



Social Impact Assessment Report Southern Wastewater Treatment Works

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1 INTRODUCTION	1
1.1 PROJECT CONTEXT AND BACKGROUND	3
1.1.1 THE CURRENT TREATMENT PROCESS	3
1.1.2 COMMUNITIES LIKELY TO BE MOST AFFECTED	4
1.2 REPORT STRUCTURE	5
2 LEGISLATION AND LOCAL AREA CONTEXT	6
2.1 SOUTH AFRICAN MILLENNIUM DEVELOPMENT GOALS	6
2.1.1 SOUTH AFRICA'S MEDIUM TERM STRATEGIC FRAMEWORK	7
2.2 SOUTH AFRICA'S ACCELERATED AND SHARED GROWTH INITIATIVE (ASGISA)	8
2.3 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (ACT NO. 108 OF 1996)	9
2.4 THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (ACT NO. 59 OF 2008)	9
2.5 THE NATIONAL SANITATION STRATEGY, BUCKET ERADICATION PROGRAMME AND FREE BASIC SANITATION IMPLEMENTATION STRATEGY (2005 ONWARDS)	9
2.6 WASTEWATER TREATMENT	10
2.6.1 THE SOUTHERN WASTEWATER TREATMENT PLANT	10
3 SOCIO-ECONOMIC BASELINE	12
3.1 BRIEF OVERVIEW OF THE HISTORY OF HUMAN SETTLEMENT IN THE MEREBANK AREA	12
3.2 THE SOUTH DURBAN BASIN AND ITS HEALTH CHALLENGES	12
3.2.1 HEALTH STUDY AND RISK ASSESSMENT FOR DURBAN SOUTH MULTIPOINT PLAN (FEBRUARY 2007)	13
4 POST SCOPING PHASE – SECONDARY AND PRIMARY DATA CONSOLIDATION	17
4.1 SECONDARY DATA	17
4.1.1 CSIR, DURBAN OUTFALLS REPORT, 2011	17
4.1.2 CSIR, DURBAN OUTFALLS REPORT, 2012	18
4.2 PRIMARY DATA	19
4.2.1 DATA OBTAINED FROM STAKEHOLDER CONSULTATIONS	19
4.2.2 FACTS TO BE CONSIDERED	20
5 IMPACT METHOD TO BE USED	24
6 IMPACT CONSIDERATIONS AND IDENTIFICATION	27
6.1 IMPACT CONSIDERATIONS FOR THIS STUDY	27
6.2 IDENTIFICATION OF IMPACTS	27
6.3 IMPACT RATING AND PROPOSED MITIGATION	28
6.3.1 THE NO-GO ALTERNATIVE	29
6.3.2 ALTERNATIVE 1	30
6.3.3 ALTERNATIVE 2	32
6.3.4 POTENTIAL CUMULATIVE IMPACTS	35
6.4 SUMMARY ANALYSIS OF IMPACT RESULTS	36
7 LITERATURE CITED	37

List of Figures

FIGURE 1-1 : SITE MAP	5
FIGURE 3-1 : RESIDENCES EN ROUTE TO SWWTW	14
FIGURE 3-2 : ROAD TO SWWTW	14
FIGURE 3-3 : FORMAL, DEVELOPED HOMES IN CLOSE PROXIMITY TO SWWTW	15
FIGURE 3-4 : BIRD'S EYE VIEW OF LOCATION OF SWWTW IN RELATION TO RESIDENCES	15
FIGURE 3-5 : SITE MAP: POTENTIALLY AFFECTED BEACH AREA	16
FIGURE 4-1 : MINDMAP OF ISSUES FROM STAKEHOLDER CONSULTATIONS	20

List of Tables

TABLE 2-1 DEVELOPMENT INITIATIVES SINCE 1994	6
TABLE 2-2 LINKAGE BETWEEN MEDIUM TERM STRATEGIC FRAMEWORK AND MILLENIUM DEVELOPMENT GOALS	8
TABLE 5-1 IMPACT SIGNIFICANCE RATING TABLE	24
TABLE 6-1 IMPACT SIGNIFICANCE RATING TABLE FOR THE NO-GO ALTERNATIVE	29
TABLE 6-2 IMPACT SIGNIFICANCE RATING TABLE FOR ALTERNATIVE 1	30
TABLE 6-3 IMPACT SIGNIFICANCE RATING TABLE FOR ALTERNATIVE 2	33
TABLE 6-4 POTENTIAL CUMULATIVE IMPACTS	35

ACRONYMS

ASGISA:	Accelerated and Shared Growth Initiative – South Africa
CSIR:	Centre for Scientific and Industrial Research
EA:	Environmental Authorisation
EIA:	Environmental Impact Assessment
EIR:	Environmental Impact Report
GEAR	Growth, Employment and Redistribution Strategy
HRA:	Health Risk Assessment
IFC:	International Finance Corporation
ISRDP	Integrated Sustainable Rural Development Programme
JIPSA	Joint Initiative on Priority Skills Acquisition
MDGs:	Millennium Development Goals
MTSF:	Medium Term Strategic Framework
NDP	National Development Plan
NEPAD:	New Partnership for Africa’s Development
NGP:	New Growth Path
RDP	Reconstruction and Development Plan
SDB:	South Durban Basin
SIA:	Social Impact Assessment
SWWTW:	Southern Wastewater Treatment Works
UNDP:	United Nations Development Programme
URP	Urban Renewal Programme
VOCs:	Volatile Organic Compounds
WISA:	Water Institute of Southern Africa
WWTW:	Wastewater Treatment Works

EXECUTIVE SUMMARY

This Social Impact Assessment (SIA) Report is compiled for the proposed Southern Wastewater Treatment Works (SWWTW) located at 2 Byfield Road, Merewent, on the north-eastern bank of the Umlaas Canal. The Wastewater Treatment Works (WWTW) is surrounded by residential and industrial development. The proposed development is planned within the eThekweni Metropolitan Municipality, in the KwaZulu-Natal province of South Africa. This SIA baseline is part of the Specialist input towards an overall current Environmental Impact Assessment (EIA) process underway.

While specific social impacts are inferred through scrutinising the current social environment, its receptors and identifying potential impact drivers, macro economic impacts are gleaned through a similar exercise. A summary of the results shows that the results of the impacts anticipated in the construction and operational phases of the proposed development, whether choosing Alternative 1 or 2, are fundamentally similar. For that reason, this SIA shows either Alternative 1 or 2 is preferable.

1 INTRODUCTION

RHDHV has been commissioned by eThekweni Metropolitan Municipality to manage the process of obtaining an Environmental Authorisation (EA) from the relevant environmental authorities as part of the objective to propose the upgrade of the Southern WWTW to reduce the quantity of raw industrial sludge being disposed of through the sea outfall by re-commissioning existing and developing new sludge treatment facilities.

Details pertaining to the EA application follow hereunder:

The work will be undertaken in 2 phases, with Phase 1 being the immediate upgrade and Phase 2 being the future upgrade. The Phase 1 upgrade will result in the primary treatment of approximately 60 Mega (million) litres (or 63.5%) of the present combined flow (i.e. 95 Mega [million] litres) being discharged from the Jacobs and Wentworth Valley Trunk Sewers. The solids (or sludge) to be removed will then be combined with that currently being removed from the treatment of the sewage effluent being discharged from the Umlaas Trunk Sewer, before being pumped to the anaerobic digesters. The biogas (made up of approximately 60% methane and 40% carbon dioxide) which emanates from the anaerobic digestion process will be stored in gas holders. The options proposed for the use of the biogas are as follows:

- Consumption of at least one third of the stored volume for heating of the sludge (as part of the digestion process) and flaring (or burning) of the remainder; and
- Utilising most of the stored gas to dry the sludge through a mechanical thermal drying process and then using the waste heat from the drying process to heat the sludge. It is important to note that the drying of sludge would greatly reduce the road transportation requirements for removal of sludge off site.

The work to be completed under each phase is as follows:

Phase 1:

- Refurbish and bring back on line two out of six existing primary settling tanks;
- Refurbish and bring back on line existing two anaerobic primary digesters and secondary digester and construct two new primary digesters and one secondary digester, all of same capacity as existing;
- Refurbish and bring back on line existing raw sludge gravity thickener and construct a new gravity thickener of the same capacity;
- Refurbish and bring back on line existing gas holder and construct a new gas holder of the same capacity;
- Refurbish and bring back on line various existing (unused) electrical substation buildings and small pumping stations;
- Establish a new mechanical sludge dewatering facility on site and 2 x 150 000 litres fully enclosed steel sludge storage silos;
- Establish a new mechanical sludge thermal drying facility on site;
- Provide additional effluent storage capacity of 23 000 000 litres at existing low level pumping station and install two new 350 kilowatt pumps;

- Replace the last 70 m of the landline section of the sea outfall pipeline with new 2 x 1 000 m diameter pipe;
- Construct new road tanker effluent discharge bays in close proximity to the entrance of the Works;
- Install new medium voltage and low voltage electrical cables and equipment;
- Minor road works and a new access road; and
- The installation of a standby generator.

Phase 2:

- Refurbish and bring back on line remaining four of the existing six primary settling tanks and construct two new primary settling tanks of the same capacity as existing;
- Construct four new anaerobic primary digesters and two new secondary digesters, all of the same capacity as existing;
- Construct a new raw sludge gravity thickener, of the same capacity as existing;
- Construct a new gas holder; and
- Install additional mechanical sludge dewatering equipment.

