it on technical. They couldn’t blame it on technical, you know there’s all this internal politics. So at that stage we had an ROD. At what the proposal was, you know there’s 2 rivers coming into the Swartvlei. The Karatara and the Hoogekraal. That catchment is more pristine. We could lay a pipeline there as proposed from the old scheme, and augment the stream in the karatara river to get the salinity down.

I got a few guys in so we can brainstorm to look at short term solutions. One of the things was vigorous water restrictions. We had water restrictions since 2006 but we didn't enforce it that much. This we did enforce. We did bring the consumption down from about 2 thirds. So where the average consumption was about 3MI in peak season we did bring it down to about 1, 1.2 MI. For the interim we had a look at how soon we can implement the short term emergency schemes. And the pipeline was about a week. So we said for that time we were carting water. so we got tankers and we got tankers from the district and from the army. I worked on the WHO about 45l/s per person per day and I added for water borne sanitation I added an other about 25l. So we worked about 65-75l/s per person per day. That worked to a bout 45MI we wanted to get into town. And the hoogekraal was one of the schemes the pipeline that was put in, we looked at short term solutions, what if it fails. And one of things that comes out was the Groenvlei whihc salinity is about 16/1000 000. Its quite brackish water but you can treat it. The less the salinity the more effective your membranes will be in terms of what you'll get out of a system. The return of potable water on deal is about 40%. The less saline, the more water you’ll get out you would think. But its not that way because the water with lesser salinity also has more bacteria so with the pretreatment you'll get your membranes clogging. We looked at all the places and then we made a decision because of bacteria and quality fo water. We wanted salt water to have less pretreatment. So the scheme would be quicker to set up. So we decided to go with desal and the membranes were sized for that. The sewater here is about 33parts/ 1000 000. Whihc means you dont have to do a lot on ppretreatment whihc makes it more effective. So would could run an environemetal process with that. In other words illegal activity. But they knew. And after that we got fined R1000. Which in principle isn't right because they knew what we
were doing. So we had to debate because we had another RO plant in Knysna. How they then explained it to us was its actually an administrative fine. So in terms of corporate governance that fine was just R1000 but in principle we were not happy about it because we followed all the protocols to deal with the drought. There was a council resolution, a district resolution, that went through the disaster centre and we got an allocation through NT, through the DORA act. So that was one of the issues. But the system was put up quite soon. But the principle was to make it portable, in terms of the ROD, f we get an ROD that says we must move it then we were, stuff could just be picked up and moved. It was designed in terms of environmental process, if something needs to be done, we could move or whatever.

We also aimed to fine in terms of documentation and tendering and procuring. We had an output spec that we put out to different tenderers. When the drought started we did have meetings with our community. It was quite interesting how communities went through cycles. First they think bad planning and then they see afterwards its not really that. They must buy into the idea and then there was the solutions. So what we did was, I set up meetings with all the depts and after that we briefed the community. They had a forum going. So they were from the start on board. So when it come to the pproc process, the knew. So there was buy in from the start from the community. And because they saw we were serious about what we were doing. While we were busy with this, I went to strategic points in the different communities and put in taps. So they could see it was serious. One of the things that came out was our plan b. You must have the physical appearance, signs, boards, loudhailing. Also we had the army trucks so people could see the seriousness. But behind the scenes there was a lot of - I think people dont really know how to deal with a drought, especially here. But in terms of a flood, you dont know when its going to stop. And its very tiring.

So we had these different schemes, different options and the committees were working quite nicely together and put in taps. So they could see it was serious. One of the things that came out was our plan b. You must have the physical appearance, signs, boards, loudhailing. Also we had the army trucks so people could see the seriousness. But behind the scenes there was a lot of - I think people dont really know how to deal with a drought, especially here. But in terms of a flood, you dont know when its going to stop. And its very tiring.

After that the drought just spread. For a long time now the small munis are really struggling. The reason for that is the funding and funding sources are based on a calculation of population, other things, which doesn't make sense. The MIG funding. You know we are the water services provider and authority. Which means for us, I've got about 7 water works that I need to develop from source to maintaining reticulation system. Which the People in the North where there's water services providers (?) like RAND Water, just buy water and add a margin in there. we can't do that because we must develop everything and to upgrade your sewage or water works takes your MIG allocation for 4-5 years. I think the way it works is that the DMUni was meant to be the
wsprovider (?). But on the SCALE which we're doing it now everybody does their own studies, is looking for its own little scheme. But the controversial thing was that we didn't have a lot of support from other munis. Because you had this thing where some schemes were developed by the DWA way back. So some was blatant, like George with the old president, they got the roads, upgraded, the airport. So we had a big thing at the disaster centre when we were alone, when we were just Sedge. They said, no they're not interested in a bigger infrastructure because they've got a dam, they've got their own infra. So it was always us and them. And suddenly when the drought was bigger, our contingency plans were in place and suddenly it was better to talk to us and get advice from us. In the beginning it was just 'why did they get money'. People wanted to just get to money.

I think from the publicity side we did quite well, we had huge public campaigns. So in the beginning it was, its unfortunate because Jules who retired, but Andre is just helping out because we're not quite sure what council wants because it's a new political dispensation as well. Thyhe have got their own ideas. At that stage I was acting town engioneer, my boss was on leave at the time. And Jules had his own dynamics, His quite interesting. His not really a people's person. Amybe, his from Sedge, he had his own ideas. But he was part of the community. Certain people, when they're long in a place, they don't look out of the box you know. Thye will say, 'no the pipeline must come from there'. But from a management perspective, your technical people you dont bog them down in managing bigger things. So we gave them support they were running the programmes. But you dont bog down your technical guys, but dealing with council items, gettign the funding approved, asking certain things, attending meetings, that sort of thing.

So from that perspective, we had the internal dynamics as well. There was also a bit of internal politics to be honest. That’s why Neale, he was on leave, but they didn't want to oull him in. They could have asked him to just come back from his leave but instead they approved his leave. So it was also not a nice place for me to run things. Neale was a good mentor for me. A well rounded person but not a person who gets involved in political issues. So it was interesting from that perspective. Internal politics, as I heard afterwards, they wanted Neale to go early they wanted to make an offer, he was supposed to retire in November. I heard later that they wanted to offer him a package because he didn't bring out his vision. I think from a technical perspective we are a service delivery department. Becasue they didn't have that control over manipulating things, they felt he didn't bring out his vision. You can just see, we got an council item out of the Eden District, whose council was dissolved at the time, 3-4 months after the drought. so there was problems as well. You needed that to take forward so that in can officially be declared a disaster. If Knysna took a council decision, it can be declared an emergency or something that should be taken seriously, but its not formerly declared a drought unless it goes through the whole thing. So we couldn't get resources because there was an official diaster.

What I’m saying about Neale is heresy. But I've even asked the MM why they don’t get Neale to come back. Because I'm loooking at the technical details. Don’t let me go looking for money or writing reports at night. So I was also bogged down doing the management. So I felt somebody like Neale, who had knowledge in strategic
Management was anything, from writing the council items, keeping council informed, yields of the schemes, funding models.

What was nice later on, when all this down down and Neale came back. They said that Rodney should be project manager once the project was decided. Between me and Rodney we did spend, did complete which was about R48m. Which was really a thing, because if you look at spending that amount of money in a few months its a thing. There financial year ends at the end of March, so we had to spend certain money at certain stages in terms of the rules of the funds. remember we didn't have a lot of our own funds. First was the flood allocation, then DWA also promised us R5m and later on he withdrew that statement. So there wa real funding issues. The project was ready, but that was also a burden placed on the technical departments.

R45m breakdown: That money from the flood, and allocation from the disaster (then declared a disaster) and internal funding. Everything that comes from government has to be gazetted, through the Dora. So our system wont allow anything to go through if you dont have the proper paperwork So the eden cause problems, because it delayed the paperwork.

In the beginnign the perception was that we were negligent. But we said that we had the project and they wouldn't help us. So we told them that its partly their responsibiloty or problem. Also previously about 60-70 years ago there was a drought so its difficult to see a cycle like that. So in the beginning it was like they were looking for a scapegoat so thats why they partly wanted to blame it on Neale. I think thats why they wanted to push Neale out of the way so they could have professional people in and see how they cna manipulate it.

(The Dam)

A scheme was proposed by Aurecon of an off channel dam, pumping water out fo the hoogekraal and from there on a pipeline to, moving the waterworks onto a flood plain, putting it on top of a hill and pumping that water to the new waterworks which will feed the reservoirs. The scheme Aurecon gave, it was also in a volatile situation with the whole economic markets at that stage. A lot of imported stuff escalated tremendously. The scheme was 2/3 more than was put forward first to council. And just before the world cup there was also a lot of collusion I would say. So it was at an unstable time that the prices were reviewed.

The consultants that we had are specialists on dams, so why would they propose something they know would be more expensive. They would have the best prices. So I would say those were the factors. But also the location of places of Knysna, on the periphery, makes its a lot more expensive.

Then later on, where we came up with a different solution, the dwa, eregional director, said we musn't put all our eggs in one basket. Then we looked at conjunctive use. The dam that was proposed was to provide for the future as well, about 4.5ml per day. So we looked at a scheme that would give us that. In between the desal plant was lying there, funding, funding, funding. That was how the scheme was put together. The last building block is the water reuse for sedge. We've put a proposed scheme together, they didn't like it. Artificial recharge. But you dont get a lot of chance to debate. We've already done a technical report. But DWA wasn't quite happy wiht it.
You know like Sedge, we want to be first in a lot of things, lead the country. Its so small that you can do things on a scale. We've got an opportunity to upgrade the sewage works, we can do the whole cycle with it. So we would like to do that. That's why we are sitting here, We must write the scope of works and also appoint consultants. Ordinary, the money comes from the MIG grant. THere's a lot of politics in alot of these things. THe monies goes to the metros whihc is actually sad because they've got money. Somebody sittign in Pretoria would rather see a big scheme. One of the sources is RBIG. Its first definition was to give funding for cross border projects. Then we found out its funding for big schemes. We propose now for KNysna, because Plett is a bit further than us, we will support them and then get a pipeline to Knysna. Then its operating on a bigger scheme. But thats just an idea to get funding from this RBIG. Now you here about these funds, but you not quite sure what the definition of it is. Honestly from a technical perspective, I dont know if I want more infrastructure, because when is a town big enough. How do people want to see the town evolve. The planning documents in general in SA is poor. They've got a SDF that should be inline very 5 years. And we've got to out in infrastructure thats got to last 50-100 years so the two are out of sync. And then, from a planning perspective, do you put in for the furtuere for 10-20 years and phase it in, and it doesn't work. So there's real planning issues, and thins we need to struggle with. And the prescriptive conditions of the funds is a problem. MIG provides only a portion for the poor. So from a planning perspective its a bit problemaic.

In the drought as we started we compiled the Comprehensive business plan and submitted it to RBIG and they promised us and said they never said that. So if its not on paper, you cant depend on it. They look at excuses to not pay munis, because the money is pulled elsewhere. And that has an impact on your cash flow.
I'm here and if you need more clarity, we can do it again.

(legal declaration)

We concentrated on 20% of the high users. People were visibly going to read their meters. There should be statics with regard to that.

(legal declaration process, talk me through it and main actors)

Wen the thing started, the firs thing was to inform council officially of this situation. So we gave abit of background as to when things started, what was done. Then we proposed the emergency interventions. And the last things was funding. What do we need to do to kickstart this process. Certain thins we said we were still investigating. The public anpaign, we allocated some funding to that. We started with appointing the consulatnt. And 2 days later we had the short term intervnetions with costing etc. then we could say, this is the shcme and then did recommendations with tasks, eg to see water affairs. then the report was more structured to get the legal declaration. So say that Sedgefield is a drought so that from an emergency part we can spend fundign on the
From our perspective, technical services wrote the report but every department had an opportunity to put their comments/aspects in. For eg grant easton would say the declaration would need to be in terms of the mfm and 'dont have funding', which would influence the bottom recommendations. But at that stage its rubber stamping. we will have meeting before that time and talk to the portfolio councillors. We also couple prices to it. My idea first was to give water for just basic needs but the MM said 'no we aren't going to let the system run dry. We're going to bring water in at any cost'. We've got councillors sitting on the district councillor and they take the items further at that level. It was Henry Mcombi. It would have been taken to the district council to be tabled there. Johnny, the previous MM dealt with it. I think Johnny has worked the same road as Nealle so I dont think you would get hold of him. That gets sent to the Disaster at the Provincial Level. And that was Dr. Hildegarde Fast. Canadian woman but very capable. I must say, I had a lot of respect for her. She dealt fairly with the munis in terms water affairs making promises. Its not that one muni was favored over a smaller one. If you were out of line she would have told you. She was firm and was also a good facilitator in these meetings. The disaster management provincial deals with the national dept. The disaster thing was more set up to deal with the drought directly. In the beginning we would have direct meetings for eg through DWA. So they would say that they want a business plan and we forwarded that through the disaster management. Because a lot of these departments play time games. So we submitted a comprehensive business plan, so we said to release funding, we've got (?), cant we do the desal in Sedge. Then the drought spread and we were in the bigger forum, our business plan had been submitted, and then we got funding allocated. Now DWA was the receiving custodian, to make sure the money was in line with conditions laid by NT. We received a portion direct from NT, and they came down with meetings and prescriptive conditions which they didn't have a clue of. They said so much has to be spent on boreholes and the plant. Now they don't have technical people, so that was quite strange. They said to Knysna that the money must be used for reuse and Nealle said we cant do it. And then Nealle was taken off you know not being the project manager of this schemes because he said no. The reason why Nealle said no was, because we're busy upgrading the WWTW at the moment so the elements are not there at the moment to give you good quality water to feed onto the membranes. But because he said no the council didn't like it and said no you not working on this committee. They dont think before they talk you know. Then we told them that it must be indirect. For example the brine discharge is out with the final effluent. So theoretically we can use that excuse. So we felt more comfortable with that because we know that the WWTW was not up to standard. (Why do you think the condition was placed?) The more we explained to them that in drought conditions re-use isn't the answer. They couldn't understand certain things. You know 'I'm big brother and you'll do ut like that'. So we had to think around the box, overcome hurdles to be in line with the conditions laid down. And that proposal was sent to DWA to make sure our proposals made sense.
We've done everything we said we're going to do except for the Sedge sewer works. The solution we've come up with is better for the environment. Because we're going to take 1ML less from the Karatara river because the plant was designed as a 2.5ML, but has been downgraded to a 1.5ML. We are busy, in this financial year we are going to do a weir. The Hoogekraal pipeline we've put in but haven't done a pump station or anything. But in terms of an emergency we can equip it with a diesel generator or something. Most of the elements we put in place.

In a municipality there's no physical budget for dealing with emergencies. That in itself causes a problem. Because initially you deal with your own operating budget. Sometimes you run the risk of not getting the money back. Later on they just do an adjustment budget. So its a problem within a muni because there's money for disasters. Lso in other munis, because everybody has their own ideas about what is a drought. They use the data but there isn't actually a formula to base a drought on. You know that was quite a thing. Because when it rained here the plants and everything takes the water. That is why I say that a drought makes you tired. Another thing in a muni is that everything gets added to your workload. From a technical perspective they brought in the MFMA, the procurement management, then you still need to monitor your system and look at water losses. So from a technical perspective it's really a nightmare. And everybody wants reports, and status update. I can tell you that a drought is exhausting, you don't stop and the demands just get longer. And you sit with the existing workload. What was nice with us and Neale is that he dealt with the strategic things and now I had to do both. It was a quite steep learning curve. What was nice on the technical side is that we were exposed to a whole chain of projects that not a lot of people get an opportunity to work with. You came up with out of the box thinking, solutions. I never thought I would be dealing with desal or indirect reuse. Now the drought has opened that up significantly and there's a buy in from the public. So where we would have spent a lot of money on public campaigns, now there's buy in following the drought experience.

(How did these particular solutions get discussed and prioritised?) Initially when we had the Sedge thing we had all the powers that be together in one room. We steam rolled a few ideas before them. Had a map of Sedge and to see what's feasible. Heenie from SSI developed a (?) System. Heenie is quite a character to get buy-in from the different political you know. This system was the presentation given to council. And then people generally, look from a perspective that at that stage the DA were also a watchdog. Now most of these older people are also retired professional people, now they formed their committee. When we were finished with our meeting, we briefed them on the decisions. I think it was also nice to have someone from Sedge, Rodney, afterwards as the project manager. People saw the army trucks, they never had the feelign that we abandoned Sedge. We briefed them. When we had the meetings at night in the public galleries they would also stand up and said they agree. KNysna was a different story. When I started with the RO plant the spec that was put out for eg in terms of noise pollution. Then there was also a question of VAT or no VAT. So when that was clarified in the beginning they had to put a building around it. Now somebody living nearby said they going to get a lawyer that the building is going to affect their property values. But they knew without it we don't have water. So do you or dont you want water.

(Decision making, meeting held, Hennie)
After the first initial meeting we asked council if we can't appoint SSI due to the reason that they did our bulk planning in town and so forth. After they were appointed Hennie was part of our team. Remember I told you the Hennie was part of that panel for the tendering process.

(I want to understand how desal became the solution)
It came up in this first meeting but we had to investigate. But physically when can people put down something. There were at that time only 2 people who could do it. Veolia and Grahamech, now Nuwater and South African company. Veolia a french company that was established in South Africa. ANd a Stellenbosch company were established but had only run pilot plants. The major challenge were the membranes which these guys had patents on, so they could tell us they could deliver within a few weeks.

(The question is at which point did desal become?)
It was mentioned right at the start that it's a source. Then Hennie had to go and look where must it be structured, Is it a medium or short term solution. Then hennie came back the next day and said he had a look. What was nice was that we had a look at that for the sewage works, THe wanted to sell this for the sewage works a while ago. So that was there but we never thought about it for potable water. SSI also had this new technology and there was some dutch funding they had withc we also put in a proposal. So the system was discussed for other funding sources where we tried to get our funding together. And the then when Rashid Khan said look at conjunctive use, it made more sense.
Rashid Khan was present a few days after when we had to go to the disaster centre, and Hennie made a presentation to them

(and this committee of engineers?)
Yes you should speak to Rodney, the Big 5 (laughs). Richard Batson, Mike Young, Terry Cockroft… It just makes sense, follow up with Rodney how it came about. From a PPP if they say they represent the community, we can talk to them and give feedback. From that side the PPP is vital. It was nice to have these highly technical people and if they've got ideas to do things its also nice. We never had this thing of us against them. They form part of the solution.
But from a race perspective there's always this idea that people think you don't know what you're doing and you have to defend yourself with that. But people know I was working with Neale for about 12-13 years. We were in a public meeting one guy said they don't want to talk to me they want to talk to Neale, bluntly, and I said you can talk to me, lets see if I can help you. So there was also that dynamics you had to deal with. But from a professional field, engineers in general will quickly hear if you're talking bull. But we dealt with things openly and didn't postpone things we dealt with it there. It was open, frank and we had an action plan.
Grant from finance also gave me good ideas. I had nice support from the whole council and from the municipal manager. Not restrictive. I concentrated on programmes to bring the losses down and look at leak detection. And also got nice support from Elton and Shaun and Andre and them. [Thats Elton. his the principal technician. In our department he does the budgets. The main people were Elton, Andre, Shaun and Jules].
Look its quite simple, they've got all this nice words about IDP, but I think its all bullshit. We can put up the projects but the perception they give to the people they've got the choice in how the money gets spent. They must tell them 95% is fixed in terms of where the money needs to be spent. The perception given to the public is the wrong one. if the bidget says R12m, a lot of it is already decided. For eg we're upgrading the WWTW and it costs R55m and we get R20m from the MIG. SO if these decisions have been taken by council is there really a choice as to where the money will be spent. And that money will be committed for the next few years. This word was added Developmental munis and that means that the public must be involved in everything. Whihc isn't the case but the science by guide. They must tell the people it will take 5-10 years. They tell people that houses will be built without explaining the process and real timeframe involved. So I've got a slight problem that the planning and processes don't support us on the technical side. Now the IDP they saw they going to shoot themselves in the foot, so now only projects with funding allocated can be put in the IDP.

It wasn't Knysna per se it was now regional, so funding was regionally spent and we got our allocation regionally and we had to motivate. Sedge was unique and we had to go through all the hoops and whatever. But after that it was easier. Only after Sedge was the disaster declared.

Interview 34 on 24 April 2012– Interested & Affected Party

Interview 35 on 24 April 2012 – Politician

I joined the DA in 2006 just as a member and in 2006 I opened my first business is Sedge. I'm the first coloured hairdresser here in town and I'm running my business now for 7 years. The 2011 someone from our are here came to me in my salona nd asked me is it not possible for me to stand for my ward Sedge/ Smutsville where I stay. And I asked him why, because I dont like politics. And he said to me 'no its gonna be a good examplea nd also for your community. YOu've lived so long here and you are one of the ladies who achieved something in sedge/ smutsville. So me for instance as a single women with a business its going to be a good impact. I was involved in communities with the schools. i was in governing bodies and representing my church. I was a a leader of the deacons in the church for 3-4 years. And thats why I became one of the DA councillors. But we was a lot of DA councillors who was standing for the Greater Knysna. I think we was more or less 24-25. I was the only one from the community where I stay. Then ther was the other 4 from Sedgefield. It was Ray Barrell, Louise Hart, Doris Nayler and Henri Mcombi, and me the 5th one. So it was a huge new thing for me to join politics, i was scared you know.

For me, people had put the trust in me, lots of Sedge people, I know more than councillor Hart knows. And she knows many people in Smutsville because she's an OT. That’s why I was standing and our first interview came at the DA, 25 was the panel we were sitting in. It was only for 15 minutes and you must answer 5 questions. I said that I support the DA but I'm goign to serve my community.

A second one that talks about the water in Sedge, How is the water here. I told them from what I understand that this plain on cola beach they're pumping the water in the dams and that’s where we get our water from. And the water you're talking about, the disaster, the people n our community didn't even realise there was a shortage of water. But I must say to you, the Directors of the water, Calvin Jeptha and RHoy Parry, they
were sitting there for hours and hours to top up our dams.

The area of ward 1 covers Smutsville, Myoli Beach, Cola Beach, comes down to the Island and Rondevlei. That’s my area. My responsibility for my ward is that I’m a part time councillor. That means that I'm at the council, I must attend my meetings, workshops, every bit of training. The reason for this is because of my business. I'm a part time councillor because I've still got my business. Then there’s a PR councillor, which is different from a ward councillor. Doris is my PR council. She must go and research our village also. If there's anything they need they must come and report it to me and I take it to council. I am not responsible because housing is the Dept of (human Settlement). it comes from government. Its not a thing of KNysna Muni. People think that because you are a councillor you must help them with building houses, and, and, and. There is budgets, but all their budgets comes to different directors: dev & planning, finance, community, infrstructure. So all those councillors represent the mayor, with their own portfolio. So that is my job, I must report to them and then they go to the mayor. My job is that I go in and work in my community. Someone was phoning me this morning and you must note everything, because you must also provide report backs on meetings attended etc.

(you said that the housing aspect in the wards, the money comes from human settlements?)

Yes, that is also a problem. If they say they can build 100 houses in the WC, they divide it to the different munis. But the need is higher. Housing and electricity is the biggest problem in Smutsville.

The water infra, because of the plant, the sewage is too small. That’s also a hold up.
And there’s also no land, so you can’t build infrastructure. In the houses, its 99 houses, back yard dwellers, little settlements are in the property. For example I live in the backyard of my mum. And the pipes are so small.

(Louise come in, pause)
In my mum's house, I get water in the house and we’ve got an outside tap. That’s how it works with many of the households. Specifically in the areas where there are settlement houses where they don’t stand on a property where is water. So maybe 10 people use 1 tap with water. In the gaatjie, beverly hills, slangepaak. Because they ahve shacks. Also with the toilets, they goin to build toilets for them now. And they goin to put the toilets where the water standpipes now. The toilets are not good. Lets say we a re 10 people in that area, and they build the toilet 10m from us, and then people use the toilet and lock the toilet, so they take ownership of it. That is why we are trying to build more toilets, because especially for women its difficult, they’re getting infections and things. We've got example of one house came to us and in that house staying 9 people. And they'd all be using more toilet. And now the muni plans to build more toilets, its come soon, and EDM sponsored us 20 toilets.

(I read in the Edge about R9m being allocated for service delivery to KM)

You see KM so they'll give it to every dept.

There is a plan, each and every councillor must plan and put your plan forward. Tonight we are going to have an IDP meeting with our ward committees to decide what we're going to do with the money. The R300 000 that are allocated to us. At the moment I’ve got 8 people on the committee in ward 1. So we are going to meet to discuss what we are going to do with our money for ward 1. We come together, draw it up, and they try to intergrate into the IDP.
For the most thing we need in Smutsville is a walk, and our sportsfield. Its very bad, we ahven't got sports facilities. At the moment we battle with that because we've got a huge amount of youth in our community. I spoke to Calvin, the sewage is thre, why are they not connecting it to pipes and bringing it to the field, so the field can grow grass. We also looking at that to put it in our budget.

In my ward committee is safety, youth, helath, environement, business, home based (the back dwellers - someone represent there, because they also need electricity), police forum, and the ratepayers. Its differetn parties and from all parts of ward 1.

Ward 1 has been seperated out?
Yes I don’t like it like that but its what they do. But what we do is that me and Louise work together. All the projects she put on her IDP is for job creation and who are the people shes' going to use, my people.
(What about the peoplein ward 1. because there is a race diffrence)
Yes, it’s a huge difference. The Smutsville people - not my people - say I m not there for them I support Sedgefield. I know Sedge hasn’t got the same housing problems. They stand together with me and they also want to tar the roads. So they also throwing a lot of racism in that. But with my people on the Island, they work with me very nice. I also sit on the ratepayers.

In the interviews I've done, the sense I get is that there is still segregation (Oh yes) can you tell me more about that?)
As a councillor they also throw it a lot. The ANC said we are not running Knysna, the ANC. But now the DA is the ruling party. But the ANC ran the area for 10 years. But what also caused problems is that it was run byt the ANC for 10 years and not run smoothly and for us to come and fix all these problems, I dont know. And race is always a problem and I dont know how we are goign to fix that.

(I've looked at the water forum for example and I've asked questions about representivity. )
What is it also. I think you can understand the situation is. We are in a really poverty situation up in Smutsville and the younger generation didn't go to study further. They finished school in grade 6 and 9. How can they have knowledge of infra nd aengineering. the opportunities are here, if yhey go and fill in forms for bursaries. the black man and the white man gets the job. not the coloured. we dont even have a high school. you have to go to george and knysna. its a lot of money. the school bus is expensive. the hostel is there but if you dont fill in a form you cant get a place. And the thing in most munis is computer literacy. there are courses but how are people going to pay R800.

The poverty is recognised by the munis. They know about it because they do research. There was matriculants in 2010 and 2011 that go door to door and do a survey. We are now also going door to door. Because that time was the ANC. So the deputy mayor and the mayor we work very nice together. So as the DA we must go and survey our people in all the areas. A place called Masithandane, they do a lot for our community. But the funds and food parcels and everything from Masithandane, its 'Masithandane gave it for me so why must I go and work' thats the poverty thing. The census they missed a lot of people. So each and every councillor wants information on pensioners, youth etc. They have that. YOu must go to the muni service desk. You can go and ask them in front.

Lots of people came out of the EC, there from other areas, they come and run our place. We are bor here and they get houses. But they don’t spend a cent on delivery and then
they are marching. These are RDP houses. There's round about 200 RDP Houses. The money comes from Human Settlements and it goes to the muni and then they allocate funds for certain number of houses for different areas. I'm also now wiser, I understand how these houses work. Its not the muni. But thats seperate for the water and the pipes and all that type of things.

(You spoke about the toilets and the standpipes in the is. How are these being developed further so people have better service diivery?)

They going to develop that further. We try to give them the better service. If there's land for housing then every settlement hose has got a toilet but now at the moment I cant tell you they going to build houses because of the delay of the housing and land. Now backyarddwellers are putting pit toilets in. There's no land for housing. So they're looking for land on this side. The other side of the N2. Development and Planning, the muni.

(Theres a clear difference in the level of service delivery between the island, the village and smutsville, sizamile. That is the services available per household when compared..)

They delayed to do something in Smutsville because who was governing in that time because Sedge was DA. We now to do something for the people in Smutsville, but we cant because there's no land.

(Can you tell me more about the service delivery protests last year?)

There was two last year. Laughs. They want to vote me out the ANC an SANCO because they said I'm useless. I said to them if you come up with that boycott for service delivery, is your sewage not drained if its blocked, your refuse on a Monday and wednesday is removed. Thye keep your service up to date, how can you boycott for services. All those living in the RDP houses, its a free house, Mandlea gave it to them. But who's paying for the water? We are sitting with bills of R90k, R60k, who's going to pay? Its just poverty and poverty and poverty.

It was not useful. It was just fruitless man. It was just jealousy.

(Other people have said its political, because it seems to be a DA and ANC battle. But at the same time the issues they're bringing up, do you think they are relevant?)

They weren't because in a weeks time they got the answers from the muni. The want houses, land for sport, electricity boxes in the backyard dwellers boxes. They give the memo to the memo and she said she has to go back to her directors and she will give them the answer. And they sittting back in square one. Because we have no land and we cant put electricity boxes in the backyarddwellers because of eskom, electricity... You can speak to Anton Gouws and Len Richardson. You can speak to the mayors PA Christopher.

(from your point of view, do you think the service delivery issues are legitimate?)

The services are good. I have no complaints. The refuse is removed, theres no problem [Does she not thin of toilets as service delivery?](But you spoke about the toilets). Yes the toilets are one issue. The water, in the shacks, there's taps. 10 households use the taps. But for the toilets you cant put 1 toilet for 40 people its ridiculous

I cant say what we want. The communities must decide. The ward committee members take it out to the sectors. So in the drafting of the budget, the way ward 1 is going to use the allocated money is as desribed and then the proposal is taken to the council. the budget is drawn up already adn the final budget is the 31 May.

Smutsville and Sizamile its together. Its in the same area. Its just the street names. And sizamile was named by the Africans who stayed there for years. But we are mixed. So its different names. So it’s the whole area of Smutsville.

(When you are engaging with people in the island and cola beach. Do you do it alone or
with Louise?)
We do it together or we email each other.
I grew up in Smutsville. The history of Smutsville you would get from an elderly person and if I can also suggest you can meet Henry Mcombi. He can tell you the whole history.

I interact with the portfolio councillors all the time. We are having our section 80 meeting now, may 2, finance in the morning and community in the afternoon. Development and planning is always the following day. Infrastructure and development and planning.
(Would it be possible for me to come with you because I don’t have a car)
I usually go with Louise, but then we stay all day. If you give me your contact number and then I can let you know.
As far as I can tell you about infrastructure and development, its not my portfolio. The decisions are made through the section. It all works like that. Section 80, mayoral, council, and council is all our councillors sittign in council. Then its passed.
(How do you influence as a ward councillor?)
You can put in your comments, so it works like that [note, its also through the proposals from the ward committees…]

Interview 36 on 27 April 2012 – Interested & Affected Party

Interview 37 on 4 May 2012 – Municipal Official

I was town engineer of Knysna and that’s when government decided they were going to have these wall to wall Municipalities and that’s when the Greater Knysna area included Sedgefield. I very soon became aware that Sedge’s water situation was tricky. We went into studies and reports and the information came out that we could expect Sedge water supplies to fail once every 2 years. I took that to council and we started with the planning. Even at that stage we looked at various measures, including deal and water saving measures. All the options. I think it was over a period 5 years, because it takes time for the studies to take place. So we’re talking about 2005, we had the answers. So to get council to commit, the most economical answer was an off channel dam at the Hoogekraal River and a pumping scheme across and a new water treatment works as the wtw was subject to flooding. I managing to secure some funds through the MIG. We went out to tender fro the wtw and it was awarded. we were on track to the environment for the dam and everything was looking positive. And the council in Sedge was DA, and they felt they couldn't be sen as suppoting a DA ward. They cancelled the contract, cost them over a R1m to cancel and I was left high and dry with my programme, and the threat was still there. I must admit that even if we had gone ahead with my programme, the dam would not have been full by the time the drought hit, I cant really say that the probelm would have been resolved. But the council I dont even think took note, the whole thing was it was a DA ward, which Made it politically unacceptable..
They tried to blame me you see, why all this was hush hush. The council was fully aware that this was a very tricky water situation. It could fail at any time. Then ofcourse we had the drought. And the normal response to go into water restrictions to ssave what water you've got. But this was a very very bad drought. I still think in that respect we could have made do without doing anything if we had severe water restrictions. In fact Sedge had gone through this once before and shut off supply for th town and people had
to come and fetch supply in buckets. But of course the politicians had taken a negative decision on expansion of the works. They now having to justify and of course look for a scapegoat, and whose the scapegoat, the director of technical services. So I was investigated for incompetence etc etc, but they didn't take it to the point where they charged me. Because the decision was taken by them and they didn't want that in the press. SO they took me out of the press. Only certain comments to the press would go through a councillor or the MM. DWA weren't any help at all. They overreacted and may have been political pressure. Making statements like no dams will ever be built again. Completely irrational stuff that was coming without a scientific backing. We know that our pattern of rainfall is more less going to stay the same, but the intensity of events, we'll have to store more.

Anyway in all of the overreaction, an emergency pipeline was put through from the Hoogekrall River to the works and really it should have stopped there. That would have seen Sedge through the drought with severe water restrictions and still had water and it could have been made a permanent supply afterwards. Which I think they still trying to get the Environmental Approval for. With all the panicking from water affairs and so on we drilled boreholes. I'd had experience with boreholes in Belvedere but basically boreholes are like going to the casino, you're gambling. We drilled 10 boreholes, 7 were successful with a yield of 50% of what we thought we could get out of it. Value for money? But politically its nice headlines

The next step was that council went out and tendered for desal which is a very expensive option. Funding was given by the state, but the end of the day that asset has got be maintained, replacement costs, depreciation has got to be built in. In 10 years time you've got to replace all that equipment so you've got to have that money and it becomes expensive. But our finance people didn't tell the council that and they didn't tell the press that. We all know its expensive

With all the schemes, the way things work, for 2 days I had none of them working. The desal plant, the wells on the beach went wrong; the boreholes the major pump blew up; the emergency pipeline somebody stole a part (?) and the water works was still in a drought situation. So you can never be 100% sure. And DWA didn't seem to grasp this. They wanted everybody to say that you have zero losses in the system, which is impossible. My philosophy was that you must always have some availability be able to say to public save water because there is a drought situation. Its fine, Sedge has now got all these reserves, enough water for the next 20 years. In 20 years time when a drought hits, where does the water come from? From water restrictions and savings? Because the next step is hardly affordable to the council.

The council don't want to spend their money on expansion they hold somebody to blame, politicians are never to blame. TO HAVE THE EXPERTISE AND People to run the desal plant is going to be very difficult to manage. My opinion is that if they want it to be successful and its not something that they mothball and wake it up in 5 years and find see whether they can make it work. Its going to need private people with the expertise, that can send the people to service it on a weekly or monthly basis and so on. Otherwise its goin to fail. Mothballing it, saying we don't need it now, and wake it up in 5 years time, its going to be a major thing to get everything moving and working again. I'm very concerned about whether small towns can afford the expertise

So Is that what you expected to hear from me? No

(To some extent. In talking to different actors, I've heard different discussion. I've come across the dam and the cost as being something R110 and that’s why it was turned down as it was too expensive. And you are suggesting it was political.)
Yes. They weren't prepared be seen to be spending that much in Sedgefield 
(What would you say to the claim that it was too expensive when taken to council?)
Look there was a mistake made by the council. It wasn't the dam, it was the WTW. To 
replace that whole works to move it out of a floodplain. Normally to upgrade a 
treatment works you don't have to replace everythng, now we were scrapping everything
because it got flooded. For 2 weeks it was under water, you couldn't use it. So it wasn't
a crisis of a drought, it was a crisis of a flood where you couldn't use the WTW. All the
motors had to be sent off to George to dry because they were saturated. We managed
through those time and time again. But because they had taken the decision to cancel it.
Now there was a drought and there was no water and they had taken the decision and
thats where all the pressure came from.
The dam hadn't been put to tender. The first part of the wtw, it was put out in 2 tenders,
the concrete works and then the mechanical equipment. So the concrete works,
structures was put out to tender and that's where we could see it was expensive. And the
council were fully informed. they took the decision to award the tender... And they were
aware in my reports of what additional funds they were looking for. But then the
finance officer was playing the political wicket. Pointed out to them to cash flow and
Said it shouldn't be wasted on a small town like Sedgefield. Regardless of the fact that
they were sittign with a very dicy water supply system that was going to fail at any
time. I didn't enjoy being investigated and so on. I had more record at home than I had
in my office because I was covering my back. You couldn't take a decision right or
wrong, where they weren't looking at me to take the fall for them. They did once before
and I made them withdraw it. They actually charged me. Gave me a letter of
incompetence and I made them withdraw it. I took them to court and had
compensation. I had 3 cases against me and eventually I was compensated. I was sitting
at a point where everything is fine as long as you have someone to blame it on if things
go wrong. As far as council is concerned, you tell yhem, you've got a crisis coming,
you've got to spend money. When it does happen. then they looking for somebody to
blame.
(You said that there was a report by consultants on the situation in Sedge)
The first thing, when you're looking at a water supply scheme, you've got to know what
you've got and Sedge being a tiny little town, really had no history of good reports so I
had to get all that built up and I was able to say to them that the risk is that EVERY 10
YEARS WE'RE GOING TO BE 2 MONTHS WITHOUT WATER. BECAUSE THAT
IS WHAT THE WATER SUPPLY IS. ITS UNACCEPTABLE. You can't live like that.
(Do you have any communication that I can trace that?)
Not that I'm digging out of my storeroom. But you should find it all in the council
records.
If you look at the reports on the water supply scheme, long before the drought situation
arose. Those reports are all there. I mean there was a meeting yesterday that I was
invited to where they were presentign the dam options for Knysna. I was dying to be
there because that started 5 years ago with me taking it to council. Now first you've got
to battle to find money just to do those things. Council, they've got a 5 year term, why,
when its something you're goign to build in 5-6 years time. You've got a hell of a battle
trying to get that stuff through

Accessing funding for projects has become a political game. The whole municipal
system in the new South Africa is highly politicised. I'm not a good employee because I
refused to play the political wicket. If I reckoned that the water supply to Sedgefield
was the highest priority when needed, regardless of whether its a DA ward. I should have played the political wicket and said (?) spend the money in ANC wards.

(What would you say to the claim that the money requested for the dam was too much to pay for?)
Absolute rubbish, absolute rubbish. We had the money from government funding, about 2/3 in different forms. It was just a matter of, if I took the money for the dam it just didn't go to other projects with an ANC standpoint.
I don't know what they said about the dam they doing on the Knysna River, but they also going to say that that one is unaffordable, and if there's a crisis then who's responsible? Then they'll find somebody to be scapegoat. Instead of saying that 'at the time we didn't take the right decisions'.

(The other question I had was, I've looked at the Com BP, and in there information was extracted from the previous reports)
Yes, and that shows that all that work was done and that the council were fully aware of it.
(The question that I have was, the scheme that was proposed to council - dam, pipeline, raising of wtw - each were different components and what I wanted to understand was why pieces of these were not initiated in stages?)

…. I can remember having quite an argument with the consultants because the easy part was the relocation of the WTW as far as approvals and DWA and DEA and all the rest of it. But to me I wanted to be sure that before we spent all the money on relocating the WTW, that we had assured alternative supply, and that's where I was pushing them. But of course they're looking at there fees and where things can go quickly. Eventually the government fundign came through and became available for the WTW and I had to compromise my standpoint and say ok the money is there lets go ahead with it, even though we don't have 100% approval for the dam. Again it was trying to manage the cash flow. To do the dam and pipeline and wtw in one financial year would not have been possible. If I could spread it out, I think it was 3-4 years, even phasing the WTW into a first phase and second phase, providing into the future. With the first phase just providing for the needs as they were. There was, the way I'd managed to do the cash flow (?) Ideally it was a big pot of money, and if I'd had the money to do the investigations, all at the same time, it would have been ideal.

(One of the major interventions was the Hoogekraal pipeline during the emergency and I wondered why a pipeline like that had not been laid earlier to make that alternative source available?)
Well, more than a year after the drought, when I'd retired we still didn't have Eapproval to lay the pipeline next to the river at the Karatara River because it was within 30m of the river banks so you've got to have special approval and you've got to do all sorts of studies and in an emergency situation where the council is now in crisis and prepared anything, then you ahead and put that pipeline in and hopefully the council will back. But when the crisis is off then the council would be like 'what are you doing now?' So the eapproval for the pipeline still wasn't finished 18months after the drought was finished and dead and buried.

(To have done it prior to the emergency stage would have been a very drawn out process before you are even able to start?)
That's right. And a lot of hassles with putting in the emergency schemes, people wanted all sorts of aprovals and I flew up to Pretoria and set with Danie Smit who's head of Eaffairs there and convinced him of my integrity and my standing in the profession that these things would be addressed you know. And on that basis he said 'ok go ahead on section whatever it is, there will be a fine'. Ja fine. And The fine could have been R1m, it could have been R1k, we didn't know. But it was on that basis that he said I accept that you're going to do a responsible thing, but at the end of the day the water legislation says that you're goign to be fined because you've done it ahead of the aprova;: But atleast I did it with them knowing about it. Not involving them in the process later on

(I'm aware of use of this clause, I wondered when the recognition arose that this clause could be drawn on in order to move forward?)

….. I think really in the case of all the Sedgefield schemes it was a case of my standing in the profession deallign with all the environemntal people. So the council scored on it, but I couldn't take any credit, because at the end of the day, the council is still goign to be facing the fine which I say 'Mr. engineer you did it'

(In the interviews I've done so far, to understand the crisis period, the names that have come out most strongly are Rodney Nay and Hennie Erwee. So what was your involvement at that time? You also spoke about how you were sidelined?
I was still involved when the tender was prepared for the desal plant in Sedge.
[Interruption..]
You know I would have found it far more difficult to talk if I had still been employed. Munis since the amalgamation have become so politicised that the right decisions are not being taken. Councils have a very short term view and it hasn't done the technical side any benefit at all because you've got to look at longer term planning. You're trying to plan for 10-20 years and thats far beyond any horizon of a council. In the old days, there were those who had 11 years as a councillor. So they would have a longer term vision for the town. Not a short term, build houses today for the people and get the votes you know. The fact that you build houses and there's no water, nobody worries about that, 'mr engi (That's also another question, there is the issue fo the bulk infra, so if you're not investing in the reticulation then wheres the water flowing, inother words, wheres the money flowing?)

In Knysna's case they've spent all the money on housing and the whole housing scheme is that it shouldn't cost the muni anything. But more than 50% (?) of the cost because of the topography in Knysna has to come out of loans from Knysna and we've got to service that loans. All the money that should have funded infrstructure and so on has now gone into those houses and the finance people have been very good at hiding it away so it doesn't look as if its houses. Because you cant actually spend it on houses you've got to spend it on infrastructure. Its all very well putting up the sewers, pipes and cables around the houses. But if you haven't got the water to get to those pipes then thats...
SO the bulk services are not there.
But anyway, then when Knysna activities started up with boreholes and reuse of sewage effluent.
(before we go to Knysna, can we just stay with Sedgefield a bit? The biggest question that I haven't really been able to get any answers to is how desalination got put on the table so strongly and through which channels)
... Hennie Erwee was a very strong player at that point. He was very much accepted by the ANC council. He put a report together for the Sedgefield situation. It's very difficult then to say well we don't need to go to desal because we can deal with the drought. He was talking the language that DWA wanted to hear. This was the new technology. The fact that it was the most expensive it would look good on everybody's CVS that this was the first one that dealt with the crisis etc. And in fact we got a lot of publicity and a lot of awards, it was done very well. But in my heart I still know it's the wrong decision. It's too expensive. Whether we'll be able to afford to maintain into the future. I think for a PE and a EL scenario where they have big staff, trained experts to deal with the pumps and electronics etc. But when you're relying on and can't even get a fitter to come and work here because the salaries are not good enough. We were very lucky to get somebody like Jules Hartslief. He had interest in the technology because he had worked on the oil rigs. His retired now, but his working again as a consultant, because nobody else can do it, you know.

(What about Calvin Jeptha?)

..... He can watch a consultant do it, whether he can have enough gumption to say we need a consultant etc. would worry me. And then the time might have passed. Whether he can anticipate preventative maintenance and forward planning I don't think so, and also I don't think he can fight for the funds.

(We spoke about DWA and the publicity of being the first in the country with a plant this size)

Certain people in DWA were very vocal about how we can't rely on rainwater, climate change was the flavour of the month and the whole disaster management people were onto climate change etc. As I said statements were made that SA will never build dams again and that was official statements from DWA. And by the end of the drought dams were being quite acceptable again. But people were reacting in a political way instead of in a scientific basis. I was very upset, I really was. There was no ways you could fight them when you don't have a crisis on your hands. But when there's a crisis and people don't have water and the money's coming in in buckets full.

What we had, Rodney was my assistant who dealt with the money side of it. And it was his role to manage the grant funding and what came in. And he did a very good job putting together that business plan from the reports. The final draft was done by myself. Gave the (?) emphasis and everybody forgets that was what was done. That plan was put together and was used as an example by all the other people looking for funding, the Mossel Bay's etc. So this was the standard. So he did a very good job. But my reports looked at the background at those reports had all been seen by council in the past. The river will provide the water as long as the WTW isn't flooded. So we may not need that plant for a while. The danger is that they mothball it. Then they've got to replace parts and where does the money come from then?

[wife arrives]

In the past I could get council to commit to a programme that was 10-20 years into the future, the finance people had to step in line, because council was already committed to what was in the programme. The new political councils will not commit, because they want next year to be able to change their minds. I found it very very difficult. I think I made it worse for myself because I wasn't prepared to play the political game

[pause]
As I said we moved onto the Knysna scenario and this is when the business plan ahd
gone beyond my stuff and Disaster Management and Hennie Erwee and company were
talking about reuse of sewerage effluent. I had looked at it at a very superficial level just
on the economics and like desal was very unaffordable. But then again in terms of the
drought it could be done fast. NT approved money for reuse. I was not happy and not
prepared to support it because I didn’t believe we could control the sewage works well
enough and had enough barriers in place to protect the public. We were already
overloaded. Already I was battling to find funding for the sewage works. So I kicked
my heels in to the extent that treasury wanted to take the money back. The MM got
upset with me because I hadn't done my planning. And there wasn't time or funding
really to do it to that level. And then council removed me from all emergency projects
and put Rodney Nay in charge with the consultants. Because my position meant that the
funding would go. This funding was for reuse of sewage effluent. I think my level of
integrity is too high. Because upfront I said the thing would not happen. Eventually
Rodney Nay fuzzed the thing gradually over time so that it is built next to the sewer
works using lagoon water and putting it back into the lagoon using the sewage effluent
as dilution of the brine. It was no... If I had to go to NT and say there's your clause, it is
not reuse of sewage water. Mr DWA what you approved, it is not what we've done
there. Everybody would have egg on their faces. But again I stuck to my guns. I can be
happy that the public is protected health wise until they spend all that money on the
sewage works. I was removed from all emergency projects. I think the Sedge desal plant
was about 90% complete, up until then I was involved.

Most of the money that Sedge had was emeregency money from some or other source.
And most of it for Knysna.

(How essential are these plants. Because one of the strong implications is that there was
no alternative. What would you say?)
If Knysna build this dam they would have guaranteed water for the next 15 years. Does
it make sense to run a desal plant with water costing 6 times the price of what you can
take it out of the dam. If you do things at the right time, you'd never have to choose
those projects. As I said to you when we started. If they'd allowed me to go ahead with
the dam and wtw for Sedge, I doubt that they would ahve been ready. But atleast the
thinking would have been there. The planning would ahve been there. As with all other
droughts in the country, we woudl have had to have relied on water restrictions and
conservation measures to manage until the drought broke. What we dont know is what is
our designing to follow once in 20 years with 95% confidence. If climate change is
changing what we thought was 95% confidence to 85% confidence then we've got to
have more water available sooner and your your cash flows start to change. And that
becomes very difficult to do because your whole predictions of droughts on historic data
and you have no historic data on droughts, climate change happening now. That
changes the plans engineers have. The whole thinkings got to change.
(Desal is promoted as a guaranted source of water)
I agree with you, if you're in Saudi Arabia, then there's no other option. I mean why has
most of our Southern Cape coast been able to rely on rivers up until now? Because there
was a good supply of water. The water is there and the rainfall is there. We've just got to
store it and use it at the right time. There's a long road ahead before it becomes the only
water available. thats a typical DWA view. 'The sea's there, we can use it. The councils
gonna pay a fortune to run those pumps. You've got to exercise your mind on that whole
5-10-20 year cycle. JO'burg, the big cities they dont have those problems. The water
comes from Randwater, power from Eskom, the small towns we have to do all those things ourselves.

(That’s something else that’s been said that here the muni is the WSA and WSP)
Yes I was the WSp and the WSA. And to speak to council about what it means to have the staff to separate those 2 functions. Those reports also going back to 2000. In 2000 I went to council. I said there's 100 vacancies in my dept. I was told in the strategic planning meeting that there's no ways they are growing the organisatio by 100 people. When I left the mayor announced the administration has grown by 100 people, not one was in my area. And how much has water services grown in this time. So we are trying to take care of things with the same number of people. The salary bill is so hihg on non productive people. And thats what an insider sees.
(Whas the shortage of staff a factor that influenced your ability to plan and put out fires?)
Very much so yes. I wasn't sure if the services were going to collapse or my retirement would come first.
The council were also aware. In every strategic meeting the issues were capital, bulk infrastructure and staff from my side.

(In the case of Knysna, I know that when the river flow levels were quite low the Akkerkloof dam levels were also quite low)
That was 50% lack of staff. The other 50% was maintenance to be able to have money to do preventative work. The money we had available was killing fires. I think the first 2004-2005 Akkerkloof was very low and we then got money to clean the pipelines. We're not talking little money for the pumps, we're talking R100k-R200k for the pumps. Plett got themselves down to the situation where they had one pump left you know.

(Can you give me a bit more detail on the situation at the Eastford and Charlesford stations and how it influenced the level of the dam?)
Ahh. A lot had to do with maintenance of the pump stations and maintenance of the electricity. Instead of having specialise people we were relying on a bloke who changes the street bulbs to come out there and deal with the crisis in the middle of the night. And things over the years have gotten more and more heath robinson. Then we got into a situation where important pumps, and they were more panickey than the more robust agricultural pumps that we had and eventually we tracked it down that there was fluctuation at the end of the eskom line and that was causing our problems. So ja, I could a lot of blame on eskom supply and the reports are there to prove it. I've got to take a lot blame myself because I could have done something 2 years before. But its the kind of problem where in retrospect you think, but when you're dealing with it you think you think you're doing the right thing but you're looking in the wrong direction. You're dealing with bearings and pumps and God knows what else, but you need the expertise in house to point in the right direction, just wasn't there. I don't think we'll ever, our size of town employ those type of people. The big cities might have those type of people. I couldn't afford to employ somebody with those expertise 365 days a year and keep him busy. You've got to bring a consultant in and when you bring a consultant in it costs an arm and a leg whihc you haven't budgeted for, you think twice before you do it.
(From the crisis and following that, there seems to be quite a heavy involvement of consultants)
All munis, even the big ones have moved over from trying to do things in house, to using consultants to do it for them. Because they don’t have the expertise to do it. From
my sake it was taking more and more tiem to manage the political environment than doing engineering.
(Do you think that the use of consultants also influences what options are selected, as there is money involved?)
I've already said so, In Sedgefield, the consultants were pushing for one portion of the work, because that was quick money and they could get the eapprovals. And I had a lot of arguments with them but then eventually the funding came in that direction and I relaxed

(The Glebe and Akkerkloof transfer scheme. I know it came aboard folloowing the drought and has been a significant factor in filling the Akkerkloof)
…………………………The Glebe catchmnet ha a very limited capacity. So you might be able to transfer quickly once and then its done. So in terms of a long term water supply for Knysna, it is not significant. It is a useful and emergency measure. But if you were doing long term planning it is not something you would rely on.

(I just want to come back to this question of an emergency. What is said is that it was absolutely an emergency and without the schemes the towns would not have survived)
On the Sedgefield schemes, excluiding the desal I was very happy to go ahead with because it was funded by somebody else and I was battling to get funding. The Hoogekraal would have formed part of a bigger scheme anyway. It they funded under emergency measures, what a pleasure. At that stage the momentum was up with the desal and for anybody to say that we are not going to do it now, DWA may have withdrawn their funding or goodness what else. But the RO plant, I presume you mean the effluent reuse plant. Thats where I got in big trouble. ? An dits in fact what they've done, but.. I dont think that anybody NT, DWA, KNysna, anybody wants to say that what it was approved and what was done are 2 different things so lets just keep quiet about it. Unfortunately I was vocal at the wrong time.

(When you talk about the momentum, that was generated at the time and that the money was then made available. Could you maybe unpack that a bit?)
I think there's 2 important aspects there, if you are looking at water restrictions, you've got to get it through to the public, the publicity, all of that is very important parts and the press plays its own game as to how they want to see it. They will use it for their own agenda whatever it is. And very ealry on the council said no statements except throguh the mm and mayor. Because of all the sensitivity of what was going on in the background. If the press ccame out wit the wrong statment only they could be blamed for it. So they didnt want anybody leaking any other info. Hopefully the aganda was that the press got all the right statements and it was all flavored by what the councils agenda was. they took charge of all publicity. So there was that momentum going.
Then on Provincial level, even National, they had started a Disaster Management Unit which was trying to gain its own momentum to stand as a Provincial and National Dept. So the legislation was there but until there was something to trigger it nobody was taking them at all seriously. So they climbed onto it and we had provincial disaster management and they were doing press releases, making sure dwa were doing the right thing. So Disaster Management grew from insignificant to something, because they really needed something to trigger.
So that momentum was swinging and we had to go down to meetings. Those might be worthwhile for you. Talk to the Provincial people and EDM. The MMs were also involved. And Knysna was leading the pack with Sedgefield as well. They were the first
ones which if anybody had listened to me, it was to be expected. Because it was waiting for a disaster.
And the 1st one, MB got into a very serious situation, but eventually they got funding too. George, a lot of their projects they already had environmental approval so they were very pleased to get the money. Everybody had other agendas underneath but the momentum had come from disaster management running it and managing it. Originally DWAs attitude was sort of don't blame us we don't provide water, we regulate. Which was a new way of looking at it. But eventually when Dmanagement started asking questions about what are you doing about it and it got up to national level then DWa had to take more of an interest.

(What of the role of the companies in all of this?)
In the field of deal, there was no muni that would have the expertise. I think even if you had to talk to Hennie Erwee and his people, there's not one of them that could design the thing. So you've got to go out and buy a plant. Not design it yourself. They had to go out and tender and so on, who's going to do it, this is the result we want at the end, how you're goign to achieve it you must teell us, give us the spec. The best qualified people would review that process. Like SSI whi had more exposure. then you'd have people like myslef and Rodney Nay who'd manage it through the administrative process of procurement and quality and council etc. So the company providers we were very very reliant on what their technology is. At the end of the day, do you really know what you're getting, its very difficult to knoe. So you're very reliant on the technology of the supplying company. They only provide us wiht as much as they can know. I mena the first time you wen to buy a computer, how much did you know, and each time you know a bit more. Now Sedgefield was the first. Maybe we would have asked alot better questions now then we did then. We had to learn as we went along.

(You said that from your studies, it was a disaster waiting to happen. Whereas others seemed to express a sense of surprise)
We were watching the rievr very closely. In fcat I had takne my annual leave to take my son back to University [background on son's health]. So I'd taken my annual leave. When I'd left there was 2-3 weeks of water left in the river. Which anything was possible at that stage, was rain goign to come. The plan was, without any support from council, because they knew about it. It was recess, over Christmas, so the full council had left, people were fully informed as to what was going on. If we got into a worse situation, the water that we ahd we would have to mange in terms of our reservoir and standpipes and people would have to come and fetch the water. The situation I'd described to you. It can be done you know. When the river actually stopped flowing out and they started to extract from what was left, it was salt. The saltwater lies under the fresh. We were aware of that but weren't aware that it was that big a problem. We didn't realise the salt (?) underneath. So when it came to use the 2-3 weeks of water, there was nothing left. that was one fo the big triggers. that brought the emergency on. And I think the farmers upstream they were using things up faster than .. What caught us wiht our pants down was the salt water that was left not freshwater. On Monday there was nothing that wasn't salty. Thats when they started to bring the tankers in. DWA sanced the issue of farmers extraction because they've got no way of reaching the farmers. They're looking after themselves first. And nobodies out there to inspect. One way to manage something like that is that if you don't know about it you're fine, so dont go and inspect..
I was speaking to my staff daily. They wanted a scapegoat. So you was a deliberate plot not to make a request for me to come back. If I'd come back and said to the press that this wouldn't have happened if the council had agreed to a dam when I told them to. I don't know. But there was definitely a lot going on behind the scenes. But the Mayor and MM etc. did not contact me at all. I was dealing with Jules and ROhoy on a daily basis if not more as to what was happening.

(Rodneys' role, from what I understand he has been a major driver in what became the augmentation scheme and the selection of desal.)

