

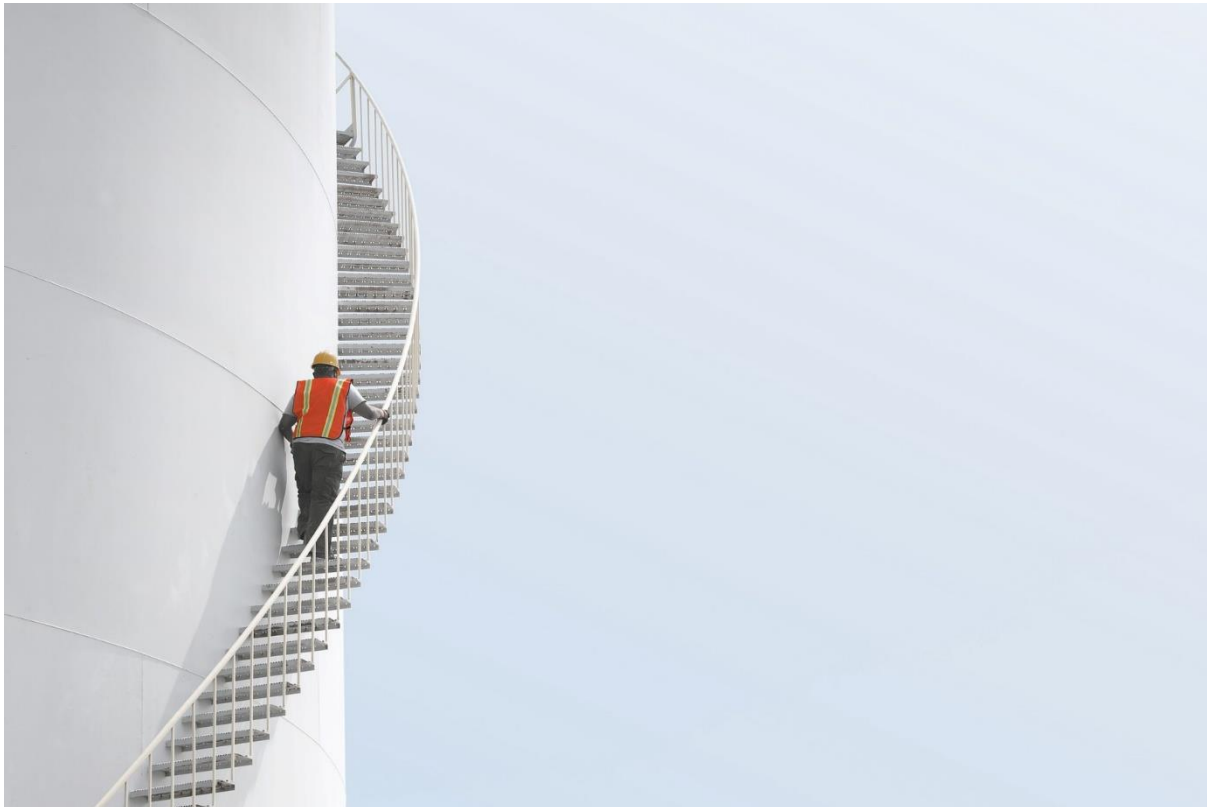


ENGEN

# ENGEN ZENEX BLEND PLANT (ZBP) DECOMMISSIONING BASIC ASSESSMENT REPORT

14 JUNE 2021

DRAFT





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ENGEN

TYPE OF DOCUMENT (VERSION)  
DRAFT

PROJECT NO.: 41102362  
DATE: JUNE 2021

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# QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Draft			
Date	June 2021			
Prepared by	Alice Moropa			
Signature				
Checked by	Carla Elliott			
Signature				
Authorised by	Nigel Seed			
Signature				
Project number	41102362			
Report number	01			
File reference	G:\000 NEW Projects\41102362 - Engen LOPB ZPB Consolidation\42 ES\2-REPORTS\01-Draft\ZBP			

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B	CURRICULUM VITAE





C ENVIRONMENTAL MANAGEMENT PROGRAMME

# 1 INTRODUCTION

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## 1.1 BACKGROUND

Engen Limited (Engen) is an Africa-based oil company focusing on the downstream refined petroleum products market and related businesses. The company is majority owned by Petronas (74% holding), who are one of the world's leading oil companies, and Phembani (21.2% holding), a black-owned South African company focusing on the broader energy sector, together with a Phembani-led consortium (4.8% holding).