As part of the EIA application, a Social Impact Assessment has been undertaken. This Report constitutes the Social Impact Assessment Report for the Environmental Impact Assessment (EIA).

1.1 Project Context and Background

The Southern Wastewater Treatment Works (SWWTW) is located at 2 Byfield Road, Merewent, on the north-eastern bank of the Umlaas Canal. The SWWTW is surrounded by a mixed development node of both residential and industrial developments.

1.1.1 The Current Treatment Process

The SWWTW receives the majority of its raw sewage effluent through three large (1 500 mm diameter) trunk sewers, i.e. the Main Southern Trunk Sewer (referred to as the Jacobs Trunk Sewer), the Wentworth Valley Trunk Sewer and the Umlaas Trunk Sewer. Other smaller diameter pipelines coming to this Works include those from Mondi and SAPREF (each separately discharging at the inlet of this Works) and Illovo (discharging closer to the outlet of this Works). The total average daily flow to this works is in the region of 130 Mega (million) litres per day and all the treated flows leaving this works are discharged directly to sea (by gravity and by pumping) through a 1 500 mm diameter, 4,2 km long sea outfall.

The Umlaas Trunk Sewer which serves the areas of Chatsworth and Umlazi discharges effluent to this Works that is predominantly domestic in origin. The discharged flow [currently in the region of 35 Mega (million) litres per day] is immediately directed to a separate treatment facility where it undergoes preliminary, primary, secondary and tertiary treatment. The secondary and tertiary treatment processes are managed by a private entity (Veolia Water) who stores and sells the tertiary treated (or reclaimed) effluent to industry. All sludge generated from the treatment of this effluent is discharged to sea.

The Jacobs Trunk Sewer which serves the residential areas of Yellow Wood Park and Woodlands and the industrial areas of Jacobs and Mobeni discharges sewage effluent that is a combination of domestic and industrial in origin. The Wentworth Valley Trunk Sewer which serves the areas of the Bluff, Wentworth, Clairwood, Bayhead and Island View discharges sewage effluent that is also a combination of domestic and industrial in origin. The flows conveyed by these two trunk sewers [currently in the region of 95 Mega (million) litres per day] combine at the main inlet works and undergo preliminary treatment only (i.e. removal of screenings and grit) before being discharged to sea.

In addition to the pipeline discharge of sewage effluent to this works, smaller volumes of effluent are also discharged by various road tankers. The effluent discharged by these road tankers also undergo preliminary treatment only before being discharged to sea.

1.1.2 Communities Likely to be Most Affected

Communities that lie in close proximity to the SWWTW, and within the South Durban Basin are found below. Approximate distances¹ from the SWWTW are also reflected.

- Merebank (20 meters, minimum);
- Wentworth (20 meters, minimum);
- Bluff (4,2 kilometers);
- Isipingo (5,3 kilometers); and
- Umlazi (8 kilometers).

On the SWWTW's western and north-western side is the formal residential community of *Merebank East*. It lies at a minimum of 20 meters from the SWWTW's boundary. On the eastern side is the formal residential community of *Merewent²*, which also lies at a minimum of 20 meters from the SWWTW's boundary.

A site map is attached hereunder. The development footprint is outlined in red.

¹ Straight line distance

² A combination of the Merebank and Wentworth communities



FIGURE 1-1 : SITE MAP

1.2 Report Structure

This report commences with an overview of the project’s context and background followed by an assessment of the most relevant national legislation, reflecting on the SWWTW. Thereafter, an overview to the history of the settlement of humans in the Merebank area is rendered. At this point in the scoping phase, an indication of impacts that would be most applicable to a development of this nature is given, along with the impact method that will be used in the proceeding impacts phase of the project. The structure is as follows:

Section 1: Introduction to project, reflecting context and background;

Section 2: An assessment of relevant legislation and local level context;

Section 3: A brief overview of the affected area and reference to the most recent health studies
Undertaken in the area;

Section 4: Proceeding the Scoping phase, this section presents a consolidation of secondary and primary data, citing recent scientific literature relating to outfalls and reference to consultations undertaken as part of the Project’s Public Participation Programme.

Section 5: Impact methodology to be used;

Section 6: Impact considerations and identification for this study; and

Section 7: Literature Cited

2 LEGISLATION AND LOCAL AREA CONTEXT

This SIA report forms part of the Specialist input towards an overall current Environmental Impact Assessment. It is important to understand the national backdrop against which social and economic development is proposed, and this we try to ascertain through a review of various national and local level strategic plans and policies.

2.1 South African Millennium Development Goals

The Millennium Development Goals (MDGs) consist of eight development priorities. The eight Millennium Development Goals range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education and form a blueprint agreed to by all the world's countries and all of the leading developmental institutions in the world. As a member state of the United Nations, South Africa is a signatory to this agreement.

The eight MDGs, in numerical order, are:

- 1) To eradicate extreme poverty and hunger (MDG1);
- 2) To achieve universal primary education (MDG2);
- 3) To promote gender equality and empower women (MDG3);
- 4) To reduce child mortality (MDG4);
- 5) To improve maternal health (MDG5);
- 6) To combat HIV/AIDS, malaria and other diseases (MDG6);
- 7) To ensure environmental sustainability (MDG7); and
- 8) To develop a global partnership for development (MDG8).

(Country Report 2010, UNDP)

The New Partnership for Africa's Development (NEPAD) was launched in 2002 and was designed to address the current challenges facing the African continent. Issues such as the escalating poverty levels, underdevelopment and the continued marginalisation of Africa are seen to need radical intervention. The NEPAD states that it is spearheaded by African leaders to develop a new vision that would guarantee Africa's renewal.

The primary objectives of NEPAD are:

- 1) To eradicate poverty;
- 2) To place African countries, both individually and collectively, on a path of sustainable growth and development;
- 3) To halt the marginalisation of Africa in the globalisation process and enhance its full and beneficial integration into the global economy; and
- 4) To accelerate the empowerment of women.

The national agenda implemented through the Reconstruction and Development Plan (RDP) and Growth, Employment and Redistribution Strategy (GEAR) in the first fifteen years of democracy and through the National Development Plan (NDP) and New Growth Path (NGP) going forward constitutes a 'continuity of change.' (MDG, South Africa, October 2013). Since 1994, there have been a great number of development initiatives. These are outlined in the table below.

TABLE 2-1 DEVELOPMENT INITIATIVES SINCE 1994

Programme/ Strategy/ Plan	Objectives
Reconstruction and Development Plan (RDP)	<ul style="list-style-type: none"> i. Meeting basic needs; ii. Developing human resources; iii. Building the economy; and iv. Democratising the state and society.
Growth, Employment and Redistribution Strategy (GEAR)	<ul style="list-style-type: none"> i. Restructure the economy; ii. Create plentiful jobs; iii. Create environment for attracting foreign investment; and iv. Create and implement policies to counter high inflation.
Integrated Sustainable Rural Development Programme (ISRDP)	<ul style="list-style-type: none"> i. Accelerate rural development; ii. Create economic opportunities in rural areas; iii. Decrease levels of poverty and unemployment; and iv. Implement access to free basic services (water, sanitation and electricity)
Urban Renewal Programme (URP)	<ul style="list-style-type: none"> i. Accelerate urban renewal; ii. Create economic opportunities in 21 nodal areas of poverty; iii. Decrease levels of poverty and unemployment; iv. Implement access to free basic services (water, sanitation and electricity); and v. Access to housing.
Accelerated and Shared Growth Initiative - South Africa (ASGISA)	<ul style="list-style-type: none"> i. Halve unemployment and poverty; ii. Improve the capacity of the state; and iii. Reduce the regulatory burden on small and medium enterprises (SMEs); etc.
Joint Initiative on Priority Skills Initiative (JIPSA)	<ul style="list-style-type: none"> i. Improve skills base required by the economy for accelerated growth; and ii. Focus on scarce and critical skills; etc.
New Growth Path (NGP)	Employment creation
National Development Plan (NDP)	<ul style="list-style-type: none"> i. Eliminate poverty and reduce unemployment; ii. Improve the quality of school education; iii. Deconstruct the spatial patterns of the apartheid system; iv. Reduce unemployment from 27% to 14% by 2020 and to 6% by 2030; v. Decrease the level of inequality, as measured by the Gini coefficient, from 0.7 in 2007 to 0.6 in 2030; and vi. Become a less resource intensive economy, adopt sustainable development practices, etc.

2.1.1 South Africa's Medium Term Strategic Framework

The Medium Term Strategic Framework (MTSF) (MTSF 2009-2014) is a statement of government intent. It identifies the development challenges facing South Africa and outlines the medium term strategy for improving living conditions of South Africans. The MTSF base document is meant to guide planning and resource allocation across all spheres of government. National and provincial departments in particular need to develop five year strategic plans and budget requirements, taking into account the medium-term imperatives. Similarly, informed by

the MTSF and their 2006 mandates, municipalities are expected to synergise their integrated development plans in line with the national medium-term priorities (UNDP Country Report 2010).

The MTSF's strategic priorities are captured in the table below.