…… I don’t think he had any technical input into the options. Those were already on the table. As I said to you his role was to find the funding and put that together for what was already on the table. So the choice of what was available, because he was an engineer when it came to the tender evaluation. I had to sit on the tender evaluation committee so I couldn't be seen to be part of the process. So I asked him to sit on the evaluation process before it came to the committee for the final decision. So he was involved in that. He definitely, as far as the sewage effluent reuse project, he was very influential in accepting the scheme and bending it over until it became something else. So I don't think he influenced the technical decisions. In terms of putting that business plan together, it came from my reports as to what options there were. When it comes to water supply, you sit down and look at what you've got. If you identify you're in trouble with your future planning, then you ask what are the best options in terms of the economics. And you say these are the options... and right at the bottom there's desal which is so uneconomical. So you take the top 3 forward to the feasibility, then you go with the project, provided you've got the environmental approval. So your engineering planning goes hand in hand with environmental approvals. So in the crisis, he was able to take those options and say these are the ones we can implement fast. And that's how things got onto the table. If you look at the business plan, you can see the options on the years and so on.

(My question is related to how desal as an option was moved to the top of the list?) How did it get moved up? Because economics fell off basically. Government was providing enough money and we make enough noise and everybody sings the crisis that we're in. That's the quickest. So that's where the decisionmaking becomes fuzzy. So in a crisis economics falls away. You know it's the wrong decision, it costs you more. It's a short term decision. But what happens in 5-10 years time. do we have the expertise. do we have the money to run this desal plant in KNysna.

Well before the drought every desal rep were knocking on my door to try to sell me a desal plant, they were looking for an entry into the market. Some were fly by nighths and others had invested heavily into the technology and had markets overseas and were looking for local entry, and had strong marketing teams. They were looking for an entry, very much so.

I'm trying to look at it from your side, in terms of the social. We've spent a lot of time trying to manage the water demand management. Asking people to save 15% of their water. How do you know. And you can't rely on NT meter reading figures because they are 2 months late. So you've got to read it now. And with my short staff trying to manage that too. When it didn't happen, for obvious reasons, another dept came in and assisted. Trying to extract data and finding that half the businesses in town had been rated at domestic tariffs, the whole database was a mess. KNysna had a water loss of
25% and we start looking at figures and find out that many meters are not being read. And across different depts fingers are pointed. But we've asked for money to replace 40 year old meetings. Our finance director was meant to report on that. Till today he has not reported. There's a lot of prickly areas to wdm that's not so easy to manage, the social spect becomes very difficult because you're going across depts.

My training is to have a handle of production and usage. If you look on a month to month, it's impossible. I've done this stuff on a 12 month average cycle.

[see final discussion on water losses - meter replacements, leaks, township pipes, no proper metering in townships]

Ideally you want technicians with skills and the big towns do it. What people don’t realise is that in small towns you are managing the whole system. And the big towns have tons of staff with skills. So its not easy for the small towns.

(About Emmanuel Myalato)

He worked for me. He obviously had an inside edge. I put in my retirement on Dec 25th. The advert was in the paper on the same day and he'd already been contacted. The MM who was one of his mentors and has now gone. SO I don’t know how exposed he is. SO I think his quite exposed with the new council. He doesn't have the concept of admin, creating a history. so after his term they may find a blank history.

I think there was a lot of publicity and a lot of people took credit and gain publicity out of it: Hennie Erwee and SSI; DWA; Dmanagement could create a big opportunity to create and infrastructure for themselves. A lot of people jumped on the bandwagon

**Interview 38 on 7 May 2012 – Politician**

I was the portfolio councillor for infrastructure for KLM from 2006 I think it was and this whole thing happened during that time. It was 2007 wasn't it, when we had the first major crisis? 2007 was the flood, and end 2008, going into 2009, we had the problem. Both Sedgefield and Knysna suffer from the same problem, or suffered from the same problem. Sedgefield is fed by one perennial river mainly which is the Karatara River and the water’s drawn from a wier. And in times of flood all the equipment from the pump station gets washed away and likewise when there's no flow on the river this thing runs dry. So you've got either plenty or nothing. Storage capacity for the town, a couple of reservoirs. So over the course of 2008, there was over an extended period low rainfall in the area. And the river basically got into a very low flow situation which was really bad during the peak period, Christmas, to the extent that by mid January the river stopped flowing.

You might ask why was nothing done previously. There was a plan in place. The technical dept of the muni had planned an off-channel dam in that area and when it was initially envisaged the thing in at R20m or so, and all the bits and pieces were added up it was realised that it was about R120m. The R20m was the original proce we were given to put in the off-channel dam. Now when you added the piepwork, the systems that needed to be put in place, the pipework from this facility. Sedgefield's got a population of something like 3000 people, divide R120m by 3000 people, those numbers just don't work. So you must interview Grant Easton by the way. Because he an I sat and looked at this whole little lot and said well it just doesn't fly. Can't afford it, can't borrow the money for that number of people. Just doesn't make sense. So WE canned the DAM. THis was during the course of 2008. And then ofcourse we went into this drought.
So the cost was astronomical when we put the whole system together. We thought it was just a little coffer dam and you'd pump and the thing would be relatively inexpensive. But it was another pipeline to another piece of property that had to be expropriated, to a dam, to a etc. etc. etc. Added that whole lot up it was hellish expensive.

(Why were components of it not implemented instead of canning the whole proposal?)
Well we canned the SCHEME. This is another of these off-channel dams. Now off-channel dam means you've got to use energy to fill the thing and basically your Rand cost is still astronomical because nature doesn't fill your dam. So the principal of this whole thing. No 1, the cost was astronomical and no 2, we didn't agree with our town engineer. Now he will not agree with my comments but that was the primary reson that it was canned.

(Can you say a bit more about the cost component and why the entire scheme was cancelled?)
Well we, the muni didn't have the money for it. Period.

(I've looked at the comprehensive bp put forward as part of the funding. Its clear there are different aspects. The hoogekraal, boreholes)
Those weren't part of the original component. Those are part of the new scheme.

(I think that those aspects went together into the old scheme, alongside the dam. So that costing of R110m that you're referriing to would have included those)
Some of it, some of it.

(So I'm just wondering why, you didn't go for a piece of it which would have allowed for an increased yield as opposed to no change)
……………… Well the plan was to look at an alternative. It wasn't no increase. That wasn't the plan. The plan was not to go for that scheme. It wasn't to not have another plan and then we got the drought. The Hoogekraal was discovered, nobody ever told anybody that there was a thing such as the Hoogekraal. I Found It. I ride there on a bicycle, so I know its there. It was used as part of the augmentation scheme after the drought happened. When we discovered the thing we actually went out and surveyed it and found that it was enough water for Sedgefield for a long time.

That's what we were saying. 'Are there not other cheaper alternatives.' Well I'm not there anybody, but the idea was to spend more money on the Hoogekraal. Sensitivity wrt catchment area going into the Swartvlei, environemntal concerns was cited as the reason why it was not used. But nobody had gone and actually done a survey of that river.
I was looking at it purely as a politician and we just looked at the picture. And one thing you discover as a politician is that your officials tell you what they think you need to know. And they don't always give access to everything. So you soemtimes make calls based on what you've been told or given and you dont actually have the whole picture. Which is a fundamental flaw in our system.

When Grant and I ssat down and looked at the costing we though we saw the whole picture of THAT Scheme, which didn't include Hoogekraal, it didn't include desal, it didn't include other options. It wa just the normal off-channel dam, getting the water to it, purifying it, moving the purification works and that whole thing as an entity on its own didn't look at that stage that it was viable.

Look there was a flood and we got some flood relief, so we were sold a package that you'd be able to put in the scheme from the funding that came from the flood. Disaster Funding, lets put it this eay. Then the number came out at R120m which was not available quite simply. So the idea was ok, lets look at canning that and see what we can do that isn't expensive and can still serve the flood. now that is when we had the
drought.

In Sedge there were no proper studies except the one. We kind of inherited the one scheme. And I had to sit in front of hoards of people banging their feet on the floor wanting to know why there isn't any water.

(So the scheme was canned as you say, and soon thereafter you had the drought)

And I was blamed for the drought

(Can you talk more about that period of time wrt the decision making)

What do you mean?

Council made the call to stop that project. So as a body if you'd like to put it that way. Not me personally but council. Then in a way almost fortunately we had the drought. Because that almost put the next steps into play which was the emergency augmentation with Hoogekraal and the desal plant. The desal plant, ja, I think by the time that came on stream we almost didn't need it. So it was a standby thing...That was funded. We got that funded.

(How was the emergency scheme put together, and can you talk about the emergency declaration and accessing funding?)

Well Rodney Nay was involved and basically the council had to declare an emergency which we did almost immediately. I January (2009) I think it was, then province had to declare an emergency and then national declared an emergency. When we got the army tankers supplying water I think people realised there was an emergency.

Well when the water stopped flowing, there were warning signals. Louise Hart in Sedgefield, whose now a councillor she basically got hold of some of the officials in Sedgefield and said look, 'we've got a problem' and got hold of our MM at the time, who didn't do anything. [laughs] So we only heard about it when the river stopped flowing. Louise Hart was quite instrumental and she contacted the muni manager and not a hellava lot was done at that stage. It was just after the holiday period. because it went through the holiday period alright. Then the problem was that there was no water to use. Then we were really in crisis.

[I can tell you a question to ask somebody, with that off]

You've got a weir and you've got the water coming down from the river, and you've got a weir and on the lower side of the weir you've got a lagoon. The tide comes in. When you have spring tides it was normal practice to check that it wasn't a problem. So you should ask certain questions around that.

(The question that I do have, is that its not clear to me whether the river dried up or the water not drinkable)

(At the weir there was water, it could be pumped but it was salty) [Agrees]

(ok, so that was the case)

It's not publicly known. That's why I don't want to say it. That's why the river flow dried up so quickly. Very few people actually know that.

I heard about it, when I discovered the tide time of the month, my first question was 'were there sandbags in place'. So that's why it was a case of overnight ran out because the pumping site was saline water. That wtw can't purify. BUT there was very low flow so it couldn't fix itself and normally there would be enough flow to fix it. So that's actually. It was very low flow. They've had low flows before and they probably would have gotten through this, I don't know.

(From what I understand, prior to the holiday period the river flow was assessed)

It was sporadic. We would get reports monthly, even more regularly than that when there are low flows. And so yes it was being monitored but it wasn't an absolute crisis at that stage. So it wasn't a point when you organise tankers because it was still flowing.
SO there wasn't enough worry because ...

(was there any effort to control usage?)
There were restrictions in place but not the type, like close your tap, don't bath etc.
(what about the people extracting upstream?)
Also a challenge, the farmers were being engaged toward the end of 2008 asking them not to extract too much because there was an issue. After the crisis of course they were forced to stop. But that was a bit later. Because our dry period is Jan, Feb. Exactly when the usage goes up. Restrictions are put in place during Dec primarily because of the plants capacity to cope. Not necessarily a shortage of water. This period, there was also a shortage of water, but you kind of got through Christmas, but January and February are also pretty high usage. But it was not a very pleasant time. So to fix it then, ja [laughs]
Well we were faced with no water, then it was get water trucked in and then it was what about other quick sources. So ja, I actually got on my bicycle and I actually ride past there and said 'guys lets have a a look at this'.
The current water works is just upstream from the wier. But now its closed up so you can't get reverse flow. So the guys learnt. And if you carry on onto a gravel road, the total distance to get to the Hoogekraal is about 4km from the WTW. That’s it. So we just stuck a pump in there a dn pumped it straight into the purification works and up into the system. Bascially almost immediately after we started using the truck we found this source. Note the word 'found'. We then got SSI involved, not the consultants the engineer was using previously, these were out the box consultants. Then said 'guys lets quickly survey it', they did on our behalf. There was quite a lot of water in it and because we had declared an emergency we could then go a long and just put a pump and pipe in there.
Oh and Neale Perring was on leave till the end of the month. The whole crisis happened while he was not around
(Why was he not called back from leave? Was that deliberate?)
……………..Erm, I can't answer that one. He wasn't called back from leave
(Who was put in charge of responding to the situation?)
Rhoydon Parry and Rodney Nay and they acted fast. We would have had a survey for another 2 years if we hadn't taken that course of action.
These engineers think out the box. Specifically Hennie thinks out the box. Desal had come up before but it then got accelerated. Seriously accelerated. Once we ahd gotten the emergency declaration in place and funding allocated to it, we then went full tilt desal. Because part of the application linked desal. Rodney will give you all of that. So it was linked and also it was a quick fix. Long term quick fix because its there now its available. So we wont have that crisis in other peak periods, just turn on the Desal. So Sedge is now oversupplied, or sustainable for many years now. Because they've got the Kartara, the Hoogekraal, the boreholes and the desal and they are 3-3.500 souls. So basically they are stable for 15-20 years.
(I'd like to just understand how it played out?)
There were lots of meetings. There will be minutes. But primarily a lot of what happened was done sort of informally but the actual formal implementation was all done through council, section 80s, mayoral committess. So it went througth those processes when it was ready. But there were meetings almost daily. i mean we used to trash around and fight and whatever literally on a daily basis. The people involved were HERwee, R Parry, myself and the Mayor used to sit in on them, and Rodney.
(how did you get to the schemes that were identified?)
Process of elimination, through these meetings, through discussions. I mean we were basically, you must get some of the minutes of some of the discussions. There was documentation, there were official ones. There were timeframes, costing. Desal plant, benefit, how long, long, short, medium term, what about discharge and is it going to be put out as SSI as the consultant running the spec. So SSI said what we require and the supplier implemented. It was the other way around, not the normal consultant ways. That cost a fraction of the cost of the one here in Knysna. here in KNysna it was the other way around. SSI wrote the whole thing, produced the bill, the works, this one cost about 3-4 times as much. So I prefer that approach. BUT there were problems like the beach discharge. I don't think it's been resolved yet. And its so simple to resolve I give up.

Erm, so that was basically the thought process, how does this basket of sources fit together, how long will they take, what do they cost and are they sustainable in short, medium and long term. Those were the decisions that were being taken in that time. And that SASSI award that we won was based on that model which SSI got. And that's fascinating to look at because using a basket of water sources instead of relying on just one big dam. I think it's a better scheme. You basically spread your risk.

The emergency declaration?

Allowed basically to go for it. When you declare an emergency some of the normal statuatory requirements don't need to be done like EIAs. But the call wasn't made because of that, the call was made because we had to speed things up. And also it allows you access to funding, which we kind of needed. Knysna hasn't got unlimited resources. We couldn't just pull R40m out of a hat because it wasn't there. So we had to look at other ways of attracting sources. So it was NB to declare an emergency to access funding.

(can you tell me how the desal plant in sedge was funded?)

Basically it was funded externally. We didn't pay for it.

(I know that the council declared an emergency early but the national declaration was later and the funding then funded the R.O plant. So how was Sedge funded?)

Ask Grant [laughs] He made it work. But we had the go ahead on the funding. We had serious cash flow problems. Basically we weren't really in a position where we could fund huge capital projects out of cash flow, which is what had to happen. We did have funding that had already been approved for the previous flood that hadn't been spent. We bridged. Rodney was the wizard that made the funding happen. He used to work with Alex township and he knew all the players from there and he knows which buttons to press to get things to go relatively quickly. They're all old friends of his and so he was very very useful. And also knowing how to put a BP together. He was also instrumental in this whole EDM DManagement thing. You know MB, George, everybody got funding. But we were the first off the block because I don't think that anybody ran out the way that we ran out. Sedge was the only one that actually ran out. (By the time the desal came, was it needed?)

For future growth it's definitely needed. Let's put it that way, everything was put in place to get it and all the other factors were variable. You don't know how much you're going to get out of the boreholes, you don't know how much you gonna get out of the Hoogekraal. Your environmentalists are saying that you can't take out of the Hoogekraal, they're saying you can only pump out very limited periods out of the boreholes. With the sea you don't have that restriction. SO you still need the back up of the deal because the other schemes could also fail. So it might sound like an expensive backup.

(what about storage?)
At that stage and even now the DWA doesn't encourage dams onstream. So there is an option of additional storage capacity. But to get back to your question, is it a waste of money. No, at the time it was going to go in and work. The other factors were all unlicenced boreholes, unapproved use of hoogeekraal. so you do need something that you know you can rely on
(Yet you've had a series of problems)
But it was never intended to run outside of peak periods
(If you had a crisis right now, it wouldn't operate)
Is it non-functional right now?
(Yes)
I cant answer that one. I'm not fully informed on the current status
(Do you think the crisis impacted on the plant design?)
I think at the time all the players felt it was the way to do it. It was new at that scale in the country. Similar schemes had been used, not at that scale. SO the feeling was that it would work. One of the issues is that its highly technical. And the capacity run technical things is limited, you actually need skilled people
(You spoke about it as being largely free because of the funding, but there's operating and maintenance costs that follow)
Yes, yes, those were thought about and I forget what the numbers are but they were reasonable. Not cheap but reasonable, especially if you took out the capital costs. The cost per l is expensive. But what does it actually cost for a l of water through the normal system. because if you look at Knysna, its absolutely bizarre. This one in town has got other problems. This one has got real problems, almost worse than Sedge
(Do you know about the reuse condition attached in Knysna?)
I can tell you that story.

(Did you have certain key active residents?)
Yes we formed a committee of retired engineers. We used to meet quite regularly, once a week, sometimes more. Batson was on there. Mike Young was actually very good. Young was sort of in charge of their committee. I used to have weekly meetings with them. discuss the status. their reservoir never ran dry. The committee wanted to be involved and the idea was to keep channels open. And they helped a lot as they kept the residents on board. They came up with ideas, they were also part of the decision to what we were going to do. They didn't make the decisions but didn't make the decisions. Ja, in retrospect I would have stopped at the boreholes. But the funding was in place. The whole thing was planned around the desal. Rodney was marvelous but the whole thing revolved around that, if they had not gone ahead with the deal I don’t think we would ahve got the funding. And we used the funding for the other works as well. Not just the desal. it was sold as a package. And desal was very in. Rashid Khan, that was very much his thing. DWA was very helpful.

Knysna gets quite exciting. My view on the drought in Knysna is very different from what other people will tell you. Although I was the portfolio councillor. Same thing with Sedge. Sedge was actually management issues. Bottmo line. But I publicly couldn't say that. The actual issue with running out of water wouldn't have happened if there hadn't been a management issue. By letting the saltwater run into the freshwater. Thats a management issue or lack of control of personnel. Thats a management problem in the muni. You can't blame an individual. I dont believe we would have had that crisis if we had not filled up our weir area with salt water by blocking the culvert when they know
there's a high spring tide. Bottom line in Knysna. Same problem. We were 21% on the
dam purely because of inefficient management. I'll tell you how we fixed that if you'll
come back for the next session and it will be very different to what the engineers tell you.
It had nothing to do with boreholes and a desal plant. Basically we needed more water
as a basket of water and basically that's why SSI are so clever. Hennie and I used to sit
and debate this for hours. Knysna is exactly the same as Sedge. Every single l of water
that we drink comes from a pumped water scheme. So you're vulnerable. Break that
pipeline, run out of electricity. wher do you get water from. Notice Aurecon off-channel
dams. So how do you change your risk profile. ANd that's that scheme of theirs.
Basically saying boreholes, desal, use what on channel dams you have. Which we
weren't doing but we are now. But Akkerkloof is a storage dam. You have to fill it with
water that you're pumping from the Knysna River 120m.
The Glebe, that's me again. Put pipes in, pump the water, let it go empty. When it rains
again it will fill. That's what Glebe must do. I could never understand it. We had Glebe.
We used to have these emergency meetings. 'how full is glebe' in my simple
terminology. 2 weeks later, 2 weeks later. How much water is there in Glebe? About
120ML. How big is Akkerkloof? About 800ML. 'We just pumped 100ML into Akkerkloof
and its dropping. Why? Hvae you checked the lines'. 'No the guys are scared of
baboons'. They had emptied the Glebe completely into the river and not into
Akkerkloof. A whole Glebe had been emptied. Gone. Then go back to my mangement.
I'm not blaming the guys, I'm merely saying that when you've got pumps etc and you
don't have the right people looking at it with an interest to manage thinking of the big
picture, you can end up with a problem. The other problem was the supply of water to
the Knysna RIver. Now the Knysna river has never run dry. it has sometimes not gone
over the wier at Charlesford. Thats never been the problem. There's a guy who used to
ride out whenever the pumps tripped. He would ride out and turn on the pumps. But it
was at a stage where he was riding out and before he got back into town they tripped
again. So what does the engineer do? He puts in new pumps. Heavn knows how much
of costs. This guy used to phone his counterpart at Eskom and say there's a power surge
on the line. Then I said we're having these water meetings, 'where's our electrical
engineer'. Len, we asked him to go and have a look. Eskom went and checked the lines
and fixed the lines, so then we got it back to 100% full because they could pump. So yes
we do have a problem because the capacity of that system to meet peak demand isn't
enough but we never filled the Akkerkloof. Because the electricity kept going down and
nobody was monitoring it [laughs]. And the new pumps kept surging. When checked
from the eskom side, the problem was solved. But now what do you tell the public? You
can't tell the public that.
[had to leave. So had to schedule another interview]

**Interview 39 on 21 May 2012 – Politician**

The team was consultants. SSI, and emergency water meeting team. The team in
Knysna was post the immediate Sedge crisis. The peak of the Knysna crisis wasn't the
same as Knysna. Sedge was an absolute crisis. Knysna came later. In knysna we were
going re
The team was consultants. SSI, and emergency water meeting team. The team in Knysna was post the immediate Sedge crisis. The peak of the Knysna crisis wasn’t the same as Knysna. Sedge was an absolute crisis. Knysna came later. In knysna we were getting really low, there was drought, there was the problem of the pumps not working properly. And the Knysna River was low. There was also a study going on at the same time about minimum flow of the Knysna River. Basically water was being extracted below the minimum flows. otherwise there would have been a serious crisis. But the Knysna River never stopped flowing, it got low. TThis team was put in place to see how we can fix Knysna. So Mr. nay and company, and SSI come up wiht the idea of this plant in town.

The original idea of the plant in town was, the plan was to actually process the sewage effluent. I wasn't that involved. End of 2009, I just went and ran an election campaign in CT. I did not sit in on all of the meetings. Politicians are not always welcome, they are told what they need to know. I dont think anybody has ever lied to me but they dont tell you the full story. The classic was the Sedge thing, we were told R11m and it eventually got to R100 and plenty mill. You'd have an official giving you a report based on a statistic from someone who was meant to have gone to check.

Basically we were having these meetings nd getting reports on the Glebe Ddam. It wa about 150ML. Over a period a of a monht that dam went from full to empty. But the Akkerkloof never went up. That’s when we discovered that the water channel was overflowing. Knysna's sole water supply used to come from this Glebe on channel Dam. There's this little concrete contour, I was suspicious when this dam was emptied and they discovered the water channel was blocked> the dam was full. In the middle of this crisis, the dam was full and we had and empty Akkerkloof. The problem with this channel is that the flow is not fast enough for the transfer to happen overnight. SO the other question was 'can't you pump the water?'. Mr. perrign and others for years have told me 'no'. It doesn't fit into our big scheme of things. So with much much much motivation we actually forced to issue to put in that pipeline. it went in very quickly. It was part of the plan that was put through to NAtional gov as part of the disaster management. Immediately Akkerkloof went up. It was ridiculous (LAUGHS)

You don’t want to embarrass the government. When we got this opportunity to get funding. It was an opportune time to put in a pumping scheme which we didn't have money for. It was an opportune time to put in boreholes. Because the fundign was then available. So there was a crisis. there was almost no water in Akkerkloof Dam. If you see the SSI plan that went around. If you look at that, there was the Knysna and Gouna as the water sources. And the Gouna fed into the Knysna. So that was your primary source and if those weren't working we have had a crisis to put it bluntly. So we had this crisis of 20% water. So what other options were there. One of them was the Glebe Dam. WHihc was part of the infrastructure but wasn't being utilised.

The responsibility was with the town engineer. But it stops at the MM. But he was a newbie. (Planning prior to crisis?)

There were studies being conducted by the town engineer, and off-channel dam. Its now being proposed as an on channel dam. But that study has been going on for years. The town engineer was planning long term for Knysna. But when it was going to happen is another question because there was no money and DWA didn't want an on channel dam. There wer various options. That whole process was goign through the public debate phase but no final decisions had been made. As you can see hardly any of that was implemented. Rapid interventions took place. All thats one is pushed the dam start date
further down. So the crisis is still down the road if the town continues to grow.

The rapid interventions have helped for the next maybe 5 years but are relatively expensive except for the Glebe. They've allowed Knysna to produce more water than when they were relying solely on the Knysna and Gouna. There's the Glebe and the 're-use of effluent plant' [Laughter]. I've said this relatively publicly. There's the boreholes built at the aquifer up the hills above us. If you work it out, you've basically doubled the capacity. There are a number of boreholes. The reuse of effluent plant is meant to be used in the peak period when the other sources can't cope

I thought it was mothballed, but haven't been following recently. I have no idea what's gone wrong in the last year. When we were around the Sedge beaches hadn't been washed away and the Knysna plant was still in operation. On that basis I would say that the schemes would be significant to relieve the risk. Where the basket of products spread your risk. By putting in this basket of sources you are reducing your dependency on the one supply. Relying solely more or less until 2010 on a set of pumps at Charlesford and Gouna, and the old pipelines, to supply Knysna. The pipelines have since been cleaned out, they got pigged (?), this involved sending a rubber bullet down the pipes. When it goes through the pipe it basically dislodges all the sediment. And that line hadn't been depigged for a long time. That pipeline was built in the 80s, so it isn't a young pipeline. Its a 250ml pipe, and its an old asbestos type pipeline. SO you getting back to the risk. It can't supply what its supposed to, it can breadk. It should have another pipe next to it. Part of this longer term plan of Aurecon is to double up the pumping. But the question is about whether you are allowed to take more because of issues with the minimum flows. Big issue with the minimum flows. Was very very hihg on the problem areas wiht the comments from the environmentalists. Ironically it seems to have gone away.

Waiting for the outcome of the minimum flows was a huge factor as it informed whether you could upgrade the pumping scheme or not. So all these things led to not increasing the pumping scheme because we were worried about the environmentalists. From a longer term planning perspective Knysna was better prepared than Sedge, except that it hadn't been implemented, but there was something coming out of the mix . This crisis sort of pre-empted everything. And also was an opportunity for money to get something going quickly. So long term we've still got to put a dam on the river. The additional funding has allowed Knysna to increase its basic supply of water, reduce the risk, while the longer term planning took place. It wasn't melicioulsy planned to sniffle funds. But these schemes were put in place to boost that basket. SSI Won an Award for that scheme.

I just think that our current system is wrong. Just look at this. Heres the river, theres 220m hihg. You're pumping, you get to a liittle sump. Then you pump again to that height. Then you put the water into a balancing dam. Then some of the water gets chucked into Knysna. If the water in the balancing dam exceeds the consumption it gets pumped to Akkerkloof. You go to Akkerkloof here, thanw hat happens, this is a 2 way pipeline. Its operate manually. You should be pumping straight to your big dam and then distributing. then you'll also have circulation. But now there's all this dead water at the bottom, because its not circulating.

[I must tell you about the demand in town, why we had a shortage in the forst place]
There were interventions by politicians, trying to speed up the longer term process. But at that stage short term schemes were not in the planning of the engineer.

You want to hear this one. I was around in 2004, deputy mayor in those days. I go fired In 2005. We had a similar incident. Knysna was running out of water, the dam was low. I'll never forget this night, with all the local ratepayers and we had to tell them we were having restrictions around the christmas period. What happened then, the following morning we had a flood and it washed away all the pipes! [Laughs] The following morning there was no water because the flood just washed everything away. Just prior to that there was a plumber that had the whole KNysna scheme in his skull, not on paper, he retired just before this. And it took 2 weeks before christmas to figure out how to turn off and on. It was absolutely crazy. then we also had these emergency meetings. And we actually filled up the dam that next year. 2005 christmas. Meantime mr. perring had been asking us to raise the dam wall and my question was why if you've never filled it. But it was then filled and had been kept relatively full until this issue with the pumping and electricity and thats when it slipped. We were told, 'yes we are looking at it, yes we're fixing it'.

It was exciting time, this last crisis. Because it was very tense. And this last MM he had losts of failings but he was good in a crisis. When the chips were down he was good, but don’t ask him to plan long term.

(A few questions to follow up: Why was the muni caught short?)
The management on the short term wasn't sharp enough to put it bluntly. You can blame political too if you want. We used to have those planning meetings, even before the crisis.

(In looking at the different rapid interventions mentioned, I'm still left with the question of when the reuse of effluent plant came on board?)
That was one of the options on the long term planning that existed prior to the crisis. But if you looked at the cost of it, the recover cos, it was very expense as opposed to the dam. It was hihg, I think it was R7-8 per MI as opposed to R2-3 for the dam. But that was the cost of running and capital. Then when we got to this crisis. The idea then was look at.. SSI was asked to look at effluent reuse. Well thats what I thought they were asked to look at. Next thing we discovered is that they were wanting tp put boreholes down at the Loerie Park. I skipped a beat there. Next thing I discovered, when the tenders went out and the basic project was on its way, we were not doing what i thought we were goign to do. there's a gap there. i was told afterwards that was because of the quality fo the effluent water. Therefore they choice to do the borehole scheme. The way that was soled, which I also helped to seel, was that they were basically not doing deep boreholes, they were doing shallow boreholes, basically what leached into the substrata and therefore we were using effluent water. I dont know how long you want to stretch that one, but thats how we stretched it. So the boreholes were extracting filtered effluent water, then thats how we got the FUNDING. Because it had to be effluent related. And I was abit shattered when I discovered thats what we were doign to be honest. Because the town used, not peak periods, its was using between 9-11MI per day, adn we were throwing into the river between 4-6MI per day. So to me an almost immediately solution was that through the recycling we cold get almost half back. 'Why aren't we getting half back. Becasue thats the way its goign worldwide'. We discussed this during the longer term plan, prior to the crisis, as a a quick longer term thing. but at that stage the cost of capital installation seemed relatively expensive.
Then what happened was sedge ended up with that plant which was relatively inexpensive. But it was done on a different basis and that’s when I also skipped a beat. In the Sedge case, they did not give the spec of what they wanted in the design of the plant. The supplier gave us that, at it cost a fraction of the price. In this case SSI took full responsibility for the design spec, so this one cost a heap more. (Knysna). In theory Sedge will work, the PROBLEM is getting the water and discharge. In Knysna, in theory it should be alright, but much more expensive. Then it didn’t fly at all, because when they started producing the water wasn’t salty enough. Because they had a bubble of freshwater. I don’t understand why the sewage salinity couldn’t be dealt with. Don’t know. So there were some technical issues. And when they started at the plant, they had to relook at quite a lot of things. Cost a fortune doing that as well because the product that they got from the wells wasn’t expected. This was all funded. In fact even the big green building was covered eventually. Rodney Nay is brilliant at getting money.

The original tests were done, I missed a beat, I was not fully part of that process, I don’t know why I missed a beat. I go back to being told only what you need to know. You’re told ‘the thing is track’ but they forget to tell you that we’ve now completely changed the whole operation. Then you suddenly discover that now we’re sucking out the ground instead of taking it out of the sewage works. And it was rushed. So you miss a meeting or two. And you miss things. WE used to meet once a week. These things were always on the agenda, short, medium, long and today issues. There were no real minutes of those meetings held with the individual directors. I should have recorded them.

(How did the plant become part of the RAPID INTERVENTIONS?)

That’s when we got SSI involved and looked at the rapid intervention options and that’s when the MM was good. He allowed that thought processes to happen. And we put Rodney Nay in charge of the water crisis - I must put this carefully - and not Neale Perring because he thinks out of the box. I like thinking out the box. Rodney Nay can think laterally and not in one component. And so does Hennie Erwee. He'll take ownership of this whole project. I'd say it was between him and me, but he'll claim it all. So to answer the question, those heads were put together and that’s how it came about. And the MM let Rodney Nay run with it. If we had Neale Perring we wouldn't have had anything [laughs] to put it bluntly. The proposals were put forward and we had to rectify them to council, which we did. The proposals were put together by SSI, Rodney backed it with the funding and that link was put forward as part of our rapid fix to Rashid Khan, from DWA. He was seriously into desal and recycling. His goin to have a totally different fly on this. Because remember we sold it to him. (NB).

(Was taking the effluent scheme forward a condition of the funding?)

Yes, without that we wouldn't have had the funding for that plant. We had to defien the rapid interventions. But the thinking was recycle, save water, reuse your valuable resource. Therefore it fits perfectly. That was part of the selling, of course. Eleanore was also a key figure. She didn’t look at the detail. She could walk into any room and people would listen to her. She was involved in some of those meetings. We worked close together. We were the team actually. Ja, so if we had the whole dept pitch up, she'd be in on it.

If you look at the Southern Cape we were the first assisted, and we got quite a good chunk off the disaster funding but because we sold it well. And Ssi went on and sold the MB and George thing, they made a fortune out of this thing. I know them from the early 80s, different players, some are still around. Hennie is a relatively young engineer. The politics I don’t think made a big difference. There was a disaster and national government didn't want a disaster. Neither Eleanore or myself played politics.
The claim that Sedge is the black sheep is total nonsense. Jules Hartslief, you can have him. His the cause of the whole problem in Sedge. But I've got to be careful, I wont say anymore. He wasn't very efficient. There was a lack of control over the salinity of the water, that was what caused the initial real problem. We wouldn't have needed those tankers. But then we wouldn't have gotten any funding, so in a way its a blessing, but no, efficiency, organisational skills, Sedge dept was't very well run shall we say. But they were a satellite. So they fell under Neale Perring adn Rodney is in Sedge. But Rodney didn't have anything to do with it at the time really.

(Staff capacity, and requests to increase it?)
Yes, it has been the case for the last 10 years. Well Neale Perring wrote a report every week saying his staffing is critical but what did he do about it? Go to Lauren Warrign the current MM going and look at her previous dept and tell me whether its well staffed or not. She's got all the right people. Same for the Finance Dept. Its the person and how they deal with it, its no good writing a report saying you're incapacitated. DO something about it (Who's responsibility was that?) The guy in charge. Its how you manipulate it. The others didn't have the fundign either. You must have the right people for the right jobs. I would say they were light on staffing, but I wouldn't say they were totally inadequate. But you din't have the right people in the right jobs either. These depts will always say they are understaffed. if you look at the munis wage bill, they are way overstaffed. If you take away the capital expenditure. So when we say there is no money to do these things, there is a problem. But a little short on teh technical side of things. Politicians are not allowed legally to actually fiddle in the administration. I couldn't employ you, you can't do that. And if you were employed there, I couldn't tell you what to do either. Like I couldn't tell the engineers to go and put in an RO plant. I would have to get a council decision on the principle of putting it in and then they would ahve to go and implement it there way. I could perhaps try to influence the changes.

The new technical director {his resigning}. I sat through the process. Out of the applicants who had potential. One was Rodney nay, and this guy and there was politicacl pressuree you couldn’t appoint rodney. Needless to say there were some votes against it in the caucus. But we made a conditional appointment never implemented by the MM. The condition was that he was a town engineer, assisted by... but that never was enforced by the mm. Perring was the long term thinker but not good at the day to day, whereas he was. So he was appointed above his capacity. But the perception of him is worse than he really is. His not very eloquent so if he sat in a meeting with a bunch of white ratepayers, he wont come across well. But his not necessarily talking nonsense. But the assumption is he is, but his english is not that good.

If what we'd suggested had actually happened it would have grown him. Because the person we've been talking about, is who'se supposed to be mentoring him. And I'm very disappointed in that person. The guy who got all the funding. And his played politics.he has the potential. He needs to be taught, if you meet the Belevedere ratepayers dont go in your old dirty jeans. We knew he wasn't right for the total post. we were forced to employ him. we put a contingency plan in plaace. we need he had potential.

We consulted the rpa and wlwf, especially sedge. We consulted them. Louise Hart was quite a strong player, and Ray Barrell. But it was a consultative process.but the actual guidance and direction came through SSI, through Rodney, through the debate. And talking to the engineers committee. We did it on purpose, definitely. We needed their support. I needed their support desperatelly a t the time. And they bought in. Firs the water guys. First it was a foot stamping. But then it got better. But the councillor there
used to like saying that, but that was her little ploy. I'm a bit of an anomaly, because I was representign the ANC, they didn't trust me one bit.

IN my time, an item didn't go onto the section 80 agenda until I was aware of it. Items on the agenda we were in on it. But then we got shocked sometimes. When an item comes to council and its not what you thought. Because the section 80 doesn't go into a lot of detail. Section 80 is a laugh, they make political decisions on technical issues. Sometimes decisions are made by people who haven't got a clue about the issue. If the DA wants to publicise something they put it in Knysna Plett herald. Hello put it in the Sun, which reaches ervybody. So most of the info about the water crisis was followed by the affluent.

There was a change of power here within the ANC. And people from CT came here and manipulte his ward. They had a meeting in the middle of the night. He lost by 4 votes, which swumg the whole vote. That one ward cost us the southern cape, and so the whole western province. Victor Mlosi's ward. Remember they had this thing about people to CT and disturbing the heirarchy.[ ...... ] If he'd won, we'd be controlling council today. The Da didn't actually win the elections, they didn't get more than 50% of the votes, but they had enough seats. [lots about wards being lost, how the election was lost, i.e given away]

There's two types of people that come into this town, affluent and non affluent. Workers and wealthy. The rpiblem with the wealthy is that they're not comign to work, they coming to retire, so they don't spend. This place is imploding because the economic source was timber and now relocated to George. So the biggest mistake was these'n's island. So our demand long term I think is goign to slow down. SO our projections may not hold anymore. They were right at the time. What I'm really saying si that somebody should revise them.

The wealthy are now indigent even though they live in a mansion. You've got a time bomb waiting to happen with so few ratepayes, so much uneployment, no ral industry and tourism as the main economic source. The problem is that land here is expensive land. Basically if you've got money here you can buy water and electricity but if not, then the excuse made is that there is a scarcity of supply.

I think Sedgefield was the trigger, acted as the domino effect and they all jumped on the bandwagon. And you've worked out that none of them actually ran out of water.

Interview 40 on 22 May 2012 – District Official

The Disaster Management act requires of each district to have a DMC. In other words you will have a broader look at what the Local Authorities is doing in your area. Are they proactive, are they mitigating any disasters occurring or threatening to occur, according to that act. We are not responsible to do the line functioning activity, ie water services providing. We are not the WSA for Greater Knysna. When it comes to Water Managment, that is the sole responsibility of the WSA, KM. But in the absence of an early warning system with regard to droguht, in 2009 [get my file] I was contacted by the KM, indicatign to me that they have only got about 2-3 days of water in their Sedge reservoirs after the Karatara River just stopped flowing.
I was contacted just after the holiday makers left - I have a report I can give you. So what happened is Jules in Sedge called me and said we haven't got more than 2 days of water. That’s not the way it's supposed to happen. They should have phoned us 2 months earlier to explain that the flow in the Karatara is dropping, they're picking up that there's less water coming to the WTW. But they didn't do that, they waited until after the holiday season and then they dropped the bomb on me, which was like major crisis. We could have done proactively before that in hindsight. If we knew before that the flow of water is going down, we need to conserve water, we would have enforced water restrictions before that, we would have asked the farmers upstream who irrigates off the karatara to monitor what they're using. Because it's not monitored, not metered. All that could have been put in place. In hindsight not what to follow. But also remember in 2006-2007, this area went through a flood and everything was overfull, so within a period 2007-2009, you move from a flood to drought. Now its the least rainfall in 132 years. Now you can see the peaks, it shows you, we haven't got water, we're retaining in dams like in CT. Because our historical data doesn't show that the Karatara River stops flowing. So if you look at it from a munis side, maybe they thought, no it will rain again, it will start flowing again. It never happened that we don't have any water. So we will go through the season and maybe it will rain in January, but it never happened. So what happened then, when we met the first in Sedgefield. We flew out there. I charted a helicopter and said ok fine, when I know we've got 2 days water in the reservoirs what is the short-term intervention. First we tried to see if there's not other water resources we can tap into. That for Sedge, because it was crisis management at that stage. We flew that area, we identified that there's a river adjacent to the Karatara, the Hoogekraal River. We did fast calculations, got google maps out and thought what do we need to get water from the Hoogekraal because it was still flowing good because there was less irrigation extraction upstream in the Hoogekraal. So what we done then is we decided to, we got in Hennie Erwee from SSI, a young dynamic engineer and I asked him for an urgent meeting here in my disaster centre, that afternoon. And said 'what do we need to get the water from Hoogekraal'. What we did was we realise we needed about 15km of HDE pipe. I think this was on a Thursday. We organised the pipe, bought all the right pipe in the whole of SA and he got the contractor to put it in 48 hours. He did the calculations that night and we got together again. But in the interim we also needed to make sure that the reservoirs don't run dry. So what we had as a backup plan is to erect water tanks and get water tankers to fill those up. Fortunately we never got to that point. What we got was water tankers from contractors in the area and made an arrangement with George Muni to get water from the furthest point which was wildernedd. To tap water there, take the tankers, cart the water there and fill the reservoirs to keep it from emptying. We needed about 1,1Ml per day to cater for the residents. Once the tankers started running it was like a public awareness. People realised 'we must use water sparingly, no luxuries'. We worked on, we did a calculation, worked out how much water we need for each of the towns. I think we worked out 65l per person per day and then worked that out. Which is very little. Our average water use per person per day is about 150l. We worked on the Humanitarian Charter on minimum standards in disaster conditions. This was 2 years ago.

We worked on I think 16000 people for Sedgefield. What we said on average a golf course uses the same amount of water as the whole of Sedge. That was quite interesting for me to pick up later in the drought management.

SO what we said was, the basic supply, 7.5-15l per person per day, but if you have urinals and toilets you add another 40l. We got to 65l per person per day. We also asked the muni to register all the spikes, so we have an idea of water extraction,
as well as groundwater. Now we've this urgent intervention, the trucks driving 24/7. I called the SANDF to make available more tankers, took a few days. Takes a while for the SANDF wheels to get rolling. Whilst we were doing everything to cart water in, and keep the reservoir from emptying. This is important as you get air pockets in the system if it empties, and then the next water that comes causes breakages and pipes, causing even more water losses. In the meantime as I said the flow in the Karatara stopped completely. There's the WTW, the Karatara and just a bit on you'll find the Hoogekraal River. When I flew and had a look over the area, my question to the engineers was why is that river not being used? Where you go over this bridge there's like a structure here, with pipes, that keeps the saline water entering this pool where they take their water from the WTW. SO there was a danger of that happening. SO we closed it up. So the water couldn't come through into this pond, keeping it fresh. Its true, because the moment you haven't got a flow of freshwater the seawater will come in. That's why they had to stop extracting water because it was saline. So they needed rain or had to stop the saline water from coming in. So you'll get a bit of flow, if farmers are not extracting. the water works cannot deal with saline water. So the first thing was we boarded up, then I saw the Hoogekraal and the engineer said its possible to pump. So we put a generator and and pipe Obviously I was looking at other water sources too, you get Groenvlei, but it’s the holy grail of the greenies. I had the right to touch groenvlei for preservation of human life [.]. So we said that the Hoogekraal is not tapped into much, but will take time for the pipes. So in the meantime we were carting in water and boarding up. And I would have also looked at water consumption post and pre because it dropped dramatically. So we managed to keep water in the taps and toilets flushing. Then in this whole process, we said as soon as we get the hoogekraal water at 1ML per day, we'll get the wtw working again. Because its quite a logistical nightmare with the tankers. As the drought progressed, we rolled it out from Sedge, but we realised that a cent soent on public awareness and getting water consumption down is the best bang for your buck, most value for every Rand spent. The whole public awareness campain cost us about R800k for the whole EDM. But if I look at how much the water consumption dropped over the 2 years. If I look at the amount of money spent on desal and reticulation, R 258.6m, and the amount of water that gave us, there's no comparison. On conclusion, your study should show the bang for your buck from public awareness. In George water consumption was about 32ml per day and now even in summer its not more than 26ml. so we've changed how we are working with water. Now with the Karatara it was a shock, so who had to manage this according to the act: responsibilities in the event of a local disaster, do you know what a disaster is? In short the definition of a disaster is if you exceed your capabilities an it threatens lives. Definition of local disaster, what the act says in section 54, the dmc must coordinate it. If local do not do anything, then I must do it. We normally do is we say we will assist you up till the point that you cant anymore. They are the local authority, the must take responsibility. Although they made a hash of it, in my view. they should have had proactive processes in place. But to give them the benefit of the doubt it never happened before. Normally the risk assessments are done when somethings happened historically. So I said 'who's goign to coordinate this?' So I spoke to Richard Meyer, and we came to agreement that he will run it from the Knysna DMC up until its beyond their capabilities. My advice to him is that he should chair the Joint operational centre, where
all the roleplayers get together and make decisions. The role of the DMC is coordination and seeing to the implementation.

So We were assisting Knysna, they were running the logistics. When we realised that this drought is going to not just be Sedge, we called the other munis in. We were getting water from George, but I had to look at what George's situation was. How long is this drought going to last. An urgent meeting was held in CT, PDMC. We had to get the big roleplayers involved, DWA. We had to get the predictions for the next 3-6 months. So the Weather office had to look. Then it became apparent that it could be 2-3 years of drought. The moment more then local authority was involved then coordination was done by the EDM. When you go to through the file you'll see up to a point it's Sedge, then we took it further to the EDM. Then Beaufort west became part and we no longer chaired as there were 2 districts involved.

We were able to motivate, get a disaster declaration, get funding, get phase 1, you see phase 1 there was some funding available. Phase 2. As it progressed we got more and more funding.

As I've indicated to you, the local muni must indicate whether they consider this a local disaster or not. A local muni cannot declare a local disaster. They can just request the EDM for a declaration. Then they must see if they can assist the muni (no declaration) or if not if they can support the request for a declaration. [I'd like to see your, and I will assist you. I've had 2 PhDs done on this already - Stell and UCT. The one did George and Stell was doing as a debrief on complete drought]. From the first JOC meetings we said to the munis to go and assess where they are, if they deal with it or not. And then to get council resolutions if they want to request a declaration. Then the munis each had to get a request from their councils, forwarded to me, I submitted to my council stating we are supporting it. Then we send up to province to get support from cabinet. Then it gets sent to the national centre for classification. Then it comes back and gets gazetted. Then you've got 3 months according to the act and in this 3 months any extraordinary measures can be taken to alleviate, mitigate, whatever. So in the 3 months what happens is, we went and declared, and while this process was going each of the lm had to readjust their budgets. YOU MUST LOOK AT PROJECTS THATS NOT COMMITTED AND SEE WHERE YOU'VE GOT ADDITIONAL FUNDING. Because you can't ask a declaration for a disaster if you've not used your own funds yet. The declaration was only approved in November 2009, and this began in January.

It takes a while.

There's various reports, state of the rivers, Gouritz river. DWA has done all these reports. Outeniqua Coastal Study Report, everything's here.

After the declaration, while we were busy with that, the various munis, because of the JOC meetings, we all knew they had to readjust their budgets. The first phase of funding, was Knysna focused. Sedge were the heads up for the rest of the area. Subsequent to discovering in sedge, everyone came together. Because there was no early warning system. Now we've got this report, which we now do quarterly. Normally the funding works with your national budget. You can request funding before budget; and then with your revised budget there's also time to request funding before October. So you'll see it came in line with that.

[Richard Meyer, Jules, Rodney, SSI Jappie van Eerden, SSI Hennie Erwee, Rhoydon Parry, John Roberts is the catchment manager, jackie pandaram for province, Dr hildeharde fast is too busy, the hod of local development; dr elmien steyn was}
spearheading the drought debrief, Johan Du Preez is now working for MB, his the one doing those reports wit the circles, DEA Danie Swanepoel in the local George office. If you speak to JR you don't have to speak to Rashid Khan.

This is the Gouritz catchment and for the whole catchment JR is the manager

[Interview 41 on 15 May 2012 – Consultant]

We got involved when SSI in Knysna approached us for a quote and subsequent to that that approved us to do the eprocess. But because it was such a urgent project and they needed the water from the RO plant, the construction and eassessment, ran at the same time. So we applied for the S24g application, so you can unlawfully commence with the construction and also do your eprocess and get authorisation. We first submitted the motivation report to the national dea, because they are the competent authority. Because Knysna dn the lakes being under the national dea jurisdiction. We first submitted a motivation report in terms of section 24f to motivate why we would want to commence with a s24g application and also have the applicant being exempt from the fine.

With the motivation report you basically notify/inform the dept. What we propose to do, the process we’d like to follow. And would you grant us the approval to go ahead with it. The motivation report [looking for it]

Construction was going on, and at the same time we compiled and submitted the eia report. Basically id'd impaacts and also mitigating it. So our environmental controlling was much more hands on. We were on site much more regularly because you had to make sure any impact occurred you had to mitigate immediately. So the eia and mitigation happened at the same time and that was reported in the report. Also with the econtrol monitoring we also compiled methods statements where you instruct the contractor and his team to do certain thins to make sure they comply with the emplan.

(Can you tell me more about the section 24g, and why?)

Because the muni had to go ahead with the project as soon as possible because of the urgency and then having to get additional water for the town of Knysna. They had to commence with the project and the only way then is to do it the section 24g way (when you were brought it was the decision already taken to go ahead with the RO plant?)

Yes I think at that stage it was identified as being the most feasible and cost effective option. SSI has been involved before that and there were other reports done by Aurecon to assess the water situation in Knysna and also look at various alternatives and what would be the best for the short term to solved the water situation. There are other projects that also form part of the water augmentation scheme like the Charlesford Eastford - I don't know if you're aware of it - but because that was a longer project we could do it jsu the normal eia way.

(I'm aware that ses ran the eia on the charlesford eastford)

Yes and there was another application, the Akkerkloof. So there were a number of applications running at the same time but the RO plant was the best and most cost effective or the short term solution. The Eastford charlesford projects are very bulky so I'll just put it on a cd for you. and the akkerkloof other consultants worked on it. they
basically commenced at the same time.

I wasn't involved with those discussions on the clause. When I became involved it was already decided that we would go with a s24g. With Ceaprac, as far as I know they started with a normal eia assessment. But then Sedge had to get a short term solution and thats why they took one portion of the proposal and commenced with that and did that as an s24g application. thats how I understand it. I just looked at their initial reports. Just to see what was the reason for them going for both the normal and s24g application. It was my first time with a s24g application. YOu could id impacts and propose mitigation. go back to the applicant and discuss it. it was more as the project was taking place you had to deal with the issues, it was a bit more tricky.

(application, authorisation, implementation. In this case reversed?)

I would say that a normal application is application, impact id, impact assessment, imitigation, then you get your authorisation, and then its implementation. Whereas now it happened sort of application, and implementation, together with impact identification, assessment and then when your implementation was completed, then you would get your authorisation.

The current status is that we are waiting for dea to issue authoriation. They've issued the fine notification to the applicant. I don't now the status yet. I just know once its paid the authorisation will be awarded. The fine is part of the s24g, that’s howe it works. there's a whole criteria used to determien the fine. they definitely knew about the fine.

(Given the order, do you think still effective process?)

Yes we did quite a comprehensive ppp, to make sure public was aware of proposal, intended activity and our application sunning at the same time. We were able to id the most significant issues, mitigate it and where possible avoid it. We also made use of a couple of well qualified specialists to assist the team with the impact assessment and mitigation.

(more on the ppp?)

The draft eireport, dated 14 dec 2010, and also the final. Chapter 5 explains the ppp, all the steps during the process that was undertaken and that would still be undertaken after this erport. But briefly, we liaised with the competent authority - the national dea - and we liaised quite a bit with them during the first few months of the project. And you can see I noted the various dealings with the dea in that chapter. We also liaised with sanparks because the estuary is part of their jurisdiction so they also had to give an authoriation. dwa, cape nature, health dept, coastal and marine, edm, ward councillor. we had a site meetign with dwa on 29june 2010. We id'd a couple of cbos and ngos in knysna - wessa, kcmf, kcommerce, eforum, rotary etc. - all notified about the availability of application form. first do made available for public comment. We also informed all the adjacent land owners. At the outset of the ppp we inform everyone we've id'd as potential i&aps. if they comment they are automatically registered, as well as all authorities. but the cbos, ngos, and adjacent landowners had to submit comments or request to be registered and then we compiled a i&aps register.

The biggest concern was the water quality of the stuary and also helath risk because that specific area the boreholes were sunk next to the industrial area of Knysna. Something else that we also did during the ppp was that we had a public meeting on 25 feb 2010 at the premiere hotel, next door to where the ro plant was goign to be.

The public meeting was more in the format of an open day meeting, like a forum so they could come in anytime that suited them. So to have a public meeting restricts the i&aps because its not flexible and we had different stations. So it wasn't possible to take minutes. but we had comments forms available, adn that was also included in our
This approach was proposed by us. The people present was the KM, SSI, Veolia the specialists who implemented the technology part of the RO plant and were especially brought in and part of the team, SES was there, and the electrical engineers that is BDE consulting based in George.

(regarding ppp, could what extent could the publics comments influence the decision, considering the implementation was taking place at the same time as the EIA?)

There comments were to highlight certain concerns in terms of the activity to take place and that has to be investigated and make sure that no negative impact occurs from that activity. Then the authorising authority with sit and look at the facts and make decision, based on specialist studies, concerns raised, 'we are satisfied that the info provided is sufficient to take a positive or negative decision'. in the end the i&aps can appeal the decision. they can simply raise concerns, impacts and also a specific alternative to be investigated and that has to be investigated in the process. even in a normal process (ordinarily they could appeal, and stall the process)

I know in this case it’s a bit different. That’s why we did the s24 f, the dea was made aware from the beginning and we did the motivation report. The public was also made aware from the beginning so we could make sure their comments were also included. in that way and thereby minimising the possibility of an appeal.

(can you tell me a bit more about the motivation?)

Well Knysna was declared a drought area and the muni declared funding from treasury to alleviate the drought shortage and go ahead with any project needed to augment the water supply. That was basically the main motivation. You have to maintain your independence throughout the process. If ouy have the facts on the table, you keep referring to the facts and you dont get emotionally involved. And remove your own opinion and keep looking at the facts. Investigate the receiving environment, investigate all the different legs environmental, social. the report was based on the facts, the info was provided by the muni and ssi, the consulting engineers. we received all that information.

(That was a question, whether in writing the reports whehter it was part of ses role to establish the extent of the dorught)

No, there were other consultants - aurecon and ssi- who did those investigations, looking at the water sources, status, long term usage and made that available. ALSO the Knysna area was also declared an emergency drought area so I mena that also provided us with sufficient grounds to say that KNysna is in a serious drought situation because they were declared an official emergency area.

[motivation report, reports on charlesford and eastford, akkerkloof - those were the full scoping, do you want the eia reports? They were done seperately, so they are 2 separate reports]

(you said you used thfacts to proceed. What I'm trying to understand is that it was an emergency, so was the motivation to support running the eia alongside implementation?)

Yes we proposed that to the dea. How we propose to run the eia alongside implementation. Based on the facts. You know that knysna was decalred an emergency area and received funding and needed to go ahead with that as soon as possible. So we used those points as motivation for proposing to go ahead with a s24g application alongside the implementation fo the activity, adn waited for the depts response. I also know before we even became involved, the consulting engineers an dmuni had a meeting wiht the dea, where they brought it to their attentuon. so it was already
discussed, but as soon as we were appointed we started communicating with the dea officially.

The impact report wasn't purposefully delayed. I think with the final environmental report the plant wasn't fully running yet. We did environmental monitoring for the construction activity but not for the operation, it was proposed in our reports and also in discussions with ssi and veolia. They had an agreement that the plant op would be managed by veolia for 3 years and at the same time they would train muni staff to take it over and run it from there.

But one of the specialists we used, prof brian allanson, his also been appointed to do the monitoring and basically assessing the status of the estuary - environmental and ecosystem - and what the impact of the brine is on the estuary. So he is involved in the operation phase. But our mandate only went as far as construction.

(Is there any requirement that the impact has to be assessed at different stages of the plant's life?)

We recommended in our report that an operational management plan needs to be compiled. At that stage there was one, but because the whole plant wasn't really constructed and running as it should, a lot of the operational phase impacts weren't clearly id'd and mitigated. So I'm sure at this stage the op management plan has changed quite a lot. So we proposed that there must be an op management plan and monitoring must take place in an ongoing manner. Those are then usually written into the authorisation by the dept. So you see that's another tricky thing. Because by the time operation starts you'll already have your authorisation which sees these must be complied with in your operational phase and we are now still waiting for the authorisation.

The main impacts and issues have been id'd in the assessment process, it's unlikely there will be major impacts arising from operational phase that hasn't been id'd. That's what happens also in your normal eias'. You id the possible impacts, recommend certain measures to avoid, and those would be included in the authorisation issued. We have The consulting engineers are aware the impacts id'd and mitigations proposed. (since the plant commissioning, the quality of the water and its impact on the membranes has changed. Also the quantity of water produced has changed. So I'm just wondering if the env authorisation extends into those?)

Well the environmental authorisation authorises the LISTED ACTIVITIES that you applied for. So if those change then the authorisation would have to change. But if it something like water abstraction - it's not listed in term sof nema its listed in terms of the water act. so those variables don't really affect the authorisation. Its when the listed activities changes that your authorisation changes. These would include the close proximity of infra to high water mark of estuary, dredging of rock, excavation, compacting of soil... So the listed activities are really for the construction and because it was so close to the estuary.

(So the things that extend beyond the listed activities. Do you know how those would be assessed?)