Engen manufactures approximately 500 petrochemical products and operates numerous service stations across sub-Saharan Africa and the Indian Ocean Islands. Its petrochemical products are manufactured at the three manufacturing plants (the Engen Refinery, Lubricating Oil Blend Plant (LOBP) and the Zenex Blend Plant (ZBP)), LOBP and ZBP are located at Island View alongside the harbour in Durban, South Africa.

ZBP is located at the cutler complex in Island View. The plant originally belonged to Esso and later became a Zenex site in 1986, eventually forming part of Engen Petroleum Limited in 2000. The plant has been used for the processing of various grades of lubricating oils with the addition of viscosity enhancing co-polymers to produce various grades and types of lubricating oils. The processing plant is fuelled by two heavy fuel oil (HFO) fired boilers on site, producing about 1.5 tons per hour of steam for use in the process.

The plant also houses a number of storage tanks for the various components used in the manufacturing of the lube oils, blending kettles where the specific grades of lube oils are manufactured, storage vessels for the final products, and the production line where the lube oils are loaded into the different containers for dispatch to customers.

Engen proposes to decommission ZBP. The scope of work involves the safe and controlled demolition of all structures, buildings, paving and equipment located above ground level as well as all foundations and underground structures. On completion of demolition and removal, all rubble and scrap will be removed from site and the entire area levelled. The site is currently leased from Transnet, which is the landowner and lessor. Following the decommissioning process and the termination of the lease, the site will be handed back to Transnet.

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the Environmental Impact Assessment (EIA) Regulations promulgated in Government Notice (GNR) 326 of 7 April 2017, a Basic Assessment (BA) process is required for the decommissioning and removal of facilities previously used for storing dangerous goods. This Basic Assessment Report (BAR) has therefore been compiled to meet the requirements of the EIA regulations in obtaining an Environmental Authorisation (EA) from the Competent Authority (i.e. the KwaZulu-Natal Department of Economic development, Tourism & Environmental Affairs (EDTEA)) for the proposed activities associated with the decommissioning of the ZBP site.

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## 1.2 PURPOSE OF THE BA PROCESS

The BA process is a simplified version of what may broadly be referred to as the environmental and social impact assessment (ESIA) process. It applies to activities contained in Listing Notices 1 & 3 of the EIA Regulations which are considered to have a relatively lower environmental impact than those contained in Listing Notice 2 (requiring a Scoping and Environmental Impact Assessment).

The BA process is an interdisciplinary procedure to ensure that environmental considerations are included in decisions regarding projects that may impact the environment. The process helps identify the possible environmental effects of a proposed activity and how those impacts can be mitigated. In the context of this report, the purpose of the BA process is to inform decision-makers and the public of the environmental consequences of the proposed project. This document (the BAR) is a technical tool that identifies, predicts, and analyses impacts on the physical environment, as well as social, cultural, and health impacts. The report identifies alternatives and mitigation measures to reduce the environmental impact of the proposed project; it also serves an important procedural role in the overall decision-making process by promoting transparency and public involvement.

Stakeholder engagement is a fundamental part of the BA process and aims to include potential Interested and Affected Parties (I&APs) in the process by notifying them of the proposed project. The objectives of the stakeholder engagement process are to:

- Ensure an open and transparent BA and consultation process;
- Enable stakeholders to register their interest and provide input into the BA process and share information; and,
- Ensure that all relevant issues are addressed as part of the BA process.

A Stakeholder Engagement Report (SER) is included in **Appendix A** of this report, detailing the project’s compliance with the public participation requirements of the EIA Regulations.