TABLE 2-2 LINKAGE BETWEEN MEDIUM TERM STRATEGIC FRAMEWORK AND MILLENIUM DEVELOPMENT GOALS

Linkage between South Africa's national development planning and the MDGs		
MTSF STRATEGIC ELEMENTS		RELEVANT MDGS
1.	Strategic Priority 1: Speeding up growth and transforming the economy to create decent work and sustainable livelihoods	MDG 1, MDG 2, MDG 3, MDG 8
2.	Strategic Priority 2: Massive programme to build economic and social infrastructure	MDG 1, MDG 3, MDG 8
3.	Strategic Priority 3: Comprehensive rural development strategy linked to land and agrarian reform and food security	MDG 1, MDG 2, MDG 7
4.	Strategic Priority 4: Strengthen the skills and human resource base	MDG 2
5.	Strategic Priority 5: Improve the health profile of all South Africans	MDG 4, MDG 5, MDG 6
6.	Strategic Priority 6: Intensify the fight against crime and corruption	MDG 2, MDG 3
7.	Strategic Priority 7: Build cohesive, caring and sustainable communities	MDG 2, MDG 3, MDG 7
8.	Strategic Priority 8: Pursuing African advancement and enhanced international cooperation	MDG 8
9.	Strategic Priority 9: Sustainable resource management and use	MDG 2, MDG 3, MDG 7
10.	Strategic Priority 10: Building a developmental state, including improvement of public services and strengthening democratic institutions	MDG 1, MDG 2, MDG 3, MDG 8

Source: UNDP Country Report 2010

2.2 South Africa's Accelerated and Shared Growth Initiative (ASGISA)

ASGISA which is one of South Africa's government programmes which promotes economic development is structured around the following framework of key interventions:

- Bulk infrastructure investments through all three spheres of Government, State Owned Enterprises and Public-Private Partnerships;
- Immediate, top and medium priority investments in specially selected sectors of the economy;
- The building of Human Capital from very basic primary school infrastructure to tertiary education level;
- Provision for a Joint Initiative on Priority Skills Acquisition (JIPSA);
- Special focused Second Economy Interventions that incorporate youth, women and people with disabilities in sector investment strategies, mass roll out of the Expanded Public Works Programme, Small Micro and Medium Enterprises promotion and Micro credit facilities; and
- Strengthening Governance and Institutional arrangements for service delivery.

2.3 The Constitution of the Republic of South Africa (Act No. 108 of 1996)

The Constitution defines the role of the public in the activities of all three spheres of government, namely national, provincial and local government (Sections 59, 72, 118, 152 and 154). Section 59 refers to the National Assembly, Section 72 refers to the National Council of Provinces and Section 118 refers to the Provincial Legislature. These Sections state that public involvement in the legislative and other processes of the Assembly/ Council/ Legislature must be facilitated, where its business is in an open and public manner. Section 152 of the Constitution states that one of the objects of local government is to encourage the involvement of communities and community organisations in its matters, whilst Section 154 states the requirement that draft provincial and national legislation be published for public comment and feedback. Chapter 10 of the Constitution (Section 195) states that the basic values and principles governing public administration include encouraging public participation in policy-making and responding to public need.

Chapter 3 (Section 40) requires all spheres of government to adhere to the principles (Section 41) of cooperative governance by informing one another of, and consulting one another, on matters of common interest and providing effective, transparent, accountable and coherent governance for the Republic as a whole.

2.4 The National Environmental Management Waste Act (Act No. 59 of 2008)

The South African regulation that is most appropriate to this project is the National Environmental Management Waste Act, 2008. All applicable expectations with respect to stakeholder engagement during an Environmental Impact Assessment process will be applied.

2.5 The National Sanitation Strategy, Bucket Eradication Programme and Free Basic Sanitation Implementation Strategy (2005 onwards)

In February 2005 the government launched a programme to eradicate the use of bucket toilets. Bucket toilets consist of a bucket placed under a toilet seat; in formally established settlements the buckets are emptied on a daily basis by the municipality and the content is brought to a treatment plant. However, buckets are also used in newly established informal settlements. There were 250 000 bucket toilets in formally established settlements as of 2005. As at March 2008, 91% of the bucket toilets were replaced by flush toilets or Ventilated Improved Pit Latrines where water was not readily available. However, communities resisted the construction of latrines, forcing construction to a standstill and asking for flush toilets. There had been no community participation in the choice of technologies. The programme was very much focused on the provision of infrastructure, with little emphasis on sustainability and hygiene promotion, so that the health impact was limited. The deadline to complete the program was moved from 2007 to 2010.

In August 2005 a National Sanitation Strategy was published. It covers, among other things, "the roles and responsibilities in sanitation delivery, planning for sanitation, funding sanitation, implementation approaches,

regulating the sanitation sector, and monitoring and evaluation." It was followed by a Free Basic Sanitation Implementation Strategy in March 2009, with the aim of reaching universal access to sanitation by 2014. According to one observer, the strategy was "deliberately vague" because the issue of free provision of sanitation services is so controversial. There is no legal obligation to provide free basic sanitation. The implementation strategy includes eight different options to channel subsidies. The policy was piloted in 17 municipalities in 2010, and in a further 23 municipalities in 2011, although it is unclear which subsidy mechanism is being used.

2.6 Wastewater Treatment

Fifty five percent (55%) of wastewater treatment plants in South Africa, especially smaller ones, do not meet effluent standards and some do not even measure effluent quality. In comparison to the blue drop certification system for drinking water, the government has launched a green drop certification for municipal wastewater treatment. As of May 2011, 7 out of 159 water supply authorities were certified with the green drop, and 32 out of 1 237 wastewater treatment plants. In 2009, when 449 wastewater treatment plants were assessed, according to official government data 7% were classified as excellently managed, 38% "performed within acceptable standards" and 55% did not perform within acceptable standards. According to Bluewater Bio, an international firm specialising in wastewater treatment, out of 1 600 wastewater treatment plants in South Africa (not all of which were included in the Green Drop assessment), at least 60% are not meeting regulatory compliance requirements.

2.6.1 The Current Southern Wastewater Treatment Plant

In 1999, Durban Water Recycling (Pty) Ltd was awarded a 20-year concession contract for the production of high quality reclaimed water. Located in the south of Durban in the grounds of the eThekweni Water Services' SWWTW, the plant was commissioned in May 2001. The R74m sewage-to-clean-water recycling plant planned to treat 47.5 million litres of domestic and industrial wastewater to a near potable standard for sale to industrial customers for direct use in their processes (www.eThekweni.gov.za). The new plant re-treats approximately 10% of Durban's wastewater. In addition, the use of this reclaimed water by the industries reduces the industries' demand for potable water by 8% (Bohlweki Environmental, unknown date).

Socio-economic issues identified by Bohlweki in their paper entitled "Water reclamation project in an environmentally stressed area" (Paper presented at the Biennial Conference of the Water Institute of Southern Africa (WISA) in 2002), included:

- During the construction phase, there were benefits to the local economy through the employment of local labour and contractors;
- Approximately 15 local people were contracted in sustainable employment to operate and maintain the plant;
- There was a delayed capital investment for future potable water supply infrastructure, with a greater volume of treated water later being available for potable use;
- The project was financially sustainable, with all finance being made available from private banks and a French soft loan programme, which was therefore at no cost to the local taxpayer;
- The potable water price increased at a slower rate because investment in potable water production would be delayed by 3 000 m³/d, and that water which industries were using was now made available for domestic use; and

- Tax on every cubic metre of reclaimed water sold to industries increased long-term water revenue to eThekweni Water Services.

The paper's end note states "This project serves as a model for others. It demonstrates that by pooling resources in a public-private partnership, and by focusing on long-term sustainability goals, all participants can gain, including the environment."

3 SOCIO-ECONOMIC BASELINE

The project development area lies within the South Durban Basin, found within the eThekweni Metropolitan Municipality, and thus, relevant data to this local context is reflected within this section.

3.1 Brief Overview of the History of Human Settlement in the Merebank Area

Between November 1860 and 1911 nearly 152 184 indentured Indian workers from across India arrived in Durban. By 1910, nearly 26.85% indentured men returned to India, but most chose to stay and thus constituted the forbearers of the majority of present-day South African Indians.

Indentured labourers had to be given accommodation by their employers; however, they had to find their own way after indenture. Those who turned to agriculture usually stayed on the land which they were renting. The government realised that there was an escalating housing problem and thus set aside several locations for Indians in areas around the then 'Natal.' The main areas that Indians allowed to occupy were beyond the Umgeni River, in Riverside and Prospect Hall and further inland at Duikerfontein and Sea Cow Lake. Springfield and Sydenham were also predominantly Indian. Indians also settled in areas such as Mayville, Cato Manor, Clairwood and Magazine Barracks, and the Bluff.

By 1936, approximately 20% of Indians owned houses in Durban that were made of brick, stone or concrete and the rest lived in wood and iron structures. By the 1940's the Pegging Acts of 1942-43 and the Ghetto Act of 1946 were passed. This act gave the government the right to remove and destroy shacks and homes in some areas under the pretext of improving unsanitary living conditions.

The Ghetto Act paved the way for the Group Areas Act passed in 1950, which proclaimed certain areas "White." This meant that the non-White communities who found themselves in these areas would have to be moved to other areas designated as 'Indian', 'Coloured' or 'African'. Therefore, Indian residents in Durban, like all non-White South Africans, were segregated by race. By the 1950's Indians were removed from the residential areas of Mayville, Cato Manor, Clairwood and Magazine Barracks, and the Bluff. One of the areas they were resettled to was the area of Merebank. Initially identified as a very poor community with informal dwellings, Merebank had transformed over the first ten years with purpose-built houses. By the late 1950's a reconstructed Merebank offered cheap houses for which the purchaser had ten years to pay. (<http://www.sahistory.org.za/indian-community>)

3.2 The South Durban Basin and its Health Challenges

The South Durban Basin (SDB) is an area approximately 4 kilometres wide and 24 kilometres long, extending from the Durban Central Business District southward toward Umbogintwini. In present day, it contains a mixture of industrial (including heavy industry, chemical storage facilities, sewage works and a number of smaller

industries) and residential areas in close proximity to each other. This was allowed to develop as a result of poor planning practices. The SDB is also a focal point of major transport routes, including highways and a harbour.