Well the impact assessment does look at all the infra and the entire proposal and the impact of the entire proposal and mitigate measures. But if the activities listed under nema aren't triggered then they can basically go ahead with the activity. Then there might be other licences and authorisations they might need but they wont need a eauthorisation. But because it does trigger some of the listed activities you look at it as a whole. But if they were further away from the estuary, it could have been another issue.
The environmental authorisation also refers to the description of the proposed activity in the eir, so it also depends on how those other changes are because it could mean that it changes the description of the activity changes. If this happens, sssi or dea or km have to inform us if there are significant changes.

As I know the plant isn't actually operating at the moment. See because its not the … I don’t know we'll have to talk to the engineers to know the changes that have been made.

(Given the borehole water, who's role would it have been to establish the quality of the water?)

Well…. The engineers I would say. The monitoring of the quality of the water abstracted was also done during the process to see if it would work for the technology they want to implement. But I understand this was also a tricky project for the engineers because they also planned it as they were implementing the project. And some of the boreholes then didn't produce as much water as they wanted and then they had to drill new boreholes, ja. but the engineering team - ssi and veolia - they worked together and did water quality. prof allanson also did water quality but that was for his own assessment on the health of the estuary.

(Liaising with different actors?)

It was fairly easy. We worked on the project together. Had various meetings, also email, telephonic communication and also various site meetings were held. All the communication is now archived. I can see if I can trace it for you. We definitely have MINUTES OF MEETINGS.

(The decision to locate the RO plant next to the WWTW was based on a funding condition?)

Ja. The approval for the funding happened before our appointment. So I'm not familiar with details. But the location of the ro plant was selected because the brine is discharged into the wwtw. Because it has its own problems and that would help the plant problem. and because it was seen as a reuse of their water supply. the discharge from the wwtw was abstracted and taken through the ro and the brine discharged back into the wwtw.

I think we covered it extensively and the reports also have more detailed info on what happened and what the proposal entailed.

[Maretha alant at sanparks was quite hands on involved during the application and implementation. DWA we had Hestor Lyons. Samantha Syman also at DWA. Danie Smit at DEA and we had a couple of case officers. Fatima Rawjee she worked on the majority of the application and then I think she moved to another section. I cant remember the name of the current case officer. the contacts of the authorities should be on the list i sent you. motivation report, application form, minutes of meetings, other things on CD

Interview 42 on 23 May 2012 – Brief Discussion Consultant

Interview 43 & 44 on 28 May 2012 – Politician

when I got here the plant was running purely on a few hours a week to keep it running. In Sedge, we also had the mess up on the beach and pipes being exposed. So you've got all that info. And we've had to invest a lot more money to keep it operational. The current situation is that the, we took a resolution now recently. The maintenance contract they are busy with now. For the next 18 months our operators are being taught how to carry out the maintenance in conjunction with the operators. So they are still going to keep it just operational. A final decision hasn't been made as far as I know. Or
we haven't really decided how often we're going to run that thing. Its goign to be purely according to the maintenance schedule

and also according to the water requirements because it looks like we are in for another drought
obviously we've got to keep it operational so that as soon as we do need the water its you know, seamless. We can just go straight into using that to supplement the water
(What is the status of the plant at the moment. I know there was drilling in the carpark)
They drilled one experimental hole, I haven't been there since, and they say that the water they got out of that was encouraging and that they got about approximately a teaspoon of sand for an x amount of pump which is very good. But I haven't been there for ages/
(decision on extraction. Which method are you going to use?)
We might have to use a combination. It depends on how viable the boreholes are in the carpark. I know the first lot was encouraging. But I don't know what they've found since. They haven't actually reportede on it.
WE'RE STILL WAITING FOR THE FINAL REPORT FROM THE ENGINEERS.
WHAT THEY WANTED WAS TO WAIT FOR THE WHOLE PROJECT TO BE APPROVED WITH THE MAINTENANCE AND EVERYTHING. I CAN LET YOU GET THE FINAL REPORT. Have you spoken to Rodney Nay? I think it would be very useful for you to meet wiht him. He knows exactly whats gping on and Andre Petersen also knows more now. I think it would be more beneficial for you to meet with the engineers. We
ja we are giving you second hand infomration
(Maybe I can put it another way. I have spoken to a number of people to reconstruct what has and is happening. So it would be useful if you point me to different document sources.
well the only documentation we've had access to is what comes to the section 80 and not everything comes. So really the best are rhoydon parry, rodney nay and andre petersen
(So as councillors heading up the committess how does the decision making take place when a lot of the 'back work is happening through the technical dept?)
Well we are not technicians so one has to have faith in your technical people and municipal manager and consultants and take guidance from them. And really the decision of which way to go is really a cooperative one. We take advice from the people who know. We take strategic and not technical advice. So for me what would be nb is how it affects service delivery, but the actual status of the plant or viability of the plant. that i can only take guidance from the technical people
I would agree with esme, because we have to see that the service delivery is there and not what happened in sedge, that I was called at the ratepayers because the people here were doing nothing, to tell me I have to do something because there's 4 days water and Knysna's doing nothing. I created mayhem to put it mildly. They wouldn't listen to the officials. it was dec people were on leave and they told them. the mm didn't listen. the man in charge in technical services did not listen. and the man in charge in sedge got so desperate that he phoned me, who was then the ratepayers chairlady, and I got Doris in and we created mayhem.
He would contact me that when I start throwing my toys out of the cot they will listen. I phoned and threatened them. I said there's 4 days water left what are you going to do about it. And then there was action like you can believe. There response was 'oh we didn't know it was that bad. ' I said 'dont you listen your officials. there's 4 days water
left and its dec when sedge is full, the pop goes up to 15-20k’. But we’d been telling them since dec that the karatara river is not running any more,

(Was anything done to manage to abstraction?)
There was nothing to abstract dear
(at the point of the wtw, but you also have farmers …)
no, no if its stops running. That stop is right at the top
(because I've been told that the lack of control by dwa, is also a factor)
IT IS A FACTOR, BUT NOT THE SOLE FACTOR. THE FACTOR IS THAT THE RIVER STOPPED RUNNING BECAUSE THERE HASN’T BEEN RAIN FOR X AMOUNT OF MONTHS. AND YOU CANNOT TO RELY ON A RIVER TO FEED A POPULATION. A RIVER ONLY TO GIVE WATER TO A POP LIKE SEDGE. BECAUSE HIGHER UP KARATARA ALSO PUMP OUT OF THE SAME RIVER. BUT THEY WERE IN A BETTER POSITION BECAUSE THEY HAVE BETTER STORAGE AND A HIGHER POP. YES THE FARMERS DID ABSTRACT BUT AT THAT STAGE THERE WAS NOTHING TO ABSTRACT. WE HAD THE SUBMERSIBLE PUMPS IN AND WE COULDN'T USE THEM ANYMORE BECAUSE THE WERE JUST SUCKING UP MUD

(do you know about an issue related to the salinity of the water?)
Yes, what happens is if the river mouth is open or not open, if the water from the top doesn't come down, the seawater, or water from the vlei recedes to go upstream and then you sit with salt water. It’s a back wash from the sea because the salinity of the swartvlei is very high. and that is why we are now going with that weir
(could anything have been done at an earlier stage, to prevent the water from becoming saline)
Well they did block off at the low water bridge but water does seep through if you've not got it sealed. They sealed it with sandbags but that’s not a definite seal. But unless you built something like they are now planning now, it wouldn't have worked. the biggest problem came. we had spent money on an off channel dam and then this council decided its too much money and then they scumped the off channel dam. and thats when the problem came. look when we started it wasn't that expensive. but if you start working it out per capita, it wasn't that brilliant an idea to start with. But that was what was available at that stage because dwa wouldn't allow an instream dam.
(the question I've been left with, is why certain schemes were selected as opposed to other. Why was desal put so dominantly?)
Well where else are you going to get water (there were the boreholes). Yes the boreholes my darling, I don’t know how well you know boreholes. You pump frantically from boreholes, they won't maintain because they need to be replenished and if you read the 1995 docs from csir where they looked at sedge, it said you can pump for 9 months and you've got to seal it for 3 months. So your boreholes is not a constant and adequate soure. you cant rely on boreholes solely. so its boreholes or desal.
(Or the Hoogekraal)
Yes but that was also not adequate.
(Why would you say that?)
Because I now that. There was not enough adequate water coming from the Hoogekraal. Your boreholes, once you've done them, they've got to be test pumped and it’s a long time before you can actually use the water. The hoogekraal, the water was not adequate to feed water to a village like sedge, it was an emergency.
(ok, you say that you know that it was not adequate. So can you give me more an idea of the confidence with which you can make that statement?)
I was there at the time and that was the information I was given
(ok, that, the potential yield from the Hoogekraal?)
Is not enough. Because remember it was in the same drought period, so there was not
water coming from above, and you can't rely on a river if you don't get rain because its
not spring water running eternally. If it doesn't rain from up top, it nots running in the
river. But that is still there in case of emergency. They've taken the pumps away.
(are either of you aware of how deal got put forward?)
That was the only option
(yes, but aside from the reasons you've just explained of why it was seena s the only
option, I'm more interested in who put it forward, when?)
Rodney will tell you. But it was the only sure source of water which would give sedge
water security at the time. There is still no other sure source of water
I think you are trying to find out if it was suggested by our engineers or consulting
engineers
Well the only way you can get water permanently and quickly in an area where ther's no
rain is desal
(I understand the logic. Its more a question of who put that forward, when?)
Rodney will be able to tell you
(capital costs, funding, money from muni?)
again rodney has that info at his fingers
most of that money actually came from disaster management because this area was
declared a drought disaster. And the dwa paid for
(Because I've been told there was R5m promised by the dwa for the sedge plant and that
money is till forthcoming)
I'm not aware of that
they came in trunches. So rodney is the one who deals with projects. His our pmu. He
fetches the funding. Motivates it. Has those figures at his fingertips. He should also be
able to tell you how much it would cost
(info on estimated cost per kl?)
they ahven't given us a breakdown of those
what I do know is that there was a question fo to mothball or not to mothball and it
would work out far more expensive to mothball because then you run into problems
with your membranes. So its far more economical to run it. And I know the running
costs wer about R25k per month which is very low in terms of supplying water to a
community. because if it wasn't there we would be in dire straights again
(so the running is to keep it ticking over?)
yes
yes, it runs I think at night, every second or third night. I cant remember what Calvin
told me. I haven't spoken to him for a long time. They run it on off peak times
(to establish the exact electricity costs, where would that info be?)
Len, because the other depts are billed from the elec dept for the elec that they use.
[BINGO]
He would be feeding it through the finance dept. Speak to Marnon in the electricity
department.
(do you have any knowledge as to the costs the muni has had to cover capital and
operational and maintenance?)
Look, those figures its not stuff I carry around in my head. I wouldn't be able to tell you
that. And without going to dig for it myself .... People like Rodney and Rhoydon, that's
what they do. That's where you'll get the info. If I had time, I could go and scratch for
you, but its not necessary for me to do that. THEY WOULD HAVE THE FIGURES AT
THEIR FINGERTIPS
(I suppose the question is twofold then, the one is I can source the info, the second is are you interested in having that info in your decision making?)
But we do get it. I mean they've got to convince us. So it's quite an interrogation with a section 80. To spend money you've got to be convincing. It's a good discussion with the electricians, finance people, everybody is there. And its quite a vigorous discussion. the recordds would be the minutes of the meetings but they are not terribly true. the resolutions are captured but not the discussions. but all the stuff is being taped. to get to it you have to fill in a form and go through mario bonthuis. you'll have to fill in a form and give the dates. But its been every meeting the last 6 months because there've been ongoing problems with both of them
Ja and the adjustment budget were also centred around that and problems with the sewage plant.
R300k something for sedge comes to mind, and R9m for knysna but I think that was the sewage plant.
connecting the wtw to the ro, Is still further down the line because they are busy with the upgrade of the existing sewage plant which wont be operational until next year (2013). And ja, so until then, if they do use the, when they are operating the RO plant, its still meant to be for treated effluent which must go up to Pezula. Its not potable at this stage. Its supposed to be for irrigating Sparrebosch the golf club. But again Rhoydon has all the technicalities, but its not potable at this satge.
(status reports?)
They are there, Rodney and Rhoydon
(as we've already discussed, there have been problems along the way, decisions made, associated costs. And its to see how this has been documented)
You must also remember that this is the first RO plant put in to giver water to a muni entity in SA.
(with sedge you quite strongly said there was no alternative. Do you think Knysna was the same case?)
Knysna is actually worse off then sedge because of the topography. It's a far more complicated system
(the reason I ask because the RO plant itself, in terms of what it produces should be ideally 2Ml. However the plant has not really produced that)
no, no if its stops running. That stop is right at the top
(perhaps you have to separate the sedge and knysna cases)
ja 2 different stories
Knysna at that stage. When I go back to the droughts. They had the akkerkloof storage dam and sedge had only the resrevoirs. So the storage capacity in knysna was higher and they could keep on topping it up because the rivers were still running. But the karatara, if my info is correct, is a shorter river and stops running quicker than the others. but that info you also have to double check. But they could still pump and replenish the akkerkloof. so they wre not in a state where we had 4 days water left I mean they were tanking water in to sedge from george
(The akkerkloof wa also 20-25% full at the time. Which also brings up questions) yes, because of not enough water coming down the rivers. You cannot depend on a river unless you've got a dam.
(although the akkerkloof can store 800Ml and that was not available)
There's 2 issues. They only pump the excess water up to the akkerkloof if I remember the system correctly. Or am I wrong Esme? Because there's some that goes directly to the wtw, and th excess to the akkerkloof. And there was no excess to pump because remember it was December.
(yes, I'm talking about preplanning. You know a much longer term of pumping when
there were higher rainfalls)
that I can't tell because I was not involved in the Knysna scene
(do you know anything about problems with the electricity supply at Charlesford and
Eastford?)
there was a problem with one of the pumps now I can't remember the detail. I don't
know if Rhoy was here then. Probably. He sorted out that problem, it was an ongoing
problem and it was an old pump which they were reluctant to replace. It was an old
council you were dealing with. It was not terribly proactive
(which brings me to a question I asked about the RO in Knysna and whether there was an
alternative?)
no, no if its stops running. That stop is right at the top
I really was not involved
If you haven't got rivers running and your storage dams are running empty, where else
are you going to get water for a town the size of Knysna?
(if you look at the production of the RO plant since its commissioning to date, in fact it
hasn't been very much)
very little. But that very little kept the dog from the door
(no its not) [not?]
I can't answer that, I was hands on in Sedge
When you look at a place like Sedge if you look at the HoogeKraal yield, that as not
adequate. Up till now for Sedge the yield is the karatara, HoogeKraal, boreholes, desal.
you cannot rely on one. But the desal gives you the security which you cannot get from
your boreholes. Because if you keep on pumping you can't use it anymore
well all the work hard been done before I became involved. So in terms of a decision of
whether to mothball or not or sell it off. That option just does not feature because in
terms of legislation if we did not use the plant we would have to pay back all the money
they gave us. So there is no option except to run it
Esme has kept a very beady eye as to what's happenin in that dept
we've been asking the difficult questions. Because I at one stage felt that perhaps we
should just shut up shop and do alien clearing, raising of the wiers, that sort of thing and
manage it that way. And the dept has officially lifted the drought status here. But in
asking those questions, that option just doesn't exist. Because we'd have to give back
around R40m
but you'll still with Sedge very vulnerable because in the years I've lived here I can't
remember a Sedge without restrictions
the plan for Sedge is definitely what comes out of the river and the desal and boreholes,
rotates between them. To keep them all viable. The raising of the AkkerKloof is about to
commence. The project has been approved and tender is about to go out. Which would
give us more storage for Knysna. Then there's still the question of the dam
(you're saying that the room for movement with the plant is very restricted?)
Yes. So the best thing you can do with that is to manage your costs of usage in such a
way that you minimise the cost of water. Because over the next 18 months its going to
cost about R850k to maintain and run, including the consultants over an 18 month
period and the RO plant here R500k
(That's independent of actual production and what you're going to pay per kl?)
absolutely. So but ja, we don't have
I'm also looking at bottling our desal water and making it into a work creation project.
I also said to them they must look at another way of disposing of the brine. The sea
saltwater.
(Whats being done with the sedge discharge pipes?)
they've got to take it further out to sea
Yes, the costs of that would have to be carried by the muni. And the costs of fixing the
problems since the initial construction, yes has been carried by the muni as far as I
know
those figures you need to double check because dwa do come to the party every now
and again
if I do come across anything I'll email it to you. The documents rodney has everything.
Really

Interview 45 on 29 May 2012 – Meeting

29-May-11
Apologies Gerhard Otto
Judie Dickson
Louise Hart
Rodney Nay

Own note Obtain water forum minutes

Desal
operated in December 2010
Brine discharge problem
pipes eroded
require progress update (?)

Tender project
for weir
construction
project up for tender

Own notes Interesting that also consultants in the Forum
Highly technical discussions

Swartvlei
water quality
Suggested database of Swartvlei water quality info

Boreholes

EIA
open up in anticipation of flooding
Gerhard Otto at next meeting. Discussion on river mouth, who
decided: Otto, Sanparks?
Alistair reported - statement by Gotto that a DWA bulldozer could be
used for the opening or if this is not possible, for KM to have a
bulldozer ready. Resposne was that the issue is when the tide is in it's
impossible for the bulldozer to get around. One issue being taken up by
the RPVA is the location of a bulldozer

Jules
retirement
Team developed
Andre took up some duties
thank Rodney Nay
Forum had tour with CJ - feedback was that they run an excellent
system
Brought to attention that the WWTW needs upgrading

Disaster Management Plan
Bhart downloaded the DMP and it is outdated! An update is required.
Response that the DMP is close to finality, therefore baffled that an older copy is on the website.
Ray takes the floor, with a side comment from Marten on the relevance of what he is saying.

Own note
Jules was going to publish the cost of schemes and comparison. This information is till outstanding. Response from Mike Young that as far he is aware the figures are something as follows: R9 per kl for the desal; R2.30 per kl for the boreholes; R3 per kl for the wtw. Alistair: Claim use of desal for a few weeks. the muni claims that desal is the cheapest way of managing peaks.

Cost of desal and comparison
Extraction, rainfall, milk. Pumping is fine as the river is not low.

Farmers
Comment on agriculture in general, advancing technology

own note
info on river extraction; relation of extraction to DWA licences, crisis period link

Water use licence
Karatara Wier
Urgent
Received licence application, will follow up (Samantha?)

Water quality issues. Inherent problems with catchment linked to the upstream Informal Settlements (Note: views reflected from a specific point of view, where the solution is not focused on eradicating longdrops)

Updates from George
the biggest requirement in Sedge is the upgrade of the sewage system as the systems are currently operating over capacity. However it is NB to get water quality samples in advance, that is I septic tanks are working then its fine

Sedge sewage system
Issues discussed are silent on Smutsville. Assumes knowledge base to participate? And continuity?

Own note

New committee
new office bearers elected

Vision and mission
look at forums vision and mission, already mentioned in previous years minutes

Interview 46 on 8 June 2012 – Municipal Staff

DM in Knysna began around 2007, about 5 years. Dmanagement as always Edm because the function lies with them. The act say shtey must have a DMC, a DMPLan. So local munis were always shifting that to the Edm. I then moved from being the traffic chief to safety and security. then I started to work on when there's fires, floods, drought
came later. I started to put plans together with Gerhard Otto. 2 years from there we changed it from safety and security to safety and security and disaster management. then we had a disaster management plan. then we had the floods in Sedge, it was chaos, that’s where I’ve learnt. I then started studying disaster management while at the municipality. But then EDM was still in charge and then the change over came. With my team involved in a coordinating capacity. From there it just grew to where it is now. we went through the floods, fires and droughts, xenophobia. We have gained all this experience. We are more a coordinating function. that’s I played and my team played. being the link between us and province and also the EDM. So we’ve done it, and EDM doesn’t ahve to come an do it all by themselves, and without putting it up to a legal level.
The drought disaster declaration was done purely from a management perspective to make it a local, district disaster and make it visible at national level. If it wasn’t for the disaster declaration we would have had a problem with carting the water, putting in the pipeline. you ahve to declare that to get resources in. So to declare a disaster it enables you to access resources and funding. but we also have to spend a % of our budget in order to access the disaster funding. it works both sides. it covers the municipality in cutting through red tape but also with helping with funds. and to get what we’ve spent from the disaster fund.

(decision to declare an emergency?)
From a committee, now not just one line function, we as a committee came to a decision to have it declared as a local disaster fro the rest to happen. So we need to decide is this so big. Because it wasn’t just affecting the municipality, also the agric people. then it didn't just stop there, it cut into the economics, for example milk supply. So the team decided that we need to make it known to council that we are in a position where we need to declare that. we need all these resources. Then it goes to council, the mayor addresses that. she puts it rough to council, the executive council they decide, then the mayor also signs it off, us as a committee signs it off. then the mm and the mayor signs it off for the Knysna area. then it goes to EDM, then provincial, then it gets declared in the government gazette as a disaster. thats how it should work, but practically on the ground it didn't work like that. We had most of the things on the ground. the pumps, pipes, machines were in, the people were already carting water. although we were getting the paperwork done, we had already covered because the process of declaration takes time. so we had already put things in place. And if KD as a council decide its a disaster area, then it is. i cant wait for a paper to put up a pipe. but that letter helps with the mfma. to say I need R.... to do the following. The paper then supports what happened on the practical side.
The pipes came from Durban and Joburg. We went through the whole eia process, but the shortened version. All the criteria for this version were motivated and the environmental consultants say they are satisfied with the way we've done it [documents may give you some questions and answers]
Plant. Most of the time was spent at the RWTW, which had already been upgraded. I was taken through the various stages of the production process, beginning from water extraction at the extraction pool alongside the Karatara River. The water is then moved through various processes, where it is also dosed with chemicals. The final product is then transported via a pipeline to a reservoir on the cloudnine hill, before being transported to Sedgefield town. At the RWTW it was possible to see what the 'upgrading' of the RWTW involved. Primarily the electrical infrastructure was raised as a measure to respond to potential flood risks. In the past the RWTW was inoperable during floods as the measuring other devices were under water. Whilst it was planned that a new WTW would be constructed on the cloudnine hill, this plan was consequently abandoned. Resulting in the 'upgrading' instead.

The tour also involved stopping at the existing 'wier' along the Karatara River, which serves to control the ingressing of saline water from the Swartvlei into the extraction pool at the RWTW. At the time the only measure in place were 'sandbags' being placed along the bridge as a means to block the culverts. Following the drought, the Municipality has begun the EIA on the construction of a wier on the river. It is emphasised that this is being promoted as a means to control the saline contamination of the river water, and not as a dam.

The Hoogekraal River was flowing strongly at the time of viewing. No pipeline between the two rivers was visible.

At the Desalination Plant in Sedgefield I was shown the membranes as well as the control room. It was explained that the plant was run on the weekends during off-peak times, to keep the plant 'ticking over'. At the time the municipal staff were operating the plant as not O&M contract was in place with Nuwater.

Interview 49 on 15 June 2012 – Municipal Official

I started here April 2011 as the Director of technical services. I've worked around the EC, 15-16 years experience. I've been in Knysna before, 2005-2006 as the deputy director of public works, which is roads, stormwater and buildings. I've enjoyed working here. I came here because my family was here. I always come back to Knysna, I have a house here. I am a resident. there were disasters even in 2006, but we managed them. But water has always been a problem. Knysna for instance has + 70 pumps because of the terrain and all those things. But the water source has been a challenge because of the storage. That is why before my time they were able to investigate other sources of water. Which is the boreholes, your desal plant and all of that. So that we could have enough storage. Because that is one of the challenges we have. But I think with the plant we are able to do so.

But I think I future from what I know, there is an investigation to be done. Because the RO in knysna , the current membrane is just to clean the water from the boreholes. One of the things we are thinking, maybe in 5 years time as that we change it so that we are able to clean the effluent water form the sewage plant. and reuse that water. The one in Sedge it did give us challenges. Firstly the inlets from the sea washed away. But we were able now to drill in the parking lot. It does show quite a good source as opposed to getting straight from the sea. It’s the one thing that I think is the next phase to be done. To make those boreholes permanent. I know that we did get the ROD. We were waiting for the ROD to make that thing permanent, YOu can see that the structure
is a temporary structure. Having the ROD now, we are able to get funding to build a permanent structure. And also the discharge.

But in a nutshell I think with the water with Knysna, we are not that bad, we are almost there. But we need to make sure that we have that months of capacity as a storage. The RO plant in Knysna is working. But one challenge I pick up from the engineer, KT, is the boreholes. The number of the boreholes is quite a lot. But I think the water they get from the boreholes going to the plant. It does use a lot of electricity. But one of the ideas we are proposing is to clean the water twice to keep the plant running. The second time it must go to the system. When we were doing the investigation we didn't know the borehole water would be so problematic. Currently also in terms of management, the company which was managing, it was part of the contract and the council have just approved the money to carry on with that O&M for the plant. Our idea also, in few years to come, about 18 months, we'll appoint people, Veolia will train them and alter on they will take over. That is how we will be able to develop skills in the muni. The desal plants are very complex plants in SA but they are able to transfer skills to the appointed people. The same with the Sedge one. Yes, Calvin and them are able to do 1 or 2 things, but once you have someone permanent there. For instance what we do during dec or june, there is a technician doing protocols. we put him there. he is getting trained, when that's complete, we just absorb him into the municipality. Also he is a mechanical engineer, which we need, not a civil engineer to manage the plant, because of the mechanics. that was our idea for sedge. he can be absorbed into the system.

Council also approved funding for staff for that plant. Also for training to take place over an 18 month period ewithin the muni to manage the plant.

The RO plant in Knysna is operating but on (?) mode because we have enough water coming in. We don’t want to use it just for the sake of using because remember there's power usage. But lets keep it running once a week. That membrane must be kept clean. therefore we keep it in preservation mode so the membranes keep on working

(If I wanted to get an idea of how much electricity that was used per month in the operation of those plants?)

KT will give you something. There must be a meter in the plant to tell you those things. And also its costing us a year in terms of operating costs, the chemical etc. there must be a record somewhere. We don't have a breakdown of costs per plant. We might pick it up in the meters, water in. its a good thing, its nice to be able to understadn the assets running costs. its something to investigate.

(calvin has the information on the plant and its operation in Sedge)

Veolia I think can give you the information because there is a meter in the plant.

Eskom is for the muni, that wont be separate from all others. In terms of the records we are not overusing the muni. People are not buying much., therefore in the general the muni is not using more. The demand is not increasing. The residents are saving because electricity is expensive

(I know that SSI has provided you with status reports. Could I obtain some of those?)

If you can speak to RP and KT. I think KT was the main engineer for both projects. He has the reports for both of them, from the commencement of the project to date.

(Can you take me through your own involvement?)

My own involvement - after plants were introduced - I was more involved in the sedge one after the incident, when we were looking at what options to use. Firstly I didn't want ti to (?). It was chosen to go straight to the sea earlier, a decision taken by the team at the time and a chance because of the sea currents. but it was a relevant decision then. In digging in the carpark, there were also other options. but in the carpark they drilled and discovered that was quite a source of water. So I was involved in the Sedge response to
the inlet pipes. And also the involvement of Calvin as he is the superintendent of that area.

For Knysna I arrived as they were almost completing it. So not much. But able to say that if they are not used we'll have a problem with the membrane. One membrane is costing almost R0.5m. One problem happened to it we are in deep trouble. That’s why they are kept running, but i came when everything was almost complete and done.

(problems with the RO plant?)
Discuss with KT. I think the expectation of production is less. Because we have to clean the water twice. That’s the only thing. But in terms of the running and operations. The service provider is doing a good job. Like I said the initial operating and maintenance costs was part of the contract, but now we did put in budget and it has been approved. That you can get from RP. the cost of replacing parts will be over an above the contract, but we haven't had any replacement costs as yet.

(Political question. Some people have claimed your appointment was political and questioned your appointment)
Let me start by saying that any section 57 - directors and the MM - the appointment firstly, I'm a civil engineer, I meet all the requirements. I did hear a story that there was an article saying that they are appointing an expensive outside when there were retired people they should ahve appointed here. So they never questioned my qualifications. that is why, it is really politics that they are playing. and secondly I did meet the qualification but if it was political or not I dont. because it is the party in power that is able to recommend the candidate, because even today people are sayign the same thing with the MM. BUT you must forst pass the criteria requirements. The issue with Affirmative Action. the right way with AA must be, lets say you're white, I'm black.
Firstly we are must both meet the requirements, the qualifications, the experience. Then they look to muni numbers, therefore the one goes above with an extra point. Before I was appinted there was no black person. but i did meet all of the requirements. I've met the xpectations, improved the expectations. Even since the DA has arrived we have spent the budget, pushed. Initially there was a problem in Greater Knysna, focusing on KNysna, but I have focused on including the Greater KNysna community. those stories I've been hearing them but they've been pushing me to do more.
But this thing happened before I came in. But I haven't heard anything to my face since. But these things are a driving force for me to do better. Politics is always there. I went to school and studied hard. I would love one day if when people apply, people dont look at the name, they look at a person as a professional person, irrespective of race. Its my second time I've been in this muni, people say things.People want the service done, but race is a drop in the ocean in Knynsa
(I've heard that with your appoinment it was said you should be mentored and you refused the mentorship.)
I like that question. I know where it comes from because very few people know about that statement, I was surprised because 2 months before I left I saw the council resolution, after 11 months. Even my boss in the muni rejected this idea because how can a qualified person be mentored. but 2 months before I left was the first time I was aware that I must be mentored, 11 months after my appointment. Because again, whoever put that statement, you can't be mentored by someone who reports to you. that person must be above you to menor you. And even in the terms of reference, if there was a mentorign to be done, can someone bring those terms of reference? There was a council resolution but never went further. Stating for example, these are the reporting
lines, so 2 months ago I hear about that. I would love to know about where the terms of reference are, or the discussion between the parties involved. They put that thing there and I know. Even the person who was supposed to mentor me, I work with him since then. He must tell me now what he should mentor me on. The council resolution doesn't state the terms of reference, the period.

I was going to show you the letter I wrote last month in May to the MM, saying it’s the first time I’m hearing about this. The few people who know about that are myself, Mr. Nay, the MM, and the writer of the council resolution, and the mayor. There is a formal letter I wrote. If it was a direction from the council why was there no direction. How can I refuse a council resolution?

The person who wrote the resolution, he is more experienced then me, but because he was more politically inclined. There was even a talk that both of us would get a market related remuneration. Which they never did with me. It was more to satisfy him, they were going to give the mentoring money above his salary. It was also a political dilemma because he phoned people within the muni to do something. He was competing against me for this post. Even his PMU management post expired in June last year but it was not advertised it was extended for 2 years. You can say it was politics. I'm happy that I've heard this after I've resigned. Even amongst my managers there were people who said that they would support him if appointed but not me if appointed. And I experienced that when I gave an instruction the person responded slowly. Luckily I was told this after I was resigned. But I was able to relate the statements back to how people were cooperating with me. So I could sense the negativity at that time.

**Interview 50 on 20 June 2012 – Consultant/ Informant**

Commenced with the development of a knowledge hub for the procurement of large scale desalination and water recovery plants

From the Trans Caledon Tunnel Authority. Rase project finance for bulk water infrastructure not paid for by the treasury

Bulk Water:

Energy - climate - food - water nexus

Global water challenges - 2020

Strategies on water security

South African water usage is 198l/d per capita per day

Where does water come from? 2/100000 is freshwater

Water footprint and virtual water - waterfootprint.org - shows waterfootprint map, shows importers of virtual water [social metabolism…]

Global Resource Challenge - resources constrained by environmental factors - 2010-2030 - forecasted increase in middle consumer estimated by 2030, expected in SE Asia. Estimated step up in demand by 2030 for water, steel, energy, meat. Challenge regarding the building of new dams is that the low hanging fruit have been picked

Energy-climate-food-water nexus: Energy, mining, agriculture and households compete for water. There is a greater reliance on desalination, growing since the 1960s. "the energy footprint of water is higher than in the past and this trend will continue"

"Because natural supply can't be relied on in those areas" [note: in the case of the EDM, I need to disprove this claim].

"Silo based planning is no longer possible. A crisis in one area, triggers a crisis in another" "interdependencies" [note: aim to show that the crisis could have been
avoided, overcome, that is make an argument for mismanagement as opposed to TINA]  

"2030 water resources group" - gap created between water availability in relation to projected growth - dams, desal, efficient water use, can reduce the gap but it still exists - 1600b cubic meters shortfall [?] -> conclusion that water security has become a strategic concern [note: show that the concern with water security is based on concern of supply in relation to growth. What about WDM? Show certain assumptions, inform conclusions which can then be alarmist. Also interesten the need to formulate the picture in a particular way - based on specific interests]  

African Earth Observatory Network  
South African water usage or yield (???) is 11.3 billion cubic meters per annum, plus the potential reliable yield, equals 13.8 billion cubic meters per annum. [Note: aim to show that its about more than climate change and that as much as climate change is produced, so are management visions produced, and the specific 'logic of demand' is generated by the logic of growth'. making things into resources and framing the problem and solution in particular ways. DOes not pay to encourage approaches such as water harvesting].  

ARGUMENT: water pumping incurs costs, at the limit of surface water development, the era of dam building is drawing to a close. Groundwater method of recharge estimation is 6bcubic meters per annum, with 3b currently in use. As a resource it doesn’t usually come into the frame of planning. Currently in Sa, there’s a balance between demand and availability. water losses in SA munis amount to 35% - includes pressures, leakages, water bursts, cracked pipes [see wrc stats] --> CLOSING THE GAP through 1) large scale desal; 2) reuse of mine water; 3) municipal run off. 900MI per day of municpla run off water released into the sea. Has just returned from Australia and SIngapore. 6 projects in Australia, "probably where SA have to go in the next 5-10 years". In line with points above on closing the gap, argues for aim to reduce municipality losses, illegal abstraction, reduce evaporation, develop new sources in the form of WWR & Desal, conservation along the entire value chain, demand management (efficiency), virtual water strategy, preserving existing water quality (polluter pay principal), economic pricing to get private sector on board  

MOVE FROM SILO TO NEXUS PLANNING  
Desal is approximately R20 per kl, 5-5 times more expensive. 'But it is only a component of the total water, AS within a system's approach'  
SYSTEMS APPROACH: Golf courses for example make use of various sources including stormwater harvesting, recycled muni water, rehab of wetlands, dual reticulation systems  
CONCLUSION: SA is not in a crisis yet but is reaching a junction, the end of the era of cheap readily accessible water. Pricing should be reflective of the resource. "Don’t allow water to become a constraint on economic development"  
INTEGRATED PLANNING FOR WATER RESOURCES: DWA planning - monitoring on a per catchment area, analyse water balances, careful planning in this case, looking at expanding water resources  
CHALLENGE: SA has never built plants of this magnitude, need to develop a range fo skills to do this effectively., they are complex & expensive and can go wrong horribly. Planning is beign done, with challenges ahead, challenges for people to pursue: Harvest water resources effectively, stormwater, demand management as with energy but the
problem with water is that its too cheap on demand side

Trans Caledon Tunnel Authority (TCTA): Focus is bulk raw water. Water Energy nexus - energy costs, desal switched off and only used during emergency, 'should not consider as the silver bullet to cure all the ills currently' but remain an alternative. 'the devil is in the detail': contractors, design, energy supply. Evidence shows reduction in cost due to advances, currently the figure is 4.5kwh per cubic meter, but with ER Devices and better membranes but with changes in these evidence suggests with changes in these it could reduce. WWR is easier and cheaper to operate, but not a silver bullet, can go wrong horribly if don't get all the details right.

Interview 51 on 27 June 2012 – Department of Water Affairs

Yes and it makes sense almost, if the sea is just sitting there (the way the move is justified is to say that you can't rely on gwater and rainfall. I wonder from a scientific perspective)
I'd say you can rely on the gwater, it just has to be managed properly. Where I have a reluctance is green. So the water is there and if we didn't actually think green we'd have the supply. But you don't want to be reckless with the environment. That's where I become reluctant to sell the idea that there's huge volumes out there that can be used. Whereas there are huge volumes. You know the table mountain group aquifer. It forms that whole fold mountain range that runs to the northern edge of the southern cape. there is storage in that. So there are places where if you drill the right holes you can get a large amount of storage. Just north of the [brings out a picture]. this is all table mountain aquifer, there will be large volumes of storage in these fractured rocks but they are on the upper slopes of george for eg. All these rivers are discharging from storage, when there's no rain. I can expect that you can drill anywhere along here and get similar high yields. But to what extent does that affect the river flows, the ecosystems and dam filling. But once the rivers have dried up its not flowing into nay dam anyway so one can pump it. But in Knysna's case access is quite difficult to get into the aquifer. So it looks wonderful on the map, but it might be difficult to actually access. If one had the money and technology, you could drill as you need, but that would require expertise and money.
(In this idea of crisis as opportunity. It appears that you have competing sources trying to make use of the opportunity, with gwater as just one option)
I would have thought that the ratepayes would all be voting for gwater as its cheaper. You see in the crisis you want the water no matter what, but now you are sitting with this expensive baby.
[provides a summary of a case in the wc where gwater went baly wrong and was publicised. Hence it has influenced perceptions and arguments against strongly]
(I'm trying to understand the option in relation to other options)
There's a perception that gwater will kill all your ecosystems. I'm viewed as green by all the gwater people, while there's suspicion amongst those on the other side. So I'd like to think I've struck the right balance. [more illustration through the problematic case discussed earlier, how droping the water table impacts springs and ecosystems]
TO my mind the all town studied is the vehicle through which they just have to look at it. An dthat will be incorporated into the wpplans. And we have to then check that these are inline with the all town study. Because if not the munis won't get funding (whats interesting then in taking this point further, is that I've been told that deal has
been promoted by the wc chief director. So how can these 2 things be reconciled?)
You know I think I'm going to repeat what I've said before. That, even with me his
asked should he be looking at desal, in general. And I thought yes look at it as one fo
the options. I think its very good to be diversifying your use. BUT BEHIND MY
SAYING YES IS GREEN. I think maybe I'm over cautious. but I would hate to see the
CoCt going and pumping the hell out of an area but to then impact all the ecosystems.
So I think its a matter of balancing ecosystem needs. [tension between demand and
green concerns. push toward green growht in demand and supply] Also these things can
creep in over time before these things manifest themselves. So from my perspective I
would ahve said look at desal, because I know there's gwater there but I've got green
corns. But I know its far more expensive to desal. So there are all thes
evironmental knock on effects in terms of generating the energy. So I dont know what
the impact is compared to impacts on ecosystems with gwater. But gwater, aide from
the ecosystem concerns, there's alot of storage there to tied you over for a long period of
time without rain. If you can spread your boreholes adequately, place them nicely, drill
them deeply enough, you can tied yourself across a long drought I'd imagine. So to my
mind its more a question of monitoring the impact.
The availability of surface water has probably inhibited development for monitoring.
And also money and science in understanding surface water. I think the time has come
for gwater. I think a bit of a problem is fractured rock aquifer as in this geology you can
drill 60% dry, as you have to penetrate a fracture to get it. so its not as easy to find and
managing it is a science. There are these sort of technical things that might put people
off and you dont have enough technical expertise. If every muni had a hydrogeologist it
would help.
(To what extent is DWA involved in monitoring, managing boreholes?)
You see they haven't applied for a licence, we need a licence application from them.
Then when we give an approval there will be licencing conditions which will include
things like monitoring, appoint a hydrogeologist to write a report on an annual basis on
the performance of the scheme. Then teh hg will make management recommendations
whihc we can follow up on. So its been very difficult, wothout licences, to get munis to
manage in accordance with the recommendations of the geohydrologist because it can
be expensive. They also have to prioritise their spending and dont necessarily have the
recommended changes. whereas with a licence it becomes a condition, that will be
annually monitoeed. So licencing is key. The implication of not having the licence is
that you legally cannot use gwater without a licence. however before 1998 it was
possible, and they continue to be existing lawful users so they dont need to comply wiht
anything. So its subsequent to that. So its all coming in time. We've had problems with
issuing licences. Firstly a lot haven't applied, and second others have applied and haven't
received the licences from the dwa yet. Existing lawful uses dont need to apply,
residential small scale users (aside from maybe municipal bylawas which may restrict
usage) dont need to apply. During the cause of the drought there was a sort of leniency
shown, so almost a blind eye cast. but the understanding was that was the crisis is over
they should be applying for licences. One reason could be they aren't using it, and if
they are using it they should be applying. If they are licenced there are all sorts of
requirements whihc could make it more expensive because they'll be forced to spend
that money on the gwater system to keep complyng wiht the licence. But then it will be
managed properly and they'll compliance, so they'll gain confidence with the system.
We then ideally should have scattered monitoring boreholes in the general aquifer. and
we do have boreholes in the wc but didn't have in the sc because people dont use
boreholes there. So we didn't have 100s of years of records.
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I have been with Dwa for close to 29 years and have worked in the WC region since 1990. I have managed the adjacent Breede Overberg Water management area since 1997 to 2009 and still continue to support that WMA until July 2010. And have been part of regional management since 1997. When the drought hit, or let’s say when the availabilities of water declined rapidly due to climate variation I was working in an adjacent water management area. There are four in the WC and I was fully informed of what was happening in the adjacent one. In July 2010 I was then appointed as the manager of the GOritz Management Area. Which basically threw the ball at me as a Catchment manager but on an IWRM basis. At that given stage a number of the decisions of what type of works or alternate sources of water had already been decided. But I had no influence at that decision making level. But there I can also tell you what were the reasons for those decision because its not necessarily supported by a lot of politicians within the local communities or even engineers within the local communities for a number of reasons. One or two of those reasons was that its an unknown field for them which is difficult for them to manage. For many civil engineer water is an unknown field because they are more inclined to build dams. What you can see is better than what you can’t see without a lot of data. From the politicians view it was a focus on alien clearing. All of them wanted to build more dams. Knysna and Sedge for many years, and still, are dependent on the run of the river flow. So they don’t have large scale dams. Knysna has a small dam where they divert river flow into the dam and they supply the town. Sedge has no dam. They all dependent on the available water in a river system while it was flowing. And when that depleted in a short period of time, they had a crisis.

Let us first look at Sedge. In November of 2008 they was a flood in Sedge [????]. 2004, 2005, 2006, 2007, 2008 for those years there were a high magnitude of floods in the Southern Cape. What we refer to as cut of lows, which means severe storm events which cause a lot of damage because its high intensity rainfall over a short period of time.

(Are you sure it was 2008, because in Jan 2009 was the drought?)

Yes, exactly. So November 2008 the flood hit Sedge. Subsequent to that you have a high surge of flow, you must take into consideration, when you have a high magnitude of flow and a town in close proximity to an estuary. Over time, the estuary through wave actions from the seaside, builds up sand deposits in the mouth and your riverine area then becomes clogged. So your sand berms develop progressively over time through wave action, and through lower discharge from upstream catchments. Now when you have a massive flow of water coming through it scourrs the estuary. So basically removes the sediment. Because in Sedge case you have a number of little rivers, then a big expanse of wetlands, then the estuary. Now a wetland normally acts as an attenuation impact. Because its a vast volume of water and a vast volume coming on top, normally a wetland can absorb flows. But in terms of high intensity flows and short duration - 300mm rainfall in period of 24 hours - its not rainfall readily captured in data records. Historically the SC were not used to those type of floods. If you go back to the records it was a flood with a return period of 1 in 20 or in 50 year period. Now suddenly you have this magnitude of flood. So the vlei doesn’t have that attenuation impact anymore, the water rushes over the vlei and scourrs the system. Now if you open the sea into the estuary because now you’ve taken out a lot of sand, the seawater starts intruding higher. Now in the critical months of water supply to Sedge they’ve got a big
problem. Whihc is not necessarily the availability of flow in the river, it is the availability of flow in the river versus the volume of the salinity increase from the seaside. Through the seas seasonal springtides starts moving into the estuary into the river system. It ingresses to a certain point where the muni can't utilise the water from the natural source which they've captured it because the salinity has gone beyond a figure, which is reported to be about 300mg per litre on a measurement basis. Once it goes over that, the quality is that it can't be purified by the municipal works and its a crisis. Its not actually a drought crisis, its a crisis already in terms of raw water which is suitable for me to treat and treatment side comes down to MONEY. When I decide the works,, I mean 'me' as a muni, I design for a certain perimeter. 'I' knew about this challenge but I worked according to that parameter. Now in terms of January 2009 when Sedge claimed to be running out of water and the salinity becoming a challenge to them and what not, they involved the SANDF to cart water there. Although there were no scientific analysis done to determine how they reached that point. Nobody even aligned the flood into drought. Nobody even looked at the impacts of what were the high magnitude floods on the estuary and the estuaries ingress into the system. AT PRESENT Sedge is planning to fix that through a licenced application. At present they make an application to put a gauging wier at the causeway to manage the salinity levels. Once the salinity levels reach a certain period between 275-300 they will then close the sluices in the river which will actually prevent the salinity from reaching higher and cause a challenge of water supply to the town[Note this challenge to the wtw source is alongside the challenge of being in the flood plain. therfore it has since been raised so it may be operational and flooded away]. Now everything in life, specifically with water comes down to MONEY. Its not a question of is there water, but a question of is there money to develop the source or money to treat the level that I want it to. And that MONEY LEVELS, and is that money readily available nad do I as a muni have that money available, that I've planned and budgeted and put aside that money for time for the project. Or am I dependent on National Government to pull me out of the depth if I'm really in trouble. OR is it a question that if I bring this into play will I be able gain additional funding, Or will I be able to increase my tariffs to such a point that my consumer now doubles the payment of the tariffs and If I double the payment what will be the Default in payment from the consumer level. Your level of default on payment on tariffs and rates and taxes increases if there's a mismatch between salary increases and tariff increases, that is progressive increase versus sudden rapid price change. So there's a fine line of balance to determine that putting in one bulk scheme is going to cost me so much of money. But if I revert that across the board to the volume I'm going to get from one bulk scheme compared to the volume and cost from other schemes I may have a 20% increase. ut now I have to play the socio-economics. if I have a 20% increase will I still have money for the operation and maintenance etc. And where do most munis get there money from? NOT from the middle, lower and indigent. But from business, industry and large scale development. Those are where you gain the biggest. Large scale development, all that infra is paid by the developer and the muni gains the benefit. THye also give some money to the muni. the developer gains the cost through the buyer through the sale of the erven. Also because its larger developments, the rates paid to the council are higher. The council doesn't put down the bulk infra - paid by the developer as part and parcel of the development and they filter it through the properties they sell. Unfortunately there's not a lot of ringfencing done in munis with funding going for bulk, bulk infrastructure grants. They charge the developer a bulk infrastructure levy whihc should be out into a seperate kitty for contributions to bulk infrastructutre developemnt (developer not building these as they do with infra on the
development such as lights, roads, services - ie 2 costs for developer 1)full payment for services on sitewhich they recover through the plot price and 2)a bulk infrastructure levy paid to the muni which should be put into a ring fenced fund) which can be planned and developed over time. Very few munis do that. they throw it into their operational budget and it gets spent. And tomorrow when the crisis hits they dont actually have funds to fall back on to do actually the development and proper planning that they need. The developer fee, part of it should be put aside for a bulk infrastructure fund for future development. Its then part and parcel of the bulk developemnt, taht is for the town.

But they dont out the money into a ringfenced pot but throw it into there operating budgets. So when the crisis come they stand infront of prov and national governemtn saying please they don’t have money, please can you help us. So in most cases, depending on the severity of the crisis, the funds will be allocated. And those funds come from the general ratepayer not from the guy living in the town. Now you take Sedge. To revert the crisis for Sedge that was looking at depleted run of river flow because its now draining faster to the estuary where it was previously contained. Its draining faster so the water drops faster. Unfortunately when you have a high flow on the other side which is highly saline, it now moves into this one. Now the quality of the water is then very saline because the pressure from the big source moving in a little source. So they've got to blend to a certain point. Then to move your point of abstraction is not necessarily viable. Do you ahve the money on board? No we dont have the money. Will the crisis be that the people have potable water. yes most likely because I dont have the money, I cant do it that fast because i’ve got to go through all these proceses - procurement, eia, water licences - I just can't put it in and make do. So thats predominantly where most of this started.

You've got seasonal rainfall in the WC. High flow in winter, high demand in summer, low flow in the river in summer because of low rainfall. Rainfall contributes to run of river, the second one that contributes is gwater. If it doesn't rain the water in the river is fed from gwater which is fed from rainwater but over time. The next point you have is from return flows from sewage works or agriculture, and in some cases releases from large scale dams from the state or large scale entities, released for actual use. So there's a lot of human intervention in giving flow to river systems. But from a natural perspective Sedge and KNysna have fairly unimpacted catchments (Sedge a little bit). So the water in the river system is dependent predominantly on rainfall or discharge from gwater, resultign in the flows dropping. Once they drop to a certain point you have a challenge firstly of whther you have enough to abstract and also if its at a volume where you can still abstract because I'm also limited to the volumes at which I may abstract. Because I've got to sustain a sensitive environment downstream. So there's a lot of socio economic and environemtnal related factors.

So the quickest one was, so he question 'why would we want to move to RO plants to reclaim treated effluent, or seawater; or why would we move to gwater?'. Its because it gives quick results and we are not dependent on rainfall. THAT 100% DEPENDENCY ON RAINFALL IS NOT IN THE PACKAGE ANYMORE. And with the reclamation works, the reuse of treated effluent, to use as a potable source is an accumulative source. Because if I take 1 glass of water I drink, 100% full. through engineeering practice I design my sewage works to except 70-80% of that. Now assume 50% reaches the wwtw. I recycle that and I can get 50% of that, so I have 25% of the original glass back into the system. Now I've got 100, plus 25. Now I put this 125 back on the same % basis I get say 140, so over the period of 5-7 years you can double your glass. But you have not changed the volume abstract from the system you have just recylced instead of
throwing it into the sea or using it to water a lawn. There's a massive amount of scope of growth to use the water we dispose of. All London's water is recycled water. So its all man manufactured [Uses examples of Thames, Rhine, Windhoek water - 35min]. Thats on the reclamation side. you can treat it to drinkable level or to a level where you can mix it and treat it a second time or in the case of Hermanus where they'll use gwater, reclaimed water and put it together. But its still cheaper than desal.

So in the case of Sedge and Knysna it was a question of how do you put a system together that will ensure supply during the peak holiday period when there's a lot of people coming, and a lot of money spent in those towns. I need to out in a scheme that I can have approved, funded, designed and built in a period of 6 months. (the schemes put in place in Sedge and Knysna, were they promoted by DWA?) They were put together by a group of people [I'll give you another document].

The fact that you had to secure bulk water supply in a short time frame. Now which were the alternatives. Sedge were saying that we are not the only ones with a low flow river. Sedge is part of Knysna. So the Knysna guys were also started to say, but our river is also startign to lower but they still had water security in terms of volume they may abstract even though its flowing lower. Bitou said 'we have the same challenge ...' We have planned for the growth of the town but we haven't implemented any of the studies. Sedge hadn't planned. they grew but the rest of the town jsut got expanded. Because the river is here, we just pump from the river.

So this group of engineers from the local munis, disaster management got together with mr. rashid kahn, our chief director, and dr hildegarde fast - the provincial head for local government and housing an dplanning. She was brought in because provincial disaster management falls under her portfolio as well as the provincial head of the dept. The two of them were brough onto a meetign of minds and they were the ones that said 'go for alternates'. And the muni guys would say 'we dont have the money etc.'. And they said well make a submission. We are giving you ideas. telling you that this is an options you can considere that will safeguard you. We said you can build a dam but we are not going to pay for a dam. And its not going to be finished in 6 months time. The volume of water that you want to capture, in 6months time you're not goign to complete a dam. If every disaster or crisis there's a crisis procedure to be followed. And the one thing is that you've got to declare the area as a drought crisis. Declare by Provincial parliament. Once provincial has declared it it needs to go to national to declare it as a drought area because otherwise NT doesn't give you any money. So there's a declaration process to be followed through province, proper documentation, out it there, declare it as a disaster area. Upon disaster declarations you can now consider applications that comes to you for fundign that goes to Provincial Treasury. Now if Provincial Treasury have money in that coffer they can supply you with funds. if not, they can revert to NT. But NT wont give you money if it hasn't been declared on a disaster on a national basis or the ministries haven't supported it for funds to be available.

So they had to declare, but they said start doing the footwork. Look at costing, find out how fast it can be put in place. Do the full design and work out the volume of water that you require as a local authorigy, will be your shortfall. So basically if my demand as a muni is 10ML per daya nd I'm getting 30% less, and with the seasonal period, and even with restricitons - whihc was part of it. A requirement - But I'm now goign to ahve a shortfall. ANd calculate the shortfall and the cost of the works against the shortfall. And thats why Knysna and Bitou came up with this 2ML works, it was the shortfall calculation.
You must take into consideration the one thing. There was very little readiness planning done by any of these munis, to not only avert a drought period but to avert the progressive growth and development of their towns. For example they didn't cater for the migratory workers that arrived for employment and the other is politics to swing the vote. What they all lack in planning is where the future water is going to come from. They approve the developments for the money they receive, but they aren't planning for the increased demand. Its not drought its bad poor planning and financial. they do not cater for the escalation growth and applied conservation rules they work on face value. How do you sell to the media and general public that you are in crisis. You take a picture of you standing next to dead fish in the " dam. And you're in dire trouble. Ja we dnt have money to develop the infrastrucutre. And PT and NT wont give us money. So now we are going to put ourselves in a crisis and then they will give us money'. That's how it works. The reactive is that if it s crisis mode then everybody is getting pulled in, everybody is looking after everybody. it doesn't matter if you are a rich man or a poor man in the town. Its domestic security, basic human needs component, constitutional right of South Africa.

We know we can argue that its not our responsibility. So then they maybe fire the council of the day and appoint a new council. Is it going to solve the proble? No, the people are still going to be in toruble. So lets resolve the problem.

We create crises to gain sympathy and high level intervention funding to put in place what we initially wanted to put in place, without using our own funds. And then on top of this you get a droguht period. So 'I Haven't planned to be ready for my current and future growth. Only in George largely planned for future water resources over the last 5-6 years. The rest are not making a lot of plans.

If 'I' want to make an application to NT, I can do that in criisi or precrisis which we would refer to as a risk reduction. There are very few countries where NT has funded risk reduction. And risk reduction is the way to go. If you really plan, this is my demand, this is my growth pattern, this is my availability. I'm presently on the borderline, if I have a drought that cuts the supply by 20% 'I'm' in trouble. I can apply wconservation to stretch it. but I've also got a % growth in the town. I can stretch it, but in 2 years time I'm goign to be in trouble and beyond that in serious trouble. The only way to resolve it is risk reduction. You can do it rhough the same processes. you have to declare the area as a potential disaster area and all the state depts have to gove a letter that they support the application. With risk reduction you are pre planning, you have time to play with, you have a long term surety in terms of supply that allows you to put in a proper structures.

The council makes the decision in a muni. They determine where the budget goes. If you work as a civil engineer for the munni and you tell the council, the mayor about your concerns he will tell you take your job and leave. So people don't say things to save their jobs. And some councils that dont commit money to bulk large scale projects because there are so many functions that the munni has to look at - schools, roads, creches, sanitation, lotof sundry. How much money am I getting in. My operational budget says I must pay for example R100m, but I get R30m, how do I stretch that? Then you still want to tell me to out R10m away to save for large scale infrastructure. Some people actually play devil's advocate, whey they allocated engineers to various towns by the DBSA to support the lcoal munis from an engineerign technical skill and scientific expertise. WHich are highly qualified guys not on the munis budget. Then they advice the council, Mayor, MM. But nothing gets approved. then the same people start emailing the minister, Rashid Khan, then it gets jumped on the council and the MM, then first guy out the door is that engineer as the whistleblower goign to National. Now
that the dept has interved, we're now doing all the studies in the Gouritz for them and giving them a lot of money. That guy is till in the dogbox because he was the whistleblower.

The constitution said we had 3 spheres, not 3 tiers of government. LM have executive authority, executive power, national government is not above rovincial, not above local. We have the WSAct promulgated in 1997 (Act 108), then the NWAct, (act 36 of 1998). In the WSAct it says the muni has to put in an IDP every 5 years, which includes a WSDP, which looks at levels of water supply, distribution as well as future planning. A lot of these plans are done in fact by consultants that they appoint. Its good to say the town is in trouble but if I have no measurement of what the town is using - I dont even know how much water I'm giving. I'm sending out accounts, but what I'm taking out of the resource, and what I'm supplying to them I dont know. So how do you apply a wcdstrtsagy and say you are going to cut 40% of supply when you dont know what you are cutting on. Now you take reports, wsdp, wcdmstrategy, paid by salga. Various documents, all coming to 3 parties. If you dont pick up the highlights and recognising the muni is in trouble. Then you contact the MM and express your concerns and the response is 'who told you I'm in trouble. You're national governemnt, you go and play on your own stoep. I gave you ther report. It was a compliance consideration'. So its a very fine line of working together.

Why is the planning 30 years. You can only get a loan from a financial institution for a period of 30 years. Because after 30 years, the institutions don’t get any return on their investment anymore. So they worked out a critical cut off for when I is financially viable for them to lend you money.

Prior to the 50s MB were dependent on run of river abstraction. MB was a small town with some seasonal influence and no large scale industry. Over time as the surrounding towns grew into one that the demand increased. Then the dept built the hartenbos dam. But MB decided not to use the dam because it was very saline. As the waters derive from shale recharge as well as running over the shale. Then the dept built the Klipheuwel dam, close proximity of kleinbrak. where we pump the water in from the river into the dam to augment the dam volume and that supplied MB and surrounds until 2005. So they used run of river, and predominantly Klipheuwel. however in 1979 we built Wolwedans. mainly built to supply Mosgas (at the time), because of the NP at the time, sanctions were enforced internationally, so the governemnt decided to generate energy supply internally. Therefore started to harvest gas from seaside, with deep oilrigs and generate power. Similar to Eskom, partly private and state. So Petrosa came in adn said they'll pay 50% of the dam and pipelines to the works etc. but we want the water in the dam for our security first and foremost. There were a few farmers abstractign to the dam, but we declared that a government controlled area and freezezd agricultural allocation up stream from the dam as well as from the dam to certain volumes of water.Since MB never really used Wolwedans, it wasn't really a concern to MB as they thought they still have an allocation in Wolwedans. Subsequent to 2005 MB visited the DWA and requested an increase in their allocation from Wolwedans as their demand is growing. So we revisited the system and increased the allocation from the Dam. Over and above that the Dam also has a Environmental Reserve allocation. Now having a false hope of security you do not necessarily plan. They developed large scale
developments as well as migratory workers, where demand has jumped exponentially when you never planned that. Now when you suddenly have a drought period and your demand is still quite high, you have a risk of not being able to supply your potential peak water users which is seasonally going to be in December of 2010 and you are running into crisis mode in January 2010. So now you have a potential risk of not being able to supply the town or the peak seasonal demand which basically doubles. So if I don't put in interventions earlier, I may lose many potential tourists, as well as indirect benefits from tourism.

Furthermore Petrosa supplies petroleum to the whole SC and potentially to the country. They also provide all the bicarbonate gas which is put in Coke and soda streams. So if Coca Cola says they've don't have an essential ingredient, its that they can't get the gas. Petrosa also makes a lot of plastics, a number of alternative products they manufacture over and above petroleum. They also provide petroleum to Shell & BP. But the bulk is managed and supplied to different companies. MB off season demand was 18ML/day whereas in the season it was 30ML/day. In WOlwedans they shared 15ML/day. The only strategic industries in SA are Eskom and PetroSa. Petrosa works on a 98% security of supply, whereas the muni is 97%. So there were these challenges. For PetroSa it was a far higher crisis then MB. Because they had Klipheuwel, although its dependent on flow. [1:26 for discussion on MB].

For the first time MB discovered that if they blend the Hartenbos and Klipheuwel water they can use it. The treatment is not that bad. All of it is money and perception. But that decision wasn't made earlier because the previous manager in my position was close to retirement, so was sitting more on the backbrner. He was not getting involved. So it becomes about your own institutional and local memory, knowing what you have available, to establish 'are we really in a crisis?'. MB had a situation where the Wolwedans was being pulled down by PetroSA and MB to the level that its empty they'll have to seize operations. Resulting in a massive shortfall of Petroleum gas, bicarb gas, petroleum in cooler systems, fruit processing industries, freezer systems, all of that would have been severely impacted if they ran out of money.

That's why one option wa RO to reclaim the water at Hartenbos and allocate that to PetroSa. Government paid for that as well. That immediately contributed 4.8ML to Petrosa, taking water from a sewage plant. [Talks further about MB - 1:30 - can return of needed]

We have plants in these towns that are not used presently. Is that not a waste of government money. But if you had 3 balls to play - rain, no rain, average rain - because of the uncertainty we've got to put in interventions that are not rain dependent to sustain the lives of the people.

(I had a few questions that have come from one you've said, and questions I wanted to pursue. Firstly you made a statement earlier that the options implemented had to do with a 6months timeframe. Why do you see the timeframe as 6 months?

The sea is not considered a landbased natural resource. For a landbased activity - NOW WHEN YOU DEAL WITH SEA ITS DEPT MARINE & COASTAL MNGMENT TO GET AUTHORITY - IF you want to use gwater, swater, store, abstract you need to get an authorisation or licence from the dept that can take anything from 3-6months; you need to go through a formal EIA that can take anything from 6months to 2 years, with ppp, env studies. These were considered by a number of parties as stumbling blocks. At that stage the head of the dept for prov disaster, local gov, housing & planning; environemntal affairs falls under the planning portfolio of Dr. Fast. So between her and Rshid they said that on the basis of the droguht you will not make an application now, you will continue without having an authorisation and EIA and without a formal licence
application from DWA. However you will begin to develop the paperwork. As it is an emergency and we will deal with it as, in an emergency we disregard administrative protocol. The second part of that is that you also need to know that if I have to make the declaration for drought area in January 2010, and there was one prior to that for Sedgefield as well. Because you need to get a declaration to get funding. Those declarations, and then to make the formal declaration you need to go through a design and criteria and determine what are our most suitable option to have the shortest turnaround period to have designed, funded and built - AFTER I’VE RECEIVED THE FUNDS OR POTENTIAL FUNDS. YES THE FUNDS HAVE BEEN SECURED, YOU’VE BEEN APPROVED BY NT TO GET THIS FUNDS - you as the council have to now go on your design, out out your tenders. You’ve got to go through normal tender design processes which could be a 1 month to prepare, a month to call, and a month to allow for any discrepancy or appeals to the tender processes. Once you’ve secured the tender you can write preferred bid and go to preferred bid status. But sometimes you need a private service provider to do the project management and you get a separate company to supply the material. Now on the same basis if we all use the same technology and supplier, that supplier may not have the parts in place because the demand in SA for desal plants are not that high. If you take Bitou for example they were the last to start. The parts were still manufactured in CT. If today [more on bitou problems with extraction - 1:41]

You had a timeframe, begin with declare a drought in January, PT and NT has to approve, lets say by April, tender is May-July, still no rainfall, but tender process through. Then get the delivery, and by November I need to be completed. So I have 3-4 months to install the plant and test it. So when Thye hit the seasonal peak I’ve got the augmentation available. Without that availability I would have high restrictions in the seasonal peak with no tourists or fewer tourists. So there were reasons why it had to be a short turnaround period. Any other alternate _G_Water you’ve got to drill a number of boreholes with a specialist geohydrologist to determine potential areas. you also need tender procedures and most did receive money from government for boreholes. You got to case, test, get equipment, creating different challenges. On the desal and reclamation side, the water is there. You dont have an uncertainty and dependency. The quality is not there, which is why the works are out in, I’m not going to search for it [ACTUALLY NOT TOTALLY ACCURATE - see RO]

Knysna is now planning for a dam. They are also planning a transfer from the Hoogekraal. We did it during the drought. BUT that’s an Unauthorised transfer ok, They Have NO Authority to do it but it was crisis management. They’ve now out in the application to have the authority to do it and all of those will have a certain rules with it. THE SAME with the Environmental Impacts, they did that on what they call 24G. its a transgression because they did that without authority. They had a verbal authority to say you can proceed, but they all received a fine of R1000. Its not that much because they were transgressing the rules of the Act. They didn’t transgress the rules according to them, but in terms of legislation you have transgressed the rules, you have proceeded without authority. BOTTOM LINE. There's NO Argument about it, you get a fine of R1000 as a Municipality (Knysna), but you have received R28.6m from Government. ‘No but we don't to pay the R1000 fine. We want no fine and we don't want to be culprits’.

But at the same time if I take Knysna, Knysna is the biggest polluter in the bloody WC. Their Sewage works continually polluting the system. And they're continuously making excuses but not fixing the problem. And the solution Is that they've got to increase capacity and put down people. People who work on WWTW and Drinking water supply
are not permitted to strike. Knysna's people go on strike, there's nobody at the sewage works, all the sewage runs into the estuary. They should have ensured that they have back up people to ensure they are compliant to legislation.

[1:49 - talks more about the abstraction problem in Bitou and how he warned against it in 2010 when design was taking place]
Now in Knysna and Sedgefield you've got challenges. In Sedgefield now there are problems with the intake pipes
(IN Knysna its got to do with their borehole water quality and how its affecting their membranes)
YES, but we also said that would happen. I told them you guys are drilling in the predominanly freshwater lake of Knysna. 'Yes, but we tapping into a layer that is saline, that will not have an impact'. How do they know without any previous drilling and testing of the quality of the water derived that there's no interface between the top and bottom layers. because you're dealing with a very vast area. So many layers of geology, thats its difficult to know the interlinkages. You would only know that if you've drilled sample holes and done various tests to know that the quality is not suitable
The urgency of the situation didn't allow people to do enough research and investigation into the challenges they may face. Now they don’t face water quantity challenge they have an operational challenge (A they have this). Now they have to figure out how do they fix that operational challenge. it may cost them R0.5m or from an operational point of view have to replace those sieves once every 4 years, versus 6 years. But they are very quick to forget that they've got R28-R30m. In MB case Petrosa paid R80m, DWA paid R92m for the plant and I think paid about R60m. Paid the lesser cost of the plant. DWA paid the bulk of it. In George we paid in the order of R236m. All of them have suddenly forgotten that.
(The question for me as an outsider is, there was certainly a lot of money spent in each of the areas. Why were certain options selected instead of others? (what do you mean)
Why was the money directed towards this specific option of desal so strongly?)
Money was not the main factor, it was put aside. Critical was water security for domestic supply, for industrial supply, for jobs, food, and for the environement. Were the first order of the day. Whatever it cost was the second option. Because if you have massive cuts you have no availability, you have far less jobs, more crime etc. those were the crux. the money side comes second. now it puts you in a different perspective. puts you in this perspective: [draws] [talks about MB system - 1:57]
[MB] - The cost to run the plant at 0-5ML per Kl costs R8; the cost to run the plant at 5-10ML per Kl cost R6, to cost to run to 5-15MI per Kl cost R4. Now if they run this plant fullborn at R4 per Kl then they run it operationally wise correct because they presently running at between this margin (first) they are paying R8 per KL, so now its massively expensive for them . But if I had to split it [goes into calculation of making use of mixed usage system which yields a cost about R3.75 per KL instead of R3, when mixing with the desal at a range of usage of 5-10MI which is R6per Kl. Then proceeds to make the argument for the peak season if making usage when running plant at R4 per Kl)
Concludes: if you evenly spread the cost, the volumes that you take, making a mixed used of the various systems... I may find I increase my tarriff by R1 per kl, so you apply that with a seasonal increase in tarriffs
(I've heard this before that the desal should be taken as one part of the larger scheme. But the problem with this is that it is based on a number of assumptions [WHAT Assumptions?] About howmany Kl you are going to be drawing from the desal plant in
order for it to be cost efficient. But you've a mothballed plant in MB]

ALL these plants have been mothballed in inverted comas, but mothballed means you can implement that plant tomorrow. Its not shut down, closed. Government has spent millions in this project.

[ALOT oF MONEY has been spent by Government] (If I talk to different people, each of them gives me a different understanding of mothballed. Some of said you turn off as its currently not needed [correct] then you would turn it on if its needed [correct] but the concern with that a lot of the mechanical aspects have to be made to made operational again [correct] . So it might be that you face another crisis and its needed, turned on but becuas it hasn't been ticking over - is the term used - to get it to operate and actually supply takes some time so it might not actually supply whe its needed)

Ja, depending on how your readiness planning is. If your readiness planning. So you've got to have early warnign systems, once the dam drops to say 50%, you are not in trouble, but it means you ahev to do your readiness planning. But if you hit that switch when the dam is empty then its crisis management. But I think that any of them, in the mode that they are, will wait till crisis management

(The other factor, I don't know if this was considered in the selection of these plants, if the plant is not switched on, even if not produced, continues to generate operating and maintenance costs)

That’s absolutely correct. You'll have operation and maintenance costs, you'll have a time to time switch on test, from a mothball, the mothball principal is what they did with eskom. Most of eskom plants were mothballed, they were closed down, 2 security guards checking the systems, other people removed, gates closed. For 7 years they were mothballed. Gov. said to eskom you are the sole provider to south africa, we want 30% of power supply to go into hands of other parties before you start developing these.

Thats why we had those massive blackouts. But those 30% never came to the party because to supply power is not an easy game. So thye've now allowed eskom to demoth those plants but at the same time DME are running renewable energy schemes so that in the future the additional 30% should come from renewable. So why are these plants so expensive. THe electricity costs. [continues to talk about hydropower in sa - 2:12]

Should be asking how we cut the power cost to make this option far more viable. The benefit with desal is that if you have an increase in demand you just have to add a few more modules. Because the bulk of the infra is already there, the footprint is there. And Knysna has ample space to do that. So the crux of your operations are there. In Knysna's case if increased you would need a preassessment to evaluate the salinity. Which lead to certain engineering questions to be resolved. But currently its easier to moan about the cost. MB might have a mothballed plant now but in 5-10 years with the growth they going that plant will be running and operation and in 30 years time it will be running full time. We dont have anymore more water to give them here. SO they've now had a risk intervention but thye've got a risk reduction source in place.

(Why were boreholes not pushed as strongly as desal?)

You've boreholes drilled in these aras, but not as high yielding and there's also a challenge on the salinity of these boreholes creating a challenge. They also don’t know how strong they are, how much they’ll supply, the only way is to know is to use it. There are a lot of alternatives. they can reduce the power costs with alternate schemes to augment the power supply so they put that into the grid in exchange to eskom. Eskom knows there's a demand from the plant from it draws on there grid. So if you contribute to their grid, they know they can use the supply for o=other users.
(To what extend did you or the dwa evaluate the actual extent of the crisis?)

Personal opinion, there was a level of exaggeration. But that’s my personal opinion. The dwa with all the roleplayers and sitting on the disaster management team with the province you've also going to consider who's sitting there. The one guy operates dams, the other is a water specialist, sitting there as a researcher who is always challenging the unknowns so are scared to make decisions. The previous acting manager for this area, like I said just sat on the backburner and in that same year retired. Then you have the other challenge that the very high level people are not necessarily informed on everything that's going on on the ground. And your high level officials, that are supposed to guide your very high level responsible parties, are not willing to tell the boss 'you're wrong' or 'i have a different opinion, or have we considered this other way'. I fortunately have a very good relationship with Mr. Khan and I will tell him when I don't agree and argue for it. But the other guys won't say a word, if they think about it and talk about it. 'we don't think its that crisis, this is the option'. Geohydro, dam operational side, those monitoring river flows and dam levels and they report on a dam level that gives the dam status, it gives you a nice birds eye view. Usually the munis water is a secure allocation. You'll see in the stem report that the akkerkloof dam was 40% full. but the akkerkloof dam is a balancing dam which means [is this correct?] I take the water from the river, put it in the dam, take the water from the dam take it in the muni. Its off channel, it does not supply, it doesn't have a continual run-off. I just add to and take from it. If its 40% empty it does not mean I am in actual crisis. It means a pump may have broken where I pump the water from. Then you have other dams where the dam fills once and I know as a town I only have that water. but as long as the dam stays full i don't care.

In the SC, it used to be the rainfall was a year round rainfall area. Now the weather pattern has changed as such that you still have an average to above average rainfall area. But those are measured in terms of volumes that and not on period and intensity times. So you have high flash flows, and then bits and pieces, but you have 600 average (Does that not become a question of how you manage your infra?)

Now they have to. Because they could have seen this happening over time (the statement I've heard frequently from muni officials and politicians is that climate change means you can't rely on rainfall, suggesting the rains not falling anymore)

The rain still falls. The volume figures are fairly the same in terms of average rainfall measured in the SC and its not climate change, its climate variation, or rainfall variation. Now climate change is a far bigger picture. Meteorologically you would have to do assessments over a far greater period. But if you go back to history the hyperbolic curve on floods versus droughts, it some cases it can be every 20 years. Now in the George, Mb area you'll see that it actually had a drought period in similar periods. But the bulk of this argument was that they had a drought period that was historically going to be there. A period of lower rainfall and lower occurrence BUT people don’t go in the history and see when drought is coming. People don’t actually plan for droughts, the don’t plan for growth let alone droughts.

[talks about worst situation - 2:33 - Drought as a longer period of below average rainfall, but they continue to abstract at a higher rate that was being replenished by the rainfall. Talks about allocated annual dam extraction %, calculate in the basis of average rainfall, but that these allocations are not stuck to, as more is extracted when rainfall is high and even when the rainfall levels drop extraction continues until 'crisis'. he says they played on sentiment. having applied for funding previously after recognising risk. then the extraction continued, so were gambling]

Politics plays a big role in decision making. The engineers can put as much as they want
we've done a project evaluation, not a post mortem of every muni expenditure against a project. You must remember that NT aims to fund a project based on a project proposal, which I submit with an application with other documentation. NT and other large scale money institution doesn't allow you to then change that if you misallocated. The first disaster in wc was 2003 flood, in other cases there were floods not declared a disaster, therefore no funding. What a muni needs to do is reassign allocated funding to fix disaster areas. Once I've done that and its declared a disaster I've got proof of expenditure and can make an application for funding. Now if you have one major flood in SA in one year and you get R500m allocated for that, then everybody put in a substantial claim with proof of expenditure, calculations etc. then you can get funds from it. BUT if you have 3 floods in different provinces of the country, or 3 disasters in one year and R500m is tabled, they split in accordance. Now many cases farmers and munis in the country received 15-20% of the actual cost of that works best. BUT in this case it wasn't a case of getting money after the fact, it was based on getting money based on what your proposal was on the table which is engineer approved. You've then go through the process of developement and see some niggles and it costs more, not our problem. Though Bitou and BWest have applied for more money. We supported the latter to be allocated from NT as its an extension but not the same projects, BUT both were declined by NT, saying its now for their own account, not for NT to fund now. But If I'm NT and I give you R100m and I find out through my project evaluation that you've only spent R90m you have to give the R10m back. BUT it doesn't work like that actually. Because NT gives the money to DWA who first evaluates the project and then based on the project satges we pay the money to the muni in transfer. Then if they conclude the project at R92m and the project was aimed at R100m then the R8m will back to NT to be rallocated to other people in the country.

(What happens in the case where a plant has been constructed based on certain understandings, and this has changed, although you still have a plant)

So it still serves the same purpose, or yield the same volume. (to be more specific, the question relates to the Knysna RO plant. My understanding is that plant was given for WWR but the plant now is not exactly that)

Correct. I know there was a change though I wasn't party to those discussions. because Knysna's WWTW is far too small to cater for the current effluent. So it has to be upgraded. So they then said how do we link the plant to the wwtw. Its linked to the project, but this is still a viable scheme but in the turnaround time they were unable to do that; also in the present time they still dont have money to do this; and the general public in Knysna dont want to allow the WWTW scheme extension. I personally told this group that you cant put in an appeal against the extension ot the WWTW while at the same time you are moaning about the pollution of the estuary from the sewage works. Why dont you put that on the table but suppor the extension of the works and at the same time you gain atleast 50% of the polluted problems you are now goign to design with a proper design problem. The muni has done sampling for the last 3 years. If you cant stop the problem the sampling is a joke. They said they have it under control and just as we were leaving we had a call about sewage from the manholes gushing into the estuary. I called the head of technical dept - he was retiring - it was a case of a few people who had come, then a paid contractor came to fix it but was moaning and groaning. So we determined the problem within 10min of being on site. I said its reoccurring because everytime they just put another plaster on the same tyre so the tube is so full of plasters. if breaks you dont know whats wrong. The back up pump wasn't there, the sewage from one tank was flowign into another... [explains details]
DBSA under their Siyanze Manzi (?) Programme deployed engineers, town planners, regional town planners, finance people to mostly municipalities. And there were a handful of us that were deployed to the Provincial Departments and to the DWA in particular regions, I think 4-6 DWA. And our role really was to assist with the unblocking of mainly Municipal Infrastructure Grant projects and maybe Bulk Infrastructure Grants projects and we assisted in that process mainly and there were other strategic interventions that were needed. That was our main role, our main function. During this time, I think that government, different spheres of government started to realise that they were not really addressing a lot of the bulk infrastructure needs in the municipalities and those needs were hampering, housing development, just development, economic development growth. That's particularly the case in the WC, but I'm sure its in other Provinces as well. So during our deployment, somewhere in the middle - and I was deployed from Jan 2008 to October 2011 - there came what was referred to as the RBIG project. And I think that was birthed because they wanted to address the Bulk Infrastructure projects that they thought were not being addressed by MIG. And at the same time, I think that this Province, maybe because it has a different political make up at the moment - being DA as opposed to ANC - had focused on growth and development. And bulk infrastructure to them was the reason that things were not happening. I think there's 5 Districts in the WC, in addition to the Metro CoCT. I think there's 5 districts, 24 other Locals, which are all Water Services Authorities. And the DWA needed some beef up in terms of their technical services. Not only munis, but some provincial offices and I think DWA as well. Some of the districts also during this period started to look at that bulk needs with regard to water and sanitation. And Eden was one of the Districts that took this up early. And the consultants involved were SSI. I think they had done this prior to, lets put it in quotes, 'the drought'. In Sedge and Knysna and eventually seems to have spread everywhere in the SC. At the same time, they had undergone this, I think they had 10 or 15 year focus on their bulk needs. The DPLG which is now the Department of cooperative governance and traditional affairs was also looking at comprehensive infrastructure plans that would address some of the bulk needs and to get a figure on what was required. And of course the figures were staggering. To say the least. And I think that was CIP which was sort of brought down from dlpg to the munis. Saying, what are your bulk needs, define them, we'll give you a template, put it into the template. So I think the EDm was quite aware of what their needs were and it seems to me that they seemed to be making an effort to address those bulk needs. At the same time that SSI was doing this study, the DPG, the Province, (I think after the elections) decided that it needed to look at bulk services as they felt it was inhibiting growth and development. They decided to go on a fact finding mission and had a team called the Bulk Infras task team. The BITT. It was chaired and pushed by the HOD of DLG, Dr. Fast. DLG was also, probably a bit concerned about the technical expertise and capabilities of DWA. Maybe I shouldn't say that, but I think also its true. So they, under the BITT they were determined to examine a regional bulk infrastructure for the province with emphasis on water and sanitation. And SSI had already worked in the SC. At the same time the RBIG programme was startign to gear up as well, which was actually money coming from national DWA. Through the BITT, local government and province went out on tender for consultants to look at the bulk water and sanitation needs for the province and they would do it on a district level so
they would have a tender for a consultant in each of the districts. The Chief Director of DWA is Rashied Khan with a big emphasis on water security. He seems to emphasise that. That is his main focus. Because his responsibility is to ensure that there is water security. So there's a lot of these players. So that kind of gives you a picture of what was going on.

That gives you a sense of the bigger picture. This was during my deployment (January 2008 - October 2011), but closer to the middle. Sedge happened early in 2009, and I first heard later in the year about October 2009. So all these things were happening just before that, maybe just a bit after that, the BITT. The BITT final draft document, I actually haven't seen it. The final draft I think it was finalised in 2011. Sedge was centrestage I think Jan 2009, when they had to truck in bottle water and all that stuff. Just before that, probably later 2008 (???), they asked me to go down and look at some of these proposals that were coming. They asked me to go down and look at some of the aspects. It wasn't really my role, but I said fine, will go down. And the SC had already approached NT, explaining to them that they were in some kind of drought and of course they were concerned that they are in a tourist area during Dec-Feb and the dam levels lowering. And I don't know how it happened but through discussions between NT and DWA (because DWA is a national dept with regional offices) they talked and discussed what was going on in the SC, and they said ok. I think Knysna was the first one at that time. NT listened and said ok we will grant you some money on condition that you a) any of these projects would have to look at groundwater first, then reuse of effluent, then the desal would be the last thing. So these were conditions attached to the funding. So of course the DPLG was quite concerned about what the SC was experiencing. They interacted with DWA and indicated that DWA should make a decision about what projects can go, based on the monies that were received from NT. So we did listen to their proposals. We went down to George, and then said, you can do a, b, c, & d based on you doing it in the priority as listed by NT. So we gave our go ahead for the projects because the money was there and their dams were low. We don't know what caused their dams to be low. And

(Ok, so you've indicated that there were conditions attached to the funding, but in terms of the factors that led to the crisis that wasn't really addressed?)

That wasn't the focus at the time. I think that became such an emergency or perceived emergency that they had to react at the time. At the same time Rashied emphasised the water conservation aspect and that humans before farmers and commercial interests. He made that quite strong and they would need to bring conservation to about 40% or 30% was the criteria of the seasonal demand. If I remember correctly.

In early 2009 (??) I recall now, they decided, Province, that they were going to hold some kind of EDM coordination meeting and at these meetings there would have to be reporting on the drought. The meeting was chaired by Dr. Fast and co-chaired by Rashied. And at the meetings was everybody. The EMD, all representative, the DMC which is where it took place, the dept of agric, dwa, officials, the dept of soc dev. A host of people. It obviously had a lot of political pull and will to make the projects go. It was quite strategic when you think about it you know. How things happened, But that was actually what took place. And everybody reported. It actually had its own legs and it just took on its own life. The projects were rolled out. I think a lot of the projects that were presented by Knysna and George etc. were projects that were thought of already. Probably 3-4 years. The drought had hit and they basically pushed those projects forward. The weather people were there. Everybody was there.

(There was certainly a lot of momentum, like you're saying it took on a life of its own. And with that momentum a lot of money was put into projects. What I have not been
able to see clearly is an investigation of what lead to that state of affairs; and at the same time whether the stated state of the crisis was equivalent to what it really was)

Yes, its very difficult to say. I think that what I do recall, after the fact, the Dwa, decided to call in the Blue Scorpions, particularly in MB, to establish what was causing the dams to be 20-30% of their normal value. I think it is well documented that they were experiencing a drought, based on weather records. The DEA were also part of it, If forgot they were very important. because a lot of these projects are bulk projects and the brine that’s left over from desal is thrown back into the sea. So there were environmental aspects. They waived some of those normal regulations because it was considered an emergency type project.

(when the decision was taken to declare an emergency?)

That is a very good question. I don't think I can give an honest answer. I don't really know … Who would actually make that declaration, I'm trying to think.

Operationally, its supposedly more costly, with the electricity component being the main thing for a desal plant. At the time I remember we were trying to establish that. I remember there was a concern. Operationally the costs are quite high so that I'm not sure that some of that infrastructure that’s been put in the ground, most of it is probably not functioning optimally. Probably not all the time. they probably turn it down and switch it on again at the tourist time to the year. And/ or they shut it down because the operational costs are too high. So of these things are a concern. They are considering putting a desal plant in lamberts bay. They keep telling me that this is a stressed area and they need desal, but I've also been told there is gwater. So I'm just wondering what’s going on with all these desal plants along the coastal area. Its a concern. Particularly Cedarberg, where I'm stationed, we cannot run or operate those kinds of plants, plus going to take on external loans of large sizes you know. It jsut seems so unfair because the EDM are quite effluent I think anyways. As well they have, its been said many many times, most retired engineers reside. [phone rings].

So one thinks about these things sometimes, how its thought out or strategically how its put through

(Do you have some answers to those questions? Because its still unclear how those particular schemes were selected)

Again I can only think, things were moving so fast, and everybody was brought in, that the decision had kind of already been made in many respects. That there was no way to slow this thing down. As I said it had a life of its own. And Remembering Engineers in this area. Knowing that they are a fraternity and in SA I think a very small and close fraternity. Thats the civil engineering fraternity in this country. Now SSI as I said had been beginning to look at these types of projects maybe 2 years before that. So they ahd a good understanding of what was needed and they ofcourse prioritised those projects. But they obviously strategised with the munis what they could use and the projects that they could bring forward. I think that is a fair assumption. Mostly likely what happened. They did indicate to us that they had these charts that showed what the water demand was and what the water supply was. And you could see that during the drought situation, the curve and when they would run out of water would ofcourse be brought forward. But if they put these projects forward then we would be able to extend the water balance. So they presented all those cases to us. And it makes it very difficult to say 'no don't do it', you know you’re on an emergency, so it makes it very very difficult. And I think Rashied was under a lot of pressure. Yeah, I can recall, it did assist him that particularly coordination committee was set up and all those stakeholders. Basically the entire province with a lot of political will and a lot of coming with power of HOD from DPLG, the chief director DWA, operational head DEA, weather, all those people
brought together every month, month and a half. It really pushed those projects. And then of course at one point MB was taken out. NT did come to the meeting on a few occasions, and NT was normally represented by Provincial Treasury. And NT had defended the reporting that they wanted to have done and they would use the national arm of the DWA to monitor and evaluate the projects and allocate the funding. I think it was a schedule 5 or 6, one of those things that requires certain type of reporting.

At some point in time, some how, it then became apparent that MB was experiencing problems. Maybe 4-5 months later. 'How can we not have funding, we need it'. And eventually they also got a desal plant. Not to also forget that there were at the time, I think late 2009- early 2010, they were saying to the committee that they also want to be apart of the committee and have some funding, they can show their dam levels, which they did. And each muni would make their case at these meetings, indicating the dam levels, and DWA and DoA would have their won reporting etc. At this point MB didn't seem to have any money or any projects, although they made proposals. And their dam levels were shown to be low even from the very outset of this whole process. Then all of a sudden the MM of MB made her case, her plea and that she was basically going to tell the tourists that they should stay home, there's no water. She didn't want to do it but was very seriously thinking about doing it. Then all of a sudden everybody was up in arms, the local government was very upset because in MB there's PetroSA. They did get funding for a 5ML effluent reuse exclusively for PetroSA I think. So they were part of that first clump of projects and the next year there was another clump of projects which they were kept out of, and they wanted to make their way into that clump, and they came in and everything was a mess and they're running out of water. They had brought their water conservation down to 35-40% and they were doing everything, they went on a public relations campaign to tell everybody to conserve water. They had imposed I guess it was a bylaw. Thye all did that. Then eventually there was a lot of political pressure and the DWA wasn't sure about the desal (for MB?) but they did eventually give in from the pressure from the Province (?) and they decided they better do it. PetroSA was also threatening to leave MB because they wanted water security. They needed to secure that water. So there was a lot of pressure. They are also a big employer in the muni, so to have them pull out was supposedly detrimental to the economy of MB so that was the case that was presented.

(As far as I know the desal is currently mothballed)

Is it. Hhhmm. Hmm. ... yeah that’s not good. On the other hand I'm hoping it could also be a reflection that they needed the bulk infrastructure. One could make a case. Because of the downturn in the economy they would have liked to have that bulk infrastructure in place to use it when they needed it for economic growth, development etc. That argument could be presented, and that infrastructure is there now and they would have needed that infrastructure anyways. So an argument could be made. They are all coastal tourist towns that do experience a great upsurge in demand at those periods. So is it not operational at all?

(I haven't looked at that case really, but I know that at the end of last year, I had heard that it was about to be mothballed)

Wow. That is something. Laughs. I don't know what to say. I mean, the way the case was presented, it was so compelling, because it was declared an emergency. It that kind of position it's difficult to know exactly what to do. And I think decisions have to be made pretty well immediately or on the spot, although it didn't happen exactly like that. That is why I think DWA made those types of decisions and didn't want to be blamed for not providing water. It was in the newspapers of Sedge that they had to truck in water and that... yeah I think eerything was in place. Laughs. I don't know how else to
say it.

(so the sense of urgency was a significant factor?)
Yes, I think it was a very important, I think it was compelling. They had build pipelines to connect one river to another in Sedge, and bring in water tanks, all those stories were happening. So I think DWA was feeling the pinch as well. At some point there's always different decision makers in any work environment and DWA has a planning division in Pretoria I believe. They seemed to have thought at one point of building dams, particularly with the rains, because when the rains come they get flash floods. And there's very little retention between the mountain and the sea so needed to dam, to store the water. But DWA didn't want to go that route. I think the reason, I have my own beliefs, mainly because the DWA was the Capacitor and also had a regulation function. Particularly at the early stage of democracy they had to support the munis, they had to get water provided and the constitution provided for good quality potable water. And the munis were not meeting all those responsibilities. So DWA had to help them, assist them, beef them up. HOWEVER, here's the other side, as the regulator part. Now they can't be regulator and capacitor at the same time. So I think that Rashied was thinking, he was told to be more the regulator then capacitor and I do think that played a part in influencing some of the decisions made. I think their movement away from dams has something to do with that. In that they probably didn't have some of the resources and monies and also they were the regulator. They were definitely leaning toward regulation, to the point of the blue drop and green drop initiatives they undertook. So regulation is the be all and end all for DWA.
So a shift in DWA key focus was a factor. And they still are in the making and are not clear. There's a lot of dynamics when you think about it. Going back its quite a thing. When you think of how it came to be and all the different areas, everybody influencing everybody else. laughs

(Can you say abit more about the political pressure, where it was coming from)
I think the munis were very concerned about their situation or perceived situation. You know Sedge happened in 2009 and the projects were presented in late 2008 (??). Just that Sedge happened in January 2009, just on top of the decisions being made at the time. So obviously a muni will request support from the DPLG, 'we need your support, we're going to set up this committee, we're going to make this thing move no matter what'. We're so determined that the HOD of DPLG is going to chair the committee and DWA would co-chair with Rashied Khan. I think we're getting our years, mixed up. [links to question about then these things happened in relation to initial sedge trigger]
The DPLG were quite determined that these projects were going to go forward. BULK INFRA WAS A PROBLEM FOR THEM ANYWAYS, so they would get it moving forward. I was in Sedge 2-3 weeks ago, but they took us to the plant. Have you met some of the guys there. He could actually assist with that initial stage between the muni and NT, declaring a disaster.
Also the province would have some meetings and we had a meeting here in Tygerberg. I gave a presentation then, I think it was mid 2009. they indicated that we should as an district and province, with provincial support, put together a proposal to national disaster management concerned with the disaster, the emergency, the drought etc. And they would present it as a district, and they would get the backing from the province
and they would push it. PT also pushed it, everybody was involved, they gave their support and I think that gave the thrust to make these projects go. but there was over R300m in the SC from these projects.

From DWAs side if anybody should have things documented it should be Simphiwe. It would also be very good to get hold of this BITT. Because a lot of these things are consultant driven. And that concerned me. We were relying so much on the consultants. they know how to play the game and basically they kind of milk it. I mean [laughs], I think they do it and know how to do it. Whats a bit troubling for me as an engineer. then I see some fo the infra, there's no asset register, there's no as bits (?) thats property of the muni. THe consultant shold on to that, so the information resides with the consultants. Its profit driven and it is consultant driven etc. To the point that they know the policies and strategies in terms of how they're going to oush things forward. And they do strategise. I might be speaking out of turn, but that has been my impression and my experience. And we as the munis are definitely relying too heavily on the consultants. We've lost the professional skills in the muns, town planners, engineers. Thats whya Siyanza manje was brought in. But we're still too reliant on the consultants and they are basically driving the process. And thats where the problem is. They are too close, they're too involved you know. So they kind of get involved with the officials at a personal level. And this is in the SA context. So things are personalised so that it can also fog your mind and your decision making as a muni official. You don’t realise it necessarily, but you're too close to that guy, that consultant. that happens without you even knowing it. At the same time your job relies on you to get the job done, spend the MIG money. Because there's too much emphasis on spending without the quality assurance and the other aspects. ANd then relying on the engineers to your oversight. they can't do that. Yes. they are supposed to do the site supervision. there's too much of that pally pally thing. the muni should ahve oversight, alongside the engineer. There just seems to be a disconnect somewhere. Wehere there's too many loopholes where people can take advantage. Now coming from a Canadian perspective you have the site engineer, the muni site engineer, the district site engineer. you have so much oversight, Althoguh its got its own corruption. However one must never forget that SA is not alienated from the world. We dont have a financial crisis but because of corruption and fraud. I believe that the route of this problem resides in one country, using Goldman Sachs, Jp Morgans, running our government, while is compromised, boughu. And I think that is part of the problem where governemnt and business get too cosy with each other. The US are TRYING TO GET OUT OF A PROBLEM by printing money. You're buying debt with debt. theres' no way thats going to solve your problem. Its exactly the same for me. People will say you're a conspiracy theorists. I think have figured out how the game is played. Actually in SA the white engineers went to the private sector. they know the muni can't be the same again, so they're running the game.

I think when you're amuni director, you don't have time to think. You need good ethical people to provide support. And the support is not always there and even that support is overwhelmed because of the paperwork, regulations, everything to comply with. So then you feel you ahve to rely on something else, so you're forced actually to rely on the consultant. A director in Technical Services is just running from meeting to meeting. Its also because they've lost their core crop of engineers. I'm sure it effects other depts too. The process takes on a life of its own. The money's already been put in by DWA, the commitments been made, how do you stop it? The decision has been made, I don't know how that happens, but it happens. I can imagine how its happened, but nevermind.
I can only say what I think happened, I think once the money was given from NT it was not going to stopped it. DWA was given an instruction from NT that they would be the monitor of the project and it was going to go. So I think a lot of those things come into play. Thye dept with the money decided, obviously with conditions. So I think that also has a defining aspect in terms of whose calling the shots. Thats where it took its root, the meetings with NDManagement, the money was made available. With the order of project priorities as I mentioned earlier. And DWA would montior roll out and spending. I think once the decision was made by NT, they understood what was needed. they needed that the next crop of projects they would just make applicaitons to NDManagement. Never forgtetting that NT and their depts also have their own performance evaluations and a lot of their monies are not spent. And because those monies are not spent, so they just shift those monies elsewhere. and the money will be unspent if not shifted, if my performance evaluation is resting on it, I better do something wiht it, so I just push the money and make it roll as well. So think that dynamic is there. Consultants definitely know that. Youc an phone a consultant, and they'll say 'oh I can spend the money for you'. laughs. so in every sphere of government if money goes unspent it reflect poorly. It defineitly happens, to the detriment of project implementation. But there is recognition within the WC that we must spend the money better. We are efficient in spending it, but we are not efficient in spending it well. So there's that recognition

DBSA's role: … DBSAs role is really as technical support to DWA and the munis because that technical capacity isn't there. They don't even have professional engineers. So that role was needed in that respect. At the same time we are assisting or supportign officials in the decision making, in the operational aspects of their work. But we only make recommendations, we assist and support. Actually we ahd limited power as we were more in terms of unblocking things, identified as problems in service delivery. That was the major aspect in DWA becasue the MIG was unspent, the technical reports just pile up, the projects dont get off the ground and so on. In this case we wer I think just technical support to the DWA wherever it was needed. I must say I was for the projects becasue for me it was an emergency in that we had a drought situation, I dont think one could deny it at the time. It was considered a 1 in 100 something years. And with the constan reportign with the set up of the committees. I dont think one could stop that, particulrly someone from the DBSA. Because we were not part of the prov team, not an official, particularly there to support. So that was our role, its not a big role, but it was something in that equation.

Marius Wust - director of municipal infra in the dept
Esai Pieterse - before Marius, started the BITT with Hildegarde
Sam du Preez - DBSA guy in Knysna, don't think he played a big role. I can also be misspeaking
PT & NT - Graham Paulse, Marius' boss, chief director in DPLG. Was also involved at the time with PT. Hildegarde also brought him over to her dept. She's also very strategic.

The DBSA Siyanze Manje project just ended and we've been transferred to Dcog. Everybody knows everybody else in WC because of our MIG meetings. Lamberts Bay have now been put on the BITT… Again the process is consultant driven, very difficult to stop, we rely too much on it. Until we can bakc track and know the munis position and contraints the munis themselves are disfunctional. Again its a bandaid put on the problem

A problem are the limited resources munis have, human capital, money, funds, can't fill many of the vacancies. It doesn't bode well if the vacancy rates are high.
I've been in council since 2000. At that stage I was still teaching and was quite involved in the community. I think at that stage the ANC saw my potential and I was approached by branches to stand, so I was on a proportional list of the ANC and that’s how I came into council. I saw it as a way to bring about lots of change. I think my one advantage is that I'm born and bred in this area. My roots are here, my family are all here. People knew that I had the interest of the town at heart. I've been away, studied at UWC for years and came back, and I have no intention to leave because I think there's still allot to do in this town.

First of all when I came into council in 2000 we didn't have the executive mayoral system. It only came in in the next elections in 2006 I think. I only became mayor in 2007. And it came about because of the crossover clause. 2 people from another party crossed over and gave us the balance of power and I became mayor. The executive mayoral system. First of all it consists of the executive mayor and you have executive powers and you select your mayoral committee. And our mayoral committee at that stage consisted of 3 portfolio councillors which includes the deputy mayor, the speaker is not a member of the executive. Each of the portfolio councillors are assigned a portfolio linked to the directorates of the muni and basically they are there to assist me with my duties as mayor. We got together at least once or every second week where they would give reports on their different departments. And those reports would help me in executing my duties and would also help me in setting up my agenda for my mayoral committee meeting. Some of those were very good items. they basically served as an arm to assisting me. I think its a good system, but also as mayor you need to understand the seriousness of your job. As mayor you are not ceremonial only. So whatever decisions you take, or have to comply with in terms of legislation can always have consequences. So its a huge responsibility, but if you take time and you're committed to really gather information and take advice from your colleagues in your committee, from your administration, it can be very fulfilling. I enjoyed it thoroughly, sometimes you went through issues, but I have the personality of some who doesn't postpone things. I had a good relationship with the officials.

The directorates have changed since the last elections. I think it has because so much has changed in the town. We looked at putting the right depts in the right directorates and for some reason we out town planning and economic development together so you have that as one directorate; then you have technical services; then you have community services; then you have financial services; and corporate services. So thats how it was restructured and it worked well. You see by putting economic development together with town planning we sort of decreased our depts, because we had 5 before but now we have just 5. because economic development was called strategic services, it was on its own. Then one of the strategic services directorates went on his own, and we had to take the decision as to whether we would advertise for another directorate. And then we decided why dont we combine the 2 and thats how it came about.

The recommendations from the section 80 meetings goes forward to the mayoral committee as recommendations and the mayoral committee has some delegation to resolve those issues; there are some with a delegated authority where the recommendation has to go full council, where council has to resolve it. But most of it we had delegated power to, but those required by legislation has to go to council.
I can say in our time, we tried to have the section 80 equally represented by all parties. First of all if one party thinks they can run all committees they are in for a surprise, it cannot happen. First of all you will not have enough people to serve on it. And it makes the whole process of getting input before things go to council, it makes it much more effective, because then you ahve all parties inputs long before hand. And it gives a platform for debate for everyone from across the political spectrum represented in council. Obviously you get cases where people don't give all parties representation. But I dont see why yu would do that. Because I always said in our council we dont have huge and awful fights. We never had that actually. In most cases we reached concensus or differed. I think its because we had these platforms before it reaches council. even in mayoral committees, it is the prerogative for the mayor to decide on whether to give other parties the opportunity to speak during the mayoral committee meeting. We decided that other parties had the opportunity to speak. And that itself was good, because if you needed buy in then there was chance to talk. It was open, it wasn't the mayoral committee meeting behind closed chambers. and the others would only see what happens when it comes to council

Well I was thinking this morning, because its like 2012. Council goes in recess in December, but I always believed that a mayor could never go in recess because the worst crisis occur in those times. So yes we were around. There was signs of problems, but not serious problems. But to really seriously tell you now. I think the problem was a bit underplayed. that to me was very very disturbing. Because surely when this thing hit us, there were signs to people working in these areas, that there was going to be a problem. Because you know in Sedge' case, we had Karatara river as the main source of water provision to that area. And its not like a river dries up overnight and suddenly you have a crisis. So I in the beginning was hammered a lot on 'why is it only brought to our attention at this stage'. And I also felt that officials had to be looked at, and there were investigations. But the bigger problem at hand was 'how do deal with the crisis?'. So we had to kick in immediately, decide on short term, medium term adn long term plans. And we had to take a decision on whether we would become a disaster area or not. And I mean at that stage we had to discuss this with national, provincial officials. What I can say as Mayor is that it made us realise that you have to have long term planning. In many munis and not just in Knysna, there's not enough long term planning when it comes to wter and important infra. We inherited ancient infra in this town when we came into governance. And we had to work with that, but. I mean just in the case of KNynsa, you know that we have a dam thats not in a ctachment area. I mean you think to yourself, how could people not plan for that. But then you had to deal with the situation and plan on that.

In the case of Sedge we were lucky that water could be transported from George. But to us rang bells, because we thought before it hits Knysna we have to think of what we can do because we can surely not transport water from george to knysna. Sedge was small enough little area to do that. So the whole situation made us realise, that we have things in place in Knysna. But let us look at a long term plan so that we dont fall into the same problem.
Vey shortly, I felt it was underplayed, as I explained to you, you do not wake up in the morning and realise. Surely there's rainfall patterns and surely you need to measure these things. Especially in a case where the major source is only one river. I cannot pinpoint it. But I just had this feeling that officials were not entirely honest with us, but we as politicians had to deal with the situation, we dealt with it as best as we could, while I think we've been acknowledged for it through many awards etc. But still we could have been more proactive if we were warned earlier. Because that's what people said in meetings. Immediately we were having public meetings. And we were lambasted in by the public, 'why were there not early warning signs about this?'. And we had to say to people, 'look, this is the situation'. It was not always easy but at the end people came together. The community of Sedge it was amazing the way people came together. The initial meeting was not a good one. There was blame shifted from this side to that side. But I always believed that the way I as mayor, and the mayoral committee, especially Finn, the way the team we had like Rodney NAy, the way we approached the meetings and people was also what pulled us through, because we allowed people to speak their minds and express issues, but then said 'ok, how are we going to solve this problem'. And we had this amazing pool of knowledge, skills, people that was retired that came to the party. Offered their assistance and commitment. Formed a committee together with officials from the Muni. So immediately that came together and was formed out of the ppp, for a very long time that committee was involved when updates were provided.

(The point of crisis, you mentioned it would have been more possible to be proactive if more was shared. What was shared through the structures?)

You see, because when you start, first of all you have section 80 meetings. But even before that, that's not your major source of information. In my time we used to have regular management meetings with the top political leadership together with the top officials. Where issues are brought to the attention. I used to have one on ones with the municipal manager for instance on a say every second week basis. That was a platform for me to raise issues of concern, new projects I want to bring about, just basically to share information and to see are we still on board, knowing what's happening in the organisation. Now through those I believe we can have known already. Yes, when budgets were put up, obviously directorates identified their infra needs. But I think directors need to be very clear to the political leadership, what is being proposed and for what reason. We might run out of water in a year, for that reason we think we must build a dam, it will cost us R80m for example.

I'm just saying I think there were a lot of platforms. Also I had a very open door. If someone from the administration thought they had to come and see me and foresaw a problem I was very open to that. So I believe way before, because in the Section 80s different directorates have to give reports on what's happening in water, sewage etc. Surely if that was put more urgently it would have been picked up. I don't want to sit here and put blame to people. I'm just saying that I feel we could have been warned earlier. I mean to be warned in December that we'll be running out of water in January, and in a peak season like that. I just think it's a problem that's been coming for a while. So ja

(I know that in the case of Sedge, a proposal was put forward for longer term construction of a dam, which was then shelved. Can you tell me a bit more about that?)
mm, well there was … a proposal put forward, yes you are right. That’s why you hear that I alluded to budget provision and so on. At that stage money was made, there was provision made, not fully for the dam. Council felt that we couldn't really, we could put money forward for the construction of the dam but others we couldn't. And there was plans on how we going to contribute the rest of the money for the construction of a dam. That was plans going on, but council knew that with the money in our coffers we couldn't put all the money together for a dam. (I was also told that the final figure for the dam was higher than what was initially proposed. Do you know anything about that?) I would rather not comment about that, no. No I don’t want to

(Now, I'm going to go to go to the point of crisis. You said that you were informed by December?)

Well it was actually when we came back. We opened in January 2009 and were informed about that in Jan. But as I said I believe the problem already started in december. And at that stage we were called in and told 'Madam Mayor there is a serious problem in Sedge, we are running out of water, you know its the Karatara River'. And at that stage we just said, 'what are we goign to do?Whats the first thing we can do?' And we got together with the management and we said fine, 'what is the short term things we can do'. So we thought George is the closest town so we transported water with trucks, we alerted residence on the usage of water. And then obviously, as I said Councillor Finn was very hands on, I said 'Andrew we've got to look at a way that we're going to deal with it'. So Andrew went with a couple of officials and then they discovered the Hoogekraal. And that Hoogekraal we then saw a sa means of laying a pipe from there, and that was used to give water to Sedge. Obviously that was not a long term solution but it started to help us with that problem that we had on hand there. Obviously there was the issues of borholes that we looked at. A few boreholes were investigated and drilled and that helped. But then we said 'we can't go on like that. we need to look at a long term solution'. And thats when we looked at the desal plant. Also in Knysna we tehn told people, 'we have a problem, we might run into that in Knysna, but lets be proactive and start looking at how we can save water'. We kept a barometer of weekly water usage to show an improvement. The community of Sedge was exemplary in the way they started working together with us. It was a wake up call. People never thought they would open their taps and they wouldn't have water. And that I think was a big shock. Thats it in a nutshell

(How is it that desal was selected?)

Well obviously you come to an area and people say 'how can you have a problem here, you have all this water'. And we, after looking at the Hoogekraal and the pipeline we had to lay, we said what else is it we can do beside boreholes and pipelines. And we said ok we've talked about it before, people came, consultants, we've talked about desal before, but because you know its not a concept that we all really knew. And we said well we've got the sea can we not look at that. And thats when we all got together. You know we had special visits at the time from National and Provincial, Treasury. because in that we also know that whatever we would know that whatever we would plan we would need extra finances. So we had to have them on board and to assist us. We then discussed with the consultants that we were working with, the possibility of a desal plant and they came extensively, explained that to council, explained that to mayoral committee, and thats when we took a decision. Obviously what we did first, you know that we had to declare Knysna a disaster area. But that was purely for operational
reasons. Because we had to do that. If we were going to get funding, it had to be at a point where people had to understand and official levels of government understood the seriousness. So after long discussions and back and forth, council took the decision, I think it was in October 2009 we took a decision to declare it a local disaster area

I think people need to understand, declaring an area a disaster area is a huge thing. Therefore those many meetings and discussions. But the more we went into the problem and the more we discussed, we realised that for us to get the funding we needed to be declared as a disaster area so that we could qualify for that. Because of those levels of government realise that the problem might not be that serious, why should we contribute to the funding you know. So that's when we took that decision and as I said council unanimously decided that's what we were doing and that's what we did. it was after many meetings, that we discussed and had with prov and national officials, we decided to put it to council and called a special council meeting. and after a report given of the situation, the council decided it was in the best interest of the town to do it in that way, and that's how it all happened.

(Just to go back to the desal, I've been told that there were certain meetings held, assessing what options were available)

Obviously the desal plant as it stands there now, all looks well and lovely, but there were lots of concerns. People were raising issues of noise levels, operating times, colour of containers. There were lots of issues around it, access for people to the beach while this was constructed. All those things came up, not just desal plant, here we go. So we had to put people at ease and say 'this is what we have to do, yes we have the temporary pipeline from the Hoogekraal to Karatara, yes we have boreholes. But now we've run out of immediate measures. We need to look at the next step'. And once people realised that that next step could put Sedge in a much better position for the next 10-15 years, they realised that's the way we have to go. Yes there were a lot of looking at use of effluent and those sorts of things. And those were the things we looked at in Knysna as well. But above all the other measures and alternatives, the desal plant actually came out tops. I mean we spoke to the authorities, they were willing to help, they came down, they were willing to put money through this project.

We had to put our ducks in the row for them in order for us to get the required funding. I remember us saying let's put on the table each of the things we can do and the financial requirements for each of those things. So we had a fairly good idea of what can be done short, medium and long term. We got local consulting engineers that came in to explain the plant and some experts were brought in to explain further. We started as a smaller group twice a week, at the very early stages, the top leadership. But in that time we also had some council meetings because we didn't want councillors to not be on board of what was happening. So at a stage we said, let's have a meeting, a specific input where we would get these consultants in to explain to the council, if we do go forward, what this desal plant will entail, what will be the costs and how we going to go about. So that also got the buy in from the council. And we had regular press updates. So when it came it was not a surprise to everyone that we are now building a desal plant and taking water from the sea. So once it came onto the agenda, council was on board as to what was happening.

(Why was desal seen as the necessary solution?)
I think it was an obvious call that one would make. I mean the fact that you have that there, that you have the sea there. To me it was just one of th every things that sto...ed out, that we should explore, that we should be looking at. We could build a dam, but there were a lot of studies done on the env impact. but after exploring everything we mostly all agreed it was the way to go. I think in the majority of that community people felt 'we can live with this. If it means we can turn our taps on, then why not'. We also decided on the RO in KNysna. In KNysna its working well. and I must say since then we have rally not have water problems. I always believe people have to be cautious in how they use water. lets not go back and forget we had a crisis. lets constantly sensitise people on water usage and things like that. We tried to always run waterwise campaigns and have an article in the paper. People have worked well together. I think there was a lot of public participation carried out to get people to understand what we were going through and what we could still go througuh if we dont start using water sparingly and I think it worked.

(If we can maybe talk about Knysna quickly, in Sedge you spoke as the trigger. How was kNysna id'd as a problem?)

Obviously when the problem hit Sedge we thought that the lights must go on in Knysna. Its not yet in Knysna, but it can easily be Knysna, because we went through aperiod where we didn't have much rainfall. We just felt lets not run into the same problem as Sedge. Lets be proactive. Now you see what happened in Knysna was we alreaday had capital projects that we had identified like the pipeline to the Glebe Dam. that process was in place, we had looked at that already. we had explored boreholes. So when the crisis hit we said lets just push this proces for the Glebe dam a bit quicler. So that was kicked into proces, the other was boreholes, then there was the reuse of effluent. and the one we went for was R.O. So those were the things we thought we could do. I must say that the process went much easier for us in Knysna because by then people knew that Sedge was a serious problem. here we have council thats proactive now. I think the meetings we had in KNysna with stakeholders the community, those were well attended. people understood lets kick things in motion. So you'll know from the reports and press that the whole issue in Knysna wasn't as serious because by then we were putting plans in place. We were trying to respond before we were in a crisis, while in Sedge we responded when we were in a crisis already. So it was nice because we could tell the community before hand. And what was nice about it also, we have a standing item, we introduced an standing item on the council agenda, a water update. to tell people of the dam levels etc. and it was run by politicians, so a councillor like Andrew would sit with officials, prepare himself and report to council. So the full council could hear and ask questions on what is happening. And I think taht kept things going. And those agendas were open to the public and we hd constant meetings with the public. At the outset they were fairly attended, but later it was more just the retired professionals, you know who wanted to know.

The committee in Sedge was a combination of residents and officials. You would have your disaster manageemnt there, your director of technical services, or a designated official. So from the major directorates you had representation from officials. Then you had representatives from the RPVA, and some individuals as well. And Sedge has a pool of retired people.
In the beginning we rotated meetings, we had the first meeting in the town hall and the next in Smutsvill. But I sensed people didn't understand the technical things so I sensed it was something they didn't want to be one. So there were a few meetings held in Smutsvill and Sizamile. And I specifically insisted on that because I didn't want this to be seen as one group concened about it and not affecting the others. It was affecting everyone. but as I said after time people had confidence in those that were sitting there. And also you had ward committees that also had a sense of what was going on. So they could on a regular basis also ask about it and share it with their wards. And the ward councillors are also asked to report and I insisted that each ward councillor had water on their agenda. I cannot say whether that actually happened. Ward systems and reporting systems are something we still need to address in politics
I can look at the documentation*

Interview 55 on 2 July 2012 – Interested & Affected Party

Interview 56 on 2 July 2012 – Municipal Staff

Interview 57 on 3 July 2012 - Municipal Staff

The Sedge in total was in the region of about R20, probably round it off to R24 when we all done. The Knysna RO plant is still in process because we doing it in phases. But its around R40m. We had a large portion of unspent money at one stage.
Hennie is very good at how they arrived at the desal as the most affordable option.
In Sedgefield we had a portion of our MIG grant, which Rodney made an application that we could use, instead of using the MIG on the water works, they got the approval for the MIG changed so that they could channel that toward the desal. We also had a disaster grant, that we had an portion unspent. Thye put some money towards it, the muni, and the edm. So it was a like saying we ahve acrisis, pots of money not allocated, some gov spending for the water works, but this looks like a better options. With the Knysna one there was provincial funding to funding sorted between the partners. But the Sedge one was basically money in the line. So it was a case of consolidating that to make sure we had enough to cover everything. And I think we ended up putting in about R6m of our own money.
There was a spreadsheet that Rodney and I did ages ago, with a basic breakdown. I might ask Landia on the asset side, but they might not trace the funding sources for the asset.
(Is there a way to trace?)
It might take me some time. (establish funding sources, quantity, when they entered into system, where the funding was allocated for each component of the augmentation scheme. As much a breakdown I could get would be great)
Ok, I'm actually also going to ask lania to give me the asset side as well. (The boreholes, the hoogekraal, the desal; and in knysna boreholes, ro, glebe, and I think upgrades to pump stations)
Do you want to track the spending from 1 July 2008 to date? Because they still going on with the RO plant. Are you spending the day in Knysna
For me its 2 aspects: 1) I'll ask Lania to take out of the asset register, 2) I'm going to also look at the budget projects what I use to populate these sheets. Maybe I can marry these 2 and see what kind of a complete picture I can get you.
The municipal budget, this is the latest budget doc, for 12/13, that’s why it says mtref under. What you've got is a 7 year window. It gives you 3 audited outcomes.
I can give you the budget docs as well in pdf and excel. In the mfma, you'll hear the word vote referred to - read the defs in the mfma. In the KM, this is interpreted as main business components, each have a director at the head. That's the main vote structure. Then in our accounting. Its and account number, its one of your ledger expense account numbers. Most munis dont just call them account numbers. but on a national level when they talk about votes, the talking about big departments. But in Km thats the internal understanding. For example a question is 'there budget on the vote' they are referring to a bidget on an individual account number. Showing reports, this is where it gets a bit confusing, here in 09/10, this is just one vote number. The 28 tells us its capital suspense votes, we keep our budget here and yearly spend, but at year end we capitalise that. In other words this uses a project control. So at year end we capitalise this, so if we spent R54m in the year, at year end we'll pass a huge credit journal and post that into the balance sheet into property plant and equipment, which is summarised. But you break it down into projects. Now thats what the depts are used to using in the capital budget. AnD its there intelligence behind the vote number, that says 28 means capital, 92 means water purification and the next 2 digits means the funding source and the last 6 digits are sort of an item, a uniques project number. then you've got categories and subcategories, that link it to this sheet (shows report).