Communities in the SDB started to express concern about deteriorating air quality as far back as the 1960's, and efforts intensified in the 1980's and 1990's as air quality deteriorated even further. Persistent complaints to Government about high pollution level, odours, chemical leaks, flares, visible emissions and health complaints ultimately led to a national response to the problem. The Minister of Environmental Affairs and Tourism at the time (Mr Valli Moosa) decided that "the peculiarities and worrying levels of pollution in the South Durban area warranted a singular and co-ordinated approach from Government." Various issues of concern were debated between representatives of government, industry and community and a way forward to addressing the pollution 'hot spot' problem was formulated. Subsequent to that the South Durban 'Multi-point Plan' was officially announced by the Minister in November 2000.

There are many 'key achievements' noted in the South Durban Basin Multi-Point Plan Case Study report (October 2007), but for the purpose of highlighting health issues the following is extracted: "Health risk and epidemiological studies were completed in June 2006. Results indicated higher air pollution concentrations were associated with reduced lung function in children with asthma. Children attending school in south Durban had an increased risk of persistent asthma compared to those in the north, while adults residing in the south had a higher incidence of hay fever than their northern counterparts."

There are also many 'problem areas and outstanding issues' noted in the report (South Durban Basin Multi-Point Plan Case Study Report, October 2007), but for the purpose of highlighting health issues the following is extracted: "There are no noticeable odour reductions and no indication of improvements in Volatile Organic Compounds (VOC's) and other chemicals, despite activities to reduce VOC emissions."

3.2.1 Health Study and Risk Assessment for Durban South Multipoint Plan (February 2007)

The broad objectives of the study were:

- To determine the health status of the south Durban residents, with specific reference to respiratory health outcomes and other chronic diseases and to determine the relationship between environmental pollution, those identified health outcomes and the quality of life within the community, particularly among susceptible populations; and
- To describe the range of ambient exposures and to assess the potential risks posed by such exposure to the health of the community in the south of Durban.

The purpose of the Health Risk Assessment (HRA) was to estimate the effects of ambient air pollutants on human health, emphasising chronic or long term impacts (for example cancer) due to inhalation exposures. The assessment was a screening level risk assessment. The risk assessment and its supporting information identify a number of toxic contaminants. The study states that it "identified a number of toxic contaminants of potential concern that warrant attention due to health risks including cancer and non-cancer effects" (Page 71, Health Study and Risk Assessment).

A site visit of the directly impacted areas was undertaken in March 2014. A few pictures are included below.



FIGURE 3-1 : RESIDENCES EN ROUTE TO SWWTW



FIGURE 3-2 : ROAD TO SWWTW



FIGURE 3-3 : FORMAL, DEVELOPED HOMES IN CLOSE PROXIMITY TO SWWTW



FIGURE 3-4 : BIRD'S EYE VIEW OF LOCATION OF SWWTW IN RELATION TO RESIDENCES



FIGURE 3-5 : SITE MAP: POTENTIALLY AFFECTED BEACH AREA

4 POST SCOPING PHASE – SECONDARY AND PRIMARY DATA CONSOLIDATION

4.1 Secondary Data

The Durban Outfalls Reports 2011 and 2012 are regarded as important for the social impact assessment as it gives scientific validation to possible water quality issues that may be predominant near the Southern Works outfall. This has been deemed significant as health concerns have been voiced by members of the community (particularly in terms of the impact of outfalls on the sea-faring tourism trade). In order to responsibly present this SIA, all scientific studies such as the Outfalls reports have been interrogated.

4.1.1 CSIR, Durban Outfalls Report, 2011

The overall objective of the Durban outfalls monitoring programme is to identify impacts (with the main focus on adverse impacts) to the receiving marine environment that can be attributed to effluent discharge through the Central Works and Southern Works outfalls. The monitoring programme uses various indicators - physical, chemical and biological indicators - to reach a conclusion on impacts. The monitoring programme comprises several components, each of which is presented as a separate chapter in this report. The components include effluent chemistry, effluent toxicity, water and sediment quality, and the status of benthic macrofaunal communities.

The bulk of the wastewater is discharged through outfalls that serve the Central Works and the Southern Works wastewater treatment facilities, both owned and operated by the eThekweni Municipality. The outfalls are situated about 12 km apart off the Bluff/Merewent area of Durban, and discharge effluent at a depth of about 43 - 53 m in the case of the Central Works outfall (about 3.2 km off the shoreline) and about 54 - 64 m in the case of the Southern Works outfall (about 4.2 km off the shoreline). The Central Works outfall carries predominantly sanitary effluent, that is, wastewater from the kitchens, bathrooms and toilets in homes and workplaces. The Southern Works outfall carries both sanitary and industrial wastewater, that is, also wastewater from manufacturing related processes.

The **toxicity** of final effluent from Central Works wastewater treatment facility was often higher than the toxicity of final effluent from the Southern Works wastewater treatment facility. This was contrary to expectation considering that the Southern Works wastewater treatment facility receives a high volume of industrial effluent, which was expected to reveal in a higher toxicity. Problems experienced at the Central Works wastewater treatment facility may be a reason for the generally higher and more variable toxicity recorded for final effluent from this facility.

With regards to **water quality**, of the various physical, chemical and biological variables measured *in-situ* at the margin of the zone of initial dilution for the Central Works and Southern Works outfalls; none showed anomalies that could confidently be attributed to effluent discharge. Faecal indicator bacteria counts provided the clearest effluent signal. None of the other indicators measured provided signals that could confidently be attributed to effluent discharge. None of the water samples was toxic to sea urchin gametes.

The findings of the 2011 survey of the Durban outfalls monitoring provide clear evidence that the discharge of effluent has impaired **sediment quality** in the vicinity of the diffuser sections of the Central Works and Southern Works outfalls. The impacts were, however, more frequent and of a greater spatial extent and severity in the

vicinity of the Southern Works outfall. Sediment near both outfalls was characterised by high faecal indicator bacteria colony forming unit counts. In fact, faecal indicator bacteria were detected at all sites, including the reference sites, providing evidence that effluent was impinging on the benthic environment across the study area. Sediment near the Southern Works outfall and to a far lesser degree and extent at the Central Works outfall was enriched with particulate organic matter. This has presumably caused the higher chemical oxygen demand of sediment near both outfalls as compared to reference sites, although once again the effects were more pronounced near the Southern Works outfall. At the Southern Works outfall, the accumulation of organic matter and the associated chemical and probably also biological oxygen demand clearly exceeded the rate of re-ventilation of the sediment with dissolved oxygen. This is evident in the strong aroma of hydrogen sulphide and discolouration of the sediment.

Univariate and multivariate analysis of **benthic macrofaunal** community structure for the 2011 survey of the Durban outfalls monitoring programme provides clear evidence that the seabed near the Southern Works outfall is enriched with particulate organic material. Benthic macrofaunal community structure in close proximity to the outfall has been modified because of this enrichment. While this impact is not considered to pose an immediate ecological threat, its expansion is cause for concern and should be accounted for in management considerations.

4.1.2 CSIR, Durban Outfalls Report, 2012

The CSIR produced a report in 2012, as a follow- on report back to the previous year's report. The main objectives remain the same. The most relevant portions of the report are reproduced hereunder.

4.1.2.1 Effluent chemistry

Metals were more frequently detected at concentrations exceeding the method detection limit and, with few exceptions, at higher concentrations in Southern Works final effluent. In fact, metals in Central Works final effluent were usually at concentrations below the method detection limit. This difference makes sense considering the bulk of the wastewater handled by the Southern Works wastewater treatment facility is derived from industry while that handled by the Central Works wastewater treatment facility is mostly of a domestic nature. Relatively few (<35%) of the organic chemicals analysed were detected in final effluent from either wastewater treatment facility at concentrations exceeding the method detection limit.

4.1.2.2 Effluent toxicity

The Southern Works effluents showed Minimum Acceptable Toxicant Dilutions ranging from 26 to 225, the latter being the only exceedance of 200. In fact, Minimum Acceptable Toxicant Dilutions in 7 of the 12 tests were lower than 100. This indicates there was little risk of toxicity beyond the zone of the initial dilution for this outfall, which has lowest theoretical minimum initial dilution of 261. The variability in Minimum Acceptable Toxicant Dilutions for Central Works effluents was high, ranging from 30 to 252, with the latter exceeding the lowest theoretical minimum initial dilution of 229 for this outfall.

Of the various physical, chemical and biological variables measured *in-situ* at the margin of the zone of initial dilution for the Central Works and Southern Works outfalls; none showed anomalies that could confidently be attributed to effluent discharge. Faecal indicator bacteria counts provided the clearest effluent signal. None of the

water samples was toxic to sea urchin gametes with the exception of middle and bottom water samples collected at a site situated 4000 m to the southwest of the Southern Works outfall diffuser. The magnitude of toxicity was very low.