What we did for this one, because it was such a diverse bunch of things and for us it was quite new administratively. We actually opened up a bunch, a range. (???) because it was difficult fo the engineers to keep track of each component of the desal and we tried to keep track of the funding because it was such a mixed bunch. Each month, in terms of reporting, once o the accountants would look at spending on components, funding, and then process that transaction into the capital suspense to try and mange that internally. YOu can get that breakdown Operating and maintenance costs is not so easy for me to give to you. Both of them came with O&M components that weren't part of the funding and are incorporated in the depts operating repairs and maintenance buget (??). Also I remember with the Sedge one they needed additional staff, also it all happened so quickly they dont think about the cost of the electricity. If we buy directly from eskom for our usgae, the cost of electricity for water as a service, has taken it from a profitable service in prior years, now its running at a deficit. and one of the main cost components of that is eskom, because of eskom cost rises. If you look at the interdepartmental costs, what water has to pay to electricity for running its RO, desal, pump stations is very high cost. I think somebody did an assessment on us and water has the water tarriffs in the WC, not necessarily because of the desal. So I dont know if I can get you R&M. Because the repairs and maintenance and running didn't happen, because it took a while to get them on line, and where Rodney 'hid' the maintenance contracts, because grahatek ran it for a while before we took over, and the same with this one. And Rodney will tell you how expensive the filters are and how often they need to be replaced. because we dont do cost accounting in KNysna, we just have the depts total budget. Which I could give you but then someone like Rodney would give you the detail. I can give you the background information for just water and then you can speak to him. The electricity costs, we could try and identify. I could speak to Marnon from electrical. (Ideally I'd like a comparison but that would require info per component)

Interview 58 & 59 on 3 July 2012 – Consultant
On the sedge one, you kind of took over when this thing sort of sorted to take a
bit of shape
je ja, ja, I was not really involved in the Sedge one
He Ja, that’s where the thinking, they actually coined the phrase conjunctive use of
water, DWA, Rashied Khan thought he came up with something
It started with Sedge running out of water and having to truck water in from
George,
je R150kl. If I can go back in time, 2009 January, end of January we got a phone
call to say that - the Karatara River is the only supply to Sedge, which is the little
river which runs through the Swartlake into the sea. There’s a weir, now what
happened is that with the very little flow they had in the Karatara there was a
huge high tide and what happened was that the salt water went over the weir and
kind of salted up their intake. So they physically didn't have any freshwater to
drink. So we had to bring water for the town, from
he It first dried up
je No, it never dried up, it was kind of polluted if you want to call it that.
Contaminated. That hole was never dry. It was the saltwater, because that’s why
it happened over night. Let me quickly go and see, I think I can get hold of a
presentation
it depends on what minutes and meetings you need, because WE KEPP
RECORD OF EVERYTHING. I Only have minutes of the project meetigns
when we were busy constructig this. Everything gets done around time, you
take decisions to fast track things and it costs money and in the end you dont
need it. but you dont know at that stage. You can certain equipment quicker than
others then you go for that equipment, but its actually not the best optimum
equipment. everythign to get the water running again. [talks about MB situation
3:30 - can return to if needed]. We built a reuse platn for MB in 4 months, it
normally takes 18months. It was more to Petrosa's benefit than the munis
Je Check here Japi, now this goes back in time [has his computer open with
documents]. We did a bit of work in 2006, we somehow knew that, a hunch, can
you remember? And we came up with this idea of water reuse and desal. that
was in 2006. I'm telling you, we're connected with some higher power somehow.
he I gave a lot of presentations to the mayors and the MM and the town engineers in
2006 and 2007, on desal and reuse, waning them that some day they will have a
drought and run out of water, and 2 years later
je But check japi, this is the presentation I did with the Mayor, this is the one with
the Vaal River or Orange River. So all these towns take water from the river and
put their waste back, and the one downstream just a little bit more waste. So we
told them at that stage that reuse is fact, its happening in SA everyday. So we
said if a drought hit what would happen. that was 2 years before. So we said,
even with growth, this is the kind of deficit we will have. So if we bring in
effluent recycling, our shortfall, you know we said a point in time when you
going to have to desalinate. You can use your waste water but there's a point int
ime when this desalination kicks in and th more of your waster water you use the
further you can push this. So we had medium term and short term solutions, and
ths indirect tease and that will be dsal, so that we did 2 years before. And this
is what bitou can do, and what knysna can do. And this is what we were
he proposing to the munis in 2006/2007. Thats MB
je I remember I had a meeting in 2007 I believe in Oudtshoorn with the mayors and
he MM. I had one in George as well.
Oh we were in trouble with this thing, remember it went into the media as well. The municipal town engineers didn't like the idea that we said that they'll run out of water, and they said how can you say that. What we were saying is that you're going to have to do desal sometime in the future, you better start planning for it now. And then the drought hit 2 years later. We had all the plans and could fast track it.

This was an unsolicited presentation that we did. And what we said on reuse is that its not direct reuse, its taking wastewater through a bit of a process and then pumping that to their raw water supply dam, and then it just comes back into the system. There's only one place in the world which has direct reuse, which is Windhoek. The rest like Nuwater in Singapore, its all indirectly. We actually got over to Singapore in 2007. Myself, Hennie, a guy from EDM and somebody from Hessequa Mun. We went to see what they do there and how they treat. So from our side we were getting ourselves ready if this thing hit.

We were quite lucky with you must remember I was the town engineer for MB for 14 years and I left and joined SSI in 2006. And at that stage when I left MB my biggest concern was that they were running out of water because they didn't want to believe me that it can become a problem in the future. And that was one of the reasons why I left them. Then I start selling the idea from outside.

Ok, here's the presentation, let me quickly run through it. You see we kind of coined a phrase like 'beyond our rivers' and we did very well with this little slogan and got ourselves on national tv. I was on Carte Blanche. Your well, this is where the whole... this is kind of, this presentation was done when we had the plans all kind of signed off. So this is not in the kind of planning stage. This is in the first planning stage after sedge. Those of the media reports. at that stage we were carting water. when we got the phonecall it was sort to come and help with a crisis. They had other consultants there, adn its part of my presentation. they had kind of a project on the books already but it was just too expensive. And the penny never dropped that they cannot afford that rolls royce. I'll show you now what it was. Ok so thats Sedge. thats the only supply to Sedge, the Karatara. We id'd another little river in our kind of investigations. But thats the river, and that little river has got a treatment plant there called ruigtevlei. and that treatment plant pumps the water through a pipeline into town. they also had boreholes in town but those things never worked, it was never looked after. They only had water from the karatara river during crisis but it was kind of salty. They never ran dry, it was just that there was so little flow that this Swartvlei pushed over its own weir with a hihg tide. So there was nothing holding it back. So the water salty, you couldn't drink it. So the main components of this scheme, the Karatara River Supply; Ruigtevlei the treatment plant which had a capacity of 2.2MI per day; they adh a few borehoels which was not really working at that stage; and they had 3 reservoirs whihc gave them about 1.5 days of water. So they were physically, they ran out of water. And that little treatment plant is prone to flooding. So when this thing does coem down, it floods its banks. So they already had a problem there. So also didn't have an early warning system. And this Karatara river comes thorugh a very high agricultural area. So there's a lot of farms and what happens is that it just got drier and drier. the farms just took more and more water until they sucked every bloody drop of . They didn't have an early warning system at all.
See here Hennie, I've got slides, 7th July 2007, that we got pictures of papers saying that there's water restrictions in the Southern Cape and then I have in my (?) the Outeniqua Coastal Study

Ok, so that’s there waste water treatment works. So keep that in mind. They only had there supply that ran dry, the 2 boreholes didn't work. What they had as a way forward was a lets build a dam, link the little river as an off channel storage dam and that scheme cost about R110m. If this scheme was in place they wouldn't have had the problem. But it was just always too expensive, the muni couldn't afford that. So the first thing we did was look at everythin that was available in the crisis. [] we looked at Groenvlei, but its salty, a low salinity, but you can't drink it. We looked at using it for toilets but the risk was too high, we also looked at that little hoogekraal which at that stage still had a bit of water, and we looked at groundwater because there's always been a gwater potential in this area, and we looked at water reuse and desal. So those were the things we looked at. And we came up with an environmental sensitivity index. What can we touch, what shouldn't we touch. And we came up with this scheme. very short, this is all documented, you know we could actually get.. What we did was we put a little pipeline from that river to the wtw. And that water was our first source, we did it in 2 weeks, and it was much cheaper than carting water. We also started a borehole next to the railway line. So those 2 we introduced very quickly Hoogekraal and private drilling. long term we looked at hoogekraal permanent, emergency drilling, we making that a permanent scheme, adn Karatara wier, so it doesn't push over again. I dont know the status of the

Hoogekraal, I've kind of lost track

This is sedge, what we proposed in sedge was to change the wwtw so that it has a membrane bioreactor, look at a water cycle by reusing the final effluent.[explains reuse option]. We had letters of support.

we actually got letters here in 6th april 2006 where the muni supported ssi in starting a pilot study on water reuse that was long before the drought. already at that stage and something needs to be done. And that’s when we got the letters of support from the munis. And that’s when it all started, to flow out from there. So when the drought hit in 2009 we were ready for them. let me take you through these slides quickly, this is the sedge wreuse. The desal we looked at a number of options. Taking water out of the swartvlei. You know the salinity of the swartvlei is not the same as the sea. You know as your salinity drops you need less energy to get the salt out becaue its brackish but environmentally they wont allow you close to the vlei. So we ended up going for the option whihc wasn't the cheapest option, taking the water out of the sea and pushing it back. So that was built, those are just the 3 options. this was kind of what was done. we've got a well field, we take the sea water from well fields and put the brine back. those were the schemes and how they were implemented.

This thing about conjunctive use is what you should look at. We saying a muni should have a mix of water sources, conjunctive use. They can't be reliant on one river. like buying shares in a company, you buy expensive shares and cheap shares. The cheap shares normally are the surface water and the expensive shares would be the desal. All the munis have some similar kind of mix. THese are our URVs.

What we doing now, we have been commissioned by WRC to do a bit research now on these plants and try and go and match what was predicted and promised. Maybe we can give you the contact at WRC, Dr. Jo Burgess, and our project
leader at this stage, Paul Gayden and (?)

The only problem is that all the plants have been either in zero mode or mothballed. So it doesn't help to do. MB only on the pumps and stuff once a week, that’s what they call sero mode, but the ro has been mothballed.

(I know there were initial costs given per kl and I'm really interested in trying to calculate)

I think the best figures we can give you is what I just compiled recently. I spoke to the engineer in MB and they said they can give the RO figures but not the electridity and they trying to get that and they will compile it. They also have the operational costs for the desal, but it wasn't tested. I don't have it with me here, but its on the CT server so I can get it for you. its a lot cheaper than you think.

the electricity is the big problem. if you don't know your electricity it can kill you

these are 3 slides, all the towns have a mix. Desal is expensive. Water reuse is not that expensive. We said desal was R15. It all depends on how you calculate that figure. If you're only going to use that plant for a very limited period, your capital pushes that figure up. So there's many ways of looking at that. Should we take capital out and just look at the operating cost.

So that sold the idea to all the munis, lets look at reuse, lets look at desal, lets look at a combination. So what happened with MB was a combination, and sedge to bitou, lets say that one fifth of demand is this water. We could get the towns through on that water and a bit of borehole water and we could get through. we said like one quarter of our... the other presentation i can give you is give me your stick quickly. I have one, desal overview on the southern cape. if you think about it to get the salt out of the water, you take water and shove it through a membrane. with fine openings and to get the water through you need 60 bar pressure. so its really really high pressures and thats what makes it expensive. And if you take waster water you only need 120, thats where the different in price is. I don't know howmany times i gave this presentation (I'm trying to understand SSI's position in the decision making and the other question is why desal?)

its not rainfall dependent. That was the reason. If everything else fails, you still have the sea.

well there's not many other options Is there. Its either waste water or desal.

in the end if everything else fails desal is the only available option. And if look at the slides we did in 2006 and 2007 we said that reuse is medium term and desal is long term but what happened in the drought of 2009 we had no choice but to bring those long term plans forward. and thats the reason why they moved to desal.

(are you involved in assessing the extent of the crisis?)

not really no. the extent of the crisis was that there was no water and you need to get water in. and we tried to come up with plans of how we could solve that problem

Well we assisted the muni technically. They also had teams looking after kind of public relations, we weren't involved in that. Because you know the first and quickest way is to use less. The wdm the munis did themselves and they did a bloody good job on that because they reduced in certain areas 35-40%. by campaigning. well i kind of presenting the first different approach. it wasn't me, i just presented that. through the work we did the last 2 years, the 2 of us, we kind of had this story.
we lead them into what they need to do in MB because I was the previous town engineer and they asked me for guidance. I told them the easiest way is to swap the water with petrosa. in the long run, the mm took the decision that [talks about mb 36min]

Jappie you’re quite right we had the idea of taking water from petrosa and giving them waste water but it didn’t sell because there was no driver, the drought was the driver.

This was also a nice presentation, because the munis got a lot of flack saying they didn’t plan for this. They couldn’t plan for this, this was a 150 year drought. It was not something you plan for. Maybe they could have planned that they couldn’t have all their water sources in one resource. but they all planned, very town has got this (shows graph) the projected demand, and that is what you have in your system. so they need to always be above the redline or they have a deficit. which means you have to bring something in. either build a dam, take more water out of the river . the capital projects munis are looking at. in demand management ..[?]

your cheaper solutions, from dwa, wdm, all the augmentations is about taking out of your normal resource, using less, better or going toward desal, reuse or interbasin transfers (gwater?) that could be one of your local resources there you see that’s exactly what you were saying, if we dropped that line we have less shortfall, but we still have a shortfall. So I used this is kind of my storyline through all my presentations. I don’t talk about the wdm, that the muni can do themselves. I looked at reuse and desal. those are the projects you know of. what did we wait so long? Because it was expensive and the chinese and indians are makign the membranes now. and the ERUnits. So we get some of that water pressure back, and then there’s these drivers like droughts, and we’ve depleted our cheap water. I believe thats what driving our world at the moment. its like oil, we are going deeper, off shore, water will never be cheap again one thing is for sure, reuse is going to happen. Its happening all over the world because its one of the cheaper solutions to get water.

this slide went totally bonkers. The cost for desal over the last 10 years has come drastically down and for surface water has gone up. These come from fortune 500. its an american mag, but it’s a common phenomenon that desal because we've got better cost recovery, better energy recovery, cheaper membranes, desal has come down. and its still going to. interbasin transfers is your most expensive water. And with seawater you’ve got huge pressures, so you only recover 50%. but on brackish water you recover 90% so theres a huge difference in cost. the desal was prominent because of the social thing, it was difficult to sell. if george was next to sea we would have built a desal plant. its goign to take decades to get people to understand. but if you dont have a lot of option then. there are things we just can’t get out of the water. Hormones is just difficult and you know, look at the Vaal river, whats happening up there.

I've got a presentation from a conference attended in australia t the end of 2010. the cost reported for seawater reverse osmosis all over the world. And the lows were singapore, 2.25 dollars, includes capital costs; Sydney was $7.60 per cubic meter. Also have a slide comparing the cost of electricity.

what happened was there a task team that province put together and we were the appointed consultants to assist the muni. They said we have a crisis and the task team will come in in 2 weeks time and we must present a way forward. So they gave us 2-3 weeks. but why they chose us was we did a lot of work on desal on
water reuse and we knew then that you didn't have to be a chopper pilot to
realise at that stage

but we did look at other sources first

yes, but we wanted something that we said that if spend a lot of money we
wanted that it becomes part of a permanent supply. And I think that’s what we’re
grappling with at the moment. We’re saying that these things are very expensive
but they should be part of our system and we mustn’t let them go, and I’m so
scared that

its all about risk. If you look at all the municipal plans, mb, george, knysna, all
had desal and reuse for the future if you run out of water. But because of the
drought, it was fast tracked. Now if you build a dam. in the 60s we built dams
that only used years later, but they saved sa from running out of water. now with
the desal, There’s a hell of a debate in Australia because all of their plants are
also mothballed. but at that stage they had no water. so by building these plants
its liek building a big dam. you need it now, but when it starts raining again you
won’t need it, but you cut your risk of running out of water in a drought because
your plant is there you can just start it up. you dont need 18months just to build.
its all about risk, the risk of running out of water. now unfortunately you sit with
these plants, if you dont use them there’s a use cost you must carry. but by doing

this Knysna can develop again, MB can develop again.

that’s actually something to note, that before this if you had a plot in Sedge, you
can’t even divide it in 2 because the muni can’t provide water for the other plot.
And that to me is a ridiculous situation for a muni. They need to grow. Because
imagaine what’s the ripple effect. you have no building activity in your area, the
builders doing ahve work, the brickies dont have work, the carpenters. its

problems?

Problems, the best person to give the run down is Keith Turner. These things
aren’t plug and play. Remember its sewater, the day you buy them, you start
working on them. And they’re all like that. Because you working with very
corrosive. And my biggest fear, i said to jappie from day 1, i dont think munis of
this size, i dont think any muni, can just physically look after these plants on
their own. if they’re going to sit on the ground and not get used at all they are
going to going to waste. but if they’re only there to look after risk then they must
be maintained to look after risk. but it takes away the moratorium then we’ve
already created wealth in the area.
The operation, frequency of running, and costs you should get from Keith. All
the munis have a policy of when to run and when not to run
[talks about the different munis policies wrt plants - 53min]so it depends on each
muni, what they do, and this is a decision we cant take for them. Remember it all
goes with risk. If you mothball it its expensive and you can’t have it with the
push of a button on again. if its in zeromode you can have it operational within
an hour. and thats the risk that they need to look at. they need to look at the total
water supply of the town and not just that plant. YOU waste a lot of money with

building those plants, but imagaine if they didn’t do it

Ja imagine, people would die. You can look after sedge with trucks, you cant
look after George with trucks. People would physically die not of thirst but of
hygiene. There’s no doubt in my mind they were essential. There’s no doubt in
my mind, yes
at that stage they were, yes
(if you take the case of sedg there was the Hoogekraal scheme, which like you said was introduced very quickly, that was then followed by the boreholes. The supply from both of those, prior to the desal, seem to be sufficient. Which does bring up the question of why the desal
because till today I don’t think we have permission to take water out of the
Hoogekraal [talking from both sides, difficult to make out]
(the desal itself was fast tracked, the eia was also fast tracked)
You can’t fast track a reserve on a river, its impossible
Ofcourse it was declared an emergency and you must remember in the case of sedge, the decision to go ahead with the deal was held back until October and they knew they had the holiday season coming. So they waited till October when it didn't rain, they said lets build a plant because they could do it in 2 months, the type of plant they've got. now its the same with MB. MB postponed that
decision, until they realised they would run out of water.
Also if you drill a hole in the ground and take water out, to actually calculate yield takes months if not years. To actually kind of know what you have. And I hope that process in Sedge is kind of . But you know how it goes you know, now the droughts away. so. but, ja none of these things. the only thing that we knew,
if we put a desal plant next to the sea we knew that eskom would give us power.
(was the timeframe a factor?)
yes, we could get a desal plant in 63 days.
somewhere along the line you have to take the decision. And it was very brave. Because if the town and petrosa ran out of water that would have been much more than the plant cost. In a month petrosa would have lost more than the plant cost. They would have lost R9m a day. we had to take a decision on erunits. because of a 7 day faster delivery period, they went for the more expensive. because they compare it to the cost of running out of water. its easy to talk after, but you must put yourself in the position of the decision maker at the time. As hennie said, if there's no water people can die, so you need to take that decision. I think it was the correct decision. just a pity that theye cant use the water for somthing else. but luckily you can mothball and restart later. What happened in the gulf coast of Australia they built this desal plant which they never used. then the floods hit them adn they had to start this deal plant because the other sources
couldn't supply.
the other thing, if we go back to this graph, overnight we've lifted this line. So effectively we've taken that project and moved it. Now this is a dam which is on the cards for Knysna and we've physically moved that by 9 years. Imagine how much water that is. we've physically made our desal and gwater a permanent supply and we've moved these capital projects - which this muni has got no money. how they can build a dam in 3-4 years time I want to see that coming
All we can give you is the capital cost, the operational cost we can probably give you estimates. [he: We need to link your work with that wrc.] People who can tell you electricity costs from veolia. [he: Jappie I don’t think she should ask veolia for those costs, its like asking the devil, rather get things from us or the muni. ]
Sanparks got involved with the water augmentation scheme in 2 different ways at sedge. The one was the desal plant and as you mentioned the eia was fasttracked because the drought in 2009/2010 brought a situation where the taps were no longer functioning. So they started trucking water in from george and that's obviously not very sustainable. So they looked at that and out human life before the environment. So what happened is that they went ahead and at the same time they filed for a section 24g application which is unlawful commencement. The people that were appointed, that's capeeaprac, environmental practitioners. Technically (?) Part of that the different authorities gave various comments on what they wanted to see and that was incorporated and that included monitoring because we realised that these things can happen. But it's quite a dynamic situation because when they put the wells in, they used divers to put the intake wells in and they had the jcb type equipment on the beach and that went quite successfully. Then on the outlet well side there's been problems on an ongoing basis. First it sucked it certain lifeforms possibly. They fixed that quite a few times. I've got photographs of that sticking out, taller than me, and it used to be 6m below. So it is a dynamic beach but there's specialist studies done on that.

Then various boreholes were drilled as part of the water augmentation and it became quite complicated because boreholes would be drilled and there'd be no environmental management whatsoever, so that was improved. From sanparks side we required environmental management methods statements and prior discussion before they drilled these holes and there's a couple of good examples. And the method statements that were developed, the consultants appointed for that on the boreholes, they are Sharples (SES). Because we found interesting things. For example at the Gouna which is Sanparks managed and in our priority areas. The water that they got from, I think they went 100 and something meters deep, so it was a brownish colour with lots of iron oxides in it and the borehole water coloured the freshwater and we almost did a mop up exercise because we didn't really expect that. The water consultants, parsons. The other boreholes got sunk in sedge, brenton, at gouna river, various all over the landscape to try and find water. Also the borehole at the lake pleasant resort and groenvlei, the muni used that to augment their water as well. At the lake pleasant site now there is an eia in process for developments. So that borehole came under discussion again. There's a karatara weir, then they started taking water off the Hoogekraal which is really quite a more pristine river. So we supported the desal plant in principle from the beginning, but with conditions, let's leave the Hoogekraal out because now we're starting to affect the ecosystems, and we know human life is more important, but please don't go to the hoogekraal. The pipes for the hoogekraal, they took it out eventually and everything was normalised. There's currently a basic assessment for a weir at the karatara river and capeeaprac is also doing that. Another group that's quite involved - you must have spoke to alistair fraser from the wlf - and they are forer monitoring what's going on and there's minutes of meetings that are quite comprehensive and they are quite an active group.

We don't like to just use the term climate change because you know the data that we have, our datasets the oldest ones are about 120 years old, our climate data is on average 87 years old. So we don't have enough info to say it's climate change. We should use balanced terminology. The scientists are monitoring it. We've got various scientific projects monitoring the potential effects of change in temperature gradients. Johan baart keeps all the rainfall records, which we get from all the weather stations in all the parks. The garden route national park is 157000 hectares that we manage, so its quite a large area. Then we've got the bugger zones of the park that goes from the mountains to the sea along river areas. And I can show you with my gis where the corridors are. So the
study area you are looking at, the karatara corridor, the hoogekraal and the knysna river corridors. And the corridors were developed through a whole systematic planning exercise through the gri, garden route initiative. Through that they looked at critical biodiversity and ecological support areas. adn through that we came up with with terrestrial and coastal corridors. In the buffer zones, my job is to ensure that the environmental integrity of the garden route national park is protected. so this areas linking a park with a park, needs to contribute to conservation outcomes. So we'll always comment in a reactive way to the eias, including for the municipality, to achieve conservation outcomes. meaning taking out alien vegetation, getting fynbos reestablished, working approach to move certain infrastructures away from the floodplain, depends on the areas, looking at fencing so there's connectivity in the landscape. because very often people can do things like build wiers, so talking about fish ladders is a very important point. Also the goukamma corridor, they had an authorisation for fish ladders and also tried boreholes there during the drought situation, and are planning a new dam and they've got outlet pipes in there.

You can see the corridors in green, you can take this map, it will help you to define your area. (??)

When there's a eia we'll get a typical report from the consultant and we provide comments to the muni in a structured way. Now that is the muni for land use change applications because they are the decision making authorities. With the eias if ots next to the park it goes to the national dept of environmental affairs. and if its in the province, but not next to the national park, it goes to the dept of env and economic dev.and planning and in the last 3 years I've commented on I would say over 300 eias and land use change applications. I must give you an example. So the relationship with the muni is very formal, we're commenting authority and mostly if they come out with a decision they would take our comments quite seriously I would say. They'd come up with a rezoning and our comments would be incorported. and the same thing with other authorities. so our comment in our mandate is conservation, catchment protection and critical biodiversity areas is nb to us. we sit on a lot of steering committees and advisory bodies together, because we're stakeholders. so there's a high level of cooperative governance wiht the KM. and critical for us is the cba maps that goes into the gri study is incorporated into the sdf and the idp. but wiht the idp all the munis are struggling to get there head around puttign the environmental jobs (??) and the muni have to negri compliant. so often if there's unlawful activities and it gets reported to me. they've got a record where env performance can be improved.but we discuss it in a cooperative governance way. In the Knysna area we are an authorising authority, we've got something like the knysna protected environment. and in this area which includes Knysna river, bigai, bangai, bongani, we have to authorise any developments as well. SO thats a nother layer where we interact. if they want to do work, for example broken pipes or the wwtw and ro plant. (commenting on the eias and the authorising authority role but only in the knysna protected environemnt. and there's regulations for that as well and thats been gazetted. A good place to get data is EDM, vernon gobbs, his coordinating the whole garden route initiative.

People already know, when I arrive on site for example I'm going to ask about connectivity. For eg we don’t support any development in the I in 100 year floodline. (Specifically for sedge there was the hoogekraal, boreholes and desal. can you take me thorugh each of them, how sanparks was engaged?)
With the desal, because it was split off and env consultants appointed that job went fine. With the boreholes initially we weren't really consulted until we started to make a noise. We said well you can't really just make boreholes, and we don't want it on our land without our permission. Then we got involved in a very adhoc basis. When there's proper process we were involved or if not we weren't then we would make a noise. But we never had any of the e-monitoring meetings. Though we went on visits to the desal plant as it was more educational. Our communication was quite clear, also the boreholes later. On the Knysna story, its the RO plants where they take the water from Loerie park close by. They started I think with 5 intake wells. I think there's 9 because the water they pulled out was not saline enough. It actually blocked their filters and they were hoping to get higher salinity. Which caused other implications, but its more on the design side. They've changed that. Its in the biodiversity control area in the area managed by us. We were very involved with that. Then they had the boreholes on that one. Then they also had a different study. Which has now been authorised for the upgrading of Charlesford. And Charlesford is the water abstraction is at Charlesford weir and they did a basic assessment to use bigger pipes so they can take more water out and upgraded the pipeline. Now that is totally unrelated though in concept it is related. But that processes were running on the one side. Now we've come to a site where there's 2 different consultants working on 2 different jobs dealing with pipes when they could have used one pipe. So there was definitely a lack of coordination and understanding. I think we at this stage were maybe more up to date because people would forget to talk about the Charlesford situation. Then now later on, that's the whole story about the dam on the knysna river and its in the preplanning stage of the eia. And I don't know if it done so much for drought as for the farmers wanting to have a secure water supply. And the consultants with that Aurecon. So that's there study but at the moment its a quiet period. Aurecon did the design, I don't know on the environmental side. But then on the Knysna RO plant, you see the water goes through the full settling tank at the wwtw and that water - the idea was to improve the water quality at the wwtw because that lacked capacity to deal with the load. And they've done some minor upgrade and there's entire reports written about that. Andre riley manager on the Knysna side of the ongoing problems. Escoli levels. The idea was that diluting the water with the saltwater would improve the water quality coming back because it comes back into the estuary. So we are receiving all this water that's not of a good standard. Mostly the effluent is not good. But that's not the only problem. There's very problem spots where stormwater comes into the estuary that's also not compliant. On the water quality you should speak to (?). Also the knysna pollution prevention committee, the muni will tell you about that because I think they organise it. I'm the one going to the side visits and preparing the documents and my manager Len Du Plessis signs it off.

Oh, then we had the soccer world cup here, then they needed water, at Loerie park they built the training field there. The water that they used from the wwtw was not suitable for contact sport. So then they had to make a plan. I think they made an agreement with Pezula to get that water for the golf and the freshwater would have to be used for the Loerie park. You should look at demand side management strategies. There is a report at the muni which they did to look at that. And there's a fair amount of loss of water through taps and pipes and not working properly, more attention could be given to those.

In general the demand side management during the drought from the munis side was very good. In these action ads they would be a certain target of meglitres and nice drawings inside so we could see are we making the target or not.
Generally we are drawn in if it's a professional process and consultants are involved. We are one of the first. They will contact us, forestry, cape nature, its when things are adhoc and organised, when nobodies actually involved, I suppose in some cases the one side of the muni may not know what the other is doing. sometimes there's a lack of proper planning and consultation.

All they did was the desal for sedge and the ro for knysna, and on the boreholes adhoc, and the charlesford on its own. So it would have been nice to have an integrated document talking about that. So there's not a doc that pulled all of that together. our comments actually talked about this lack of integration. because you've got to address the gwater, freshwater, all together. and thats why its a dog's breakfast, you will find all these different bits because its not pulled in. You see for sedge desal and ro section 24g was run. for the rest no, but for the boreholes they started doing method statements. so that was the furthest they went with the others towards compliance. but some fo those triggered and some not. you see whenever you are close to water, you can trigger a basic assessment. by doing exploratory drilling in theory yes, but in an emergency we realised that the best is now to mitigate the situation. But in an ideal world we should ahve had an eia covering the entire augmentation scheme right up front and we wouldn't have had all these problems. another thing is setback lines. because with the storms and high water levels, sedge at island lake, there's some muni pipes. there's still infra that ideally there should be provisio to remove infra thats in the hazard zone. even that could have been involved wih eia stuff. then atleast you've got authorisation.

Alistair fraser will help you with info on floods. Although its in the management plan, we had to go through a basic assessment, the eia process to make it compliant. We got an emergency directive to get people to prepare the channel. Then we got an authorisation, then somebody from sedge made an appeal and eventually we won that appeal. there was also that unlawful activity where he made a ditch. But you must just check on the facts, the green scorpions took it on. [talks about the opening of the mouth]. correct there's an ongoing disagreement on the managing of the opening of the mouth. towards bridging that gap we ahve appointed jeff cowen to do a hydrological study, a whole modelling. [41min onwards on opening of the mouth. ian russell on the estuaries, rb]. the batson relationship has not been ideal for a few years. But it can be quite complex. Something I'm working on is a dune management plan at myoli beach. Here's where swartvlei comes into the sea, the desal plant is here, this is myoli beach dunes. We manage the green bit, the gap inbetween is the muni, then its private land owners. We patrol our area, then a private landowners chops something down for a view, it crosses muni land and then impact sanparks land. so all the issues are very interlinked in terms of management areas.

[interview was interrupted. To be picked up again…]

**Interview 61 on 5 July 2012 – Municipal Staff**

certain chemicals supplied by the municipality including soda ash and ferichloride, with specific chemicals through the contractor, because don't want to be accused of getting inferior chemicals that affect the RO operation. An O&M is in place which SSI deals with. They drew up the contract and manage it, with the relationship between SSI and Veolia.

Currently in preserve mode, to be operated in the peak season of Nov - April. Try to run at low peak times, that is operation is influenced by the time of use tarriff. Run below peak hours inorder to optimise the system, in this case they don't exceed the notified
demand, and the kwh cost is less, this is a management decision

The filters are used to produce ready quality water for the RO plant. Twice monthly the boreholes are started, open and close valves, 1 stop pumps, this is done to make sure everything is working mechanically
In preserve mode means that preservative is pumped out of the RO, which takes about a day for each one. 2 RO's are run at once, and never 3, in this case its still possible to achieve tididity of ,0.5. The bags have to be changed on the plant when needed as the quality of the water is poor.
There is a pump on each RO, to push up the pressure. Just to run that pump results in pushing up the electricity costs. Furthermore if the plant is run once a month, the costs are paid for the whole month.
Many teething problems encountered. The plant is designed to push water through the filters, with high pressure through the filters and the RO Plant. Initially high pressure resulting in the system shakes and breaks on the filters. But the filtration doesn't need high pressure, so now clean water to the tanks with higher pressure to the RO (?). Filter bags cracked because of pressure going through. the tididity of the received borehole water is quite high. the design is to produce 2MI of potable water from 5MI of product water. However the tididity goes up, and is still a problem. SSI is still looking at the problem. Everything was started in a hurry to get the process running. This has influenced the plant operation. It was designed to extract 5MI however it has never done that. It can't produce 2MI. A test was run and there is a problem of tididity, while it causes the filter bags to break. The tididity to the RO should be <1, and the contractor Veolia wants to to be <0.5. However the current water causes the filter bags to block up and have to be frequently replaced.
Because of the budget there wasn't sufficient money for the whole system. Only duty (?) pumps were installed with provision made for standby pumps to be done when the money is available
When the plant was first started there were initially 6 test boreholes, however problems with tididity were experienced and 2 more boreholes were drilled to lessen the load on the original 6. Part of the teething problems was that the brine pumps filled up with water. there was a problem to put all the pressure on this side of the filters. The filter bags needed to be changed quite often, which requires many man hours to change the bags, and blocks up frequently. When the tididity is >1 the filter bags ahve to be frequently changed. Veolia has the records on the filter bags
A challenge in operatign the plant throughout the year is that a budget is needed, as the current funds do not cover the cost to run the pplant.
Its costly to run RO plants. All the munis spent money and are now faced with new plants and full dams
the rainfall level was low, the dam doesn't have a catchment, instead the muni pumps into the AD. The rivers pumped from were low and the town demand didn't come down, it was high.
The pumpstations at Charlseford have since been revamped, as the old pumps were monopumps, meaning that they sucked the water out, while the new pumps are submersible pumps. These new submersible pumps are below 2m in the weir. Prior to the revamp the pumps at Charlesford were old with lots of breakages and spares. The pumps at Charlesford were stopped once. the system was old and also affected by a period of loadshedding, resulting in many current dips and stops/starts. this influenced storage, the dams were not filling, while at the same time the demand didn't tag off. The Gouna was also revamped. the initial flow was water from the Gouna to the balancing dam, however the problem was with frequent pipe breaks, that has since been fixed. The Glebe dam had a stone channel which ran from the glebe to the arch dam, which was then pumped up to the AD. The muni had people frequently cleaning the channel, which was old and became clogged with debris which influenced the water flow. Therefore the water coming through from the Glebe Dam was low. Its a small catchment dam, but water wa lost as the channel was often blocked and too small.

arch, gona, bigai, don't know upgrade costs

Don’t think the risks could have been avoided as the infrastructure is old and the funds were allocated elsewhere. The capacity at the WTW was increased in 2006, not thinking there would be a water crisis. The state of the infrastructure was not addressed. the funds were not there, therefore it must be done in phases with the decisions selective based on availability of funds. Prior to the crisis all the revamps were discussed, except for the desal. but the problem preventing implementation was money availability. The muni was also looking at raising the dam level but pumped money into Charlesford instead, there's no sense in raising the dams when the pumpstations are a problem. The Charlesford weir is being measured by DWA to prevent extraction below the ecological reserve.

In Sedgefield, the Karatara River wasn't enough with the Swatrvlei pushing back over the weir. The old boreholes also didn't supply.
A dam between Bitou and Knysna, laying a pipeline and feeding from there, as money in this case won't be spent on separate dams, but an integrated system. Durign the drought DWA looked at the proposals/ wish list and the issues were no funsd, out of drought, not looked at if crisis, therefore keeping eye on dam level

**Interview 62 & 63 on 5 July 2012 – Municipal Official & Municipal Staff**

the loadshedding took place in 2008, but after that the loadshedding had come to a halt. The desal plant and RO plant came on much later than that. Yes so there was a problem with the loadshedding at the time. But that was an eskom problem, they couldn't supply. I know they did have problems with pumps burning out but that RParry is actually, because he actually apppointed a consultant, whihc is actually our consultants, to try and look into the matter and resolve the matter. Then they looked at upgrading the transformer, the supplier. but they still into problems with pumps burning out, because of the line I assuem. this is what i heard from them now. because the line, the eskom line is a rural line and its quite to the end fo the line where the pumps are situated. the substation is in rheenendhal, being a rural line it supplies farmers. so the voltages and start up currents wwere a bit dicey. so they looked at putting a bigger transfromer in whihc would give it more steam. I thionk they loo ked at power factor correction to try and pull that right. but i still believe there wa s aproblem. being a rural line it does trip more than a municipla line, lets put it that way. the charlesford pump whihc is in an eskom area and then you've got the eastford pump whihc is the second stage pump. they
pump from charlesfrd to eastford and from there to the waterworks. the second stage pump is in our area which is not as susceptible to power outages as the rural eskom line was. effectively what would happen is we would ahve power in the east but charles would be down. so it doesn't make sense they cant pump the water out of the river. That is why i think they decided to out a generator there, because regardless of whether the line was down or not they could still pump to eastford and eastford would take it up. because east, its just a much shorter line, whereas the line from rheenendaal is about 15km long, prone to outages. and i think this has solved a lot of their problem. but this is just heresay because thye made use of the consultant cmb. we did sit in on meetings found to be necessary, but i think the big issue there was the problem with the pumps. we dont really get involved in the pumpstations, design etc. they've got ssi, engineers who do that.

I think the pumps they were using was very voltage sensitive if I can put it that way and thhey kept burning out. I don’t know what the situation has been since they pit in the generator and the power factor correction, because the complaints from that side have gone down a lot. i think if you really want t get the full story its best to talk to pierre conradie from cmb. coincidentlaly the same company is our electrical consultants but i think the problem has been mostly resolved wiht the generators.

(The other question is to try to understand the relationship between the electricity supply and the desal and ro plants, as well as the boreholes. Because I know in sedge the boreholes were drilled and the supply was only provided at a later stage to make it functional)

I don’t know, I wasn;t involved in sedge. We were basically just approached a t a stage. They sunk a few.the sedge I cant comment on that much, because I wasn't that involved. I know they sunk a line of boreholes on the northern side of sedge, we were approached to out power in. but KNysna and Sedge ran as 2 seperate towns. Anton Gouws is the sup there. he reports to me, but basically he deals wiht those matters. i belive it was just before they put the desal plant in sedge

(in terms of the desal plant, and ro plant?)

The deal in sedge, the time they switched on, anton will be able to give you that information. There was certain work and upgrades, substation had to be put down for the desal plant which we did gove them costs for and was installed. I think cmb were involved with the boreholes in the forest in Knysna, he most probably was involved in sedge.

Let me go and look for some stats for you

in sedge, cmb were involved in the design of those 2, they were appointed y ssi. Upgrading work had to be done in sedge. The overhead line had to be upgraded, relocated and they put in a substation next to the desal plant. A 500kva transformer was put down, the cost of that, the engineer with cmb was specifically involved in that job. Pieere was inc harge but not that involved with the details

(I've asked Marnon about the electricity costs. I was asking about the operation of the RO plant and was told that currently its switched off and they turn it on maybe twice a month just to run the filters I think, but not the mebranes. Initially there were a few tests done and he told me there's teething problems. but I've been told that everytime the plant is run there's a few associated costs, for electricitya nd i'm not too clear on that.)

If I can show you. It will help you more, show you this wheel. You see this is basically eskoms, and we pay exactly the same. We are on what they call megaflex and we apply the same principal to our bulk consumers of which the RO is one of them. You have a choice of going to the standard rate: Whre you apply for a fixed kva demand or amps on that you would pay a fixed charge; and then a very high rate on the kva demand; then
the consumption, the kwh would be on a flat rate but on a fairly low rate. Eskom then had problems with energy, so what they've now introduced is this time of use. so the tariff exists and has got 3 components. The red is peak time between 7:30 and 10:00 am and at night between 6-8pm. then standard time 8-10pm is the yellow time, then offpeak which is the green time. On a saturday you've only got standard or offpeak and on a sunday its all offpeak. and each of those blocks have got different rates per kwh. so eskom are trying to get you to move your load out of their peak because thats when they've got problems generating power, so if you move your load, you save money. That is when they were starting up there plant, in the offpeak time to keep the costs down. Yes, the nice part about this is you can move load. the bad part is that they've got 2 seasons, winter and summer, winter is june, july, august. Our normal bill for town is about R7m, this month between Knysna and Sedge we've knocked R14m because of us being in their winter tariffs now. We buy energy from eskom at over R1 per kwh and we are selling it at 36c to some of the consumers. and that is basically what affects the tariffs. we've had businesses now in the industrial area that start at 10am, and all the energy they're buying in that peak time is; if you just look at that. your peak energy in the summer months (cheap months) was 66c/kwh, is now going up to 74c. Standard is 44-45c, and offpeak is 29c. you can see how cheap it gets in comparison to peak. BUT in WINTER, PEAK is R2,34c per kwh; 60c, then 40c. but the peak is the killer. So in winter our account basically just doubles because we cant control what our consumers are using. most of our consumers are on the flat rate, so it doesn't affect them. but we've got to pay eskombuy, we're buying in excess of R1 and selling to some consumers at 36c kwh, and residential consumers just close on R1kwh. thats what affects the tariff, because its on time of use there's a fluctuation in the tariff everyday. 
(Can you tell me about the kva cost as well?)
The standard bulk charges would apply. That is the standard charge. There's 3 charges, you've got a basic charge, network access charge and a network demand charge. And this is where the difference comes in. if you look at your network demand charge, its R30 per KVa, your network demand charge there is R138 per kva so it's major difference (time of use difference?). but there's a flat rate of 37c on kwh, on your consumption. So this actually kills the whole project, because that is a monthly payment irrespective of whether you use or not, depending on your kva, but thats normally the killer.
This is for example, this is RO platns account. The notified demand or the amount of electricity that we must have available at all times for it, is 550kva. So that's the kva portion of it. Now this it bulk charge. Now you can its just idling. This is the month here, 29/7. in november2011 and jan2012 they ran the plant, you can see it drew 228kva and 246kva. but then its just been idling again, they haven't used it. (are you still paying for 550kva). yes. This was the consumption or energy charge, you can see exactly the same. I've also attached our tariffs for last year; the bulk charges. then i've just done on the time of use charges, the rates are much lower but the units differ. The way they are operating the ro at the moment I'm not sure if bulk time of use is the right. It could possibly be cheaper for them to go to the standard tariff, but as soon as it kicks in they goign to use it more than it would be much more. the way eskom has designed it the time of use makes sense, although th 3 months are expensive.
This is sort of a typical account for the ro for this june (2012). Your first charge is your 1) network access charge which is the 550kva * your network charge, then the 2) bulk charge is 10kva * R198; then the 3) consumption was 1191 units * the unit charge and the 4) basic charge each monht, thats basically the way the account is calculated each monht. The bulk charge (2) is that you pay for the demand that you are placing on the
network basically. Its your highest peak in that given month.

the meter that a bulk user has is an intelligent meter. Fro a standard user you would have a circuit breaker which gives you a fixed amount fo amps and it will trip, and you've got a meter which just read kwh. Whereas for a bulk user it will actually log the maximum you drew for the month in kva, it will log the kwh you drew. so on a monthly basis; you've got a network access charge which is a given thats a contractual agreement; then your network demand charge is the actual demand that you drew, thats the bulk charge your amps, but its the highest demand you've drawn in that month for a half an hour period; then the kwh is your consumption; then its the basic. So the network access charge and your basic are always a given, even when these plants are not producing.

This is the bulk, the date, number of days between reading. And it’s the same here, the date, the meter reading and the difference. We only do 12 months at a time, I'll see if I can find earlier.

that is the tou charge (for bulk). Then you've got the standard bulk charge, which has the same components but the kva charge is very high. The option they've gone for is tou. In the case of standard bulk the kwh is on a flat rate, but the netwrok access and network demand (bulk) charge is at a much higher rate. Obviously it doesn't make sense for us to secure 550kva for you if you aren't using it because that we could actually sell to someone else, so you must pay for securing it. in the past it was, the way they dealt with it was they didn't have all these charges. you would have your demand charge and our agreement was for 500kva you would pay the minimum of 70% of that. that would be your minimum. but now eskom has changed it. they've broken it up because its what nersa wants

(Do you also have a comparison, that shows for the wtw, so I can see the difference between producing potable water for the ro and normal production)

The information is all with finance, but maron has access to finance pcs. Maybe maron can do it for you. But I believe that this RO plant is a very bad investment. It sbasically standing there mothballed. Rather say lets run it during offpeak times. its a nobrainer to run it in winter when you've got all the water in the world but maybe look at running it in the green offpeak time.

(They've got the operating & maintenacne contract which has to be paid, as well as these costs)

As I ssay its an investment and not s a piece of gold that you can lock away and 100 years from now it will be the same. It’s a piece of metal in a highly corrosive environemnt and it will just rot to bits 10-15 years from now or 20 maybe, there'll be nothing left. so it doesn't really make sense to just mothball these things. and i think naything is designed to work, like a motorcar. try and start it after a few years and see the errors just by not operating it.

The information of how frequently its run is very close to the hearts of the people operating it, but if you get the kwh usage you'll be able to see exactly how much. The consumption will tell you. But I really don’t think its worked a lot. I was hoping to make money out of there.

I've got the eskom account here, I'm busy working on it. 26c is the off peak, standard rate is 48c, then the peak charge is R1.87. that’s last months account. Its R9m for Knysna and the Sedge one is R1.4m. We subsidise the rest of the muni. Its very close to the heart i must say. its skewed if i can put it that way. its skewed in that they've go to all different charges against the electricity dept that go into the expense, you dont see it as surplus. the muni at this stage, i think we are very close to the rate income, which is just
enough to pay the muni salaries. water is running at a loss, electricity is doing well but
our tariffs are regulated by nersa. obviously the muni has got to subsidise the libraries
etc. The electricity dept subsidises a lot. if we had to fold the muni would go very
soon. what govt is doing is very long, they provide funding for hosues and electricity.
adn the maintenance lands on the muni and the consumers we get contribute nothing to
the rates, water, and still get a free component. and the electricity payment they get is
not enough. so the paying portion of town has to subsidies. THe smaller munis cannot
support the housing and maintenance. so i'm saying its the wrong thing government is
doing. they make all these promises but the consumer in town is being taxed out of their
houses
This is consumption charge from 2010 up until july of 2011 and the same for the bulk.
(Do you have the same for sedge? I'm wondering what would be the best way to
compare water production costs)
The wtw is going to be a very difficult exercise. Because the wtw consumes very little
electricity. The big thing is to get the water there. So you would have to start with the
charles, east, account and all the other pumpstations to get the water to the reservoirs. so
its a bigger job than just looking at the wtw, because they're using nothing. but you've
actually got to look at the cost of gettign the water there and gettign it away because of
the topography. there's very little. i think there's only this one section in town, thesens
island where water is not pumped. the rest is pumped into the reservoir.
Rhoydon and them should have records. it would be stupid to run a dept and not know
how much it costs. Even if the consultant would do it. Because they would know
exactly every pumpstation they've got to pump water to reservoirs and , because they
are paying the accounts. once you've got the account numbers. but to egt the
information we wouldn't have that.
(for the desal plant?)
I will have to first get hold of the account number
(I could send you an email with my questions)
Ok, let me get you my card
It's a big job to get that information off of somebody at the engineers dept and I would
be very reluctant to go through that operation because it’s a big job. But somebody in
that position should havea list of all those accounts. THEN YOU approach elna and say
you want a copy of the consumptions of each of these accounts. the accounts have
different names. because its all under one name, KM. they describe specifically the
pump stations. somebody in the engineers dept will know which account applies to
which pumpstation. The only person who really can tell you whihc account number
applies to whihc pump station is Rhoydon, maybe

**Interview 64 on 6 July 2012 – Municipal Official**

the vast majority of the money came from government, mainly national government, so
we didn’t contribute much to this thing at all. Didn't Lorien give you the breakdown
when you were here? It should be on the sreadsheets. Rodney should also have those
spreadsheets. We can find it for you, it should be in the financials of a couple of years
ago.

We can find those because those are on the original MIG applications. But I think you
need to understand something about the application process from MIG. You've got the
finance dept doing its thing and then you've got the engineers this is prior to basically
this year. And what basically happened is that the engineers did the wrong thing, they
applied for MIG money for whatever projects they thought. they just registered projects
and those projects would be probably approved over time. That doesn't mean they are necessarily going to be approved, but you've got them registered, you have the opportunity and just whichever one they wanted to. And for example some of the money was scheduled for the library. It happened this year, so the library was delayed. but it was like a menu for the engineers to register projects and get the applications in, and the problem with that; and I've complained about it bitterly since I've got here; was that there was no synergy between what they were doing and where I wanted to go. because my role, and I said from day 1, is I will fund the portion that Mig expects us to fund, which is the 20%. They fund the 80%, I will fund the 20%. We had money coming in from reserves, but not for sedge. We would borrow the balance money and it was a case of literally you got this thing dumped on you because Mig had approved this and the fact of the matter was there was no lead up, lead time that we had seen for this thing to come. So the projects, you would have to look at Rodney's spreadsheets, you can pick it up from there. I wouldn't be able to say we redirected from that to that. He was redirecting Mig money, not from our side. Mig was basically supposed to be used for essential infrastructures, except they were also supposed to be used for some community money, some electricity were also supposed to be in there. But the previous town engineer essentially only took it for water and sewerage. He kept it for himself, the electrical engineer used to moan. It was only later than we discovered that in actual fact its for community as well. The library for example is entitled. Everybody's now entitled to get a portion of Mig, the problem with that is that you dilute Mig, so its kept mainly for infrastructure, and its supposed to be infra in previously disadvantaged areas. So you would have this situation, where they would fund the pipes for example in a previously disadvantaged area, but as soon as it hit sedge, they wouldn't fund. But its a whole system. And Rodney was good at playing around with that.

(Is there any tracing within the Mun of how Mig money is spent? [yes] Could I get access to that so that I could actually see the way it has been directed to date?)

We give monthly reconciliations. Which years do you want to do? You want the actual monthly reports that we submit to Mig? We can give you those. Ask Anthony to pop through for a second.

(Another question is something we've discussed previously about augmentation fees, and at the time you said to me that the augmentation fees were paid by developers to be used for the infra for these developments?)

In theory. In actual fact if its water augs they get used for water. And that's exactly what happened. They were ing fenced electricity, water sewage. The aug fees were exactly for a developer paying to have a service connected to his development. The simple reality of it is that you don't put a service in for a single development. You put a service in for a host of developments. For example Welbedacht Road.

Brian, do you or Anthony have the Mig monthly reconciliations that are submitted? From my side I have mine and his got his. Mine basically, just Mig goes back to 2010. Before that should be in the files. I'm not sure if they're still there. Will bring a copy. The Welbedacht road, the developments paid augmentations in, now you can't build a road in portions. So you just pile it in, add in what you need to add from the munis side and build the road. So its part funding by both. Same thing will happen with water. On electricity for example there's a specific tariff on the eastford substation, developments which tap into that have to pay that tariff which is effectively equivalent to the augmentation. Because we built it and designed it in such a way that they would have to carry the cost of the thing, we cover it over a longer period. What had happened in the past, prior to 2002, was that those augmentations had just been put into a reserve but the developments never took place, or the upgrades never took place. So I just looked and
said it's all for water. I don't really care whether its for this or that development. To see the period of augmentation build up you would have to have a look at the financials. My philosophy has been the assets must be in the ground not in the bank. The library should have copies of Knysna's financials.

(What happens with the unspent monies?)
If its capital it will be rolled over. Or if there's not an equivalent project then it would just not spent. Now you must remember, prior to 2008/09, which is when GRAP came in, we worked on Basoc fund accounting, and you would roll the money from 1 year to the next. Now if you don't spend it you lose it. Unless it's budgeted in a long term capital project and will be sitting in a capital replacement reserve. That effectively how it works. So it's far more targeted now. With fund accounting then you could roll it and you didn't have to go for a budget for this and for that, and permissions. But now, especially on government monies, like Mig you have to pay it back unless you have a plan in place and contracts signed. But the internal monies I'm working on the same principal now, including borrowings, we will still roll the money. But you can't roll the external government funding. You have to get permission for that. If the Mig funds are not so spent we have to report to national, motivate to national, and pay it back if we can't justify it. We haven't been able to do it yet. (Those funds for the desal in Sedge, the Mig funds, I think they came from 2006 and 2007 Mig grants for the flood?) And there was a whole lot of reporting because I ended up going to Pretoria to argue the case on it because they wanted us to pay it back. The simple matter was that in those days NT reporting systems weren't up to speed yet and they were unsure. In fact there are a host of reports on that. I ended writing 2-3 of them to motivate to government. Rodney will have those. In fact they ended up getting their financial years wrong. Their financial year starts 1st April, you have that overlap period, but if you weren't spending by the end of March, they would say 'you haven't spent it' and we would say 'no, no, no, we go to June'. And that was where problems were caused. The officials with national treasury were getting to grips with this thing. So Mig needed to be rolled over and that was a lot of the issues that were taking place. So you would get monies going into their financial year but not in our financial year, and there were discrepancies. And if there were delays, same thing would happen. Exactly the same thing happens with housing for example, fiscal dumping takes place, province hasn't spent their money basically they go into a panic mode in February and you get a huge cheque in March which has to be spent. And we say we can't spend this money, and turn a blind eye to it, but NT doesn't. So we accuse province of fiscal dumping. We got R9m this year, which we've had to spend in our financial year, so that province are made to look better. It's ridiculous. So those anomalies still exist. When you declare an emergency that's a different issue, it's not fiscal dumping. There might be access to greater funds but province wouldn't fiscal dump on the region. It was an emergency. Theoretically they are supposed to move to the money from where its available. Province and national have contingency funds, what they call emergency disaster funding sources. (Were those funds subject to the same conditions of spending?) Not at the time of giving it. They decided only afterwards that they needed to sort out their administration and then they applied the rules per se. Although in the case of the Sedge one, at the time of the Sedge ones, there was a rush to spend the Mig. Which is why Rodney went and got the people he got. We would have still spent it. That's why the roll over started to take place. We can't spend large amounts of money easily. We ended
up with deviations that year, which is technically irregular expenditure after the event when really only went through the books in 2008/2009. that was about R30m and I had to declare it as irregular expenditure. and the sources of funding can also be seen in the afs, it should be in an appendix i think when gives you the projects.

[looks at mig reconciliations - final one 2009/2010. this is what is submitted. The summary reports. This is our received, spent, scheduled, budget, actual, committed] (you see in looking at the costs I'd like to contextualise them. So for example, the mig grant, to locate that within the larger mig grants.)

In that case I would suggest you schedule more time with Rodney. Ebecause we deal with them from a payment side. We don't deal with them. Our records are here, but they differ from his. He was reporting, basically got to do with vat. Thre has been a circular release now by nt which says that mig must be reported according to the section 71 reports when is the normal section monthly reports we do. that is a ntional thing. there's an anomaly between what is reported to finance and what is reported by mig at national level. so they were not tying up. nt have actually asked the mig authorities - because there've been rumours that mig has been wasted - so the whole process is being standardised. So what Rodney as been reporting in the past and what we've been reporting may not be one and the same and thats all through the country. ROdney was generally reporting on the gross and we report on the net. the way mig works now, is we take out the vat portions on it and there are circulars from nt saying you can do that. and i use it to subsidise my tariffs. so we ahve subsidised tariffs at the expense of capital infra. thta happened over the last 3years, and there's been a lot of debate between the engineers. its worthwhile to look at the nt on these things because they are very good. in pretoria the chaps name is conrad barberton, he handles a lot of the local government stuff. the provincial treasury people, probably frans sabbat, his in charge of accounting. and at nt level elsabe rossouw, she would have a sense of whats going on (I've been told by a few sources that the water dept itself is in deficit)

…… Yes and no. it comes down to the funding of local authorities. And as you know local authorities are funded by tariffs and rates. Now it depends on how you want to do your funding mix. Nt will tell you that the services elec and water should make a surplus and the services of refuse and sewage should be economical and therefor break even. my argument to that is that, elect , yes; water, depending on where you are in the country i would buy that argument; sewage is so linked to water that the same principal would apply; and refuse it depends again on the circumstances surrounding each individual local authority. now our tip site is in MB. So we have to cart our refuse from here to MB. it use to run on the train, the train is dead now. so now we road it all the way through there. thats an increased cost. water you know there are what 160 pump stations in the knysna area, whihc is probably 3 times more than any other comparable local authority. knysna is topographically inefficient. our cost of water is hideously expensive. especially now that eskom has put up its costs 25% plus over the last 4 years. so water has gone from making a surplus to making a deficit. knysna water tariffs are already the highest in the wc. now if people want me to make water operate at a surplus than I'm goign to have to increase those tariffs, its already unaffordable. now you go and look at my debtor situation. the highest grouping of debtors, proportionally are sewage, refuse and water. why?because i cant swith them off. I can only switch off electricity and i can only take you to court on rates. so my debtor increases on these 3 services are going through the roof. waht am i supposed to do? increase my tariffs? I'm just then increasing my debtors, so what's the point. so yes, water is running at a deficit. but its running at a deficit deliberately because i've held the tariffs down because atleast i can recover what i'm getting.and i have had this argument with gov officials all
over the place. this is not jhb or even ct, where the systems are relatively simple. this is incredibly complex. Heath robinson was an inventor, if he had to invent a pen, it would be the most complicated way of doing a pen. thats what knysna is. the town engineers over the years ahve mde this thing so complicated that we pump water up then down again then to a holding dam then it gets purified then it gets pumped back up somewhere else again. its the most ridiculous situation. thats why it runs at a deficit. so I recover it throught the rates. which means the previously advantaged are paying more than the previously disadvantaged. except i move the rates system across into the northern areas. my rates are one fo the highest in the wc, thats exactly why. in other words in this local authority the minority is subsidising the majority far more. And thats the way I get this place to run, otherwise i'll have huge non payment. Our staffing levels are amongst the most in the wc. In the last few years I've squeezed out a lot of the waste that there was. That’s not there anymore. That’s why the depts hate me. Because I work on a cash bassis. (I was told that the tech dept is understaffed)
No they are not understaffed, they are underqualified. (what been suggested is that lack of adequate staffing has been a factor which lead to the crisis [where?] in Knysna)
There were 2 crises. There were 2, in sedge in knysna. Which one are you talking about? (I think both) NO in sedge, the river stopped. That’s all that happened, there was a drought, the river stopped. That’s all that happened. The simple fact of the matter is, there was the dam, the works, all the various pipelines and that was R135m for a taxing base of 2500. thats not even.. and the river stopped. thats waht happened the river stopped, for one week. the salinity issue us a different issue. the fact that the mouth opens and doesn't opne, causes all these things to come back, thats, we didn't evne run that side of the equation. so, ahh, i think you'll get an awful lot of people trying to say thats not my fault. well i'm sorry it was your fault. this thing should ahve been dealt with 20-120 years ago. there should ahve a been a holding dam for the untreated water. many many years ago. that was the sedge one. I'm sorry i dont buy the sedge thing at all, i think that was just downright incompetence. and the whole thing that happened after that was a complete overreaaction. and we've ended up wiht a desal plant, which you probably know better than i do, whihc i think we've used once? (I think for a couple of months in 2010 it ran). yes, but thats it. If I was nt i would say fruitless and wastless. because they did a rushed job and they didn't think it through. (What was the reason? What do you think the factors were for what you term an overreaction?)
complete incompetence. Genuinely. The deal plant went ahead ebcause it was the quickest and cheapest way of solving the problem. It was what, R18m, as opposed to R135m. I'm not saying the R135m is not necessary, its just not going to happen. So R18-R20m was a far simpler way. but the river is now running, so the problem is not there.
(you're saying the water dried up for a week, there were also the hoogekraal and boreholes)
I do happen to believe that desals are the way of the future. If 97% of the world's water is sitting in the sea, that to me is not rocket science. And then it just comes down to cost. But the cost, as the technology improves will come down. Desals are all over the world. that was just a nightmare caused by bad management
Knysna, 2 sides to it. 1) the same principle, I think there was incompetence, the only genuine water engineer we had left about 5-6 years ago. Since hen we've had nobody who really understood what was happening. The engineer at the time wanted to replace with someone he had mentored and brought through the ranks, whose not a qualified engineer. so that i think is the reason he wasn't replaced. The second reason is that the town had expanded but there was no way that the town was going to be able to expand financially to meet the demands, not when the cost of the systems were already running so high. thats. you can give me. i think there's a report somewhere which shows the infra requirements of this muni run into the billions. now we have a capital budget in this muni of about R60m per year. its not going to happen. water and sanitation takes probably 50% of that budget each year. and thats another complaint i've had. we spend too much of our money on heavy infra. and to me we not seeing any of it, nothing's getting better. our water losses seem to have fallen. but i dont stress too much about that. because we dont buy the water, we pump it out of the water. the argument i have with the auditor general and others - you know the knysna river, there's a wier, we pump before the wier, pump up into the whole system. But if you dont pump that water and it goes over the wier, its lost. so its not as though there's a. we have this argument about water losses. but if it goes over the wier its already lost. there's a hell of a lot more that goes over the wier, than gets lost in the system [point about the need for better pumping capacity]. Yes, there's a cost of purification, pumping, distribution etc, but its miniscule. yes if this was jhb, where you are buying from the rwboard, thats a differnt issue because its a direct cost you're losing. here its a whole different system. WE DONT EVEN METER UP THERE. I dont see the logic of that. lori can pull the water usage stats. there's a water team that meets. You can speak to William fillies, he gets that information.

(the O&M contracts on the RO and desal, where is that accounted for in your budget?)

It would just show as a line item, probably consultant fees. Its all including into their budgets, part of their operating costs.

(I've been to the electricity dept and they were able to extract the ro monthly usage as well as the different cost components. I asked them for the RO. But water production the traditional form)

They run a very tight ship. I wish they were in the water dept. I don't know, I'm guessing, there might be account numbers. But I'm not sure whose reading them. You may want to go back there and ask elna. She's the one who produces the water and electricity. the bulk water is produced by technical

(I would like to get some indication of cost per kl, the usual system)

You can do a simple one of expenditure divided by number of kl. That's a very superficial simple way of doing it. If you wanted to actually break it down, its tricky because you going to have to end up taking each and every activity going on there. I have no idea how much is flowing in the RO. you would have to speak to Rhoy.

(The muni itself ahs done no cost comparison?)

No, because ultimately I take it to the income side. I would love to go through it and do a whole costing exercise on it. But the point is why would I want to waste my time doing that when I know I'm already subsidising water through the rates purely to cover my losses. we dont have the costing and metering systems in place as we are not a muni that has a lot of money to spend on that type. and i have to think to myself what the benefit. i can't see it. this local authority has phenomenal info all over the place. you have to hunt to get it. the one person in this council who can pull that info together is lori. the problem is she doesn't have time to do it either. I dont stress about it because i look at it from the question of whether its affordable.
I'll dig the report out for you which shows the local authorities in the WC and knysna is way in access. So I'm already charging my consumers. But it's not enough. So it may be there's a hige waste in expenditure, which 160 pump stations doesn't help. And our water losses have already come down to something like 17% this year. whilec puts us way below the national norms. I don't know if I trust those figures particularly. it's a difficult one, but I'm not sufficiently concerned about it because of the mechanisms that we use and I don't have the staff to dig around for it.

That's why I'm very interested in what you come up with, from the technical analysis of the info because I'd like to take that and extrapolate it. In our technical dept we don't even have a finance person there. I've told council, if you give me 5 more staff, graduates, I'll put one in each dept. but i'm not getting that. if I was a vote holder in the technical dept I would want my own finance person.

(I've heard suggestions that the challenges faced at the time were exacerbated by a lack of money)

What did they expect. I can't wave a magic wand to get more money for them internally. The rules are very simple. You cannot go borrowing money because there's a cost to it. There are many ways to deal with crisis that came up. How much do you now of the previous administration? because this thing happened, for the first time in 2004/2005, meaning problems with water in Knysna. Dave Daniels was the previous MM, so before 2006. Andrew was part of it he knows, it was the same town engineer, the same person in charge of the system. The previous guy had just left to go to the DBSA. Perring was in charge, parry was the number 2 in charge of water. We had a public meeting here in this town hall where the residents were shouting and screaming. My own opinion was very simple. The water simple is very much like a water system. If the cash stops you must fire me, and if the water stops. We had a big shouting match here. Like your blood flow, if your blood stops, there's a reason for it. Now you can't sit and say, 'this was dreadful, we had no money to fix it'. This thing had already happened (2006) and we had put money at them to try and fix it. That's why they already started to upgrade and then about 3-5 years later it happened again. Now I'm sorry, emergencies are emergencies. You should be able to predict. The akkerkloof dam wall was raised, now it's not a detention dam. If it's 40% full, you've got 40 days of water. We don't have the money for something else. I'm sorry its easy to say no money. This town doesn't have cash reserves, and governments not going to give you money.

(If you look at what got Knysna over the water crisis, it was the pump stations operating, and the glebe to akkerkloof channel that was revamped)

Which should have been regarded as ongoing maintenance actually. I think those were not addressed earlier Because when the water engineer left noone knew what the system was. That's my own personal view of it. And there's always been a standing joke that there's only one person who knew how the system worked and he left. there's an argument for institutional knowledge in a time like this. but that should only last for a year, and then the person taken over should know the system. So all in all don't think there's been enough management, training and succession planning in the dept. yes they complain about the money, that's fine. but whose going to pay for it, because the residents are not going to pay for it. We've kind o missed the big thing. There's an elephant in this room of what's been sucking up the money. That's housing, thats what sucked up. now you could say we didn't have any money or you could say we were building houses. now that's a political decision. if the politicians say as they did, 'we are going to build houses' that's what's happening. Housing operates at an R11-R12m deficit, that money you could argue should ahve gone into the infra. but that's a political argument. I'm on record of saying that housing must stop. but they've continues because
as soon as you stop the ANC jumps up and own. The mayors budget speech said we must cut back on housing, i wrote it. what has happened is we got R9m from province. so we fiscal dumped R9m on us. ITS NOT THE R9M THATS THE ISSUE. ITS THE ADDITIONAL R4-6M THAT WE HAVE TO PUT IN. WHATS HAPPENED IS THE top structure is effectively funded by the provincial grant, so all the other stuff i'm paying for. the sewage plant problem is because of the increase in volume. so thats the elephant in the room nd we all know it. every local authority in this country is going to go bankrupmt in the next 5, 10, 15, 20 years because of 1) the financial system in this country is totally unsustainable; 2) housing. the demands being placed, the hidden demands, the impact on the inra as a result of the increased housing goin on. government depts dont like when this argument gets brought up. unfortunately that takes a political decision to say we are goin to stop building houses. neither parties willing to say that. but the munis are not being supported. thats the issue. this local authority is already about R20m short on the equitable share. its a subsidy, i regard it as a revenue. because i'm short my tariffs are up. the head of pt, came for our budget meeting, he said the wc already gets more of the equitable share. my comment was that a lot of it goes to the bigger authorities. we are seen as efficient because of our recovery and our population numbers are grossly understated. So yes the techncial guys have got a point. but they've also got a reality check. they will come out with their estimates and I will say get real.

(then there was the crisis and this money made available through an emergency grant. We were discussing the source?)

I think, there are a bunch of reports on it which rodney should have because they all went to council. I think mig gave some money, local give gae some money, dwa, they all got bundled up. I don't care where it comes from

(I'm just trying to understand this seeming contradiction between a limited amount of money made available to munis and what appears to be just a flow of money at a point of a crisis)

trevor manuel used to discuss this beautifully. He used to say if you give us plans we'll give you the money. Ahh, they gazette amounts to local government each year,you have to look at the provincial and national budgets now. they have gazetted amounts to us. in our case, lets say R18m. we will spend that on whatever mig projects we've agreed with them. and i'll kick in another 20% plus. and it will be funded by various sources over the next couple of years, because each project will run and the next one comes through. its a revolving type thing. how they budget for it, its gazetted in the national budget,. they have a whole lot of unspent funds anyway on the provincial budgets of local gov and on the nat depts who dont spend all their money either. thats sits on the national budgets. which they can reallocate in the case of emergencies. there is a reserve kept on the budget for emergencies. then it just gets reallocated to the correct dept, either via prov or to the local dept itsef. when i was in ct 13 years ago, a tornado went through manneberg. the city declared a disaster area, province agreed, and national. it developed into a hige fight between province and national.the city had declared it a disaster because it give us access to money

(The reserve is allocated annually. What % what to the drought relief?)

I think to answer that you would have to go to the national account. But there is an appropriation amount for unforeseen expenditure. It could be utilised for a whole raft of things. But it would be recorded somewhere in the national accounts. Frans sabbet at pt, or conrad, ask them how this system works.
all I see is the national budget each year and there’s an unallocated amount each year. I have no idea how they will allocate that out. That’s why you have these disaster areas. National steps in, declares, money starts to flow in. its how they do their accounts. they will have unspent balances, specific allocations. We’re like washing machines, the money goes in, it gets revolved around and gets spat out at the other end, and its clean.

That’s how all governments work, ultimately the money is for who shouts the loudest and if there's a disaster somewhere, or they overspend. the prov gove in ec has overspent. where are they getting it from? national is giving it to them. its unallocated. thats why the whole nt team went into limpopo i think. because the minister of finance is realising we having to borrow far more than we used to. he has a gap in his budget. he doesn't say it. if the gov depts are goign to overspend his got a bigger problem. thats why the wc hasn't got any money at the moment. they haven't paid us. this was picked up by, i have a lady who handles all the gvt accounts for the schools, prisons etc. and they were supposed to pay monthly and on time. in our case its not a massive amount of money. but they're in arrears now for 2 months. its probably only R2m, but when she chases them up they're saying they dont have any more money because they've spent it all, and national is not giving them anymore.

I'm not really helping you, but you do need to speak to rodney again. Go to our website for our section 71 reports.

I'm fascinated with what you're going to produce. Because it’s a very interesting topic. The sedge one is a completely different issue to me because it was caused by the river not flowing for a period. And the reason I'm interested in that one is because i had said 'no this is not going to happen' [dam]. but to me, there should have been ways of doing it including raising the wall of the wier and the water would have been there. the issue with knysna and the complexity that exists its somethings thats happened with time, history. and maybe its just bad planning as to the town layout the fact that we are sitting in this national forest and you cant expand in various ways. its just an incredibly complicated design for a town. and the fact that its built on hills doesn't help much. so thre's method in that madness. the fact that our sewerage plant is situated on one of the top estuaries on the continent. whoever came up with that one! but thats 30 years ago. our should have been over the hills and far away. or done what ct does. adn you think the town fathers got this wrong and we're having to live with the consequences. a well known developer has already come out with a couple of ideas. but the engineers are not interested. they dont have an alternative. because of the whole ro thing. its goign to cost R27m or something.

(the original condition of the ro funding was that it would be waste water reclamation) ja …. I don’t know. When you put your hand up to fight it. 'no that’s where its going. We've spent this already, that’s the way we're going to go. And then you get the experts in. Fine there's a cost coming. Therefore I do it, fund it in such a way that i will get the money back.

That’s the problem I have to look at that. Whereas the engineers will look at it from their littl square. But that’s not how the finances operate.

(how are the decision made in connectign the ro to the wwtw) now you've back to the beginning. Because those decisions get made in a plan between the engineers and their technical consultants. It then, withut me seeing it, goes to mig and mig approve it. And all of a sudden its registered, 3 years later a plan appears, the projects ready and migs' gonna give them the money, and its presented as a fate accompli. and i'm going 'hold on a second, how mush is this going to cost?'. 'R40m but migs goign to pay for R32m of this. yeah ok, but its over a 4-5 year period. Thats how it works, and how the engineers have been working. but i'm trying to this so that mig
gets discussed 3-4 years in advance. because i cant plan properly. the neighbourhodd dev grant whihc is the big R100m economic dev monster coming. the engineers will want to plug into. i’m going to do a full scale forward plan and try to tie the engineers into that. i know that rhydon parry's already agitating for a dam on the knysna river. but now his got a much bigger dam sitting next to him on the sea. as soon as i get a hint of a dam coming on the table, i’m goign to want to see the alternativs. adn we've now organised, would you believe, that we re goign to meet with techncial services. which would never have happened in the past because they just refused to. they dont like people playing in their plans. the issue of mig is critical because its done and handled by the engineers and we dont see. and the 3 projects for example are kept as seperate projects, and the fundign gets secured for each and its only later that the jigsaw comes together. thats the problem. what should happen is mig, which was never run by nt, it was part of cogta or whatever, they link it to dwa. they weren't linked to nt either, they just get an allocation. its only now that nt are saying these things are not talking to each other. before you get anything at mig, talking to nat and prov about this, finance in the local authorities must sign off. Everything in this country works from nt. under trevor manuel nt h had the power to run the country on a finacnial basis. pravin gordan is the not the politician that trevor manuel was. its now being chipped way by power brokers. his not a power man in the Anc which Manuel was.
mig ‘s handling has now flowed from nt's demands now. Rbig is supposedly the replacement for mig. I'm not entirely certain. The problem is rbig is going to be on an even bigger scale and I don’t hink that’s going to work because local authorities work on projects. Rodney knows more

that’s not an emergency. That’s planning that’s required. When an emergency hits they don’t cost a lot of money because there are alternative solutions. First we had a desal plant which was a way over the top response to the emrgency. The ro plant I kind of think thats also over the top (how do you think these solutions got driven?) the desal one was a short sharp solution and I think everybody thought it was a good idea. And I think governemnt looked at it and also thought maybe it’s the way for the future. I think… it was a fashion statement in many respects. The RO I think it was a solution because somebody thought it was. I dont know. i suppose we going to be playing for this thing for the next 20 yrs. i think its a lack of holistic planning. Len Richardson will tell you he generates all teh money for the town. well he doesn't. reds were not put forward because nt realised they cant afford to transfer it from the national fiscus. it comes down to how you fund local government, forget what you spend on. how do you fund. and the engineers need to understand that

**Interview 65 on 10 July 2012 – Consultant**

I’m the md og cmb and we are an office in george and look at whole of the sc, also go into the ec, and partially into the wc. The projects we were involved in, firstly in the case of george we were involve din the emergency effluent pump scheme [talks about involvement in George 1:00min]. that was quite a large pumping scheme, i imagine it was about 500-600 kw of pumping capacity. the second scheme we were involved in was at Sedge, a small desal plant. There we only did the main supply at the beach. We basically did the main reticulation and the substation, in order of about 315kva.
In the case of Knysna we were involved in quite a few schemes, they extracted water from the lagoon with submersible pumps, in other words basically borehole pumps and that was sent to a semi-deal plant. That was larger then the sedge one. There we basically did the main supply as well, the substation, the main distribution. we didn't do any of the internal, SSi did that as a package. then we were involved in the Charlesford and the Eastford pumpstation. Unfortunately the guy who did all the electrics is on leave, Stephen Magersee, he can give you more technical details. But, we also did another pumpstation in George, extracting water from one of the rivers here, the Malgas pumpstation. that was also part of the emergency scheme that George built, the electrical substation there was 800kva and they needed about 550kva. there we did the main supply, substation, and all the internal work in the pumpstation.

Coming back to Knysna, our work there wasn't a major upgrade. Our involvement there was more a generator that they installed there. They installed a standby generator set. They use borehole pumps there, which is used in a funny way, because its not the normal borehole down a vertical shaft. its actually lying at a funny angle in the river. So its not submerged in the river. so its not like a normal borehole where it goes down the shaft. they actually use it in the river itself. And if I actually remember there are about 3 of them there. we helped, aurecon was the overall principal consultants there, and the same with eastford, basically there we just upgraded the electrical installations in the pump stations; because they had problems with the motor failing on a regular basis. But there weren't any major work done at Charlesford.

The reason they installed the generators was because in both Charlesford and Eastford, to the lesser extent Eastford, but Charlesford is very much on an Eskom rural line so the supply is not so firm there as it would be in town, and they have regular power outages and thats why its quite critical that they have the generator there as a standby, because Eskom supplies that pumpstation directly, whereas Eastford is supplied for the municipal network, Eastford is much closer to town. Charlesford is just outside Knysna toward George. Charlesford is on what we call a rural network which means the quality of the line isn't as good as in town.

But Charlesford to my mind wasn't really linked to the drought. You know the generator problem and the problem they had with the motors was historically a things that came a long time. Whereas Eastford was a new pumpstation. In other words the Eastford pumpstation followed the drought.

In Eastford I think its best if you speak to Aurecon. The work is actually handled by their CT office. But historically they were involved with Ch long before we became involved. Basically they had this problem with the motor failures and that's where I got involved because we are consultants for the muni for the knysna area. and they had continuous failure of the pumps; the pump motor, the electric side of the motor continually failed. they had severe problems with the motors themselves and the appointed us to assist Aurecon with measures to improve it and we did several things to improve the situation: we improved the earthing, we increased the size of the motors so that the loading on the motors was less, and various things on the controls and protection side to improve that. Thats how we got involved. But they've been planning extensions to Charlesford and we were involved in doing the preliminary planning and cost estimates. But they haven't gone ahead with it as yet. Charlesford is on hold at the moment.
If I may just quickly say, we are also involved in the telemetry side for all of these pumpstations. Its called a scada system and essentially there are certain parameters monitored at the pumpstations and through a radio network linked with the main control station at these pumpstations. thats another service that we provide. We did a very extensive report for them on their whole telemetry system in Knysna. we improved the telemetry to Charlesford as part of that.

(Documents tracing work involved in for Knysna - Charlesford, Eastford, Sedge & Knysna schemes)

I'll get somebody to fetch those files quickly, then you can look at these

Sedgefield was done done by SSI in Knysna, its best if you talk to KT about those 2 chunks. He was involved in both of them.

You see our involvement is purely the electrical side. The main functions was done by them. We were involved in george, knysna & plett, not MB. It was a much more complicated plant. Everything is standing still at the moment, its actually become a white elephant. My biggest concern is to maintain something like that. because when you mothball something like that and its near the coast, when you start pumping salt water its a different story to pumping freshwater. the organisms from the sea enter the pipes and grow very very quickly. They enter everywhere, its like cancer and start growing. that problem will only be there when you pumping the seawater. but because the plant is near the coast, its highly corrosive. So the biggest challenge is going to be to maintain this plant. you can't just close the door and walk away. and i dont think they thought about it when they did the design. about long term maintenance on this plant. Also the electrical demand, the have the capacity available is a lot money, which is the kva figure they are paying on a monthly basis. I think thats something the munis haven't thought about yet. they spent a lot of money gettign the plants there. I know the Sedge plant has been plagued with quite a lot of problems.So I think that is a thesis on its own, just to maintain that plant. waht do you need to do to maintain that plant. Its highly sophisticated equipment in a very corrosive atmosphere. Personally I think they are goign to have to put in a lot of measures to maintain that plant. Are they goign to run it on a regular basis to make sure its still working. there's a lot of mechanical equipment that have to keep turning. If you leave it standing the mechanical equipment would seize

My question was why not spend a lot more money on subsisding tanks at peoples houses. But I think the muni was scared that when the drought was over people would still use those tanks. So that's a lot of income that the muni will lose.

I think there was a lot of panic at the time, some of the clever people said that it was an overreaction. The drought was longer than they planned, but some say that they overreacted. If they'd waited another 1-2 monhts, they would have made it. Which is what happened. You've got to play vey careful in terms of your reserve capacity and your growth.It was a bit of a kneejerk. but i think if people are honest with you i dont think those things were ver really used. they always seemed to have problems, and now the drought problem has gone away. And the cost of electricity per kl is immense. its about 4-5times the cost of normal filtration. So nobody's going to run that plant now if they've got enough water.
At the moment it's not worth it and there they've got massive desalination and you can only judge it by the size and number of power lines going to the desal. But there they've got no choice and it's super efficient because they've got to use it 24 hours a day. The problem with the plants purchased here is that it's very expensive and they have a choice. I think they might never need it. You see people have got to justify their expenditure and you've got to read between the lines. I believe at the time they were in a very difficult situation and the decision was the right one at the time. It's always easy to be clever after the time and say if you waited 6 months it would have been ok. And if it had continued those officials would have been in terrible trouble with the councillors. Most of the funding also came from NT so it wasn't like the ratepayers money that they were spending. Because if that was the case I think people would have been up in arms with the plant standing there and doing nothing. Now the country carries the cost, not the individual entity, but I think there are alternatives. Like I said pumping schemes and raising dam walls. I think George has done good work in terms of long term planning. We've been involved with quite a few of new developments and what we've been saying is you have to be more efficient, and look at penalty schemes. Chris Muller and Associates developed the whole thesens island. They've been involved with innovative energy saving, because you can't just pass it on to the authority. What we are saying is you should start with basics because it will cost the authority nothing, it's just legislation they have to pass. So they say to developers that's something you have to do, it becomes a part of the agreement.

In our profession, obviously the more work we get the better for us. So it's not in our interest to advocate better water management. So I don't think the consultants are going to push water management more than augmentation. Because augmentation means jobs, whereas management is not something that's going to generate much work for us. Also from the muni's side they want to sell KL. So you have a bit of a catch 22. But I believe a lot more emphasis needs to be placed on water management because it costs a lot less.

Charlesford is an Eskom grid. You see what happened at one stage, not really relevant to Charlesford. In addition to the drought the other issue was that Eskom had a supply capacity problem, which became more significant after the drought. Because you had such large developments in the area, their network became overloaded. But what happened was Eskom contained the munis, saying you can only have so much capacity. In Charlesford it wasn't a problem as they had a direct supply from Eskom. It was relevant in the case of Sedge and Eastford. And Mr. Richardson was quite tight in making capacity available to each of those plants. And council become quite strong. He had a major problem, due to limitations from Eskom. Also the plant in Knysna, there we also had a major problem in making capacity available. He was already on top of the allocation given to the muni. So we had to say to him that we will try to run the pump stations outside peak periods. The peak periods are in the morning, say between 7am-9am and in the afternoon from about 5pm-8pm. So what we said as a mitigating measure that we go to run this plant outside peak. The supply capacity problem refers to kVA.
The difference between Kva and KWh. If you a simple circuit, a resistor circuit, you can compare with a dam. The circuit will draw current, I; and that's amps. And the voltage is V. I is the same as the flow of water, and V is like the pressure. AO CURRENT (I) IS THE FLOW; AND VOLTAGE IS THE PRESSURE. That's the parallel between water and electricity. Capacity is expressed in kwh or kVa. Now if you've got a load here, the size of the load will determine the current flow. That's called a resistance, the switch is the same as the tap. There's an exact parallel between water and electricity. The load will determine the current that flows. Voltage * amps = KVA. That's the capacity you need, the same as litres. The difference between Kva and Kw is kW = Kva * power factor. Now when you've got a resistive load, the current and voltage is exactly in line with each other, but if you've got an inductive or capacitive, there's a phase shift, between the current and voltage. The characteristics of the load makes the 2 phase wise apart, because this is Alternating current here. So if resistive exactly in line, but an inductive load makes the current lag behind the voltage. The current in AC goes in a 50 times a second cycle, on and off, pos, neg. If its an inductive load, when the current goes positive it generates a magnetic field that makes the current lag behind the voltage, and that lag is expressed as a power factor. That's why we distinguish between a Kw and a Kva. Kw is the real power and Kva is the apparent power. Stations are talked about in Kva as that talks about the capacity, the same as a dam, it tells you the size of the transformer, that is the capacity.

The capacity needed for running a plant is established by working out a schedule, adding up all motors, lights, but often there's diversity for example only one motor runs at a time. By looking at the power factor we convert that to Kva. Because as far as electricity is concerned it only sees Kva. As its only interested in the current flow, not whether its lagging behind the voltage or not. So an electrical device is expressed in Kva.

To come back to your question there was a restriction in terms of the capacity so we had to find ways of making that capacity available and it was quite a challenge. So we had to convince Mr. Richardson that we would run the plant outside of peak hour consumption. If you look at a 24 cycle of that kva consumption, you've got a peak in the morning and evening. Your system only sees that peak, so your conductors have to be sized for that peak, same as your water pipes. So what we had to convince Mr. Richardson is that we're going to run it during the dip hour as best as we can so that we don't push his peak up. That's why it's better to run in off peak, because you don't push up the peak, also they offer different tariffs, if you're on a time of use tariff. So its nb to run off peak because 1) you not going to exceed your flow demand(?) and 2) your kwh cost is a lot less. So with all the pumping schemes and desal it's better to run off peak. Because if we were running that plant during peak hours he would need to increase his whole supply network just for that short period. Eskom gives you a little chart on off peak. There's an incentive to do that. That's what we had to do to mitigate the supply challenge.

[Look at documents for the different schemes CMB was involved in] If you look at charlesfor, here's correspondence december. You see this for example was a letter to Len Richardson 8 december 2010. [ ]

You really need to talk to the civil people, they were the principal agents. Other correspondence comes from them.

costing, issues, proposed response, to trace the timeframe

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officially I was the environmental coordinator. The title changed a few times. At the

time fo the drought I was the only one in the office, so I acted in various roles, though

not officially. I was still the ec but alone. At the time of the drought I took on sort of a

supervisor role tot he plan in process and all of the emergencny response plans that went

in. because obviously we had an environmental consultant that was linked to each of the

projects. So from a legislative point of view thye handles all of the requirements from

that side. But I was there as an advisor to the muni as to whether we should go

according to the recommendations of the consultants, or whihc consultants we should

get in, or obviously to ask questions of the consultants. thats an overview. I also

reviewed a lot of the projects, particularly with the physical work going on.

Quite a few of the projects, lets say specifically with the boreholes, didn't require any

kind of environmental authorisa

 tion. So we could continue with that as an emergency

response and still not hand in an s24g application. which is an application following

commencement of an activity. so its following basically commencement of an illegal

activity. whihc is what we did with the desal and ro. we commenced with those

activities, planning them, putting down the foundation, means that we started with the

activity. So we theoretically would ahve to have authorisation. but because we didn't

we go to whats called an s24g application. so those projects from the beginning I was

the sole one responsible for ensuring we become compliant by appointing a consultant

to begin with the s24g process and once the consultants came on board I was merely

supervisory and wasn't actively involved. i was involved in meetings, but further than

that, thats what a consultant is for. But with the borehoels whihc didn't trigger any

activities, there I supervised through the works, thorugh the meetings, to make sure that

we were happy from our environmental perspective.

Minutes of meetings should either be in the old office - soft or hard copy - or they don’t

exist anymore. The minutes that for example Rhoy gave you would be, there were no

separate meetings between the consultants and myself. I just represented the

environemntal side of the muni. Because those decisions regarding who to appoint,

appointment were made by technical services. I was mainly there to provide advice and

support

(How was the decision taken to go the route of section 24g?)

The nature of th problem, it was severe. So things like the boreholes, its always an

option. So when we had the drought we started drilling and it didn't require a s24g. And

then muni was forced to look for alternatives and because we got or knew would be

getting drought relief, because it was declared a disaster area we got financial relief

from the province. So the muni had to think very quickly, because you have to soend

that money very quickly, what can we do to supply water for Sedge & KNysna, that we
can do now and thats not traditional; because we dont have off or on catchment storage.
so the desal and RO came into perspective. Because as well, the process from an

engineering perspective, its a long process to esign, consult. so they had to to start

immediately to ensure they could finish it in time and before that disaster relief didn't
exist anymore. because there's obviously a time limit wihtin which you get that relief.

So a decision was made; we either delay the process by a year or 2, depending on public

part process goes, to get it preauthorised from environmental affairs OR we start now

and run an s24g process concurrently. So the decision was made to take a risk to get a

fine. so we knew what we were getting into. But we knew we could run it concurrently,

commence with the plant and the s24g application. But we had to take the risk of, we
could get fined, or in an extreme case we could be told to greak the whole thing down
(was the muni advised on this route?)
I don’t think that any consultant advised the muni to do it. I think in approaching any consultant the muni said 'in their legal opinion, would we be able to run the s24g process at the same time as starting the development and they all, in communication with DEADP and DEA understood. What ou must also understand is that right at the beginning, the moment we had a drought, I do not remember, it was some exploratory boreholes right along the lagoon and those would have triggered a listed activity, and that was communicated with DEA national, with Fatima. And her response was that they understand it was emergency and we must understand that you are going to undertake an s24g process, but they are aware of an emergency and urgency. So from the beginning, I think it was 2 boreholes alongside the lagoon, was communicated with DEA, so there was an open communication from the start. Nothing was decided on the sly in a late night meeting. We had an emergency, we got the money, we had to think of an alternative, you we didn't have water in the rivers. We put consulting engineers how fast can we get something up and running fast, because we didn't know how long the drought was going to last. So we needed to get something up quickly, that DEA was aware of. As soon as the muni made the commitment to go with certain projects, they got quotations and consultants were appointed. And those consultants further communicated with DEA that they would notify them of the intent to commence with the s24g application process. so DEA were aware that there were actually illegal activities being undertaken due to an emergency.
(The first time that the s24g was mentioned was with these 2 boreholes that triggered a listed activity [yes], ok and from there there was an awareness and a constant communication

the communication was national because the knysna lakes area goes straight to national, the deciding authority is national. Its just been delineated in that way. I was very uninvolved in sedge, the desal plant. I think Rodney might have told you, they had capeeaaprac on board from very early on so the process, by the time i was alone and involved in the drought, they were running with that. I think it might have been DEA, but you must just check the rod

(Your own role and responsibilities?)
With it being an emergency and a lot of decision being made, there wasn't a lot of time for calculated risk. There were no major issues, we had no major env disasters. But in a normal process, where you have 2 years of engineering planning, there's a lot more calculation that goes into it. so risk is greatly reduced because you have done all the research before. here we were going forth with very little research and trying to figure out the solution of the problem as we went along. so there were a few problems that arose that might not have been there had we gone the other way. but its unfortunately the nature of the situation. so for example with the boreholes, not the ones on the lagoon then linked to the RO. we had boreholes on the gouna river and boreholes up in sedge. but the ones that gave us problems were the ones we drilled at the gouna river, because we drilled into an artesian well. so we had iron rich water that was deoxegenated that was with pressure flown to the surface and being oxidised adn the iron oxidised and we got a precipitate. if this was flowing into a calm section of the river we got this layer forming, looked like rust on the floor, just coated everything. then we had to find a solution, cap all the boreholes. they didn't know it was an artesian well at the time. also at the akkerkloof we had a similar problem and they had to be capped. Whther we were able to test to see whether it was artesian before drilling i'm not sure, but those were there were a number of issues while all of a sudden we had to deal with very quickly. the muni or engineering consultant had undertook an activity and we had to think of a
solution as moving along.

I've been the consultnat either submitting the s24g or an eia so I'm not sure how the processes from submission differ. But from an officials perspective, is that there's a lot more attention paid by the dept to the s24g. Because the activites were happenign as we were doing the s24g, we had a lot of official visits. so dea were very involved, dwa were on site regularly. because thye were both monitoring the process as were doing the s24g, with an eia its more commenting and review process. here they were commenting and reviewing but also want to keep on top of activities. because you dont want to be in a situation where they say we not goin to approve the applciaiton we must decommission the whole plant. They understood the situation adn didn't want to end up with a situation that was ... or there could ahve been. dont take it that they were trying to help us. but they knew the situation, so they wanted to be involved so that they didn't give us a negative rod because of a lack of information. so things were added and taken away from the s24g along the way.

A s24g, it’s the same ppp. From those involved in the ppp, a lot of them were angered or frustrated with having to be involved in a s24g applciaion. Because they don’t agree we should be commencing with an activity before applciaion. So they didn't understand why we didn't just stop any engineerig activity, finish with the process and commencee (Munis explanation for going ahead) We had a crsiis, we didn't have any water. I mean we were trucking water in and using what little Knysna had. I mean we have agricultural land that need the water we get from the river. And for eg on the karatara there wasn't enough for the muni and so there wasn't enoguh for the farmers, there's a knock on. we have a huge muni area thats affected by this. it wasn't purely about no water for people to drink, it wa there wasn't water for people to make a living. We were in an emergency, we had to do something. We didn't have enough water. We don’t have ontream, offstream dams. We didn't have an off catchment or on ctachment storage dam. Sedge ahs no storage capacity. In knysna we have the akkerkloof and glebe but their capacity is minimal. with the supplies of knysna and demand for water, it wasn't enough. you know it can only store enough fro 30 days and wasn't being replenished by pumping from the knysna river. so with limited water sources that were already stressed. the muni was looking at this or no water. it was just very bad and there was a lot of pressure onw aht the muni was goign to do. Because you know when we had the major growth in the muni area, the muni had plans to do an off stream catchment dam in the karatara, and I think there was one for Hoogekraal, I cant remember. And ther's been a plan for a long time to build a dam on the KNysna river. adn there was alot of pressure on the muni, that you've allowed the town to grow but none of your plans for long term storage have materialised. THe point is there wasn't an alternative made and stil the towns were allowed to grow. So it was almost a catch 22 situation. we haven't provided, there is nothing to provide, what are we goign to do. (And that influeneced the pace at which you had to act) definitely (You spoke about pressure on the muni, what were the main sources?)
I think … there was a lot of pressure from other spheres of gov because of the fact that we, particularly with regards to sedge. Sedge started trucking water in because they had let it get that bad. They hadn't put enough warning in place prior to having to truck, running out of water. so there was a lot of pressure from spheres of gov saying this isn't the way you manage your water resources and this isn't the way you manage your town. you know there was a lot of pressure that was ill amanagement so the muni had to do something to better there previous .. er mistakes. Also pressure from the town. the people that pay their rates and taxes want water. so there was a lot of pressure from the ratepayers to provide a solution

At the beginnign of the drought, it was officially declared at the end of 2008 or 2009. (??) So there was someone with me, the manager, he left tht decemebr. There was a drought declared, it was my responsibility to do the initial public awareness campaign to say we've been declared a water scarce area and boards showing usage and targetes. and from jan i was alone and our role became purely supervisory to the dept of technical services and the public awareness campaign went over to another dept.

(Has it always operating in a way that the eia is run by consultants)

yes. The dept has always been evry small. Prior to me there was one person alone for about 3 years. It was initially part of town planning and the function was to review building pplans, dev application and provide comments to eias within the area. Its only in the last 2 years that the dept has grown. previously the dept was very small and the role was limited to what one person could do

What I can reiterate is that the muni played open cards with the dea from the beginning and sanparks came in quite soon. My first involvement with sanparks was from jan 2009. it was very much a part process. We had the kcmf and the wlcmf and there we hd land owner, farming representeratives, ratepayers, sanparks, water affairs representatives. and there the theme of the meetings for the entire length of the drougth was what is the muni dodin, restrictions, there was a lot of consultaion throughout the drought. Nothing was hidden from anyone. So the moment we realised we area in an emergency and dont have a choice but to do something, it was communicated with dea, it was communicated with sanparks, and they were involved from the start. there are no secrets about the drought, it was very public thing.

**Interview 67 on 17 July 2012 – Consultant**

(From what you've shown me there's civil cost which is R15m and a bit and the mechanical R12m and a bit, so that comes to maximum R28m for the wtw. And in the discussions I've had with certain muni officials in explaining the shelving of the dam when taken to council they said the figure had jumped to more than R100m)

No, not with the water treatment works. That was the final figure, nased on tenders. So what happened was when it started as an estimate in may 2003, it started fom R4-6m it went to R27m. Just remember some doesn't include vat, and over the period of 4-5 years. but that had nothing to do with the R100m. [looking thorugh files]. - At that stage the estimate was about R33m, thats the abstraction works - pumps, swartriver dam and (R13 and R20m) {?} ... firstly 2005/2006 was the treatment works, civil works that sort of thing. that was R13m in 2006 and that went to R27m. Secondly, the next one which is the dam 2007/2008 400000cubic meter, had a R20m price tag to it and i can show you where that went to [you can look through the files for the changes] Now keep in mind,keep in mind that there were various feedbacks and report backs as we became aware of the rising costs. and we were asked to go on tender, asked to draw up the tender docs and got them in and the prices came in, and we updated as we went along.
so please don't think for 1 minute that the client thought that it was that and then we came with a figure of R27m or whatever it was without informing, there was a whole period of informing as went along. its all in these files

(so by the time this was taken to council, there's been communication between aurecon and the muni?)

yes. [shows a document] I don’t know exactly what you want to bring out. I hope you're not trying to bring out that we were negligent and we didn't inform the client properly or something like that

(No, I'm trying to make sense of it. Because I've been given a number of sort of contradictory accounts of what happened in responding to the water needs of sedge prior to the drought. And from what I understand there was one major project proposal and that was the building of the dam in sedge in order to increase the water supply to the town. And so far what i’ve been told is that proposal was taken to council and was turned down because the cost had increased to R110m when all the different components of the project were put together. and the project was rejected and soon after that the drought hit and the muni was left sort of caught by the circumstances at the time. I'm just tryign to understand from differetn point of view)

Alright as I said to you our estimate of the civil construction costs, in 2007 is R12.5m, the gross if you add 14% vat and 10% contingencies you get to R15...m[7:00m. Reading doc]. Now remember, in september 2007 we have not asked for tenders yet. [] 19th of october, so beginning september we said to them the civil works is going to cost them R15 675 000. Remember one of the reasons why the cost went up is because the wtw was mean to be built on the top of the cloud 9 hill. you’ll see there's a powerline going up to the existing reservoir. they wanted the wtw to be an architecturally designed building so thats a key reason how R7m becomes R15m. So from a visual point of view we had to make it more acceptable. those are things i rememebr that piled on the price. so in september 2007 we told them about the cost increase in the civil. we started making noises about the cost increase, it also took forever to get to the tome when we were instructed to do design. then we did the design and asked to make it more appealing. then the mechanical had to be added on there. so it was goign to be way more. Also Steel went up by 40%, mechanicals went through the roof, amjor price hikes. so in september we asked if we should continue and ask for tenders, or call the job off. and we were told to go ahead. So I was quite pleased when we came within 2% of the estimate I gave my client (the muni). Although what RNay does now is he goes back to 2003 and 2006 and the prices we gave then. I say thats unfair because we informed them of the price in 2007 before calling for tenders. they were not caught unaware.R15m for civils and add on top of that the mechanicals,just the wtw. The wtw was an integral part of the whole water supply system. thats what i said first 2006/2007 financial year then 2007/2008 [??]. because the existing wtw is lying in the floodplain of the ruigtevlei. the moment you get a major flood the wtw are flooded. the water supply pipeline is running through the ruigtevlei. that whole thing gets flooded. we said that the position of the wtw is suspect, its been there for 50 years, its been upgraded so many times. also remember a major amount of that money was granted to them as flood relief money. that would not have been the sole cost of the ratepayer, the R27m. but the decision was taken they would not build a white elephant. because if they dont have enough rainfall whats the point of having the relocated wtw. So we said that was another ballgame. lets look at an offchannel storage dam. and that is where that comes from. and the price of that thing. the woner didn't want to come to the party. he wanted
milli for his little piece of ground. and eventually it would have been an
expropriation where he would ahve been paid a fair amount. but alright, i dont know, i
cant remember the total cost. we'll look now. but remember, from the dam there would
also be a major outfall pipeline that would take the water tot he wtw. and would have
happened as we converted the existing wtw into a pumpstation that would have pumped
the raw water to cloud 9. so there was still some other infrastructure in the 2006 report.
but the cost of the original report was too low. we compared about 13 different options
to supply sedge. [i roger parsons can provide you with the borehole report he brought
out linked to this report. [15min - on the borehole report and its unreliability at the
time]. Some of those boreholes we drilled right next to the reservoir on cloud 9. the
sand was too fine and eventually the boreholes just collapsed. so its a dicy thing []. even
roger parsons was surprised then by the poor yields. Also remember at that stage we
were not allowed on the beach. the desal was unacceptable because the environmental
just shut us out. they just shouted us down. we thought about going on the beach,
getting the water out with a spike and treatign with a desal plant. the problem still with
that is the price of electricity.
(Do you have any price comparisons?)
yes, they are in that first document. Remember its uRV values, its old, its from 2003. it
gives you a comparison between the different schemes. Now keep in mind that if you
make a calculation error you've got a problem with your Urv. The Roger Parsons report
was done in 2004.
(the other question I had was, given the situation sedge faced at end of 2008, as I
understand it the water come from the swartvlei increased the salinity of the water.
Could anything be done in terms of forward planning to avoid the salinity?)
I just think the 2009 drought was very severe. Its one fo the estuaries that runs into
swartvlei which is saline. And as you've seen they talk water out of a bit of a reservoir.
And during spring tide you get contamination. And what they used to do in the passed is
put sandbags there to control that. but the river stops completely and you'll see in that
report that in 2003 we say even a 1 in 10 year drought would mean you'll have about a
60 day period where you'll need a water reserve. you'll see that their was an estimate of
the sedge water use, therefore they talk of a dam of 400 000 cubic meters to give you a
60 day period. So you have an off channel dam, what you do is pump the water into this
dam. when the drought comes you'll have 60 days within whihc you can wait for the
rain to come again. thats for an acceptqble 1 in 50 year drought. it gives you a 98%
surity of water supply to the town. the way you cover the other 2% is water restrictions.
I'm talking normal consumption, 1 in 50 year drought. and they used to cover it and
make it, with the river running and filling this sump out of which they pumped. what
they've done is, there's a lowe level bridge that runs over that section, they put planks so
that the high tide couldn't get into the sump. that was done by SSI.
(They are prospeosing building a wier now, I wonder why that wasn't done earlier)
Because I constructed a wier for rheenendaal. That took me about 3-4 years to get
approval. So if you want to put up a wier at the ruigteveli you are looking at 6-7 years
of environemtnal studies. We were never asked to look at a wier. Because at that stage
we would ahve used the off channel storage dam, with a pipe directly to the pumps at
ruiyteveli. so you would make use of that river when it was running. but when saline
use the ruigteveli pump.
rememehr at that stage we were part of Ninham Shand. Keep in mind the report was
done by the guys in PE and CT. So I was basically the emesenger taking the flack.
Nperring was very annoyed with me. But I felt it was a bit unfair.
He blamed me for the cost increase and I didn't do the cost estimates. I accept that we did a poor estimate. But because of various reasons. There was just an enormous increase in cost during that time and we underestimated the escalation. Until we finally got to a stage when I said I'm going to base it on actual... remember with those reports you don't do the actual design, its estimates, you look at drawings. Eventually we underestimated. We had a meeting with the client explaining the reasons for the underestimation. But the real thing is the tender price at which point we asked if we should go for the tender, without asking for fees. But if we said that is the price now, and then we are told go ahead. Then I expect to be paid based on my latest estimate. If we were told not to go on then we would call it quits.

The whole project was just like crazy in terms of the price increases. It's a very difficult area to work. Also the wtw which we were to build on cloud 9, access to that area is difficult. But the only thing I can say is that... the pity is that we took the client into a scheme which we thought would be a certain cost but it wasn't. But before we accrued cost from our side, for which we expected payment, we rescheduled the whole thing and realised it was going to be much more for various reasons. I just want to look at the dam price [looks in files]

We can basically add it all up. All the figures I'm giving you is with VAT and the escalation and contingency included. 1) R27m for the wtw - civil plus mechanical; 2) then we had the rerouting of the water rising main. Do you know what I'm talking about that is from ruigtevlei to the new wtw, that is R7.884m; 3) here in January 2008 we had R8.7m for the dam, but that was just and estimate; 4) then the civils for the pumpstation at Hooge Kraal is R2.2m; 5) the mechanicals for the pumpstation was R5m, actually it was R7.9m in total for the Hooge Kraal civil plus mechanical (4+5); 6) then... 7th December 2008, I just want to check something quickly. .......

The R110m that was given to you do you have any substantiation for that? (it was just a figure that I've heard a few times. Who told you that?)

Because you don't know or because you don't want to? Did Rnay tell you? But its my client I must know

(I can tell you that it was within the muni that the figure was given and that I was told that all the components, as you've listed them now, were combined, the cost that emerged was around R110m and because of that figure the project as a whole the project as a whole was sheleveled. Why is this because I haven't heard any evidence for it. Its just a figure I've been given)

Now you see the position you are putting me in here. I'm sorry I'm not going to waste my time anymore [closes the file]. You're putting me in a position where I've got to now to look and find where the cost is. As you can see the size of these files. They are quite enormous. And I come up with a figure that says R80m because it happened 4 years ago. I can't remember what cost estimates was sent through. I can't remember if we were asked to make a summary for all the costs. So the point is I don't want to be caught in the middle where I say the cost according to me is R60m and they say no bshit, we have a letter here. I hope you understand I don't want to be in a position where I contradict my client. I've already had enough hardship in terms of that whole story. If the client says its R110m then it is. I'm not going to try and... that whole sedge waga hurt me and my company enough and it took me years to repair the damage and I'm glad its behind me. So whatever they say I'm not going to dispute. There's nothing for me to be won to challenge what they say. Its a sad part of my engineering career and I'm just glad to say its behind me. And it took me years to convince Rnay and RPatty that I can actually do
estimates. So I hope you understand I'm in a difficult situation. There's no use in me going through this and bringing back old memories. I'm not sure we were ever asked to give them a final sheet. They obviously added up things that we gave to them as we did estimates. The whole story stopped in July 2008 when they gave me an instruction and said that the council is not going to proceed anymore with a bulk water supply for sedge. and the severe drought followed and sedge was out of water. so that's where the story stopped. and GE was very upset with me personally because the muni had to pay i think about R1.5m to the civil contractor that supplied the R15m civils for the wtw. and I was instructed to appoint him. The costs were running away, you aware of this, you still take 8-9 months, then tell me to appoint the contractor. so in September 2007 I told them what the cost of the wtw would be, in January 2008 they tell me to appoint the contractor but not to give him the site, in July 2008 they cancel all bulk water supply. the contractor comes with a claim of R1.5m and they are upset with me. I found myself being blamed firstly for a cost estimate I didn't do. but I accept that because I took those reports to the client. I tied to contain the damage by giving updates. but the final estimate kept shifting. it came down to what I thought was a sorry state. why tell me to appoint a contractor. If you talk to GE he'll tell you I'm responsible. but that's unfortunately not what I was. I react to instructions I get from my client. I still have the email that says proceed. and that cost them R1.5m which they got nothing for, not a cent. because the contractor just turned around and claimed. he proved his direct costs for machines and people and was very lenient. I think he claimed about 2 months. he could have claimed much longer. the tender closed 19th October 2008. now you can imagine, the tender had a validity of 90 days. 19th Jan the tender would have lapsed. they could have lost it lapsed but instead we were asked to increase the validity time. then repeatedly. until he was eventually appointed. Then he was asked to wait till 18th July, but his got a valid contract in his hand, then they said no we cancelling everything. you see I couldn't understand why these things, normally what happens is, I'm not the type of engineer to say I'm out of plans. Lots of things could have been done. But that file stops on 18th July. I actually said to my office head that there's a break of communication between me and the client. And as a consultant I cannot advise if there's a breakdown. I was blamed for the price increase, even though I was just the messenger. [interruption]

So what I found strange in the whole thing is it was unfair. I'm blamed for something for which I'm not responsible and there's a total we're out of here. we've got no interest in sedge whatsoever. But they had something like R14m from flood relief. I said for heaven's sake use the R14m. the wtw at the bottom is a DUMP. If you know anything about wtw. they then spent money to make it flood proof. but if you can't get to work how are you going to operate it during a flood. but be that as it may I felt it was handled wrong in that, where I tried to give input. We'd sorted the thing about the costs out, I've had my cane stripes can we move on. I'm saying there's a lot of circumstances that can contribute to that thing being dead in the water. lots look for other options. remember the flood relief money was given specifically for the relocation of the wtw. (Are you saying they could have used that money and moved the wtw pre-drought?) Yes, (it wasn't done) because of an attitude that we lead them up the garden path and embarrassed them with their councillors. But remember it was dragged out for 4-5 years. Of course prices increase.

I said you've got R14m, lets apply it. Remember in 2008 the environmental guys were not friendly, even toward the boreholes. We also looked at the beach. 2008 there was no drought but there was a complete, the decision was taken. Have you seen the letter that stopped the whole thing? [searches for it]. 'we regret to inform you that the Knysna
council decided in a meeting held on July to cancel all the sedge wtw projects’. we got that letter in august 2008. … [searches through files]. You see, ‘we hereby confirm our tender will be valid until 8th september 2008’, so in july I was still extending tenders. Now for almost 7 months we were extending validities. Then we got the final letter. (why do you think the process was dragged out, you talk about 2003 -2008) …. Things happened. We did work immediately, to sink some boreholes, 5-6, which gave us some leeway to work with and boost the supply to get the rest going. And it just takes a long tiem to tget a project of that magnitude going. [looking in files] (Had it been considered to do the scheme components over time?) yes, you'll that in there. We said, the problem they've always had with sedge. When there's a droguth they have problems, and with a flood. Both have the same effect. Point being in the one you have now water to pump, its saline. And with a flood the wtw is flooded. so we said the whole thing is too susceptible to rain. so we said that the archilles heal is the wtw, we ahve to have it relocated. thats where the whole flood relief thing came in. we helped them to apply. he put in an application and got R8m, the I think it was R14m. we said move the wtw, atleast its out of the floodplain. npw what we can do is either pump from one or tow sources, put up a dam and the rest can follow. Neils argument was a solid one, 'what are we going to do with a white elephant if there's no water”? But the counter argument was that you have R14m to out up infra. Its not a white elephant. Its atleast sayign that a storm or flood wont damage us anymore. also you know the environemntal issues had a major role to play in the cost of the whole thing. When the report was written the thinkgin at that stage was that we can get water out of the river. But sometimes during low flow periods the water gets saline. so we had to move 100m upstream. increasing the associated costs. but the point is that the whole environemntal thing - remember we started with those immediately, but couldn't construct anything as we were still going through the environментals. Theneverything got stopped. we were moving toward the environemntals. we were trying to secure the area which we realised had to be expropriated. you see here, discussion 30th June 2008; ‘the fact that the project had increased from approximately R35m to the present R93m. we had not timeously communciated to him, during the meeting NPerring’ you know maybe you should look through these things. I'm just trying to give you the other side to this whole thing. Now here it is R35m to R93m. Now remember R35m is a figure that comes from way back when. I said well if you double the R35m you're at R70m. Its not sofar far from R93m, I know its still a distance to R93m but better than comparing R35m to R110m. thats not the truth. Its a meeting between allan shelley, Mike Luger, kevin handley, ashwin west, Hanes Kirtszinger; meeting with NP. 'Hanes K reported that np had recently written a very critical letter to NSHand in which he interalia stated that we had provided the KM with poor advice'. I think you'll have to take the time and battle through this. I cna tell you in broad terms what happened. A lot could ahve been done. I was terribly disappointed. I can jsut tell you the gossip bit. I was told to award the tender and I wrote the letter of acceptance to the contractor. that was done in jan 2008. in july 2008 they cancelled. Why take 7 months, when the rpices were available since september 2007. why take that long to put that to council? To ask what else can we do, we need a contingency problem. In jan i was told to award the contract but not the site. I asked if they were sure. Our fee is based on the actual amount, it’s a %.
They had R14m, the wtw life is expired. It was never intended to supply 6000 cubic meters. So it didn’t make sense to me to not go ahead with it. Atleast move out of the floodplain. 31st july council decide no more. Eventually they turned around and said they are not goign to pay the contractor, i mislead them. I called the lawyer and said have you seen the letter I have from my client. i faxed him the letter i had instructing me. he didn't know that the letter existed, which told me exactly what to do. From december 2007 to july 2008 council decides no wtw. From july 2008 to dec 2008, the contractor gets paid. now we get to 2009. I said there are things you can do. its an underestimate, the job has stopped. I dont know where they got the R1.5m, because it can’t be taken from droguht relief. I told them they would get the wtw for R13m (R27m - R14m flood relief). I asked what the ratepayers will say when they realise that he squandered R14m.

I don't know if there's anything in these files about 2009. you look at the drawings you'll understand all the different components of the scheme.

I stood in the hall in sedge, with no water in sedge. I was listening to the councillor. I wanted to hear what they would say to the people. I had the letters with me. Nobody asked why council took a decision on 31st july to stop all. Nobody referred to it. then it was 'we've got to stand together and save water'. then it went to ssi, they were seen as the big saviour. you knwo the rest. they went and got all approvals to put spikes on the beach, when they could ahve put them right next to the plant. which is what they are doing now. and between you adn me, they are taking freshwater out of the ground and they putting it through a desal plant and calling it dealination. because in that parsons report you can see that we looked at boreholes in those areas. the water is 400m below the ground. there's freshwater below that parking, close to where we examined. be that as it may, i'm just disappointed that there was a lot of time wasted and you ahd the whole of 2007 and 2008 to do something. but because of an unfortunate cost estimate, and almosta breakdown in communication, and a lot of blaming.

(I've heard the desal represented many times as essential. I was wondering your view) I don’t want to say it and it sounds like I'm sore. But what I can tell you is that desal [looks in files]. As you can see option 7 was the desal plant. In this doc you can see there's a lot of different options, varying with desal being R5.53. I don’t think at that stage there was an alternative. but what i'm weary about is that compred to R3 you looking at amost R6 in 2003, and what i hate is that they take desal and tell you its a cheap option. I would still say, i would rather have said because of the water situation, i would ahve sunk a lot of boreholes. You know what it looks like, draws a picture from cloud 9 to the sea. remember the reservoir is on cloud 9. [] thats why i say to you that the myoli cluster, there were 4 exploration boreholes, we got freshwater there. I would have suggested a well field and forget the desal. I was in a meeting, prior to when i met you, and they said they goign to put well points in the parking lot. and i thought thats freshwater. so there's always alternatives. I always feel surface water, gwater second, then desal. if you look at the record of desal. i would liek to know how much knysna's plant has produced, adn in sedge. I think very little. they have problems. the one in plett has been stopped because they were drawing down the estuary. the one that treats treated effluent has had so much problems because they couldn't handle algae. the first thing you learn is about algae blooms! That one was on and off. the one in MB I dont even want to talk about. we were told it was an emergency job. but 6 months down the line they hadn't started. that plant was a year late. the need had come and gone. luckily MB never depended on it. it was meant to be operational dece 2010, i dont think it was operational a year later. the cost of electricity is killing it, and anything that is a bit foreign. i think the best that they've produced is 1/3rd of capacity in george. So SSI will say the cost is R3-R5 per cubic meter (?) they say they base it on the production of the
plant. so then the price is actually R15! Because you should take your running cost and divide it by your actual production so if you running 1/3rd, the price should be 3 times. maybe it is an oversimplification. but also what about the capital cost. DWA gave MB R200m. Rashied Khan, [1:40 commentary on Rk and KM state of affairs]. You cannot expect the KM guys to give you a run down of the report its not there speciality. We brought the specialists to attend a meeting, to infomr the whole, in the EDM disaster centre there was a about 200 people, we informed them of Knysna and George situation. then SSI spun their story on MB. the first words he says that DWA is not goign to pay another cent to consultants, yet they were just listening to consultants. then he said that the answer to the water supply problem is desal.