4.1.2.3 Sediment quality

The findings of the 2012 survey of the Durban outfalls monitoring provide clear evidence that the discharge of effluent has impaired sediment quality in the vicinity of the diffuser sections of the Central Works and Southern Works outfalls. The impacts were, however, more frequent and of a greater spatial extent and severity in the vicinity of the Southern Works outfall. Sediment near both outfalls was characterised by high faecal indicator bacteria colony forming unit counts. In fact, faecal indicator bacteria were detected at all sites, including the reference sites, providing evidence that effluent was impinging on the benthic environment across the study area. Univariate and multivariate analysis of benthic macrofaunal community structure and composition for the 2012 survey of the Durban outfalls monitoring programme provided clear evidence that the seabed near the Southern Works outfall is enriched with particulate organic matter. The benthic macrofaunal community in the vicinity of the outfall diffuser has been modified because of this enrichment. Comparison to previous surveys reveals a gradual increase in this effect over the past 13 years. However, data for the 2012 survey indicate a marked improvement compared to recent surveys.

4.1.2.4 Range of the scientific survey

The 2012 Outfalls Report analyses and discusses the physical, chemical and biological characteristics of the water column near the Central Works and Southern Works outfalls as measured on a single occasion in May 2013. The major objectives were to (1) determine whether effluent signals were evident in the marine receiving environment, and (2) to determine whether water quality at and beyond the margin of the zone of initial dilution was compliant with the South African Water Quality Guidelines for Coastal Marine Waters (Natural Environment) (DWA 1995) at the time of monitoring.

The above indicates that the study area did not stretch very far north or south of the Central and Southern Works³.

4.2 Primary Data

4.2.1 Data obtained from Stakeholder Consultations

The MindMap below illustrates, in note form the responses received regarding 'social' issues. These responses are indicative of the perceptions (and considerations) that would echo with the local community at large. While the illustration renders results from two consultative meetings (14 April 2014 and 19 May 2014, respectively), a public meeting which took place on the 21 May 2015 did not yield results, as no stakeholders had attended, and thus is not included in this illustration.

³ RHDHV made contact with the CSIR in January 2015 to enquire about possible further water quality sampling points that may cover the Aliwal Shoal/Umkomaas area. The response received is that sampling did not cover the area in question.

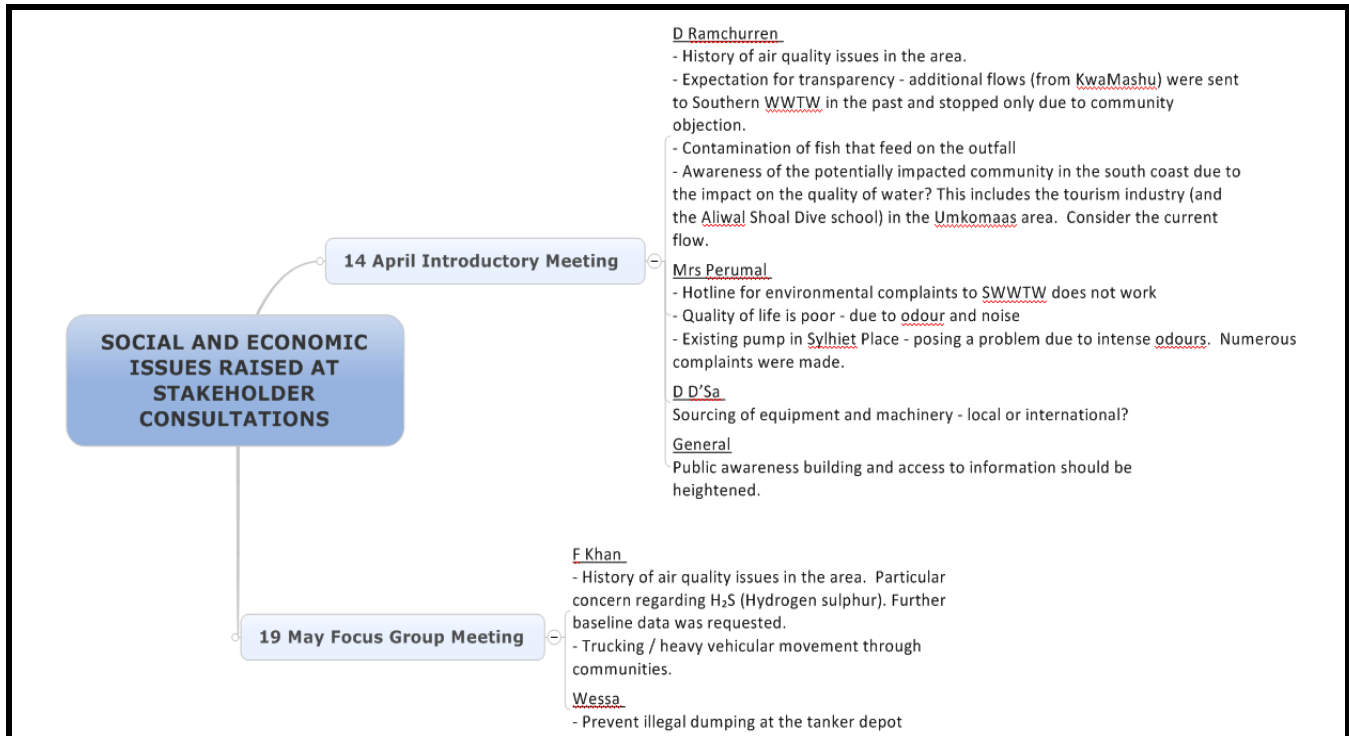


FIGURE 4-1 : MINDMAP OF ISSUES FROM STAKEHOLDER CONSULTATIONS

4.2.2 Facts to be considered

The eThekweni Metropolitan Municipality and eThekweni Waste Services (EWS) have responded to crucial issues that were raised by concerned citizens during the course of stakeholder consultations. Some responses have been captured below in the form of Section 4.2.2.1. and in addition, the data contained within Sections 4.2.2.2 to 4.2.2.6 also indirectly responds to issues raised. Collectively, this data will assist in the measuring of social impacts (the crux of this SIA).

4.2.2.1 Direct Responses from Stakeholder Consultations

14 April Introductory meeting

- An apology was rendered by EWS regarding the past incidence of additional flow from KwMashu. An EWS representative stated that KwaMashu did not have sufficient infrastructure at the time to deal with the flow and the additional flow to SWWTW was done without EWS knowledge;
- With reference to the presentation rendered at the meeting, it was stated that no odour increase would occur but in terms of current odour, the air quality assessment will address this, potentially through an Odour Abatement Plan.
- The remaining issues raised on the 14th April were considered during the social assessment, albeit the issued were not directly addressed at the meeting.

19 May Focus Group Meeting

- The issues raised on the 19th May were considered during the social assessment, albeit the issued were not directly addressed at the meeting.

4.2.2.2 Dewatering sludge⁴

The options proposed for the disposal of the dewatered sludge are as follows:

- Removal off site to agriculture and/or landfill;
- Thermal drying and then removal off site to agriculture;
- Manufacture of fertilizer through a separate sludge pelletizing process to be established on site by a private entity (unconfirmed at this stage) and then removal off site. This option may be investigated under a separate study to be undertaken by others and does not form part of this study nor the scope of work described hereunder'; and
- Further to the option of flaring the remaining gas, the option of utilising most of the stored gas to dry the sludge through a mechanical thermal drying process and then using the waste heat from the drying process to heat the sludge will also be explored and investigated as the EIA unfolds. It is important to note that the drying of sludge would greatly reduce the road transportation requirements for removal of sludge off site.

4.2.2.2.1 National Environmental Management Waste Act (NEMWA) listed waste activities triggered

These include GNR 921 Category A (BA): 1, 3, 9 and 10. These are elaborated on below:

- (1) The storage of general waste (sludge) will be undertaken in (2x150m³) silos on the site, for a period of a day prior to being trucked to a landfill site. The waste water treatment works facility constitutes a "lagoon" hence the triggering of this activity.
- (3) The scope of work includes the option of the provision of dewatered sludge to a pelletizing plant which constitutes the recycling of general waste. The pelletizing plant will be outside of the premises of the SWWTW.
- (9) The options for the disposal of the dewatered sludge (inert waste) include disposal to agricultural land or landfill. This will not exceed 25000 tons per day.
- (10) The options for the disposal of the dewatered sludge (general waste) include disposal to agricultural land or landfill. The land area will not exceed 200m² and the waste will not exceed 25000 tons per day.

4.2.2.3 Future Planning Intentions

With regards to the comment relating to the Metropolitan's future planning intention and the inclusion of a secondary treatment process, rather than to still discharge to sea, and to investigate how to treat industrial effluent independently of sewage, the following is noted:

From the trends in assessments of the CSIR reports and the possibility that the Ethekeeni Waste Services (EWS) may not be permitted to discharge to sea in the future and solutions are needed to improve the effluent currently discharged to sea.

However, this is not being done in isolation of the broader and more sustainable solution. Given the fact the SWWTW was developed in the late 1990's and that several components of infrastructure were mothballed, in order to attain best practices, the works will have to undergo a phased approach to current and best practice technology for which the outcomes can only be best achieved as each phase unfolds. What is gleaned from

⁴ Dewatering sludge, the potential uses of the sludge including the availability of land on the site for a sludge drying facility is not confirmed at this stage. As a result, related activities and processes will not be factored into the impact assessment of this report.

public comment though, is that a cradle-to-grave assessment process should be explored and this will be assessed going forward into the EIA phase.

4.2.2.4 Odour

- The Air Quality Assessment (AQA) being conducted will have as part of its overall deliverable an Odour Abatement Plan which will prescribe measures for the mitigation and control of current and perceived odour.
- Anaerobic digesters are fully enclosed and therefore will not increase odours; however, in order to address current odours, the air quality assessment will evaluate the extent of the impact and develop an odour abatement plan.
- Odour levels are a warranted concern, but it is important to note that this proposed project does not propose increased capacities. However, the introduction of primary sedimentation digestion (that is, increased treatment processes) will result in an odour increase. Mitigation will need to be proposed.
- The Air Quality Assessment will produce an Odour Abatement Plan which will prescribe measures for odour control, including recommendations for monitoring. Reliable and verified data on air quality can and will be shared with the greater public.

4.2.2.5 Noise

The new pumps will be of a more superior technology than the existing ones, therefore they will be more silent. The scoping phase has therefore found that noise is not a significant concern beyond the expected noise of the construction phase which is forthcoming of all development and easily managed through a Construction Environmental Management Plan (CEMP) which will form part of the EIA's Environmental Management Programme (EMPR). It is therefore not deemed necessary to conduct a noise study for this EIA.

4.2.2.6 Public Awareness

The efforts to engage the public and stakeholders that had particular interests, is evidenced by the Project's adequate public participation (PP) programme. Specific actions undertaken as part of the PP programme are outlined below.

Public Notices/Site Notices

10 Public notices and site notices were displayed at the access points to the site and at areas frequently used by the public.

Background Information Document (BID) and Written Notifications/Invitations

A background information document (BID) and notification letter with an invitation to Interested and Affected Parties (I&APs) were distributed as follows:

- 3000 BIDs inserted into post boxes at various physical addresses; and
- Distributed at meetings,
- Upon request, distributed electronically.

Advertisements

Advertisements were placed in a regional newspaper, the Mercury on 07 May 2014 and a local newspaper, the Merebank Rising Sun on 13 May 2014. The content of the advertisements included:

- Brief description of the Project's proposed scope of works,
- Location and details of the public meeting,
- Details of the locations at which the Project's Draft Scoping Report and the Project's Plan of Study (PoS) are available for public access; and
- Details of the independent Environmental Assessment Practitioner (EAP) tasked to undertake the Project.

Meetings

- An introductory meeting was held on the 14th April 2014;
- A Focus Group Meeting was held on the 19th May 2014; and
- A Public Meeting was held on the 21st May 2014.

I&AP Communication, Comments and the Issues Trail

As a result of the advertisement, BID distribution and public meeting, correspondence (comments) were received from I&APs and were duly captured in an Issues Trail. The Issues Trail is found within the Public Participation Process section of the Project Scoping Report. This is continuously updated.

Draft Scoping Report and Plan of Study Review

The draft report has been made available for review for a period of 40 days and hard copies were placed at the following venues, as advertised:

- The eThekweni Municipality, EWS Building, 3 Prior Road, Durban Central;
- Southern Waste Water Treatment Works;
- Merebank Library, Bombay Square, 12 Natraj Lane, Merebank, Durban, 4052; and
- Royal HaskoningDHV website: www.rhdhv.co.za.

5 IMPACT METHOD TO BE USED

The RHDHV impact rating method that will be used is found in the table below. The impact assessment will account for impacts that are likely to be experienced during the three phases of the project, that, is the pre-construction, construction and operation phases.

The following impact rating table will be used.

TABLE 5-1 IMPACT SIGNIFICANCE RATING TABLE

Descriptive criteria		
Nature	Category	
Extent (E)	Categories 1 – 4	
	1	Footprint / site
	2	Local
	3	Regional
	4	National
Duration (D)	Categories 1 – 4	
	1	Short (less than five years)
	2	Medium term (5-15 years)
	3	Long term (15-30 years)
	4	Permanent
Intensity (I)	Categories 1 – 4	
	1	Low
	2	Moderate
	3	High
	4	Very High
Probability (P)	Categories 1 – 4	
	1	Improbable
	2	Probable
	3	Highly Probable
	4	Definite
IMPACT : Cumulative		
Extent (E)		Choose from Categories 1 – 4
Duration (D)		Choose from Categories 1 – 4
Intensity (I)		Choose from Categories 1 – 4
Probability (P)		Choose from Categories 1 – 4
Significance	Significance = E + D + I + P	
	Minimum value of 4, maximum of 16	
	Status determines if positive / negative	

Neg (13 - 16 points) NEGATIVE VERY HIGH	<p>Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw.</p>
Neg (10 - 12 points) NEGATIVE HIGH	<p>These are impacts which individually or combined pose a significantly high negative risk to the environment. These impacts pose a high risk to the quality of the receiving environment. The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.</p>
Neg (7 - 9 points) NEGATIVE MODERATE	<p>These are impacts which individually or combined pose a moderate negative risk to the quality of health of the receiving environment. These systems would not generally require immediate action but the deficiencies should be rectified to avoid future problems and associated cost to rectify once in HIGH risk. Aesthetically and/or physically non-compliance can be expected over a medium term. In this case the impact is medium term, moderate in extent, mildly intense in its effect and probable. Mitigation is possible with additional design and construction inputs.</p>
Neg (4 - 6 points) NEGATIVE LOW	<p>These are impacts which individually or combined pose a deleterious or adverse impact and low negative risk to the quality of the receiving environment, and may lead to potential health, safety and environmental concerns. Aesthetically and/or physical non-compliance can be expected for short periods. In this case the impact is short term, local in extent, not intense in its effect and may not be likely to occur. A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.</p>
0 Neutral	<p>Impact is neither beneficial nor adverse. These are impacts which cannot be classified as either positive or negative or classified and null and void in the case of a negative impact being adequately mitigated to a state where it no longer renders a risk.</p>
Pos (4 - 6 points) POSITIVE LOW	<p>These are impacts which individually or combined pose a low positive impact to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is short term, local in extent, not intense in its effect and may not be likely to occur. A low impact has no permanent impact of significance.</p>
Pos (7 - 9 points) POSITIVE MODERATE	<p>These are impacts which individually or combined pose a moderate positive effect to the quality of health of the receiving environment. In this case the impact is medium term, moderate in extent, mildly intense in its effect and probable.</p>
Pos (10 - 12 points) POSITIVE HIGH	<p>These are impacts which individually or combined pose a significantly high positive impact on the environment. These impacts pose a high benefit to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is longer term, greater in extent, intense in its effect and highly likely to occur. The effects of the impact may affect the broader environment.</p>

	<p>Pos (13 - 16 points) POSITIVE VERY HIGH</p>	<p>These are permanent and important beneficial impacts which may arise. Individually or combined, these pose a significantly high positive impact on the environment. These impacts pose a very high benefit to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is long term, greater in extent, intense in its effect and highly likely or definite to occur. The effects of the impact may affect the broader environment.</p>
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6 IMPACT CONSIDERATIONS AND IDENTIFICATION

The land identified as the proposed development area is in a 'brownfields' site located within the South Durban Basin. It is located in very close proximity to residential homes, as it has been since the very start in the early 2000's. The full extent of the potential of such a development to positively or negatively impact on the area and its people must be supported through a visual and oral verification exercise (on-site). The most critical aspect to factor into the impact report would be whether there would be additional long term impacts and the future scenario when accounting for cumulative impacts in the already impacted area.

6.1 Impact Considerations for this Study

At this point in the study, the following impacts would have to be further investigated for quantification.

- Perceived increased in odour and repellent gases (impact on nearby communities and businesses);
- Perceived increase in health disadvantages due to the perceived increased odour and carcinogenic properties;
- Increased perceived disadvantages to the quality of life of residents and workers alike from the surrounding areas;
- Temporary restricted access to portions of the beach due to upgrade of outfall pipes;
- Added to the increased ocean outflow (design capacity of approximately 215 M³/day under pump discharge) there may be the potential negative impact of a loss of livelihood directly related to fishermen, and potentially to sea-faring tourism events;
- Potential impacts on property value and sales;
- Perceived effects of increased construction vehicles to community health and safety as well as increased traffic loads during peak periods;
- The potential positive air quality benefit of storing sludge in a contained silo; and
- Potential noise and air pollution that may be caused by the generator which is meant to be operational only during times of power failure/s. The location and power output of the generator within the development footprint would impact on the noise and air quality factors – where residences may be directly impacted.

6.2 Identification of Impacts

The assessment of social impacts is complex because of the multi-faceted nature of human systems and organization, the potential inter-connectedness of impacts, and differing implications of the same impacts for different receptors.

The following perspectives will guide the SIA:

- The SIA must be based on sound social economic assessment and the comprehensive description and understanding of social and economic baseline conditions.
- Impacts are defined as the social and economic consequences of project driven changes in the baseline environment.

- Impacts might flow directly from project activities (for example the loss of land and crops due to the construction of a facility), or they might be indirect. Indirect impacts could be a consequence of the project itself (for example improved quality of life where an employee of the project is bringing an income to a household), or they might be a secondary outcome (for example credit facilities due to an improved local business outlook).
- Impacts might also be isolated or cumulative. Cumulative impacts are typically those with many links in the local socio-economic system. They also arise from multiple activities associated with the initial project.
- Impacts must be assessed for different phases of the project cycle. The IFC⁵ proposes a four-phase breakdown⁶ that is, design and planning; construction; operations; decommissioning and closure. For the purposes of this report impacts are assessed at two levels, that is, construction and operation.
- Impacts can be positive or negative. The same change in the baseline condition might be experienced as positive by one section of an affected community, and as negative by another. In principle, all changes are seen to have the potential to initiate development, if the impacts are managed creatively and effectively.
- The mitigation of impacts must be recommended. However it should be noted that responses to impacts can range from focused and specific mitigation and compensation to broad and inclusive contributions to sustainable development.