At that stage desal was the buzzword, first of all the people that were elected as the specialists didn't know if they were coming or going. I was involved at the Knysna wwtw with SSI. We were supposed to put in a pumpstation and the rising main to oldplace reservoir. they wanted to pump the desal water to the akkerkloof. First of all they want to reuse the effluent from the wwtw. Neale Perrign said forget it. and then he was told his too negative, out of here, so RNAy became the chief guy there. They phoned me one morning asking me to be there at 1pm. Rodney, I was there to do the pumpstation and the rising main. 'They want to use the treated efflelunt’. I said you cant because its too poor. Eventually RNAy, we were on avery tight schedule then. I wrote a 3 page letter saying that i suggest they use spikes in the lagoon. RNAY had just come back from JDOuglas, they spoke about the emergency supply. [talks about wwtw calculations, water available in the case of a drought. 1h 49min]. eventually my suggestion was what was done. then we're involved again with the wwtw, and now we're back with the client. some people still talk about what happened in sedge. Now I've been working on the wwtw. its still not ready. The cvivils done, the mechanical must be done. then teh wwtw will be fine. then MAYBE you can look at treating the effluent to potable water standards. but there's no long term research on what arvs and hormones will do to healthy people.

What I don't like a bout desal is don't do a half cocked thing. Do a proper thing. If you talk to a guy at quality filtration systems, his given up tenders becaue he's way too expensive because he does the proper treatment. Whereas others short circuit and go straight to the membrane. I say dont try to make it cheaper, dont try to make it the solution it isn't. but dont mislead and right about how cheap it is.

I got the idea that it’s a bandwagon and in this region it meant nothing to the consultants except one consultant. And ssi were demarcated as the be all and end all of desal. and in fact they had very scant knowledge. What happened in sedge was they gave a tender with no specifications of what they wan. now they say they'll never use Grahamtekk again. you know you've got to be very specific about what you want. But i just beleive ssi were clever enough to be at the right place at the right time and convinced these local authorities that they were the people for the job. but its not the success story that maybe you're lead to believe. because in every case they bypassed the environemtnal. charlse norman in our environemntal section were involved in plett. they didn't put down the monitoring boreholes. its all costs. and the millions out down in MB is an atrocity. that thing is now consuming water. because you know you have to flush them. remember when you flush you sit with the brine. what the hell do you do with the brine. you have to take it somewhere. its a chemical byproduct you're sitting with. the flushing has to happen to avoid algae on the membranes. So eventually they stopped - here in george we designed the pipeline and for monhts they couldn't produce any water for us to pump [2h02min]. they said the decision to run the plant rests with 2 people at the muni. Its exactly waht the guy at quality said to me, the necessary checks and balances
and pretreatment are not in place.

this is africa. Here we've got to design stuff that’s bullet proof. Then the other thing is of course you've got long periods when the dam is full. Now that thing is a water consumer. That is my opinion on desal. I can really recommend that you talk to quality filtration systems, Herman Smit, 083 269 5441, herman@qualityfilters.co.za, qfs@iafrica.com. Grahamtek have got a guy there called Jean Vos. 082 7852433. SSI are part of DHV, from Netherlands I think. Remember they manufacture membranes. I'm saying I accept you can be unbiased, but inherently there's a problem. That’s why quality filtration doesn't bother to tender for SSI. First of all his very firm on pretreatment. Its not black and white. if the cost is given i say you have to ask if all the checks are in place. you must be sure that you compare apples to aples because desal plants are not the same at all. I've been in this game sicne 1987 and i’ve realised that to call yourself a specialist, you should know it. I will not bring out a doc on desal, although water and wwater is my game. but desal is a specialist field and i dont believed the guys from SSI are specialists. In Sedge they jsut had to say they want a 1.5MI plant. grahamtek comes, puts it up, first storm pipes exposed. And everything knows its a volatile beach. To a certain degree I was dead in the water, when the costs starte increasing, i would recommend you go through these files to give you a bigger picture, tehn if you cant find or understand something, ask me. thinking about it again, it was one of the most interesting things i've ever been involved in.

[Interview 68 on 8 June 2012 – Brief Discussion Municipal Official

Interview 69 on 24 July 2012 – Development Bank South Africa

I worked for the DBSA and I resigned in 2009 to join the Ecape and then I came back, we were living in Knysna and I asked them if there's anything going on in the area. And they said yes, the knysna muni indicated that they needed some help. Its on a national programme, called the Siyenza Manje programme. its to assist munis, its a hands on capacity building programmes, for infra services, and other things. they said that the knysna muni needs assistance. the way it works is that i’m deployed to the muni, as opposed to seconded, hich means you working for a normal set of deliverables within the structure of the organisation. whereas in my case i was employed by the DBSA but doing things related to both my terms of reference for DBSA as well as assisting the muni in terms of what's necessary. It was a bit difficult because some of the people didn't want me there. Its a normal thing. in each deployment you have to build relationships with the people at the muni to enable yourself to help them and to get to a stage wehere you can actually engage with the work. But i think the technical director then - just dont say anything about that - i get the impression that he didn' think there
was any need.

Ok as far as the drought is concerned and the projects I worked on. Because at the end I only assisted for project management functions on the drought relief projects amongst other things. So as far as the drought is concerned I worked on water relief projects. But I couldn't take over and the idea of the DBSA programme is supposed to work in such away that you don't do the work for the muni. But at the same time nobody as well will do it. So it's a very difficult situation. I'm used to doing it but you need cooperation from the muni to actually do it the right way. But in the end I wasn't very important in the whole set up I would say. I assisted.

I attended meetings, arranged things on site, I worked with the budgets, I assisted the consultants. I was sort of a link between the link between the muni and the consultant to make sure the consultant was well enough informed to develop the project and implement them. There were many issues because it was a very quick project, very quick implementation some decisions were taken while the planning and design work is continuing. Ideally you need to take all your strategic and management decisions before that and then its developed into the project when it starts to work afterwards. But even during construction some changes were made and the budget was applied to whatever was necessary and whatever took the highest priority. And also from the beginning the budget wasn't 100% known. There was an issue, I think we didn't have confirmation of whether all the funding applications would be approved and paid. And also the VAT was also not clarified. It had to be clarified later. So it puts a lot of pressure on the consultant to design and build this plant without clarity on the budget. I'm referring more to the Knysna case. Sedge I wasn't involved actually. I was here, looked at the plant we looked at it. Because it was the same consultant and a different team of construction contractors and it was basically almost been completed by the time I arrived. I pretty much fell into what was decided already. I had my opinions and very soon realised that it was decided already. And my opinion wasn't really asked for. I'm also not the best known water engineers, so I could assist. Laughs

I won't say the people on the project - Rodney Nay, SSI, we worked very well together - I'm referring more to the muni an institution or the dept. But it was normal. Basically when I arrived there. Let's say the head of dept sees this stranger come in, deployed to the muni, paid by another organisation, comes with all kinds of views, to help and solve the problem. Sometimes those opinions are not welcome as he doesn't come with a structure. Also I have my criticisms against the development bank. They deploy people too quickly. But we could work on the realtionship, it was more the one guy who was not receptive. It influenced certain things I could work on, I didn't feel free to talk to the guy. I was also tired of the deployment arrangements required.

In Mb you may find similar things. It would make your study much better I guess because there's also involvement of a big organisation, Petrosa, and they also required many things from this process.

(you mentioned the budgets as initially uncertain)
Yes, the solution initially was there, but the budget was say in the end on R40m it came out to become roughly R45m for the RO plant and boreholes in the area including a main pumpline from the ro plant to the main reservoirs. And it included all the main studies. so that R5m out of R40m difference was quite a significant amount which was confirmed later. there were all kinds of tricky decisions around that. Technically and financially its very difficult to build an RO plant, you know you've got so much and have to do so many little things and all of that must come out of the budget. the main contractor had to give a price which went out on tender, all contractors were tendering. here and there there was negotiations that changed the price with the main contractor. the consultant had to negotiate on behalf of the muni on discounts. for example the budget had different classifications of each item into different risk areas. For example if more money would become availabel or one of the items i taken out as a high priority, another item might move from low priority column on the spreadsheet, move into a higher priority and becomes a thing that must be done. meaning that item requests something from the budget. that whole play was going on constantly. i felt very sorry for the consultant. It sounds a bit strange, but any project is like that sometimes. YOu have earthworks, connection pipelines, and if the design is not sorted out 100%, you dont know enough about the budget. YOU HAVE THIS FLUCTUATE BETWEEN DECISIONS VS BUDGET THE WHOLE TIME. For example a pumpsation may only get one pump instead of a standby pump next to it. whereas if you run and ro plant you should have a duty cycle between 2 pumps, thats the best practice. but in many cases ther was only one pump. so if that pump dies the whole cycle would stop. so there's a risk versus money relationship and that had to be managed by the consultant bearing in mind that his decisions depends on other consultants and specialist. for example the ro specialists had certain requirementd for their system. whihc this civil engineer consultant didn't necessarily know all those things as its a very specialised job. Then we also had a few risks that became issues. For eg. The civil contract - manholes, earthworks - the contractor wasn't a very experienced guy and the intelligence of his organisation was sitting on pe. He wasn't on site all the time with a foreman on site and all the decisions has to be taken by telephone. which is not what you do in this type of situation, where you have a change in design all the time. [gives example] So the decisions that went to site wasn't quick enough because that contractor wasn't on site and they didn't have enough experience. it wasn't millions but here and there they made a mess of a few thigns which they had to come back and repair, for no pay. (To what extent did the fasttracking of the process impact on the outcome?) Very much, the whole time. Which also cost money. The consultant was overworked for example. Sometimes all of the people were out In the field doing things and the main consulting engineer was overworking himself. Which is very costly in terms of the quickness and speed with which he respondds. and also if there was costs involved he had to carry it. he worked overtime like nothing. so he absorbed the costs as a man and company. talking about management that stuffs very important. you ahve to manage your hr as well. its not just managing the problem. i was want to draw something here. the textbooks say: value = quality + speed of delivery + flexibility / by cost [pure operational management]. so the quicker you can repond the higher your value. the more expensive it becomes because of changes made, the lower your value. also the ease of flexibility increases the value of your product, that the client experiences. I always add accuracy, which is not the same as quality. You know you can do it perfectly, but it might not be the thing that accurately addresses the problem. so i saw how the whole time the value was a problem and I felt for the consultant. the cost was not necessarily an issue. sometimes it was beared.
(can you say a bit more about accuracy. To what extent the plant reflects the best solution?)

In Sedge the scenario is different. It’s a cheaper solutions. The ro plant is cheaper, housed in containers, a quicker fix in that it didn't need earthworks, the didn't put down a fixture. Whereas in knysna the idea was to establish a site where purified effluent can be used and treated further on. a reuse plant is similar to ro, but doesn't go through such fine treatment. in other words it takes the water, treats it, then its clean enough to cahe through a ro plant. and the future development of knysna had it on the plan. the idea was to establish something permanent to amke use of the purified effluent. that whole idea was used as the political motivation to get the funds from NT. if they said they just want fundds to solve the problem, they might have received less OR the eia might have said something else. by indicating from the muni side that thye would improve the effleunt received, it softens the recommendations or conditions. the environemntal conditions were softened a bit and it enabled them to get funding quite quickly.

that option of wvreclamation was put throuh as a potential option. They couldn't lie, they would use it to first do something else. But later on the beenfit of the first decision materialised. That approach was necessary to get what they needed. otherwise they would ahve received only a portion of what they intended to do or a lesser amount whihc needed to be filled up by their own contributions. so it was definitely strategically important. You see because of that, communcation with NT was very important. the reportign that went there always adh to state it as if its reuse. because otherwise they woudl say 'you're not reusing'. because initially the letter given to the muni stated 'we'll give you this money, as long as you' in other words it was a condition. 'as long as you use or move ahead on the national target to improve the possibility of reuse. I'm putting it in broad terms now. but the idea was ok you can have money as long as you reuse. but it was not possible. the technology in sa doesn't exist yet. you cannot just build something and then reuse the sewage effluent, because the wwtw is not treating sewage up to t apolished standard, it needs something else in between. Also during drought the sewage inflow becomes less, so you have a lower quality because you're sittign with a higher concentrate. So that was the idea. so during the whole process and to amek sure that they get the second allocation from treasury, was this careful communication. but as soon as they received it then they relaxed. but by then the whole project, the 3 subprojects were already almost completed. but by schedulign the different priorities into the budget, it was a split budget: critical priorities, hihg, medium low priorities. the redesign could be done quite quickly and the items were shown already in the separate column. when the additional funds came, we immediately - i think there was about 0.5m needed just for additional equipment to double up the umpcapacity for risk management. so luckily that could kick in. so immediately that went there. took the item out into the amin column. its jsut that would have been ideal if the budget was known from the beginning.

look I was always busy, but if you ask me my role in detail, I can't show you. Its very frustrating. It hink ti goes for many of the people. In other words we worked to manage the situation, attending meetings etc., then to put down deliverables. From my point of view i'm not allowed to do something thats not doubled up by another person because my deployment is risky, i can be called out at any time. Also Rodney played the role, he knows the institutions, the dorught, how they got to the solutions. so I said, he must be the project manager. waht i'm tryign to say is that we would ahve an issue and all have to jump into a meeting and then explain it. but thats project management. this case wasn't standard project management. especially for the consultants. they were paid to manage the job. but for eg. the engineer didn't have enough tiem to think and plan and
execute project management issues. We kept on battling to get certain project management answers from him. This budget was never complete, he could never finish it because the whole time it was changing all the time and he was working with it. He was very pressurised, he couldn't really build in or keep a contingency high enough. It was shrinking. So had many risks, and he tried to manage those as well as the project as well as doing technical decision making. The Muni PMU could only pressurise him, and I also pressurised but went to his office many times to assist him in making certain decisions. He also liked this because he didn't always have a clear answer from the Munis to use as a basis for his decisions. [Phone rings] That's a problem. Sometimes I wished I could do more because I understood both things from both sides. I'm not saying I understood all the engineering technicalities. There's the ground physically, there's the contractors, that must all be managed by one consultant. Then there's the client, he talks to the consultant but to all the other people. This image is only the communication structure, the technical structure you could draw lines all over the place. I understood this but my roles was only to assist, like I said at times I went to Keith's office and would assist him in that I had information he didn't have, but the tech knew what to do with it technically. Also because it's a specialised project, everything was imported. The stuff was delivered at customs. Apparently there was a strike somewhere and it was delayed by a few weeks with the ship, and then also customs took longer. That risk becomes an issue because it pushes out everything. Then there's electrical work, construction work, civil work that must all still be done. So other contractors for eg. Small projects actually became so complicated. And then later on this chunk of money arrived on site as well. So I think certain people had too much responsibility and others couldn't take responsibility because they were uninformed so they could only take uninformed decisions. In my case, I was working for another organisation so I couldn't even - and certain people didn't want me - I wasn't just trusted and told this is your job, go and do that. With the boreholes I did quite a bit, went to site, or out with the environmental people. Those were also small issues, but they have to be done.

(To what extent do you think the experience of the consultants are a factor?) If it was a turnkey project - eg. the Muni speaks to the turnkey consultant, implementor, trainer because they do build, own, train and transfer. And Veolia water, the main contractor for that one in Knysna, are experienced in doing this. But it's difficult because the supply chain processes and decisions, everything in SA must be done somehow, you can't just take the decision. The supply chain processes in SA in this case made it difficult because the civil work for example has to be advertised. You have to appoint a contractor according to the policy. And in the end he delayed the process, as an eg. But the consultant couldn't recommend anyone else because of the supply chain process. The rating could have been advertised differently but then you trigger all kinds of legislation. So it's complicated. But the main contractor - Veolia water an international company - also their turnkey product was broken up. It was broken into a civil construction component, and the pipework for example fell under civil work. Whereas if they were appointed as a turnkey contractor they would have for eg. Used their best practice - they would have perhaps become more expensive but not necessarily, it could have been much cheaper because the responsibilities also shift. Whereas if a specialist must share his responsibility with someone else, his going to charge you more. Or the value becomes affected. So this project was complex because it was broken up, not a turnkey project. I think it gave the consultants good experience. They might think that they're becoming specialists in the field now. But I don't think so. There's not much you can take away from the core RO units. And it was overcomplicated because they split it
up, whereas in the case of sedge it was one turnkey contractor with their own specialist.

so the risk stayed with the contractor, it didn't come to the client or the consultant.

because in that case they specify in the tender that they want a solution in very broad

strokes. so if something goes wrong you call the contractor and say it doesn't work

come fix it. but if you split certain things, it had to be managed by the consultant. but

the people who worked for him - stood on site sometimes and just for example a

shallow stormwater trench they didn't check the slope. So in other words the contractor

wasn't good enough, the site inspector wasn't there all the time as he had other work as

well. but he wasn't quick enough to notice, i could because i'm experienced on site and

walk around with my booklet of plans and design. but if you walk around on site

without that you are totally uninformed so he didn't have something to work from. I

would say the consultant people on the ground were not experienced enough. whereas

KT is experienced but was totally overworked. sometimes the decision was delayed

because the guy on site had to go back and talk to Keith.

I've got lots of documentation, but its all in the box. Well maybe later. Next week I can

make a plan. Send me an email. Tell me what you need. Maybe there's a format fro the

budget for example. I've got detailed stuff but I would need to explain it.maybe if i send

you all the different files, you can see the change over the months.

Interview 70 on 30 July 2012– Municipal Official

I've been here for more than 25 years at the george muni. My previous position was

deputy planning and project management. So I've been involved in water planning for

many years at george.In my previous position in planning I was involved more directly

with the planning of bulk water sources. we undertook a study in 2995 for geogr.

Ninham Shand at the time undertook the study, the purpose was to look at the situation

and investigate sources fro george. it was quite a comprehensive study and it was

updated a few times. i think the latest report was in 2007, it sort evolved into the final

report. At that stage we also did sort of a decision matrix process to determine the best

options. in that study about 11 options. we then undertook that process to determine, out

of these 11 options, waht is the best option. the best is also not always the most

economical we also have to look at the social, and ecological implications. that process

took place. it was quite an extensive process where we invited all roleplayers, dwa,

ngos, everybody in the water sector was involved with that. And eventually out of the

11, 4 water sources, options, were identified. of whihc the first one was implemented in

2008, before the droguht, basically a pumping scheme. that was completed in 2008, in

accordance with this plan. reuse of wwater was one fo the other options, of the 4 that

came out. as part of that we also decided that we need to focus on wdm, as part of that

strategy. so thats also the source, if you can call it that. so we had quite a comprehensive

wdm strategy. and we introduced water restrictions even before the droguht. So early

2009 we were still fairly ok. It was then that we supplied water to Sedge. the droguht

then actually worsened in 2009 and toward the end of the year it become more extre

and then in 2009. the problem is we already had the kaaimans in place, it wouldn't have

helped to raise the spillways because that would ahve been dry as a source in a drought

situation. the malgas was an option, because it was so dry thst catchment wa also not

supplying much water. So our approach was choose one of these 4 whihc is part of our

long term strategy, and that will reproduce water. and thats why we went, we did look at

desal but for several reasons it was not an option, basically it was just too expensive; so

we went the reuse way and decided to introduce indirect reuse. whihc means that we

pump the treated water back into the dam, from where its then treated again. so its a bit
more soft and more acceptable perhaps. so we expected some, but it actually went through with not too much resistance. so early in 2010 we decided to go that ways and the plant was then completed in august 2010. and then it started to rain and the dam overflowed at the end of 2010. so we basically never had to use it. we also at that stage decided to drill for gwater. because its also an instance source. we drilled 19 holes, we were very successful, yielding about 5Ml per day. we equipped those that supplied the most and situated close to he treatment plant because they needed to be treated further in the wtw.

We went through extensive public awareness process through the drought - media, papers, visited all 54 schools in george, at one stage all I did all day was to manage this drought. Was very effective we reduced the water consumption by up to 40%. And the fact that we had the kaaimans pumpstation. one of the reasons we pulled thorough was because we already ahad a plan in place. also we already had an rod on the wwtw. so there was alreay preparation in place to roll out projects very quickly. but the public awareness and kaaimans basically pulled us through. the lowest dam level was 17% in feb 2010, and thats not a very comfortable level where you have to supply 117000 people. people were asking us why did we go to the extreme to build that plant. its all a matter of risk management. i mean you have to manage the risk. so you have to make allowance for the fact that it might not rain. actullay it began to rain and it is part of our long term strategy. adn thats basically our story

the wwtw was already id's as one of the top projects for long term water source developemnt. A few years ago when we had an application for a big development towards sedge side. At that stage we looked at the option for desal and actually progressed quite far into the eia process and we investigated desal, but the problem is, we are a bit diferrent from a place like sedge as we area bout 200m above sealevel. so its the cost of desal, and the cost to pump it o our distribution system 300m to our distribution reservoirs. that is a very high cost. eventually that is the reason why the option of dedal was not an option for us. and if you look at the urvs of reuse and desal. there's a vast difference. wwtreatment is about R3.50 and desal, people will tell you different figures, but between R10-R20, lets say that

(Why did the others go for desal?)
I don’t really want to speculate about that. My personal opinion is that, especially in the case of MB, it wasn't the right option. They sit with avery expensive plant that’s going to cost them a lot of money. But I cant speculate, don’t want to speculate.
(one of the reasons I've been given is because wwtreatment has a stigma attached)
yes I think it could be
(Yet in George you could push it through)

Yes, you know I went to singapore a few years ago to a desal congress and they have all the optioon there. They have desal for potable water, the indirect reuse, they actually use all the options there. In singapore its actually very successful and people accept it, so i think in sa it is also doable. there are still people not very happy with it. i think indirect is softening the issue
I think its quite a sophisticated technology, atleast more sophisticated than most munis are able to operate. I think there is some kind of a confidence amongst the public here that we are able to operate our systems successfully. We've received green drop every year since the introduction. since the introduction of blue drop we've been amongst the top in the country. So we've made use of the press, we have a good quality control in place, we have a good lab, before you introduce something like that you have to build sort of a confidence with the public. and it is worry, you know will you always have that capacity. but there are a lot of safety factors built in. we had some fears and we still
ahve fears about the hormones and it is something to be aware of. the indirect, if you compare the amount of water we are putting into a very big water system then that helps a bit. with my decision it helped. and the fact that we have the capacity. we have a very good lady, swatika suriya, in charge of our lab. and she's always busy with degree studies in hormones. so that's her speciality. so that's maybe the reason why we could take that plunge. but you must be aware of the possible risks associated with it.

(How has implications of reclamation been communicated?)

articles in the press, responses to letters, that sort of thing

(Seems to be a long history of investigation into ro technology in this muni?)

Yes it sort of evolved out of that study we did in 2005 where we realised we have limited sources and we are in a very high growth area. If you study the figures and a report like that you realise you have to look at other options. We can't, there is just not enough conventional sources of water, you have to look beyond that.

A big difference between us and the other places, is that we had this plan in place before the drought. I mean drought management is crisis management, but it was sort of managed crisis management because we were well prepared for that.

(The area was declared a disaster, but to what extent was the extent of the crisis investigated?)

Well I went quite in depth into the rainfall patterns and there are different ways to analyse it. It depends on what sort of period you look at. But I think it was so critical that it was a 1 in 150 year drought, something like that. It was definitely an extreme drought. we have recordd going back more than 100 years in george. so it was an extreme occurrence. its something that you cant in normal circumstances plan for. i mena its something thats out of the scope of any water management planning scenario.

(You mentioned through the wdm usage was reduced by 40% and that with kaaimans that got you through the drought, and the rain came in 2010. do you think the schemes introduced as disaster schemes were a necessity?)

Well that connects with the things of risk. Its very difficult in hindsight to say stick it out. At that stage we consulted many climate specialists and nobody could tell us how long it was going to last. I think to take a decision to implement a project that in our case was in the value of R90m for the assurance that you can endure the drought was the right decision. to take the risk, the socio-economic possible consequences of failure to supply is just to extreme. That is not an option. I think it was the right decision
to take the disaster schemes as a necessity?

Well that connects with the things of risk. Its very difficult in hindsight to say stick it out. At that stage we consulted many climate specialists and nobody could tell us how long it was going to last. I think to take a decision to implement a project that in our case was in the value of R90m for the assurance that you can endure the drought was the right decision. to take the risk, the socio-economic possible consequences of failure to supply is just to extreme. That is not an option. I think it was the right decision

(how the actors within the local munis interacted with each other?)

Yes, look the provincial disaster management played an extremely important role in this whole process. Dr. H Fast was at that stage the head of that unit, and from provincial side, they began to have a big input into this drought and this crisis. So regular meetings were held by province where all the local roleplayers were in attendance, where the risks were discussed and situation assessments presented. that was on a 2 weekly basis i think and definitely on a monthly basis. More locally, in george muni, i'm just the director of civil engineering services. but the disaster is also disaster management and other muni roleplayers. so we started to have weekly meetings, at one stage 2 times per week, drought management meetings in the muni. because disaster management was actively involved to manage the awareness. We did inspections in our organisation and picked up wastage in our own organisation. so it was intensive management of this situation. and edm disastermu also played a central role. so it was an intergovernmental exercise of none. it was also a good example of cooperation between the different spheres of government. so we learnt a lot. even PE, later had problems with drought and came to visit us. so there were many roleplayers involved. we appointed a lady that helped us with the public awareness. she went to the schools to talk to children who
take that to their homes. We brought in a technical person to go through the water consumption figures on a daily basis and if he sees a household is using up to 150kl per month, he phones them. So we zoomed in from all angles to reduce water consumption. I wish i could tell you that the same intensity is still ther. but unfortunately not. but i think a lot of the awareness has stuck with the public. we can see it in the consumption figures which didn't go up. Its jsut a matter of the finances. and its actually a pity because we should go on wiht those. but a lot of the wdm principals are still applied as well as the rainwater tanks.

**Interview 71 on 27 July 2012 – Consultant**

(Can we begin with some kind of summary of your approach and objectives)
The issue was about the drought that we had previously. Since I came here in 2002, Knysna was affected by intermittent periods of flood and drought. In this particular case we had a flood in 2008 and after that an extended period drought. Knysna's water supply mainly comes from the Gouna and Knysna rivers. We dont have a catchment dam, but what they do is pump the water from the rivers in peak periods. in off peak periods, they pump the water and store it in an off channel storage, the Akkerkloof Dam. In peak periods they pump from the rivers an draw down from Akkerkloof dam to meet the demand. Knysna WTW was designed to accommodate approximately 10ml. but the demand far outstretched the supply. when we started with the exercise the demand was about 14-15MI per day. thye couldn't keep up with that demand. they could only keep up with it if Akkerkloof is full and the rivers are full. So in the period drought they couldn't pump what they normally could from the rivers because they only had a limit in terms of how much water, and if the river reaches a certain level they had to stop or reduce the extraction. So essentially the exercise was to look at the demand side - households, businesses, commercial - and look and reducing demand or identify wastage, anomalies in terms of use. From the KM side they put in water restrictions from as early as 2007. the restrictions were in place to limit mostly households in terms of what they should be using. to limit to 20-30kl per day, preferably the lower but started with the upper limit. the purpose of this exercise was to look at the high consumers and wastage and leakages and bring these down, reducing the demand on the bulk supply

(the data source?)
that comes from the KM meter readers. They have meter readers fro both electricity and water consumption who physically take the readings and capture these on the municipal accounts, which we then use as the main source of information. Our approach was to take the finance data and divide the consumers into the various rates categories - domestic, commercial, schools - because we couldn't apply the same criteria to all consumers, we had to apply different criteria. we divided into categories and then looked at the top 100, then went to top 50 thereafter. for example if we took a domestic consumer we looked at the average consumption for domestic and singled out the highest consumers. for example if our average was 30kl per day, we would look a those above, until we got to the top 100, so usually around 50kl per day. then we went and monitored those users on a weekly basis, versus monhtly, to identify the reason for the high consumption - swimming pools, sprinklers, number of bathrooms etc. if it was a b&b we would give them a letter from the muni asking to reduce consumption as well as a pamphlet from the EDM - as this was a district issue - designed to encourage people to save for example by putting a brick in the system. so that was the approach for the high consumers. then if the consumption came down, we worked our way down to
there were very many varied findings. We gave everybody an id number, specific to that property. Some people were on the wrong rates based, meaning we had to recategorise people to different consumptions. There were some recommendations we put together for the muni. there were some domestic consumers were 2 dwellings on the property. so we had to look if the second dwelling was legal or not. thats why the legal dept was involved. some of the tarriffs were incorrect, should have been bulk instead of domestic tarriffs... essentially the big issues were irrigation systems, toilet systems leaking, in some cases the meter readings were incorrect, and swimming pools. so those were the major consumers. but it varied from place to place. what i can remember is that the highest consumer was by far the prison. we went there and had a meeting with the officials, explained the crisis, obtained the number of prisoners and evaluated a theoretical consumption and compared this to what they were actually using and discussed this with them. it mostly related to toilets that were leaking, so we ended up with a major focus on prisons and schools. the reasons were similar. we've got public toilet blocks not maintained properly. they were leaking. also schools and standpipes and we found these running over wends, due to vandalism or people opening the taps and letting them run. security issues were a problem at schools. so together with schools and edm we suggested different types, press button instead, but there were costs involved. so we just provided them with proposed solutions.
The muni cannot go into other state property, cannot fix the school facility, that was the nat dept of public works. So the communication was through the principal and then to the dept. the same with prisons. What the muni did was to encourage them in terms of providing solutions. obviously the muni was taking the brunt of the impact in terms of consumption. what we did do was resorted to penalties if theoretical consumption is exceeded. there were issues relating to these penalties. cant recall exactly how it was resolved. what the muni did invest in was with general consumers they had the hippo bags and they also had restrictors placed into repeat offenders, in other words water supply was forcibly reduced. there was a whole pack they supplied to people to reduce consumption
With the schools and prisons ultimately it became the responsibility of public works to maintain and reduce consumption. This is an analysis we did of the school consumption for example. We id'd all the schools in the area and the average consumption over the last 12, 6, and 3 months. what they were using in terms of their baseline and the target in terms of the theoretical value we calculated. so we gave them a designed baseline and target line and commented if they were high consumers and needed to be focused on or not. not all the schools were targeted. the designed baseline was based was based on 20 1 per person per day and the design target assumes 30% reduction on the baseline. so we gave them a design target theoretically and then said because we're in a crisis they should use less than that. and the technical director made a decision that we were aiming for 30% reduction because we wanted to get below the 10ML per day mark. so were trying to get total consumption reduced by 30%. then on a weekly basis we monitored it. you would have to go through the data. the red ones were what we were concerned with
our main role was to identify the abusers of the system. The majority are within the consumption limits. There were very few over, and sometimes way beyond. We didn't id all the people, only those on the rates database. So that excludes most of the is, most of the currently developing northern areas. so there was a separate exercise by the mun to look at the is where they have standpipes instead of houseconnections, they have standpipes within every 200m radius. they were looking at leaking standpipes etc, and that they fixed on a maintenance basis. but we didn't record any losses. (I'm just try img to get an idea of the % of the documented usage of the total consumption)

I can't give you that answer, but finance should be able to give you an idea of how many they have on the system. But if I had to venture a guess I would say 60% of northern areas are not on the system. But the northern areas consumption is a lot less than the general residential consumer already on the database. because first of all the design for the areas is a lot less, and also the general public has about 1.5 bathrooms. and the toilets are the major consumer. whereas in the area its more shared toilets and standpipes. the 15Ml is total usage for the town, so when you add it up, the recorded, you won't get to 15Ml. from what I understand of unaccounted for water its unmetered standpipes and infrastructure issues: losses, pipe breakages and maintenance repairs. Even if you do meter the standpipes is still not 100% accurate because you do get illegal connections. its very difficult to get a 100% accuracy.

(Did this exercise look at the issue of leakage?)

Not the bulk system, we didn't investigate each and every bulk system leak. It was an exercise in reducing consumption, not looking at the infrastructure itself. We have done a previous exercise in the previous drought. I think it was probably 2006/2007 and this was a follow up on that. following another drought period. in fact I think the restrictions were probably from 2004/2005. They were 2 distinctly different periods. so we didn't do any correlation to prior abuses to abuses now. In the period in between we had floods in between. like I told you it alternated, knysna had drought i think in 2005, floods 2007, drought 2007 -2010, floods i think after that. we alternate between droughts and floods. so Knysna is in a difficult position in that we cannot benefit from the flood period to fill catchment dams as we don't have any. With floods whatever comes down flows out. we have a limited take off we can take from the KNysna river. its not going to increase during floods or decrease during droughts, except when the river is too low. Normally in the bigger cities you have a catchment dam. in periods of flood it overflows, then you use it during periods of drought. KNysna doesn't have that luxury. one of the things that reemerged now was reinvestigating a dam. its been punt ed before and they were try ing to get it revived.

(What were the consequences of the wdm exercise and why did the muni follow this up with augmentation? Could it have been done with just focusing on the wdm?)

I think KM had a parallel approach focusing on reducing consumption and increasing supply. KM fluctuates between offpeak and peak periods, in peak periods our consumption increases 50-60%. So they were looking at responding to normal consumption and also providing for peak periods. my understanding for sedge wa that they were faced with the drought but it was also during the peak period. So that initiated the augmentation side of it. Sedge is more unique because it has a smaller demand area but a smaller supply, also it doesn't have a catchment supply. So the augmentation initiatives they undertook were multiple initiatives and investigations undertaken to get sedge running. Knysna didn't run dry but our supply and demand was a problem. consumption was too high for what we could supply. as far as the ro plant is concerned, I wasn't involved with the project, but my understanding was that we don't want to be
stuck with a situation where we don't have a supply, so we needed an alternative. Water reuse there's still a way to go. It's not off the table but probably a question of funding, so it was a 2 pronged approach.

(Do you have any measures of the impact of your demand measurement?)
Our meter readings would show. We did comparative figures on a weekly basis just to give you ideas of where we were and going to. For different categories we have baseline and targeted values and then different consumer categories. So the domestic we could see that the consumption reduced from where we started to the end. They were well below the baseline but still above the target; as far as the multi residential - b&bs, hotels, more than one dwelling unit - they were well above the baseline, well above the target adn when we started off there was an immediate impact in terms of reduction in consumption, then a spike, then reduction again. So there was a positive impact reduction from above to below to baseline; for the non domestic which is a difficult one - businesses, commercial, industrial (where do the golf courses fit in?)
I can't remember. They were high consumers initially but subsequently stopped irrigating the fairways only irrigated the greens and tees. The Pezula club was classified as commercial. The Pezula Hotel was separate to the club, so I don't know if the club is the golf course. But both were monitored separately, they've also got a private reservoir which we monitored. [... the Pezula club stabilised at about 8.5kl per day]. We've got 3 golf courses. Knysna golf club was classified as sport not commercial. They were at 200l per day. But I think this was just for the club, they have a few meters, all of which was classified as sport. The highest one, I assume would be the golf course, the highest was 7.5kl per day. When we started with the exercise they were at about 5.7kl and came down to just above 1kl per day.
The question I was trying to ask earlier was about forward planning. These uses could have been targeted earlier. Looks every crisis initiates an approach. When you are not in a crisis you don't do anything about it. I think the problem with forward planning for most munis is budget. For example KM has got a master plan, and I think you spoke to KT as well, as most of the plans would be in this master plan. But this requires money. So for example the dam will never happen until budgetary approvals get. I would say that the planning would not have averted the crisis because of budgetary constraints and there's statutory issues as well. meaning that when you talk about augmentation you have to go through environmental processes as well which is a huge obstacle. So I'm saying yes, if Knysna had a dam, there wouldn't have been a crisis, but to get a dam in place is huge.

In terms of consumption, I mentioned there was a drought in the past resulting in water restrictions, which were not lifted. In the previous case we did the same exercise and it'd high consumers. It was a similar process we went through. What did happen was there was a gap between when they id'd and if there was any subsequent monitoring up to the second crisis, that I can't tell you. We are employed for a certain period time, a couple of weeks, we make certain implementations and unfortunately we don't implement it.
I hope you get a picture of what is happening. This will give you a good idea of what happened at the prison. In fact at the prison we did a daily count, looking at when consumption was high in the day. We started from 7:30am and ended at 6pm.
Including disbursements - expenses fees were about R206k and expenses were just around R60k. You just got me interested in what happened previously, I can't remember, the previous water demand study. The information is archived. Bulk meter readings were taken in 2005, so it was 2004/2005. I think we started with the project in 2005 and used data from the November 2004 readings. We also mapped this in 2005 we mapped it for kNysna on GIS so they could exactly see where the problems were. I think that's the CBD, Knysna Heights, and that's the prison. We colour coded them, so the red ones were the high users. But it was a good few years ago. And just the same kind of information as the later study. Excel spreadsheets. You can see we looked at the erf number, then we highlighted the high consumers. It wasn't that easy because we have some duplications on erf numbers in Knysna's cadastral, so we had to look at street addresses. Also some obstacles were that not everybody wanted to allow us to the site. Also some meters couldn't be opened. They were either stuck or buried. So those readings would have been estimated before. Or we couldn't find the meter on the property so we had to then get the official meter readers in. Remember we used unemployed guys, so we had to give them training on how to do the readings. So we had a little training exercise to show them how to do it. That definitely posed some challenges, we got back datasheets that were incorrectly filled in. Belvedere was done by Elroy and Albertus for eg. They had to write it in manually and then we captured it. But we omitted to anomalies if we couldn't verify it. We had many, many challenges. Some readers were very accurate, others not. We wanted to do it consistently, so we would say it must happen on a Monday. But that didn't always happen. So we had to recalculate our averages, because we had to work on average per day. For weeks we couldn't have access to certain properties. Also there were fences, if we couldn't get access, we just waited until we could get access. We didn't capture all the people we id'd for access reasons or couldn't find some of the places. There were pamphlets handed out. EDM was also involved so they also did an awareness campaign. We also instructed our readers. They had pamphlets with them. Samples of the hippo bags. Ask them to issue them to the high consumers, to explain it to them. We were part of that exercise, but the muni drove the awareness campaign separately as well.

**Interview 72 on 30 July 2012 – Department of Water Affairs**

I actually worked for nature conservation in the northern part of the country first first, then I was transferred to the WC first to the To cape nature conservation in Stell at the time as an aquatic scientist. Then we started doing the river health assessments, looked at the resources. We were primarily involved with the DWA at the time. Advising them on the conservation status of rivers. Because they were still implementing the national water act and the various requirement of the Act. I was part of the committee that drafted the national and provincial water resources strategy. Then I also started a collaborative project with DWA where they funded additional posts for us to be of service to them. And then I went into consulting for 1.5 years, then I went back to cape nature for 2 years. I've been involved in the SC for 11 years now. Always being involved in water issues. From land use perspective, doing the eia phases, cape nature consistently asked the munis to give proof that they are able to supply the new developments. Jumping up all over the place. It got to a stage of confrontation where we felt these guys were just okaying. There are 2 implications of this. They chipped away at their security of supply in the dams. So they've actually gone from a 50 to 10 year water security cycle. So they could run into trouble in every 10 years. The usage increased significantly in the last couple of years. I then said to the munis, they have planned resources for their
growth curev., but what they did not think about is it may take 8 years, because there's
eia process, the tenderirng process, the building. they knew about these things but i think
they were kind of thinking 'we'll solve it when we get there'. we anticipated this thing.
the george muni was one of the forst that started their planning process in terms of the
nwa requirments, and in terms of the water services act. they must have a wsdp, as part
of their sdp. the other munis jsut constantly said its not our mandate, if it hits us we'll
just rhw enough money at it. then we got this drougth and the george muni was the
only one that had plans and had done assessments. so must of the interventiosn that
happened, happened without the asessements. it was emergency. And we are now
seeing that with all the projects, especially the desal plants there are a lot of teething
problems. all of the things that we would ahve liked to tell them we never got the
opportunity to do. So it was implemented in a disssater scenario, and now we are still
battling. for instance the bitou muni who placed their abstraction in the mouth of a
sensitive estuary. SO thats an example IF THERE WAS AN EIA THERE WOULD
AHVE BEEN ALTERNATIVE SITES, ABSTRACTION POINTS HTAT WOULD
HAVE BEEN ASSESSED BUT WAS NOT DONE. now we're sititng with something
that we are not happy wiht a R15-16m plant, and there's still a dire ne
ed for water
supply.
we had a joint operation centre where a lot of meeting shappened with the different
depts and everybody gave their blessing saying its an emergency we will support what
nedds to be done. We realised the problem, there's going to be a mass evacuation if we
dont do these options. but you know, the take home message for me is that because of a
lack of proper planning and assessments things happened. and they may have been
cheaper options but you would ahve had to have time. for example some say alien
control in those catchments may ahve produced the same or better yield in those
catchments without putting a strain on the energy system in sa. the desal plants are
energy intensive. what apppens if we run into a drought and eskom cannot deliver, then
they cant even desalinated. I think the great thing that happpned, something that we were
pushing for was to not only be dependent on desal but to develop a whole range of
options, so that you can manage your infra to havea consistent supply. but if we allcate
the ful availbale supply of all those options you still wont be able to manage it. so you
need to have spare capacity
WDm came in quite strongly. George I think cut almost 40% of usage. And it hasn't yet
really increased. Education is necessa
ry. Its green here but SA is an arid area for all
intents and purposes. We've got quick resposne cachments fast flowing rivers theres no
opportunities for big dams here. [??]. they also developed ghwater, started drillign into
the tmga, whihc was fairly well accessed for other projects in the WC. So there was
ghwater developments, RO, desal, augmentations from rivers into the dam, interbsin
transfer and rainwaer tanks and that type of thing
(to what extent was the crsiis really assessed?)
I think the WC has a pretty jacked up Dmanagement team and the Depts are pretty
jacked up. Also with the local authorities I think the management is still okay to a large
extent. So the information was available, there was plans though all of them was
assessed. so the team that came together had good information to base it on. so they
could establish it was a disaster. so it was a great team.of people working together, they
had good information to base it on, and all the depts gave their time.
There was as couple fo different forums that came together in SC thorugh the EDM, but
they also involved the WC Dissater team and also from the national level. I was not
with water affairs then, so wasn't that much involved. The role of cape nature was like
always. a watchdog function. although thats also done by dwa, through the nwa chapter
3, is specific on water resource protection. But I think at the time like that when you have mostly engineers and catchment managers, there's a bias towards water supply. So I think we were there, along with environmental management to make sure they do integrated planning, develop various resources and that they protect the resources used and not abused. Not just give them a blank chequebook to carry on as they like.

I think DWA played quite a significant role as they were the funders by and large. So they're a requirement in terms of cost. Because they look at URVs and also looked at existing infrastructure, stuff that could be implemented quickly (when you talk about the URV, desal is significantly higher, yet a large part of the money from NT got invested in these plants. Why do you think?)

I think Rashied Khan was quite progressive in saying that we don't have additional surface water available we have to look at alternatives; also the cost of these plants came down due to the membrane technology, also the cost of meter of water came down; and it was quick to implement. Which was important in the case where the surface water is depleting. I did my PhD on the relationship between water and surface water. The perennial systems get their water from springs located at the geological contact, where the shales meet with the fractured rock. [I] But if you drop that water table you are going to dry up the springs feeding the perennial rivers. So we cautioned them, again from a conservation perspective to be careful with water use, because we could add to the problem by making perennial systems seasonal systems. Because of the unknown water issue, dams not filling, no surface water, the easiest and quickest was desal and ro. Those were the options available within a short response time. A dam wasn't really an option you need water to fill it and it takes too long. They did do some borehole development but they didn't find high yielding boreholes with confidence of not affecting high yielding boreholes. There have been studies on water looking at all over the WC and also the SC Karoo area, looking at the TMGA. But water is just highly variable. [I] With the coastal areas that got into trouble, most of the boreholes were drilled fairly closely to the contact areas so the response time for that drawdown to affect the head was going to be quickly. That was my concern, I don't think the water people were that concerned. So it's important to have a multidisciplinary team involved so that you don't create more disasters (Implications of spikes in Sedge)

You have the TMGA, a fractured aquifer [I] its artesian. That's the one type of aquifer that would potentially dry up rivers. But a different type of aquifer is a primary aquifer. In the case of sedge there's a primary aquifer. But the problem with that that I've got is that they have a sewage treatment plant and a waste site, and all of that leaches into the water system. [I] Through these spikes you can create a gradient of inflow and you can even suck in saline water from the estuary. And we said they are creating a lot of hydraulic gradients. You can even reverse the flow direction while pumping. You could also affect vegetation. A lot of biodiversity may be reliant on that water table. So these are the things we try to balance. To not only look at the water supply but also the environmental implications.

I think with any post facto approval - The NEMA and EIA regulations make provision for retrospective approval through a s24g process. Where they do a post facto eia and it can be refused and rehabilitated. But with high profile political stuff like this its goin to be very difficult to refuse authorisation, they can ask for mitigation, but then there's money involved. And that's what we've seen with the bitou one, where the conclusion was you have to look at alternatives but its refused based on money or other factors. So the restrictions are the political issues and the water supply issues (What would be the implications of s24g?)
I think the problem is that it can be at the wrong place. You place the desal plant to supply water now. So a lot of the decision making at the time that had to be done quickly, forced it to be situated at certain places. I don’t think we had the opportunity to think these things through properly as we would with the eia. we may be lucky that we address the issues through mitigation. thats why good planning is important and the nwa requires munis to plan properly. not just reticualtion, infrastructure, but also resources.

the munis have id'd these in their plans but they ahven't been assessed. whihc is a problem, as it will take many years. you must also understand that the munis have a funding problem. they have to convince the politicians making the final decisions on budgets. they say ' we have to do an eia, we want to build a dam in 8 years time'. and the politicians say 'no we have social needs here. we're goign to build houses with this monye'. so its a clear cut thing. thats why i think its important that a multidisciplinar
team comes together and thinks these things through. I mean Sedge had a 4 day water

security.
(How does a muni land themselves in that position?)
I don’t know. I can show them letter upon letter written to them by cape nature asking can they supply the basic services for the developments approved. In some nwis the goodwill was just not there. That’s really the way I saw it. We were talking to them and asking them to think about the resources and we were told its not our mandate. but we said anything to do with sustainability was our mandate. The fundamental requirements of the nwa hat munis ahd that responsibility and i think dwa had to police that. but i think there was a lot of evolutionary processes with the nwa. alot of the requirements of the nwa were kind of phased in. but i do think the munis should ahve had their plans in place not just scenarios. as they had plans withoout assessments. thats a fundamental
difference. assessments are a requirement in sa. the typical thing we see in sa, and probably across the world, is that you ahve this growth and different supply schemes that step in. and there's always times of excess and slight deficits and i think that the drought caught us at one of these deficit corners. and its teachnig us the lesson of proper planning, proper assessments and to not waste water. from a conservation perspective i criticise that a lot. but there's also good reason for that which is funding for pipelines for farmers. which is why they continue to use the abusive systems.

I think with the new CMAs, to become the new in thing in SA, where the decision making is supposed to be at grassroots level. Once they becoems more apart of the decision making they will take more responsibility
(I've heard criticism of DWA?)
There's a lot of criticism. But its mostly based on capacity. Again that relates to funding. They lost a lot of people, reurning or becoming consultants. And then with funding constraints to get posts filed is difficult. Then the occupation specific dispensation came in, whihc says if you have specific expertise you get more. now that osd is placing another burden on depts financially because they have to pay htese people more and secondly htere's a registration requirement, which was part of the system. so thye cannot find engineers and scientists registered. suddenly you sit with this big organogram of posts that you cant fill. when you come into the organisation you see the logistic, managerial and financial constraints and also the implementation of the system you realsie there's good reason for that. not that thats an excuse
(to take one eg. In sedge I was told it’s the role of dwa to police farmer extraction)
technically it is DWAs responsibility but practically we all know its impossible for any government dept to police something completey. You need partnerships and that’s the whole intention behind the CMAs. And then also the requirement in terms of the NWA is for people to organsie themselves into water user associations, they will make sure they police each other. then if they cant resolve it themselves they can report it to the DWA. it crisis you get into the blaming game, but its not necessarily just givern not coming to the party. People know givernment has funding constraints. adn for a long time the requirements of the NWA and the NEvAct I think was not seen as a priority. I mean for the WC at the moment they've got 2 people in the entire province doing compliance and monitoring. and in wc in environemntal affairs they've only recently started a directorate for compliance and monitoring. and I think the reason for that is that both the NWA and the NEA are young acts. So if you think about the details of how these things roll out in a fairly young legislation it takes years for this to happen. And I think anybody who uses water should police temsleves, take the responsibility. You take responsibility for your commitment I think that things happened very well with all the contrainst. We ahd a multidisciplinary approach, a lot of collaboration, a string team. In the end with the JOC and coordiantion with the Disater Management team I think theres a lot of lessons learnt and best practices.

Interview 73 on 31 July 2012 – Municipal Official

Interview 74 on 3 August 2012 – District Official
Notes taken at Interview 74

Interviewee presents and discusses the Disaster Management Act

The Disaster Declaration process involved a response, the recognition of an emergency, the application for funding, meetings across the EDM as part of a droguht response, a key issue for the DMC was the absence of an early warnign system. Had this been in place it would have possible to detect early indicators of drought. Therefore what is needed is a more proacti ve attitude at the level of municipal management.

At the first meeting between the EDMC and the representatives of Sedgefield, the Hoogekraal river was identified as an emergency supply source. The matter was treated with urgency, with water tankers sourced from the SANDF to transport from Wilderness to the Sedgefield Reservoirs. In this time the Hoogekraal emergency pipeline was brought on board.

The Sedgefield population is approximately 6000 people, and working on a figure of 65l per person per day, we aimed to supply a minumum amount in the immediate emergency period.

The role of the EDMC was disaster management and the management of the disaster declaraton. The EDMC steps in when the challenge is beyond the capabilities of the Local Municipality to manage and when the disaster affects livelihoods. The EDMC was supported by the Knysna DMC, with a Joint Operation Centre set up directly in Knysna.
The requirements for a disaster declaration are as follows: The Local Municipality approaches the District Municipality. The issue is then brought to the District council for a decision. Next it moves to the provincial level with a submission to Cabinet. Thereafter to National for a classification as a Disaster. This is followed by the decision being gazetted. The whole process could take 3 months. Only following the gazette is the funding made available. In the interim it is recommended that the Municipal Council recommit the internal budget.

Interview 75 on 6 August 2012 – Department of Water Affairs

Ok Simphiwe Mashicile from DWA I’m the programme for the Regional Bulk Infrastructure Grant Programme and out of that there is the drought programme which deals also with the infrastructure. I was dealing with that one in the EDM. Our role was that we first do the assessment together with the dept of local gov and housing. there was a forum that was dealing with that on a monthly basis. there was a technical forum then a higher level forum, the JOC, dealing with strategic issues blocking the development of the project. for instance EAI is delaying the project, so they take a decision. So DWA, DLG and Environmental were the strategic decision makers. In the technical meetings we all sat there but only technical issues were discussed. out of these decisions the technical team did the possible solutions with the muni through this disaster. then the munis did support the business plans to us through the disaster management centre because they were coordinated there. they then sent the bp to dwa to review and then sign if we are happy. so that they can access the funds through NT. but DWA has to assess the projects first as possible solutions to the muni, then its sent to NT for funding. the funding was available for 2 consecutive years, the first year to KM, George, MB. The second year to Bitou, KM, MB, BW & George.

The funding was available for 2 consecutive years, the first year to KM, George, MB. The second year to Bitou, KM, MB, BW & George.

The assessment happened immediately after the drought. Then there was this forum. The assessment was coordinated by the disaster management centre, then they called this forum to discuss the issues and the possible solutions. And after that the munis were mandated to come up with a BP

Sedge got affected first. Then we learnt a lot from Sedge. So what we did with the other munis we learnt through Sedge. George & Knysna said that everything is fine, but 2 months later we found out there was a problem. With Sedge, they had already developed a bp. but with most of these munis, the planning was far ahead. so it was easy to just pull these plans out, the planning was for 5 years or 20 years time. In George for example the planning, design and EIAs were all done. Even Sedge it was easy for them to give us the BP. The others, Bitou, MB and BW followed later with the design. But George & KNysna were upfront. that was good as we had to be on time to submit this to NT before December

The funding, we have to get the BP, then DWA signed them, then we return to the Prov Disaster Management centre in Tygerberg, then they compile the submission to NT. These were supposed to be there before December 5th so that it can be on the budget adjustment of the NT, so that the money can be available from the April 1st of the following year. once it goes to NT, it has to have many signatures so that it can be on the DORA. the money is then channelled through DWA and DWA has to sign an agreement with that muni. the funds are with DWA, then munis submit an invoice and a progress report. it was based on invoice not transfer. and we also have to do a site inspection

This region have to be declared as disaster. Then they write a submission on behalf of the muni to NT. In this case it was approved because NT and PT have got a good
relationship. But the money was coming the NT disaster funds.

The condition was that money must be spent in that financial year. They can see they are controlling. They have a system where they monitor the funding to the munis. And we had to stick to the payment schedules for the munis from NT. So we had to push the munis. But most of them the equipment was on the ground because it was an emergency. they were mostly using s24g. also they all know that money is for that financial year.

In Knysna's case, what we must do is what is on the business plan. The RO and water conservation. So those were the conditions and in the close out report hey have to indicate if there wa any savings

(Do you have documentation I can look at in terms tracing the money transferred. The breakdown for each year, spending per muni.)

Yes that’s fine, we can do that via email [follow up, check what was already sent]

(In the case of Sedge & Knysna with the desal and RO they’ve had numerous problems. Does that become the munis cost to cover?)

Yes it becomes the muni's cost. We hear the issues. With the person constructing it, there's an O&M contract for 3 years. In Sedge the was a guy providing training a& transferring skills to the people. We are thinking now in September to go there and see what is the performance now. we wanted to do a roundtrip then and to see and write one report. We haven't put a date to the trip as yet.

We are just monitoring the flowing of the money. But now we here there are issues and think that we need to do the performance evaluation of all of them

(Can you tell me about the RBIG)

All the muni apply to DWA for this grant. We evaluate them. Those that meet the criteria, we approve them. And they do the feasibility study. So that we weigh up the options with them. In the feasibility study they weigh up the options and the one they are taking. then they do they implementation readiness study to check whether they are ready. money, designs, instituional arrangement, then we approce it. RBIG is only approving the social component of the project. If the project is R200m and the people poor is 25%, we only pay 25% of the project and the 75% comes from the muni. so the muni has to give us insurance that they ahve that money. The money comes from NT but is channelled through DWA. We used to have money, there was this money called MIG. where we were doing the projects, now that money went to local government. Now we do the technical projects and sign off if we are happy with that project. They were saying that DWA has a lot of red tape a long the way so the money must go straight to local government. its water and sanitaion related the munis give it to us so that we can approve their technical report.

(The actual augmentation schemes that were selected, how is it that these technologies were prioritised?)

Those were prioritised by the munis themselves and then they come and present to the committee, what is there priority schemes and to justofy why these schemes. And most of them we know the problems in that muni. So it was easy for us to say this one. Also most of those towns didn't have catchment storage dams. because before that drought 3 months earlier there were lots of floods and all that water goes into the sea. 3 monhts later, a drought, but because of no dams they couldn't hold that water. because if you talk of building a dam, you tlak of maybe 10 years. the design, eia, all those things have to be approved by DWA. and the muni has to have money and these things were costing less, they were then the short term solutions. especailly for the munis, depending on the surface water. Some are using gwater. but engineers mostly want to use water they can
use.

(Having looked at the schemes and the URVs for these schemes, Desal is far higher. So there is a question mark as to why it was selected)

Its high, but at the same time you need the insurance. Especially those towns are growing fast and also there was the issue of 2010. Although the running costs are expensive we needed a short term thing to be done.

(What about the importance of forward planning. Sedge was in a position where they had 3-4 days of supply?)

The main issue was the funding. Everything was in place but funding was blocking them from doing this thing earlier. We found out also, they had no early warning systems. Although we have as DWA, we check the levels of the river, but the muni didn't access that info to see that the river is going dry. So when we were doing these things of the technical committee they used our records to check the trends. I can get you the information for rainfall, dam records & river levels from pre-drought to date.

The planning by the technical guys were there but the issue was the funding. And you know in muni's the technical guys are not on good terms with the finance guys because the finance guys say these guys want a lot of projects. Let's say we put that desal in sedge and the technical guys want a budget of R3m per year. The finance guys usually want to cut that thing. Even the politicians say no, we'll use R2m of the R3m to build houses for the poor. So normally the technical guys make a request & the councillors will say they give them 20% of the request. They don't know the houses are increasing the load on the WTW which is not coping. Because they want to be voted in the next election year. So those are the issues we face.