6.3 Impact Rating and Proposed Mitigation

There are no impacts that are anticipated during the planning stage of the project. This is the case due to an original facility being in current operation on the site. However potential impacts and their respective measured ratings for the construction and operation phases of the project are anticipated. The impact tables presented hereunder will be done so accounting for three alternative designs. Firstly, a No-go Alternative will be assessed, followed by two alternative options, Alternative 1 and Alternative 2.

It is imperative to note that the proposed upgrades will include infrastructure which is currently in place that will be refurbished (as in Alternative 1) or reconstructed to greater capacity requirements (as in Alternative 2) thereby increasing the physical treatment process and allowing for significantly less solids to be disposed via sea outfall. Both Alternatives 1 and 2 will include the construction of a new tanker bay facility, and a new sewage storage basin. The development footprint does not increase, no volumes received or disposed of will increase or decrease⁷ and the long term objective of the SWWTWs to release effluent free of solids to sea will be that much closer to fruition.

⁵ IFC – International Finance Corporation (International lenders. Project typically complies with international guidelines for environmental and social requirements).

⁶ International Finance Corporation: Good Practice Note – Addressing the Social Dimensions of Private Sector Projects

⁷ The plant receives around 130 million litres per day, even though it is designed to accept 150 million litres. This will not increase or decrease.

6.3.1 The No-Go Alternative

This option involves retaining status quo. The used and unused infrastructure in place will remain and the quantity of solids being disposed of to sea remains the same. In this alternative, the treatment process remains as such:

Domestic Effluent - Effluent undergoes preliminary and primary treatment. Thin raw sludge is deposited into effluent channel leading to the sea outfall. Settled effluent is transported to the Veolia Water Treatment plant for further treatment.

Industrial Effluent - Effluent undergoes preliminary treatment before being diverted towards the sea outfall.

TABLE 6-1 IMPACT SIGNIFICANCE RATING TABLE FOR THE NO-GO ALTERNATIVE

Impact and Mitigation Table	
Pre-mitigation impact rating	
<i>Operation Phase</i>	
<i>Issue/ Impact</i>	The potential air quality impact of the sedimentation tanks.
Extent	2
Duration	1
Intensity	2
Probability	4
Impact significance	9 (moderate negative)
<i>Issue/ Impact</i>	Perceived disadvantages to health and the quality of life of residents and workers alike from the surrounding areas
Extent	2
Duration	4
Intensity	4
Probability	3
Impact significance	13 (very high negative)
<i>Issue/ Impact</i>	Loss of livelihood directly related to fishermen, and potentially to sea-faring tourism events
Extent	2
Duration	4
Intensity	1
Probability	1
Impact significance	8 (moderate negative)

6.3.2 Alternative 1

This alternative involves the refurbishment of two old unused primary digesters, secondary digester, gas holder and thickener; as well as replicating the old structures across the road so that in total there will be four primary digesters, two secondary digesters, two gas holders and two thickeners. The construction of a new tanker bay facility and raw sewage storage basin will also take place.

TABLE 6-2 IMPACT SIGNIFICANCE RATING TABLE FOR ALTERNATIVE 1

Impact and Mitigation Table		
	Pre-mitigation impact rating	Post mitigation impact rating
Construction Phase		
<i>Issue/ Impact</i>	Temporary restricted access to portions of the beach due to upgrade of outfall pipes	
Extent	1	1
Duration	1	1
Intensity	1	1
Probability	4	4
Impact significance	7 (moderate negative)	7 (moderate negative)
<i>Mitigation Measures</i>	Moderate negative impact significance. The beach will be fully closed for 24 hours (one day), and will have restricted access for approximately one month. Since the construction of the outfall will definitely take place, the construction area will have to resort to restricted access to the public due to the health and safety hazards related to such an area. No mitigation can be proposed that will change the impact significance for the duration of construction. The only recommendation is that there be no delays related to the construction and that only the directly affected areas be cordoned off, still allowing fishermen and others access to the beach and surf for livelihood and recreational purposes.	
<i>Issue/ Impact</i>	Sourcing of equipment and machinery locally	
Extent	2	2
Duration	1	1
Intensity	1	1
Probability	2	2
Impact significance	6 (low positive)	6 (low positive)
<i>Mitigation Measures</i>	Low positive impact significance after mitigation. The sourcing of equipment from local sources is possible, although the degree to which is unknown. Concerted effort may be made to give procurement preference to local suppliers where possible. The probability is that procurement may fall outside of the local area due to the type of materials required and the honouring of current supplier contracts. Note: The industrial area of Jacobs is in close proximity and could possibly represent a supply area.	
<i>Issue/ Impact</i>	Inconvenience and danger to proximate residents through increased road traffic, dust and noise.	
Extent	2	2
Duration	1	1
Intensity	2	1
Probability	4	4
Impact significance	9 (moderate negative)	8 (moderate negative)

<i>Mitigation Measures</i>	It is expected that during refurbishment, there will be an increased number of construction vehicles on the road. It is recommended that alternative routes be found at scheduled times of the day - perhaps that would help keep the roads free when schools close, allowing children mobility without being hampered by large trucks utilising the same roads. A policy on Contractor Health and Safety for the duration of their work on site, must apply, and be monitored. In addition, a Contractor's Code of Conduct (especially in terms of respecting local by-laws and specific practical community concerns on which agreement may be reached), should be applied for the duration of construction and refurbishment. Regular information sharing discussions with the Contractors must be pursued, giving residents an opportunity to voice concerns and grievances throughout the duration of project construction.	
<i>Issue/ Impact</i>	Local job creation opportunities	
Extent	2	2
Duration	1	1
Intensity	1	1
Probability	2	2
Impact significance	6 (low positive)	6 (low positive)
<i>Mitigation Measures</i>	Low positive impact significance after mitigation. Job creation expectations will have to be well managed via management systems and communication mechanisms that regularly informs the local community (on site and at local community centres) of the progress and job / skills needs at the development sites. A formal job application process must be communicated (should this be a requirement). The potential is that a small number of jobs will be created for the short duration of refurbishment and establishment of some other facilities. A Community Liaison Officer (CLO) will be employed to facilitate the process.	
Operation Phase		
<i>Issue/ Impact</i>	The potential air quality impact of the tanker bay facility, sedimentation tanks, raw sewage storage (low level sump) and anaerobic digesters on the nearest residents.	
Extent	2	2
Duration	4	1
Intensity	4	2
Probability	3	4
Impact significance	13 (very high negative)	9 (moderate negative)
<i>Mitigation Measures</i>	Moderate negative impact after mitigation. The fact that the tanker bay facility, sedimentation tanks, and the raw sewage storage will remain uncovered, will pose a high air quality impact on the nearest residents. However, mitigation for two main facilities are planned- the main odour emitting facility (anaerobic digesters) will be covered, the raw sewage storage will be lime-doused and the skips will be covered. These mitigation measures are to be included in an Odour Abatement Plan. The Air Quality Report (March 2015) shows no significant increase in expected air pollution, however one must note the hydrogen sulphide odour which is expected to exceed the detection limit. For this reason, even with mitigation the high negative air quality impact would improve to a moderate negative impact.	
<i>Issue/ Impact</i>	Potential noise pollution from the upgraded pump facility on the nearest residents.	
Extent	1	1
Duration	4	4
Intensity	1	1
Probability	2	2
Impact significance	8 (moderate negative)	8 (moderate negative)

<i>Mitigation Measures</i>	Moderate negative impact after mitigation. The pump station will be upgraded. The noise impact is likely to be low as it will still be housed within brick walls (as is currently done). There are no new generators that will be installed on the development site, therefore the on-site noise impact does not increase.	
<i>Issue/ Impact</i>	Perceived additional disadvantages to health and the quality of life of residents and workers alike from the surrounding areas	
Extent	2	2
Duration	4	4
Intensity	4	3
Probability	3	2
Impact significance	13 (very high negative)	11 (high negative)
<i>Mitigation Measures</i>	High negative impact significance after mitigation. Increased odour, noise, threat to livelihood and increased health and safety threats are the factors that would typically influence a resident's perspective on the effect on the quality of life in the impacted area. While there is no increase in sewage capacity, and the implementation of newer technology including anaerobic digesters, there is no mitigation available for the tanker bay facility, primary sedimentation tanks and raw storage facility. The anaerobic digesters, the main producers of odors will be covered, however the potential is that the the hydrogen sulphide levels will still be high. This is noted in the Air Quality Report (March 2015).	
<i>Issue/ Impact</i>	Loss of livelihood directly related to fishermen, and potentially to sea-faring tourism events	
Extent	2	2
Duration	4	2
Intensity	1	1
Probability	1	1
Impact significance	8 (moderate negative)	6 (moderate negative)
<i>Mitigation Measures</i>	Low negative impact significance after mitigation. There is no increase in sewage capacity, therefore no further increase in outfall is expected. The outfall capacity is being decreased, therefore there should be a positive impact on those utilising the sea for various purposes. In additional, the long term strategy of the SWWTW focusses on complete elimination of sewage via outfalls. The CSIR's Durban Outfalls Report dated 2012 does not highlight extreme risk related to levels of effluent chemistry, effluent toxicity and sediment quality.	

6.3.3 Alternative 2

This alternative involves the demolition of the existing structures (primary digesters, secondary digester and gas holder) and the construction of new structures that are approximately twice the capacity of the existing structures. The construction of a new tanker bay facility and raw sewage storage basin will also take place.