Also, you find water income generation is cross subsidising other expenses. They are not ploughing back in terms of asset management so those are the issues we are facing.

If they can just ring fence the money made on water, so it's not subsidising other functions, then they can have a great impact on the water infrastructure. So many of these guys have a 20 year plan but they can move slowly.

The NT money is only released in the case of a disaster. Ours was 2010/2011. They have to wait for a declaration, first do the assessment, table it to parliament, and if its not declared they cannot get these funds.

(It seems to suggest muni's are building to a disaster because there's no funding)

Yes, it would seem that way where the technical, finance and politicians are not talking to each other. Because if they don't do this thing, in the next 3-4 years this thing will be a disaster. Then we have to ask for money for something that we knew 5 years ago, this thing will come back. Now this year we'll say it's a disaster. Now in the case of Stellenbosch, they are in a mess. If you look at their infrastructure they are not investing money, some come 2 years time it will be a disaster. Then they are making emergency decisions. We take emergency decisions and then we find there's complaints.

(Is there no way for NT to make funds available in a more sustained way?)

Unfortunately that's how they work. They have to have that declaration because the funds are there for emergency but you can't just access any time only when there's a disaster. That's the only way.

I think the other thing was the lessons learnt and the way forward. But I'll send you a presentation on that and the way forward. So that if another region is in the same situation they can learn from us and not reinvent the wheel.
At Knysna the issue is pumping capacity. The drought was almost irrelevant in Knysna, it had a limited effect on capacity. That is drought per se was not the problem. The problem is that the planning needs to account for the pumping capacity. Therefore the most favourable solution in Knysna is increasing pumping capacity. Addressing this issue will result in the Akkerkloof Dam being filled. As demand increases more and more will be required from the AD, resulting in it being empty during the dry periods. However extra pumping capacity will help to a point.

Well designed infrastructure systems can cope with a 1 in 50 year drought. Knysna is at its limit at the moment. The biggest constraint to change this is the availability of funding.

Growth projections/ assumption are informed by historical trends, subjective opinion and, a link between justification, assumptions and the scheme proposed. Designing for a 1 in 50 year drought is a luxury as it comes down to affordability. Those at planning limit 'suffer' from drought.

The Sedgefield situation was slightly different from that of Knysna. It relies on a run of river scheme with no storage. Originally the proposed augmentation scheme was to supply from the Hoogekraal River but this was replaced by desalination. Which is 2-3 times more expensive. The justification for this is that desalination is environmentally more acceptable, but this is debateable because of electricity. Therefore you are shifting the environmental costs elsewhere. Desalination comes into its own in places such as Dubai which are dry with coastal strips. There they don't have any other option. In South Africa it is now being considered for the City of Cape Town and Port Elizabeth. The beauty of it is unlimited yield.

The argument that there was no alternative to Desalination in this case is absolute nonsense. It would have been possible to build a storage dam to supplement river supply. Also the explanation of climate change and its impact on rainfall is absolute nonsense. The river flow is cyclical and part of good planning is design for a 1 in 50 year drought.

Was it a disaster? Depends on how you define disaster. Maybe it was a disaster because planning recommendations were not implemented or were still on the way to being implemented as a result of a lack of funding.

Desalination functions as a quick-fix compared to dams which would have had to have been in place before a drought as it still has to fill. Maybe in certain senses desalination was the only option at the time. I don't know if boreholes would have been adequate. But now that the drought has passed what will they do with the desal?

If Sedgefield had a dam in place and filled it, we wouldn't be here. In Knysna, it was not a drought problem but a pumping capacity problem. Another problem is the lack of skills, and also DWA licences take forever. So the problems are pumping capacity, DWA reserve determinations and the lack of skilled municipal staff (technical). The
funding to implement planning is also a major limitation. As a result work is mostly given to consultants. If all the infrastructure was in place there wouldn't have been a need to panic and implement emergency measures.

**Interview 77 on 8 August 2012 – Disaster Centre – City**

Previously I was with the provincial disaster management centre within the department of local government of WC. I moved onto the city of Cape Town disaster management centre on May 2nd. At the pdmc I was involved with the recovery aspects. Part of my duties was to coordinate the late phase of the drought experienced in the SC and the Central Karoo Municipal areas. Previously I was in mitigation unit, so I became involved with the drought project in Jan 2011 and as you are aware the whole project began in 2009 already. But I was involved in the commissioning of the post event study where we appointed DIMP from the University of Stellenbosch to do the study for us. Normally in the National Disaster Management Act Provinces are required to do an in-depth study on major events. And in this case it was declared a disaster. And normally in this case we commission a briefing session or an in-depth study to determine the lessons, to take processes further in the future, or to correct actions where it went wrong, so its actually for the parties involved to see how they can improve processes in the future. And in this case the drought was over and all our coordinating activities came to an end. That's why we commissioned this briefing on May 5th adn that was followed by the post event study. Its not finalised yet, I think it will be available in the next month. Dr. Ailsa Holloway is the project leader and they are waiting for final input from DWA. Then of course it will be distributed as wide as possible and even to the national centre because they can distribute it to the other provinces as well.

maybe I can just give you some background. Within the Province there's the pdmca nd each of the 5 district munis have to have a district centre and of course the city of cape town. That's all requirements coming out of the disaster management act. So normally a local muni contacts the district muni, if they can't deal with everything they will contact the pdmc to assist them, because the province has a coordinating role. So we then try to set up coordinating meetings where we get the roleplayers together and try to determine what needs to be done and which parties involved can bring what to the table. In this case edm contacted the provincial centre, I think it is the first week of January. They contacted the pdmc to indicate they need trucks, for sedge. So then we started to get involved. Then the town of Knysna started to experience a water shortage problem as well. Then after that first of all the premier at that stage asked the department of the premier to set up a coordinating structure and come up with a report and that was compiled and finalised in April 2009. But the main problem was to secure funding for the towns. Then it got worse due to the lack of funding, then later the district approached the pdmc to provide assistance and the pdmc set up a coordinating structure and there was monthly meetings. First there was the drought decision support structure held normally in Cape Town where the head of department of local government chaired it with some critical depts like national dwa, agriculture came in later, environmental affairs and development planning because they need to give approval for EIA studies. And now it was a disaster and we needed to give them on board to go through the eias and give approval and of course provincial treasury and MIG which is within the dept of local government. Initially it was just the SC. You'll see on the map it expanded. Its the coastal towns. But it started on the Eastern side. Those were the decision support meetings and usually a week or two later it was the drought management meeting, the
more technical meeting, was held in George. Following up on decision made in the
decision support meetings, present were all the managers of the local authorities, the
same depts from the decision support meeting and I think the dept of social develop,
adn the sawether services. they used these structures to coordiante,monitor, support
and see what type of interventions is needed next. I think one of the findings is that
nobody used the same definition of drought, water scarcity. they all had there own
understanding of the terminology. that was one major finding now. one needs a uniform
definition to tackle any hazard. Also The SAWS predictions, at every meeting they gave
the prediction for the next 3 months or so, but we never used the maps from the SAWS
to predict. so when you look at the stellenbosch maps you can see how it got drier from
the eastern to westen side. so a finding is that in WC we must make use of the
information available. they need to look at the longer term scenarios and inform us and
we also need to ask them. Initially also the focus was on water provision in the urban
areas, soboby thought about agriculture. Also an official in EDM Dmanagement is an
engineer. he came up wit a monitoring tool indicating the availability of water in each
of the muni dams where colour indicated the danger. that was also a tool we sued to
monitor the water. another thing, through those soodinating meetings, the munis agreed
on tarriffs and water demand management. that was a positive thing that came out of
this whole coordianting during the crisis. Only later we founf out theres a problem with
the farmers. so we started to include agriculture in the meetings. monitoring the farmers
usage. Agriculture used there GIS system where they can actually see if its getting drier
in the area before they go into the area. So they only came on board later and then we
realised there's a major problem in the rural areas as well. that will also be a nother
finding that you must look at the urban and rural areas. in this report you'll see there's a
huge focus on the agricultural side. there's also a scheme where they provide fodder to
farms, following an assessment to determine which areas need droguth relief assistance.
based on evidence, agriculture will issue letter to the dept that they can apply for fodder
assistance [17:30min]. one of the good things of post event studies is that out of the
recommendations you can hopefully come out wit a policy changes as well. [eg.
challenges faced by farmers]. thats also one of the purposes, to see if you can influence
current policy. if its not working you need to come up wit a new strategy. Also
remember farmers are hit not just by drought, but they could also experience flooding,
fires. what the government and munis need to do is to get the info on gis so that they
can do scenario planning to see whats happening every year to same farms. At the CoCt
we are documenting everythign and putting it visually on maps for scenario planning.
The focus for us was only on municipal infrastructure that’s why our MIG engineers
needed to be part of it. Luckily they were in our department. But if you wanted to go
through minutes etc. I would suggest you contact the provincial dept. Jackie Pandaram,
the director responsible for operations, and ronelle Pieters were part of the process from
the start so maybe they have more information. Only in NOvemeb 2009 Central Karro
contacted us, about a problem in BW. the we also started to involve them. From the
PDMC side we are coordinators and if theres an application for funding we are also
repsnsible to obtain funding via the national disaster managment centre. I think there
were 2 rounds of funding. through the structures we get a feeling fo the seriousness,
then we ask the munis to submit info on it. we review it and establish the need, verify it
and then put it in a cabinet submission to our provincial cabinet. so we normally
forward it to them and every submission we will recommend to ask for a disaster
declaration or not. in this case with the cabinet submission we recommend that the
pdmc should start to liaise with the national centre to obtain funding. in this case the
prov cabinet approved it and we started to liaise wit the national dmc. they will
forward the request to NT that will evaluate the need and request outstanding documentation. Then NT also involve PT to determine if the munis involved will be able to cope financially with the burden. If not they will provide funding, but the munis have to do a lot of work as they have to provide the technical information. Also they don't get all the money needed, also the process of accessing funding immediately is problematic. In this case most of the munis did have funds so that they could proceed and then there could be a refund. But the problem is if on the other hand they do work and they don't get any relief funding then the cost is on them. So in that case it's the financially stronger munis that can do things as they can afford it, they don't have to wait for the financial assistance to arrive. The other thing that's still problematic for the PDMC is that you are responsible to coordinate and report to the national centre on the expenditure of funding received via declarations. The reason I'm saying its problematic is because normally if its infra money it will go through the mig unit in the dept to the munis. So its not coming through our budget so we don't have control over it. DWA will also do the payments directly to the munis. So that's still problematic as well as the time delay. I think that's more or less the problems. But definitely a uniform definition, a difference between a sudden and slow onset disaster. We need to work closely with the available tools, like the maps from SAWS and also use the GIS system to plot an idea of the problem areas. And then policy changes which we hopefully can do. I've already mentioned the time delay in the pay outs if we receive relief funding. And also what will come out of this report is that if the PDMC is the coordinator than all the roleplayers have to be honest and upfront with the information. For example DWA are a specialist, we don't have the info they have available to assist us. Also we were not aware of all the financial sources used. We were only aware of the funds we obtained through the national centre. Now in this report you'll see there was a lot of money coming to munis from various sides. That's also critical for me. You'll only have a complete picture if you know what was spent in total. That's also critical for PT and NT as they need to do modelling and keep record of what's allocated.

(The first thing you said that from this report it emerges that from 2007 there were signs of problems. So a question is what were the factors that prevented its identification?)

I think because it's a slow onset disaster. At the PDMC we were used to dealing with sudden things. That's why I said you have to focus more on the preventative stuff. Maps, simple modelling, I think we would have picked up more. We need to focus in that way so that we not just responding at a point of crisis. Because I think in that way we could also save a lot of money. So maybe in the future that could be a requirement. Because certainly I would look at the preventative slide. Especially if a post event study brings out information like this through the coordinating structures the PDMC relies heavily on the line depts. The munis engineers will indicate the problems and come up with solutions. Then we try to get the various depts involved to see if they can move money around or reprioritise in their financial cycle. Also if DWA or Mig have specific specialist studies on a muni they must bring that to the table so that we can use that in relation to info coming from the munis. (You spoke about the process of accessing funding through treasury. What did the PDMC assessing involve?)

Normally we have an assessment template we normally use to ask for information from munis and depts. The info we get from that we will build into the cabinet submission. In this case we asked for detailed technical reports after the problem was identified. The local munis will forward that to the EDM DMC. If they decide they don't have the capacity to deal with that, a local muni will get a council resolution for the declaration of a disaster. They will submit that with their report to the DM DMC. And the munis will ask for a
declaration of a local disaster because the act only makes provision for local, national or provincial disaster, you can’t declare a disaster for industry. That’s why with the avian flu they couldn’t declare a disaster as the fodder relief wasn’t applicable for ostriches. So anyway the local municipality will submit their council resolution and funding request to the Dmuni. If the Dmuni has 3-4 munis with the same problem, they will also make these submissions, then the district will assess it and if they are in agreement for the declaration of a local disaster, then they will get a council resolution and they will submit all the reports to the pdmc. We will use that as a basis, and go through all the reports. In this case if it related to DWA or MIG as it was initially with the infrastructure then we will also consult with them. So we try to be very transparent. So we look at whether MIG already allocated funds to a specific muni previously, from DWA’s side. If we decide to go ahead with it then we’ll put the info in a cabinet submission format. Where we ask prov cabinet to recommend the declaration of a local disaster. Then after endorsed we will forward the submission to the ndmc and ask for the classification and the declaration process. So in this regard they classified it as a local disaster. Then we’ll get the letter as well that it’s classified as a local disaster in terms of the act. Then the ndmc will liaise with NT, NT with PT, and again interaction of PT with PDMC as well. So that’s the normal process.

(What do you see more of the relationship between the pdmc and DWA?)
We worked closely with them as we involved DWA in all the structures. They were aware of everything. We sort of reached consensus on support. But in this case the funds went directly to DWA, they were responsible for the pay out to the munis. Also the municipal engineers and DWA were part of the coordinating structures there was personal interaction. DWA will then inform PDMC in the management meetings if there’s problems with funds and infrastructure delivery. Also if there’s delays with funds the muni will communicate with PDMC and we try to communicate with DWA to speed it up. In this case MIG mainly provided guidance and assistance because the money went through DWA. In other cases whether there’s funding the money will go through MIG and they will monitor the payout and provide assistance. But MIG and DWA were supposed to work closely together.

From the PDMC side you are not a specialist so your main role is coordinating, that’s why you need the various roleplayers. Pertaining to infra for the munis we got MIG and DWA involved. Environmental affairs and development planning were part of the structure in order to assist us with EIA approvals. Also they will give guidance to the munis on exactly what to do. We tried to involve everyone.

(At which point was a decision taken to declare a disaster?)
That was done more through the coordinating structure. But I assume that was after they assessed the problem. Everyone out their data on the table. In this regard the EDM told us they have a serious problem, they need it declared. But on our side we get all the stakeholders together and do an assessment and determine. That’s how the PDMC gets involved.

(come we go back to the question of the assessment. I’m trying to understand what the assessment involves. Do you assess the feasibility of the proposed schemes?)
As I said we normally have a template for things like flooding. For a slow onset disaster it’s a bit difficult. The munis will indicate their needs, and give the financial implications and the amount of water it will generate. We can’t just look at the short term we also have to look at the sustainability. That’s where we need the specialist departments on board. There’s whole discussions and serious interactions involved around that. Because the PDMC has to defend the recommendations to the NDMC and the PT and NT. Our view is to not declare everything as a disaster but to also look at other options. So we...
always look at other options. the disaster declaration will really be the last effort. we also look at reprioritising funding in munis and depts

(significance of the declaration of a disaster?) According to the act there needs to be an emergency fund on a national level. But that doesn't exist, but I think its simply because there isn't money lying around. But like I said if there's really no other avenue to obtain funding and if its really life threatening, munis can't cope or use their own funds, if its really the last source, thats why we go thorough the process. Unfortunately its taking long. normally currently the process is that they only sat in FEB and in AUGUST during the adjustment budget processes to look at applications. unfortunately not throughout the year. so reports liek this also needs to influence the access and availability and when they release the money. And also what we actually thorough experience advise the national centre, if we ask for relief funding, we ask for it to be made available over a 3 year, MTEF period, if its a major amount. because normally they gazette the allocation of funding in the DORA. So if they gazette the amounts allocated to munis in the DORA, if they've done it in December in the DORA for example, then most probably depts and munis can only start accessing those funds in February. Provincial and National depts end of financial year is end of MARCH, so normally you start to stop spending at the end of Feb, end of MArch, and in the case of munis the end of JUNE. so there financial year starts on the JUly 1st. So there's no chance that the dept can do it with in a month or munis in 3-4 months because you need to go out on tender. it normally takes 6months to get the approval to appoint ehn they can go on site. so on our side when its major amounts we ask for the money over a 3 year period. but in this case they needed it immediately. so it was required that the allocated funds were spent immedaitely. because they needed the money now, otherwise what's the emergency. So as soon as they got the funds they could start with the implementation and through our whole coordinating process up till the declaration of disaster the munis were actually forced to come up with project proposals, look at options. so they had the documentation available so they could just go out and appoint a service provider

(consequences of fast tracking?) There could be. Some might come out of the report. Maybe if we looked at the available info we could have known the drought was coming and prioritised projects earlier. But we didn't see the signs. That's on the bad side. maybe 2-3 years earlier could ahve looked at the projects. that would ahve saved some money, now it was critical and they needed high amounts

(NT has emergency funds allocation only released with disaster declaration. However if a muni id's needs but without the available funds…) I don't think NT will go for the option to release extra funds because they simply don't have it. I think the best would be for munis to monitor things properly then align planning and projects accordingly and see how they can prioritise. I think that's the only way otherwise you'll have a repeat. but it could be that national bailed the munis out and it could be that they will go on as they were with the assumption that national wilol bail them out again. So I think at some stage they will work on more stricter criteria. so i think thats will NT will do. look at the criteria and i think that will force munis to monitor. I know they have a shortage of capacity

(aside from weather patterns, have other factors been id's as having informed this crisis?)
I think it’s the silo effect within munis and depts. I think if everyone works closer together then you'll get a more complete picture of what’s happening in a muni area. Because I think to a certain extent everyone is still doing their own planning and not trying to align depts with munis. There is an effort, but it needs more. If various spheres of government work more closely together on the decision on the allocation of funding the silo effect could be solved. There is an effort but I don’t think its working 100%. Sort of in a crisis you are forced to work together but through that you solve a lot and also the people from different depts and munis come to know each other. The challenge now is to implement the recommendations make sure its not just a report that will be filed. (Once the sense of a disaster dissipates, what happens with the relationships?)

Lessons were learnt. That’s why through this post event study we put it on paper. I think it’s a positive aspect of the Act. But now you need a driver to implement things. Like if the pdmc is commissioning the report the pdmc must make sure they follow up on the findings and recommendations of the report. But definitely if something happens in that area in the future than a municipal engineer will know who to contact at mig or dwa etc (in the assessment done by pdmc were there question marks on the prominence of desal?)

we don’t have the technical skills on this. That’s why we relied heavily on water affairs. That’s why before we forwarded the submission to the cabinet we first consulted with everyone, in this case dwa has the specialist engineers working in those areas.

In management you are busy dealing with many things at the same time. So unfortunately for me the downside is you cannot do a detailed study. That would be the ideal but unfortunately you don’t have that luxury. That’s why the assistance of the pdmc as a coordinator could come in, especially if they commission studies like this. If you pick up something while you busy with your research please feel free to contact me and also Dr. Ailsa Holloway and Ronel and Jackie will be able to make the report available to you. Also when you go through that report itself you might have other questions.

**Interview 78 on 7 August 2012 – Department of Environmental Affairs & Tourism – Provincial**

I’ve been involved with eia’s since 2002, under the previous conservation act eia regulations where I was appointed as Environmental Officer, then with subsequent promotions I’m now one of the managers. But in 2005 I was appointed one of the assistant directors in land management with a EIA component. So I’ve had a lot of exposure to EIA administration. Before the Section 24g unit was established which I’m currently head of now, I dealt with Section 24g in Land Management in the EIA component. Where we did the normal EIAs and Section 24g applications. The unit is quite new. It was established in April 2011 so it’s just over a year old. And was successful, I did ask for a transfer but they wouldn’t accept it, so I applied for the position.

The EIA component handled the section 24gs as well. But there was a need to divorce the other functions because it was too much for that unit. Appeals is also a new unit that’s been established. So I suppose the other functions needed to come off, it was identified as a need. The Gauteng province has had a section 24g unit for a number of years already. Within the WC its fairly new. I’ve been the head of the unit from 21 November 2011, 2 people were acting in the capacity
Well basically, we started off with the environmental conservation act EIA regulations and that was subsequently repealed in 2006 under the NEMA EIA regulations. Now what section 24g is, is a section in NEMA that allows for an administrative procedure, called a section 24g application, for an applicant who has unlawfully commenced with an illicit activity, can apply for rectification, in that particular provision it allows for an EIA to compiled and done in a report. And that included, as part of that report is an EMP and a description of the mitigation measures and public participation. SO its basically your EIA but thats done retrospectively. The difficulty you have wit Section 24g is that you have to consider post commencement. you have to do an investigation that is post commencement. So its like post construction. you know there's a readiness an impact on site. So you need to consider what was the impact prior to and after construction. that is what we look for in what.

(From what I understand, there seem to be 2 strong implications of section 24g, the first is the order, and the 2nd is the speed at which it takes place)

In terms of the WC we don’t really fast track the application we still require an EIA to be done [should have clarified that is the construction process that gets fast tracked, not necessarily the EIA]. Its not the same in all the Provinces but in WC we do require that. I'VE ACTUALLY STANDARDISED THE EIA REPORT FOR THE WC. SO I CAN GIVE YOU A COPY OF THAT. BUT IT DEALS WITH PRE AND POST COMMENCEMENT IMPACT SO YOU GET A BIGGER PICTURE AND MAKE SURE YOU CAPTURE ALL THE POTENTIAL ASSOCIATED ACTIVITIES WITH THE LISTED ACTIVITY THATS BEEN COMMENCED WITH. So its a lot more concise than people would assume it is. the assumption is that it is fasttracked but its not actually. Becasue I do come from an EIA background I do tend to fall back on what was the requirements under the eia regulations, so i've implemented it here to make sure that there is a set administrative process in place to do section 24g applications.

(These things that you've now put in place, did they exist prior to the unit?)

Like I said section 24g was dealt with at land management, eia component. And there was an application form that also took into consideration the env impacts. So that application form was a combined eia report if I can say that. And there participation required in addition to that report and an EMP as well. so there was a set process, but not as set as it is now.

(You spoke about ppp, I know in the case of the emergency declaration in the EDM, they did undertake ppp, however the ppp didn't influence the decision to commence. So in the instance of section 24g, what is the significance of ppp)

Because section 24g is written up in an eia report, the public then has the opportunity to look at what are the impacts and what were the mitigation measures put in place, even though its post impact [here she refers to participation following construction, unlike what was done in the case of knysna, or referred to by knysna actors when asked about], they ahve that opportunity to raise their concerns if any and even to jsut comment on it. its not to say that if its already constructed that its a fait accompli. in terms of section 24g you can actually direct them to take it down or rehabilitate the site.

(Have there been instances where the report has been written and the ROD has been that its enironemntally significant?)

Most of the section 24g are not. Most of them that we have don’t have significant impact so it doesn't justify rehabilitation. But there's one that we have now, where an applicant has diverted a river. So we'll be directing him to rehabilitate.

(The statements I've heard from some interviewees is that section 24g is being abused a loophole)
I think the reason why its seen as that is because the applicant has an opportunity. Like I said in this particular section it says that the applicant may apply. But it does not mean that the enforcement will not still go forward. So it possibly could undermine the enforcement mechanism. but at the same time it supplement the enforcement mechanism if it is shown to ahve impact. but it doesn't justify the unlawful activity. 
(The reason I say that is because in a standard EIA, if you take case of a dam for example, its possible that that entire process could take years before the permission is obtained. So it becomes quite a lengthy process, whereas where the applicant would satte that because it was an emergency and then apply post construction, they've essentially bypassed that entire lengthy process)

It depends on the activity in terms of section 24g we can still direct in terms of the particular activity that’s been commenced with either to do a basic assessment or a scoping eia. So just because the EIA is longer doesn't necessarily mean that the information collating during the process is much more concise than a shorter process. the length of the process is not necessarily indicative of the infomration requirements

(Sure, its more a question of implementation)

It rerms of how the appointed practitioner manages that process, that’s where it comes in. because a lot of the EIAs that I've been involved in is because it was poorly managed and not because the information requirements were stringent.

(can we move to this particular case, you said you started later with it. I can understand with the establishment of the unit only in 2011. what has your involvement been)

I've had no exposure to the case. At the moment its just an application that’s been submitted and we're waitign on the EIA [??]. But for that there was a number of requirements coming out of the ppp where there's been authorities involvement where they've requested certain reporting to take place and that is why its taken this long to get to our stage.

(I've been told that the case of sedge, the approval has been provided already for the desal plant)

Oh, I thought you menat Plett

(You know there's sedge, knynsa, mb & plett. And all of them have either got desal, or ro, essentially the same technology. I'm just wondering if I wanted to find out the status of the eia application of each of those, where would that info be housed? )

It would be with me, but I would have to check the database. I do deal with many. You're welcome to send me an email. We can trace the status for you just tell me the particular ones that you want. You said the desal in Sedge has been approved? Could be. The RO, for section 24g there's a fine, so the fine went out this week, the one in MB. If you send me an email I can tell you the status of the projects.

I think the boreholes would have come out as the alternatives that were considered. So in terms of the reporting it would have come out as the alternatives considered and the viability of that would be reported in the reports.

(I would be interested in the status and secondly the process they followed given that they made use of section 24g prior to the unit. So it would be interestign to know the process they followed versus what you're have now streamlined)

Well there was definitely an EIReport as part of those processes and ppp. But we can do that for you.

(You've spoken about the change in the legislation. Is there any background documentation)
We have a standard operating procedure drafted in 2010 for section 24g. I can give you that version. That will give a bit of background of what I call the vacuum periods. There was one specific vacuum period that section 24g couldn't be utilised that was when the section 24g allows for the provision for the retrospective rectification of the unlawful commencement of a listed activity. So in 2005 I think, you could first use in terms of the eca regulations section 24g, so you could apply, the first time it was utilised. because there was no mechanism in eca to rectify post commencement. and it was called the amnesty period and then, i think it was 2005. then there was period where between, there was about 6 months a person to apply Jan 2005 - July 2005. then from July 2005 up until the 2006 nema regulations came into place, section 24 g couldn't be utilised, that was called the vacuum period. Then from 2006 onwards section 24 g was being utilised for all eia listed activities. then in 2009 it made provisions for whether there was still similarly listed activities under teh eca regulations you could still apply for rectification for something that was done unlawfully under the eca period (you can understand how there would be a question mark as to how section 24g allows those that have committed an illegal act to be legitimised legislatively) Ja, I would say that there was a need for it under the eca act, when we were busy with the eca regulations. Because if you did something unlawfully but you were willing to rectify that unlawfulness then there was no mechanism for you to do that. Then you would have to go a court of law. and obviously there wasn't always significant impacts associated with that. So to criminally charge somebody where there was no significant impact didn't seem just. therefore there was a need identified particularly for your municipalities. You know where they provided a basic service. so like you said it was an an emergency drought they ahd to provide water services to the community. otherwise they fall short of their mandate by not providing that basic service. So therefore that mechanism was recognised and implemented. and also if you have a facility that was constructed unlawfully and you have no mechanism to rectify it, but you want to improve that facility, then how do you rectify that unlawfulness and at the same time try to improve it, that would also potentially require an EIA. Because you can't do an EIA for something that you maybe want to improve and yet the existing facility is unlawful (how do you prevent exploitation of section 24g in the initial commencement of a project?) In the initial commencement fo a project.. I think the role that we have is to show that section 24g is not the fast and dirty process. You are still required to do an eia. I have tried to adopt the basic assessment process. And in the case of section 24g you require the ba for pre commencement and post commencement so its a lot more stringent. once applicants realise that then they wont fall back on the s24g and see it as a get out of jail free card. And with the s24g there's also the fine imposition where you can fine a person up to R1m, and with the ammendments of NEMA thats currently in draft they want to increase that to R5m. So you have to still basically do an EIA thats goign to cost you money, pay a fine, adn at the end you may still be redirected to take down. So there's no guarantees with s24g that you're goign to get an approval. but the perception is liek that because there's not a lot of applications that have shown that s24g is not actually that mechanism. But I hope to build a case for that (Would you say there has been a change since the establishment of the unit?) I am trying to influence the perception fo s24g. I went to a national task team last week where I basically conveyed my sentiments of what s24gs should be utilised for that they should still require an applicant to do an eia that covers both pre and post commencement impacts. And then also we are hoping to build a database where we can id repeat
offenders, where we can then so automatically the fine as at R1m

(I was going to ask whether there's any monitoring in place or some database that recorded all the s24gs)
Theres currently a national database where all the provinces have to report on a yearly basis, the necer. Its an env complicity enforcement report. They do make provisions for s24g in there. We've been asked to now complete that report possibly on a monthly or quarterly basis just to build that record on repeat offenders. We've also made some recommendations to s24g now that nema is possibly going to be amended. not all of them were accepted by national legal services. But what we suggested is that the env management inspectors be given the power to direct somebody to do a s24g. but i think they said it was unconstitutional. Then obviously we're looking at potentially how for the future we can use s24g so its not abused. because its either s24g or enforcement. and we dont want that s24g undermines the enforcement mechanism. at the moment its voluntary.
(From what you saying its sounds like something in the making)
You see with s24g, national knows an application has been submitted it can undermine the enforcement action. But at the same time they still and doing the enforcement route because there's no guarantee of a s24g. The mechanism is an administrative action its not the criminal procedure that's been taken. so there's a difference between them.
(Im going to email you about the contact details of people at land management, and then the status updates on the various plants. Is there anything on the unit and legislation you'd like to talk about?)
It's a fairly small unit, just 3 environmental officers that's been established positions of which only 2 is permanent. I would have liked somebody in the George office but funding is always a problem. Theres a national task team and I've known the people at national for a while now so we are in contact formally and informally. I also want to set up a meeting with gauteng to see how we can learn from each other.
(From what I've understood the applications went to national, to fatima rawjee. So I'm trying to understand the channels. How would it have worked prior to the establishment of your unit?)
She's in legal. Well the 24g reports you referring to would have gone to land management in the george office. But because they also deal with eias in general they would have put it through a rigorous eia process. It was then moved over to our unit following its establishment. with the applications still pending, where the fine has not been issued would come over. it would stay with land management in the eia component of this dept. we have 4 subregions in the eia components and the george office is one of them they're called land management region 1 i think. the 24gs were dealt with under those geographical areas, whereas now this component deals with the whole WC.

Interview 79 on 17 August 2012 – Western Cape Infrastructure
Notes taken at Interview 79

The Unit oversees MIG money allocations. The allocating agent for MIG money for water infrastructure is the Department of Water Affairs, whilst the money is received from the National Treasury. That is the DWA functions as a conduit, that also monitors the allocation.
In order to track MIG allocations over a period of time for the KLM the best approach is to find this information online where one can view the DORAs (Division of Revenue Act). In this case the disaster money allocations coming through the MIG would also be tabled through the DORA (all allocations would have to go through the DORA and be gazetted before the money can be released. However the interview did not know much about the allocations relating to the Disaster and how it works. This information should be available on the Municipal Infrastructure Grant website.

MIG is allocated for bulk services. Whereas the Department of Housing looks at service delivery at the point. Provincial MIG looks at the monitoring and support for the delivery of services. National looks at overarching policy setting and oversight.

Monthly meetings on Provincial MIG allocations are held in Worcester where the MIG Programme Manager and Municipal Engineers meet to give feedback on expenditure progress reports. New applications are also appraised, and monitoring of associated expenditures, including site visits, meetings with officials. Monthly minutes for MIG meetings could be made available if I require them.

**Interview 80 on 16 August 2012 – Consultant**

My involvement has really been with the sedge desal plant and I don’t know if you are including the mb desal. I guess my involvement is for the sedge eia for that myoli beach desal plant. I was the marine specialist on the project. It is a 24g emergency eia application. We were appointed to do a marine specialist study by capeeaprac. from my perspective its actually a very small desal on an international scale. It's discharging about just under 2MI per day of brine. when they presented the initial plan to us thye were going to pump seawater out of beach wells and then pump brine back into beachwells a bit further down the beach. I was very comfortable with pumping water out of the beach wells. As a source of water I thought it was a clever idea. it was prefiltered and reducing fouling which is the growth of marine organisms on their pipes. it reduces the need for anti foulants because when you're pumping seawater directly out of the sea. Eventually it comes with little sea eggs and larvae that settle on the side of the pipes, just as thye do on the side of a ship. As they grow they restrict the flow in the pipe. SO they have to use anti foulants to restrict the growth. often something that's toxic to marine organisms. So their approach for the abstraction of water out of beachwells was fantastic as its filtering the seawater through the beach sand which eliminates all the eggs and larvae. So it eliminates, largely eliminates the need for any pretreatment or cleaning of their pipework. Because usually what happens is that they clean their pipes with anti foulant or toxic chemicals and they want to pump it back into the sea, which is obviously a bad idea, so I was very happy with that. BUT I was concerned with their proposal of pumping the effluent back into beachwells on the beach because I didn't believe for a moment that it would. Trying to pump water into a whole in the ground which is already full of water, for me is not going to work, its just impossible. So I think they eventually agreed with that and went to a system where they would be just pumping it, they would have a pipe that was buried in the shallow surf zone, maybe 20-30 m from the beach. that would be buried under the sand and then emerge in the surf zone and then discharge directly into the breaker zone. I felt that had more chance of success, but i did highlight that the amount of sand movement on the beach is hige. in fact more than i had imagined. and what happened after short period of time was the discharge pipes were broken off. what happens on that beach is that sand
level can vary by about 3m, over the space of a week. which is week. so what happened was it exposed their pipes and simply broke them up. so what happened from that point was the effluent was flowing up, welling out onto the sand surface above the low water mark and then flowing down the beach into the sea. which upset the locals obviously because they are using it as a recreational beach. its unsightly having what appears to be toxic nasty stuff flowing out on the beach into the sea. so that caused a lot of controversy during the EIA process. My recommendation at the time was always that the pipe should be taken a substantial distance offshore beyond the breaker zone. from an aesthetic point of view but also from an environmentally friendly point of view. I'll explain why now: The surf zone environment of a sandy beach is an interesting place from a water movement perspective. When waves approach a shoreline, the always approach almost parallel to the shoreline. Or even if they are approaching from an angle from out to sea they will turn to move parallel to the shoreline. What happens on a sandy beach is as these approaching wavelines approach the shore, anything, surf zone is a closed system, there is very little exchange of water between the breaker zone and water offshore. so anything that gets discharged like heavy brine. the brine they produce is about 60 parts per 1000 of salt. so thats 60mg of salt per kg of water. Normal sea water is about 35 parts per 1000. so its about twice as salty as normal seawater. and the more salt you put in seawater the heavy it becomes, so what happens is it tends to sink to the bottom. so if you pump this brine into the sea its very heavy so it just sinks to the bottom and tends to sit there. In the surf zone, very dynamic, waves are breaking, so it tends to get mixed into the water column very quickly. If you pumped it into a calm bay it would just slide to the bottom, but in the surf zone there's a lot of mixing. So when the brine goes out, we did a lot of monitoring on the beach. Our initial recommendations came in before we did any monitoring and my initial thoughts were that its not a good idea to put this brine into the surf zone. Because everything we know about surf zone is that its a very closed system. there's very little exchange between what's going on in the surf and the water offshore. so anything you put in the surf tends to get trapped there and gets funnelled along the shore in one or other direction. And stays in the surf zone and doesn't simply get dispersed offshore. So I said it was very uncomfortable with the whole idea of, even the initial idea of putting the initial buried pipeline and coming up inside the surf zone, i said i was uncomfortable with that and i was even more uncomfortable with the fact that they were just flowing it across the beach. My recommendation was that they should go out beyond the surf zone and that the effluent should be discharged beyond the back of the surf zone. But the argument was that it was very expensive and that it would cost them several million rand with a pipeline to do that and that it was a very small desal plant. and they couldn't afford that and this was the only thing they could make work. And it was an emergency, they said well we are in emergency situation we simply have to go ahead with. we can afford to ignore as a marine specialist (Just to be clear, you are saying that the factors influencing your recommendations not being taken forward were funding and the emergency status?) Yes, as a factor there was that they absolutely had to have some water and for them this was the only reasonably feasible way they could get it and that they didn't have the funds to build a 300m long pipeline say, to take it back to the surf zone.
One would hope that the competent authority would have looked at the recommendations in the specialist report with a normal eia and acknowledged the severity, or my perceived concern around that and said a compulsory mitigation measure would be to out the pipeline beyond the surfzone. But it gets worse than that. Because it was an emergency application, s24g application, we insisted on monitorig the impact. Because the authorities don't have the luxury of considering the eia application before the project goes ahead, that's why it is fortunate in this situation the authorities generally insist on monitoring, whereas often with an eia the specialist makes a recommendation, some mitigation measures, the rod/e is positive, very often there's no subsequent monitoring, so if I guessed wrong nobody would ever know. It's a problem with our eia system, that there's very little post construction monitoring required in the eia process. In the 24g process there's a much greater emphasis on monitoring because we haven't got the luxury of being able to consider the application prior to authorising the development or not. So in this case we made our recommendations, I don't even think, I'm not sure that it even went to the authorities, the recommendation to put the pipeline beyond the surfzone. They were going ahead anyway and they said this is all we are going to do, please access that. The initial was put the pipeline in and discharge it into the surfzone. I said I'm pretty sure that's not going to work it's going to break off. A month later the pipe broke off. Then they were going into the surfzone and I said I don't like that because I'm pretty sure all that brine is going to be retained in the surf. And they said, we can't afford to put it offshore, they went ahead with it anyway. But we were given the mandate to monitor water quality and intervals along the beach. So we set up a number of monitoring stations and 0m, 50m, 200m, 500m, 1000m. I think we stopped at 1000m from the pipeline and we went both in an easterly and westerly direction, and the what the result was was that as soon as they started discharging effluent into the sea we were able to pick up elevated salinity levels up to 1000m from the pipeline. Now I initially proposed a 1000m point as a control station where I didn't expect to see any impact and the idea was that we may see some impact at 50m, 100m, and maybe even 200m, but the 1000m was far enough away to act as a control station. Turns out that this particular situation is even more of a closed system than I expected. Because the surf zone is so highly retentive on this particular beach. Normal seawater is about 35 parts per 1000, and we were picking up 36 parts. And many people didn't believe the results and I didn't either initially and we were challenged repeatedly. But we were able to show quite clearly that when the plant was running we could pick up those elevated salinities, because the plant went on and off and was running at half capacity, then it was running at full capacity and most of the initial time, the plant was only running at half capacity. But as soon as it went to full capacity we were able to pick up those elevated salinities. Then it went back to half capacity and then it turned off. But our initial results said there's a problem in the plant, we actually extended the range of the sample, extended the intervals to 2000m to see how far it goes. I don't think it ever extended beyond 1000m for me it was quite a unique situation. I'll give you a lesson on beach morpho dynamics. You have a beach over here, you have approaching waves. This is called a bar rip beach, the kind of waves that form in very high energy conditions. You get this offshore sand bars that form parallel to the beach. The waves come, they break on the bar as they come in, then they gradually roll into the beach and break again on the shallow water on the beach. So there's a huge volume of water moving over the bars onto the beach and effectively it gets trapped there, you get rips that form in the gaps in the bars. So in a situation like this, depending on how long across the back of the beach offshore, the bars is. What seems to be happening at Myoli is that under very high wave energy
conditions, these bars all kind of link up for a very long distance, so you get a semi continuous bar for up to 2km across the back of the beach offshore, so when this brine effluent is discharged it goes along the beach for 2km before it can find its way offshore. so this inside surf zone area has elevated salinity for a huge long distance. my recommendation initially was you got to put this thing beyond this back of the bar. But this particular beach was much more retentive than I'd ever encountered before and I think many other people had ever encountered before. So when we got the results of te monitoring work. I sent another recommendation saying that we are enforcing our original recommendation, saying that you ahve to absolutely send this effluent offshore because, although much of the time you've got this interrupted bar situation, the effluent will only leave the end of the pipe and be trap along the beach for maybe 100, 200, 500m depending on how far the first gap in the bar is and then go off shore. but under certain circumstances you are going to have a much greater impact where elevated salniity is going to extend acroos the whole length of the beach. One thing about seawater in terms of salnitiy is that its incredably consistent. so elevating salinity from say 34 to 36 is quite a significant issue so many marine organisms cannot tolerate that because they are used to the environment fluctuating within a very narrow range. For me this was quite a significant impact. the long and short of it was
I was very unhappy, I was particular uncomfortable with this process because our results were challenged by the municipality. They said that they didn't accept our results and there must have been an error with our measurements. Because we didn't get that elevated salinity consistently, it was only under certain circumstances which corresponded with when there was the almost continuous bar across the back of the beach. that bar seemed to form under calm conditions. and typically calm conditions are in summer when they wanted to run the plant. so i was very uncomfortable with that. i said there's a high likelihood that you'll be running the plant when you've got an extensive bar along the back of the beach and there's a hihg likelihood of having high salinity water being trapped and impacting on fish or anything that tends to favour that zone. But the muni challenged that and tried to duck and dive and said there was errors with our measurements. Disagred wiht our results, they didn't like our results. I was also unhappy with the way the eia practitioner carried forward our results. You see what we said in our specialist report and what went into the eia report, they didn't really speak to each other. I was unhappy about that and made my concerns known, but i never really got anywhere. So generally i was a little bit uncomfortable with this project. Givven that it was a retrospective 24g type application, given that we knew so little about the potential impact, that this was novel technology being untrioduced, i was very uncomfortable with the way the process was handled. I know there's not a lot the authorities can do with a 24g application. but i guess there should have been more emphasis on taking cognizance of the results of the monitoring. I think it was very good that they insisted that there was detailed monitoring but i dont hthink that they paid enough attention to the results of the monitoring. I was also unhappy that the project proponent was a governemnt agency who shoule have been more environemntally conscious. I can understand private industry having minimal ethics. The muni were the proponent of the project and i feel they should have given more concenr for the environemnt. when the results showed that there was a problem with their project and instead of ignorign them and trying to discredit them they should have taken it on board and said yes there is a problem we have to address it. But they kept coming back, ' well we can't afford it, so we just have to go ahead, tough'.
Then I don’t know what happened in the long term. I know they went onto a system when they were going to only run it at peak holiday seasons, and not surprisingly with their first summer season they gave the job to someone else to monitor the water quality after that. I suppose that didn’t surprise me but I suppose that it disappointed me that the muni were dodging their responsibilities in my opinion.

I’ll give you my specialist report, you’ll see, as a specialist one very seldom bothers to read to the 24g application thing. You know you are asked to do a job as a specialist and you do your work, submit it without your recommendations. And just in this instance I read this particular report and said that doesn’t bear any resemblance to what I said and I went and looked at it in more detail and I said I’m very unhappy with what you’ve done with my recommendations, you’ve underplayed what we were saying and you haven’t reflected them fairly in the final report. The environmental assessor’s role. I’m uncomfortable slagging them off because I think it was an aberration on their part. I’ve done a lot of work with them subsequently and their approach has been much better. It was just with this project that things went awry.

What do you think cause this situation to go awry?
I think its got a lot to do with personalities and trust. So 3-4 years later we’ve built up a much better relationship and I think they have a higher level of trust and respect for what I do and I think retrospectively would regret what they did there. But the exparc has to trust implicitly the specialist if they think that the specialist is maybe being a bit alarmist, then they might play that down. or if they are being pressured by the authorities they might play it down. It can arise from a number of different factors. If the exparc is sympathetic to the pressures or requirements of the project proponent then they are likely to play down or trust with the specialist. I don’t know what was the case here (You said you were uncomfortable with the process. Would you like to say a bit more?)
About the 24g process, I don’t like 24gs because they, it’s a dangerous thing to allow someone to. Its like, its easier to ask for forgiveness than permission. You do something and its simply too late, so all you can do is mitigate it afterwards. So if you've made a giant mess you can try and mitigate it afterwards, but its not ideal. I ccept it was an emergency, disaster situation, my main concern wiht the process is tha the disater is now over and the plant is still operatin and they havene't mitigated in the way that i consider a sufficient manner. because they are still discharging in the surf zone. in fact i think its still flowing across the bach. ok i dont know what else you know about the project. but whith the effluent when the pipe got broken off, quite hihg up above the beach, what happened was it was flowing down the beach and cause serious erosion down the beach. what happened to the beach was , it looks like this, there' s a high dune. they were discharging their effluent, and the beach developed a notch where the effluent was flowing out. what happened was it started eating into the dune and this whole dune got eroded to the extent that these houses at the back were threatened. i felt it was highly irresponsible. I dont feel, 24g emergency is fine but then you've got to fix the problem once the emergency is over and 3 years iter it hasn't been fixed yet. MAybe its not the authorities fault because my recommendations were never carried adequately forward into the eia report but then the authorities should ahve taken the trouble the specialist studies in detail and pick them up
The eia process requries that all the specialist studies are included as appendices in the eia report. But I suspect few people bother to read through all the specialist studies. Normally an eia comes all this documentation and one person has got 50 of them to read and they just move throught them and dont bother to read everything in the sort of, spend the amount of time that they ought in these things
(In the people I've spoken to so far, the brine discharge has been communicated almost as a non issue. As the findings of the eia were that its not of sufficient concern to merit any mitigation. So this is the first time that its mean strongly communicated otherwise?) I Believe it is a concern and I believe its been underplayed. For me our results were quite unequivocal. It showed there was elevated salinity. What we know about marine species and sensitivity to salinity showed our concerns were warranted. The local stakeholders were very concerned. I suspect the impact of the plant would have been more important on timny larvae, that sought of thing. wich is not that easy to observe in the shorter term
I would have expected more care from the muni. In terms of nema they are expected to apply duty of care. I expect the private sector to oush their luck, but I would have expected the muni to exercise more care
(Do you think private actors had an influence on municipal positions?)
I suppose the operators and people constructing the plants would have pressured the muni, that this guy is being a bit alarmist or extremist, or whatever
I still feel that the process was not handled conrectly at the end of the day and I suppose a number of people had a hand in that. And for me that the plant is still discharging on the beach for me is wrong. Due process wasn't followed in this instance. i dont think the 24g process itself is necessarily flawed. I think its a necessary evil. i dont think the eia process in this country is that good either. I think its a necessary evil, but handled properly i think the outcome should be reasonably good.
(Do you think that due process not being followed was made possible by 24g?)
Yes, the project would have been less likely to have gotten away with it under a regular eia process, so yes. Ordinarily we would have recommended, given that we know so little about these plants na discharge of effluent from these plants into certain environments, we would certainly have recommended detailed water quality monitoring post implementation and if that recommendation had been adopted then hopefully the problems would have been exposed. But my experience suggests that there’s no guarantee anything would have been done about the problem, even in a normal situation. So one could only hope that with a normal eia process the problems would have been handled better, but I’m not 100% convinced that’s true.

**Interview 81 on 27 August 2012 – Disaster Management Centre**

**Notes taken at Interview 81**

In terms of Desalination, some municipalities were way ahead in planning. For example George already weighed up options and established that WWR was the best option as they are too far from the sea. Therefore desalination would have been too costly.

In the S.A. Context municipalities have relied on desalination to date. In this sense the drought response was groundbreaking, but was also the right thing.

In the emergency case we aimed for conjunctive use. Borehole supply is not entirely reliable, therefore we needed innovation, and DWA assisted the municipalities with various augmentation schemes that were context specific. For example in Mossel Bay, the industry is PetroSA. They looked at a solution to benefit the industry and municipal resources.

Desalination was selected as engineers had to look at their options in dealing with the problem. A regional consultative approach was adopted, weighing up the positives and negatives. The PDMC assisted in assuring water security and the municipalities were responsible for taking things forward.

Imagine the consequences of having no water. People would be dehydrated, there would be medical issues, deaths. Therefore if you don’t have any water in the dams and need to ensure water security, what do you do? Therefore in that situation desal was the better option and taking into account there was no favourable rain forecasts. Therefore it was necessary to plan for the worse case scenario.

The Karatara River ran dry. This had never happened before. If they had a dam then they could have managed, but the river ran dry and no water was available.

When you have a disaster declaration then it is a condition of the legislation that a post mortem is carried out. We had a disaster briefing in 2011 and an output has been a disaster assessment report.

The role of monitoring the schemes post implementation is the responsibility of the DWA as allocating agent. This is linked to their overall mandate of water security.

There is information available on weather, rainfall etc. from the South Africa Weather Services (SAWS), but it is the responsibility of municipalities to obtain and utilise this.
Whilst this information is available a finding of the drought report was that this is not utilised in project planning.

**Interview 82 on 29 August 2012 – Department of Agriculture**

**Interview 83 on 30 August 2012 – Academic**

Notes taken at Interview 83

The drought assessment report is an unprecedented report. It includes information on parts of the EDM that go back some time, with 3 500-4000 records were reviewed. The report covers the Southern Cape area, central karoo and traces deficits from 2008 to 2011. The focus is also placed on the urban/rural relationship and dimensions. With a further focus on rainfall, surface water, the social consequences, and the costs of drought and the related drought response. In reviewing the costs of the drought response, the report was developed through examining treasury records, and the national adjustments of expenditure report.

The Outeniqua Coastal Water Situation Study identified a water shortfall years before the drought. The drought resulted in an accelerated response. That is, it provided the motivation for the implementation of interventions. It can be said that the drought resulted in funding release for projects that had already been identified pre-drought.

The drought assessment report is the most detailed in the history of South Africa. The report documents the funding mechanisms drawn on in the drought response. The research is located in the Disaster risk discourse on coping and adaptation. This report locates the analysis within a political ecology lens. The drought coincided with the global economic recession. The dots were not connected in the drought response regarding the floating of cash combined with the threat of failed infrastructure. A key argument of the report is that the problem was incorrectly framed. It questions the conceptualisation of the drought. It effectively sees the drought discourse as framing a catastrophe to justify access to emergency interventions that in fact had been identified as development interventions before. The drought was used as a scapegoat, as a convenient crisis.

**Interview 84 on 12 September 2012 - Municipal Official**

**Interview 85 on 12 September 2012 – Municipal Staff**

**Interview 86 on 16 July 2012 – Sanparks**

**Interview 87 on 20 June 2012 – Consultant/ Informant**

**Interview 88 on 25 July 2012 – Meeting**

Notes taken at Wilderness Lakes Water Forum (WLWF) AGM – 25 July 2012 (Includes notes on discussion & my own questions/reflections noted in observing the meeting)

Agenda Item 3 – previous minutes – matters arising. Minutes have been circulated, and the constitution of the forum has been distributed.
Question on the development of a disaster management plan for Sedgefield

Discussion on relationship with officials from Sanpark. MY states that what is needed is a more cooperative as opposed to antagonistic relationship with Sanparks

Discussion on the cost of water treatment through various means. According to LH the desalination is only run on the weekends during the 'cheap' electricity. A question is posed on whether the calculated costs per kl are reflective of real costs or just running costs. LH responds that she believes all the costs are reflected in the figure R9/kl. AF said that a conversation has been had with RN and this has to be confirmed, that the figure is reflective of actual costs – includes accounting of capital costs – and not just running costs.

Update provided on Sedgefield water system:
The Karatara River is flowing
Borerholes are working well
The Desalination plant is being operated on weekends, off-peak
Rainfall in June totalled 141mm at the RWTW
The Karatara River is flowing strongly

TC: The Karatara always yields more water (than the Hoogekraal) under the same rainfall conditions, therefore the Karatara is the key in terms of floods.

LH: The DWA has signed off the reserve determination for the Outeniqua region. This has been going on for the last few years and it is unclear what 'signed off' means. LH will start asking more questions on the issue. The weir on the Karatara River is being held up because we don't have a reserve determination for the Karatara

Interview 89 on 3 May 2012 – Meeting
Notes taken at Planning & Development Committee Meeting – 3 May 2012

Very formal process of communication

ANC Youth League councillor with t-shirt, 'Economic Freedom Fighters'. Very provocative in engagement with the chair. Chair appears to be trying to contain him through following the formal channels of communication within the meeting.

There's a sense of formality and lack of understanding amongst some of the councillors on the committee. These factors make it difficult for the members in the committee to engage in this environment?

Decision-making process as follows: Issues all presented within agenda reports, with recommendations made on these areas of discussion. Meeting moves through each of the agenda items, discussion takes place, the recommendation is put forward, followed by an agreement to send the recommendation to council or a decision to send the issue back to the relevant municipal department for further consideration. It is clear also that behind each of these items there is an underlying process that is not visible in the final recommendations put forward.
Process continues. Signs of tensions as certain statements made on the process to follow in speaking within the forum. Committee members don't all engage in the same way. Definitely different levels of ability to function within this framework – experience/knowledge/background informs ability to participate and comment.

How do the issues come the Section 80 for discussion?
How are the committee members selected?

**Interview 90 on 3 May 2012 – Meeting**
**Notes taken at Infrastructure Development Committee Meeting – 3 May 2012**
(Includes notes on discussion on my own questions/ reflections noted in observing the meeting)

Powerpoint presentation given by Aurecon on proposed Dam development in Knysna:

Projections are linked to planning. Present graphs on demand from 2004 – 2011 – graphs are all based on calculations/assumptions

*Made contact with Aurecon representatives, agreed to meeting to discuss projects for the municipality, past & current

What is the difference between the Technical Services Director and the Technical Services PMU?

Electricity purchases report presented.

NB – Status quo report on water supplies for the greater Knysna – 16 April 2012

Forums are interesting in showing the behind the scenes process to some extent. Meeting provides insights on how decision-making happens, and the restraints on participation. That is for example, budgets and tables with breakdown on expenditure presented by the technical department as part of the reporting process. Deciphering these tables and being able to comment requires the ability to understand/interpret technical data …

The Section 80 meetings reflect the 'standard' process of decision-making. It is interesting however that the 'disaster' response was more exceptional wrt to legislation drawn on. Would be important to trace historical and post disaster moments for historical context.

What are MIG grants?
How important are external grants for the municipal Capex?
What is meant by 'rolling money over'?
What is the significance of planning to access money in advance, to unlock funds to act?

Sedgefield Desalination Plant Report presented:

   Expended more than R1.5m O&M costs this year for the plant
   Would cost R2.5m to take the brine discharge out beyond the beach
O&M contract - can't get away from Nuwater as the component parts only they can supply

Received a favourable Return on Decision from the environmental authority – plant has been made permanent

To assure yield from plant sufficient for development it is essential to provide resources to run the plant – Question posed on whether to bring the plant officially on board

Question on what to do with the plant in the future. Options are to maintain and run OR mothball the plant. Plant is currently not running as waiting for the O&M contract. Statement made that if the plant is mothballed, all the money will have to be given back to MIG. Whatever is decided, it must be an informed decision. Technical needs a decision to know how to proceed.

Debates follow the presentation, relating to the feasibility of the plant operation and what to do. One comment that companies are interested in buying the water and bottling it. It offers value for job creation and tourism. Another option is that Veolia is interested in running the plant and the municipality can buy the water.

Question presented as one of whether the council wants to see the desalination water for development or not. Do they want to count it in the yield. That is the decision on what to do, is to determine whether to approve and count this water (desalination) for development or not.

In making the decision it is important to remember that lots of money has been spent on the asset. We can't let it go to waste

Sedgefield Water Augmentation Case Study Report attached

23March 2012 Update Report by project consultants on Sedgefield Emergency water supply presented

Knysna Reverse Osmosis Plant – Report from Director of Technical Services:
To inform the Council of the costs involved in operating the Knysna Reverse Osmosis Plant. Recommendation agreed to as follows: That council approves funding in the 2012/2013 financial year in the amount of R1 571 670.43 to enable the operation of the Knysna Reverse Osmosis Plant.

Interview 91 on 2 August 2012 – Meeting
Notes taken at Infrastructure Development Committee Meeting – 2 August 2012
(Includes notes on discussion on my own questions/reflections noted in observing the meeting)

- Update provided on an ongoing theme in the Municipality related to informal dwellings on the N2 bypass road which belongs to the SANRAL, that is the settlement is on a road reserve which does not belong to the Municipality. The Municipality suggested that the land is private land and that SANRAL is responsible for what happens with the land. The Municipality does not have enough land to resettle and their is a long time delay on available land for housing. It would not be feasible to prioritise those on the road reserve above others on the housing list.

Comment from ANCYL councillor for a request for an invitation to a follow-up meeting. As long as we aren't talking to SANRAL there won'tbe a solution. Propose that SANRAL come to public meetings as people can pose questions.
Report on Knysna Estuary pollution control
The report has been done and should be made available to the committee. It is recommended that it is taken onboard to inform a comprehensive approach. Going to be a considerable financial implication. The cost of the recommendations listed in the report is R124, 000. 00, but in practice this amount is not going to solve the problem. RP: Many things that won't require a lot of money can be done now. Some of the infrastructure is very old. The sewers in the CBD were installed in 1968. If you don't budget yearly you don't get anywhere. That is, if the infrastructure upgrading is not planned and implemented the costs of addresses the challenges will continue to be big amounts. Without investment the cost of the problem escalates. It is high numbers but should be funded in phases.