TABLE 6-3 IMPACT SIGNIFICANCE RATING TABLE FOR ALTERNATIVE 2

Impact and Mitigation Table		
	Pre-mitigation impact rating	Post mitigation impact rating
Construction Phase		
<i>Issue/ Impact</i>	Temporary restricted access to portions of the beach due to upgrade of outfall pipes	
Extent	1	1
Duration	1	1
Intensity	1	1
Probability	4	4
Impact significance	7 (moderate negative)	7 (moderate negative)
<i>Mitigation Measures</i>	Moderate negative impact significance. The beach will be fully closed for 24 hours (one day), and will have restricted access for approximately one month. Since the construction of the outfall will definitely take place, the construction area will have to resort to restricted access to the public due to the health and safety hazards related to such an area. No mitigation can be proposed that will change the impact significance for the duration of construction. The only recommendation is that there be no delays related to the construction and that only the directly affected areas be cordoned off, still allowing fishermen and others access to the beach and surf for livelihood and recreational purposes.	
<i>Issue/ Impact</i>	Sourcing of equipment and machinery locally	
Extent	2	2
Duration	1	1
Intensity	2	2
Probability	2	2
Impact significance	7 (low positive)	7 (low positive)
<i>Mitigation Measures</i>	Low positive impact significance after mitigation. The sourcing of equipment from local sources is possible, although the degree to which is unknown. Concerted effort may be made to give procurement preference to local suppliers where possible. The probability is that procurement may fall outside of the local area due to the type of materials required and the honouring of current supplier contracts. Note: The industrial area of Jacobs is in close proximity and could possibly represent a supply area.	
<i>Issue/ Impact</i>	Inconvenience and danger to proximate residents through increased road traffic, dust and noise.	
Extent	2	2
Duration	1	1
Intensity	3	2
Probability	4	4
Impact significance	10 (high negative)	9 (moderate negative)
<i>Mitigation Measures</i>	It is expected that during refurbishment, there will be an increased number of construction vehicles on the road. It is recommended that alternative routes be found at scheduled times of the day - perhaps that would help keep the roads free when schools close, allowing children mobility without being hampered by large trucks utilising the same roads. A policy on Contractor Health and Safety for the duration of their work on site, must apply, and be monitored. In addition, a Contractor's Code of Conduct (especially in terms of respecting local by-laws and specific practical community concerns on which agreement may be reached), should be applied for the duration of construction and refurbishment. Regular information sharing discussions with the Contractors must be pursued, giving residents an opportunity to voice concerns and grievances throughout the duration of project construction.	

<i>Issue/ Impact</i>	Local job creation opportunities		
Extent	2	2	
Duration	1	1	
Intensity	1	1	
Probability	2	2	
Impact significance	6 (low positive)		6 (low positive)
<i>Mitigation Measures</i>	Low positive impact significance after mitigation. Job creation expectations will have to be well managed via management systems and communication mechanisms that regularly informs the local community (on site and at local community centres) of the progress and job / skills needs at the development sites. A formal job application process must be communicated (should this be a requirement). The potential is that a small number of jobs will be created for the short duration of refurbishment and establishment of some other facilities. A Community Liaison Officer (CLO) will be employed to facilitate the process.		
Operation Phase			
<i>Issue/ Impact</i>	The potential air quality impact of the tanker bay facility, sedimentation tanks, raw sewage storage (low level sump) and anaerobic digesters on the nearest residents.		
Extent	2	2	
Duration	4	4	
Intensity	4	4	
Probability	3	3	
Impact significance	13 (very high negative)		13 (very high negative)
<i>Mitigation Measures</i>	Moderate negative impact after mitigation. The fact that the tanker bay facility, sedimentation tanks, and the raw sewage storage will remain uncovered, will pose a high air quality impact on the nearest residents. However, mitigation for two main facilities are planned- the main odour emitting facility (anaerobic digesters) will be covered, the raw sewage storage will be lime-doused and the skips will be covered. These mitigation measures are to be included in an Odour Abatement Plan. The Air Quality Report (March 2015) shows no significant increase in expected air pollution, however one must note the hydrogen sulphide odour which is expected to exceed the detection limit. For this reason, even with mitigation the high negative air quality impact would improve to a moderate negative impact.		
<i>Issue/ Impact</i>	Potential noise from the upgraded pump facility.		
Extent	1	1	
Duration	4	4	
Intensity	1	1	
Probability	2	2	
Impact significance	8 (moderate negative)		8 (moderate negative)
<i>Mitigation Measures</i>	Moderate negative impact after mitigation. The pump station will be upgraded. The noise impact is likely to be low as it will still be housed within brick walls (as is currently done). There are no new generators that will be installed on the development site, therefore the on-site noise impact does not increase.		
<i>Issue/ Impact</i>	Perceived additional disadvantages to health and the quality of life of residents and workers alike from the surrounding areas		
Extent	2	2	
Duration	4	4	
Intensity	4	3	

Probability	3	2
Impact significance	13 (very high negative)	11 (high negative)
<i>Mitigation Measures</i>	High negative impact significance after mitigation. Increased odour, noise, threat to livelihood and increased health and safety threats are the factors that would typically influence a resident's perspective on the effect on the quality of life in the impacted area. While there is no increase in sewage capacity, and the implementation of newer technology including anaerobic digesters, there is no mitigation available for the tanker bay facility, primary sedimentation tanks and raw storage facility. The anaerobic digesters, the main producers of odors will be covered, however the potential is that the the hydrogen sulphide levels will still be high. This is noted in the Air Quality Report (March 2015).	
<i>Issue/ Impact</i>	Loss of livelihood directly related to fishermen, and potentially to sea-faring tourism events	
Extent	2	2
Duration	4	2
Intensity	1	1
Probability	1	1
Impact significance	8 (moderate negative)	6 (moderate negative)
<i>Mitigation Measures</i>	Low negative impact significance after mitigation. There is no increase in sewage capacity, therefore no further increase in outfall is expected. The outfall capacity is being decreased, therefore there should be a positive impact on those utilising the sea for various purposes. In additional, the long term strategy of the SWWTW focusses on complete elimination of sewage via outfalls. The CSIR's Durban Outfalls Report dated 2012 does not highlight extreme risk related to levels of effluent chemistry, effluent toxicity and sediment quality.	

6.3.4 Potential Cumulative Impacts

The South Durban area is known as a ‘toxic hotspot’ due to the number of heavy industries in the area. This study has paid careful attention to specifically the air quality and potential health impacts from the proposed project due to the high levels of toxicity that the South Durban Basin already contains. In the case of this study, two cumulative impacts have been identified, those are related to:

- Air quality and associated health risks, and
- Property value and property sales.

These are discussed further in the table below.

TABLE 6-4 POTENTIAL CUMULATIVE IMPACTS

Potential Cumulative Impacts	
Air quality and associated health risks	<p>While there is a current very high negative cumulative air quality impact assumed, the proposed project is not seen to directly contribute to the cumulative impact (as there are other companies such as Mondi, Engen and Sapref in close proximity). The Specialist Air Quality study does not refer to added risks in this regard.</p> <p>The South Durban area has been known to be a 'toxic hotspot' for air pollution and control strategies, and has commonly been referred to as one of the most polluted areas in South Africa. Serious health risks have been associated with living in the area - with the highest cancer and asthma rates in the country. The Mail and Guardian had previewed a short documentary on the topic. It is called "Welcome to South Africa's Cancer Valley" (narrated by Lauren Clifford-Holmes). This is also supported by a 2007 Health Risk Assessment Study undertaken in 2007.</p>

<p>Potential impacts on property value and sales</p>	<p>A very high negative impact significance is expected to continue. Due to the current low return property market, there is no improvement expected, s this will remain a cumulative impact. The existing environment in the Merebank/ Merewent area is one where property investment is not vigorously pursued. Firstly there are no critical pull factors for buyers. The current health challenges in the area is widely publicized along with the impact the current environment has on children. The area is largely inhabited by the poorer, more vulnerable portion of the Durban population. Current sale prices are extremely low. There is no anticipation that property prices in these affected areas will ever improve to the degree that it would enter the competitive property housing market. This impact is also guided by the number of industries surrounding the residential area - potentially providing both a visual and air pollution impact.</p>
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What is noted, is that there is no anticipated increase in road traffic. The Specialist-produced Traffic Impact Statement (March 2015) notes the following, "Analysis of the Byfield Road/ Tara Road/ Badulla Drive intersection for the horizon year indicates that the intersection still operates within capacity during the A.M peak and beyond capacity during the P.M peak. The horizon year (2020) analysis of the traffic operational efficiency with the additional traffic (tankers) to be generated by the development has a negligible impact on existing and forecasted traffic operational conditions." Therefore, there is no foreseeable negative impact on traffic conditions as a direct result of the development.

6.4 Summary Analysis of Impact Results

This SIA does not show a comparative difference in the significance ratings of impacts for both Alternative 1 and 2 as results in terms of ratings before and after mitigation are in most cases, similar. The biggest difference would probably occur in the construction timeline expected between refurbishment (as in Alternative 1) as opposed to construction (as in Alternative 2). One would expect construction to take longer.

Apart from the above practical distinction there is no great difference in significance ratings of the construction and operational phases of the project between each Alternative. Subsequently, this SIA is not leaning towards any specific preferred Alternative. Either is preferred.

The main issue that is of critical social (health) importance is that which relates to the hydrogen sulphide levels that would be imminent following the project development, whether following Alternative 1 or 2. For this reason, and the fact that this development is planned in close proximity to an already- vulnerable community (from both a social and economic perspective), further concerted effort must be made in order to curtail additional air pollution (particularly hydrogen sulphide) levels.

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