*\*\*Note that the SER is only included in the final BA report for submission to the Authorities.*

## 1.3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP Environmental (Pty.) Ltd (WSP) has been appointed in the role of Independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed project. **Table 1-1** outlines the details of the EAP and his expertise.

**Table 1-1: Details of the Environmental Assessment Practitioner**

NAME OF CONSULTANT:		WSP ENVIRONMENTAL (PTY.) LTD.
Contact Person:	Nigel Seed	
Postal Address:	1st Floor Pharos House 70 Buckingham Terrace Westville Durban 3629 South Africa	
Telephone:	031 240 8864	
Fax:	031 240 8801	
E-mail:	nigel.seed@wsp.com	
Expertise to conduct this EIA	Nigel has 19 years’ environmental and social consulting experience. He is a Technical Director as well as the lead for the environmental and social impact assessment (ESIA) service in Sub-Saharan Africa. Nigel has led complex EIA and transaction related due diligence assessments across a range of sectors. He has been involved in major projects in the petrochemical sector for over a decade. As a critical role on industrial expansion and decommissioning projects he routinely interfaces complex technical-environmental issues. He has undertaken waste management strategies across the industrial sectors including mid and down-stream oil and gas, chemical and extractive industries. His specific expertise includes waste categorisation and classification, best practical environmental option (BPEO) analysis, waste minimisation strategies and compliance assessments.	

The EAP Curriculum Vitae is attached in **Appendix B**.

## 1.4 BASIC ASSESSMENT REPORT STRUCTURE

For the purposes of demonstrating legal compliance, **Table 1-2** cross-references the sections within the BA Report with the requirements as per Appendix 1 of the EIA Regulations (GNR 326 of 2017).

**Table 1-2: Legislation Requirements as detailed in Appendix 1 of GNR 326**

(a)	details of-	
	(i) the EAP who prepared the Environmental Management Programme (EMPr); and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.3 and <b>Appendix B</b>
(b)	the location of the activity, including:	Section 1.5
	(i) the 21 digit Surveyor General code of each cadastral land parcel;	
	(ii) where available, the physical address and farm name;	
(c)	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Figure 1.2
	a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is—	
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	
(d)	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	N/A
	a description of the scope of the proposed activity, including—	Section 2
	(i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure;	
	(i) planning and design;	Section 2
	(ii) pre-construction activities;	
	(iii) construction activities;	
(iv) rehabilitation of the environment after construction and where applicable post closure; and		
(v) where relevant, operation activities;		
(e)	(e) a description of the policy and legislative context within which the development is proposed including—	Section 1.6
	(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and	
	(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	
(f)	a motivation for the need and ability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 2.3
(g)	a motivation for the preferred site, activity and technology alternative;	Section 3
(h)	a full description of the process followed to reach the proposed preferred alternative within the site, including —	Still To Be Undertaken
	(i) details of all the alternatives considered;	
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	

	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 4
	(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 5
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 5
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 5 and Appendix
	(ix) the outcome of the site selection matrix;	Section 5
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 5
(i)	a full description of the process undertaken to identify, assess and rank the impacts of the activity will impose on the preferred location through the life of the activity, including—	Section 5
	(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 5
	(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 5

## 1.5 PROJECT LOCATION

The ZBP site is located within the Island View Culter Complex in Durban, Kwa Zulu Natal. The site is situated alongside the Port of Durban and is surrounded by other industrial holdings in the area. The location of the site is shown in **Figure 1-1**.

**Table 1-3** provides the required cadastral information for the proposed project, in terms of Annexure 1(3) of GN.R326.

**Table 1-3: Cadastral Information**

### SITE LOCATION DETAILS SS PER GN.R326 ANNEX 1 (3)

(i) 21 digit Surveyor General code of each cadastral land parcel:	N0FU00000001634400111 N0FU00000001634400112
(ii) Physical address and farm name:	34 Trinidad Road, island View, Durban, 4052 – Portion 111 & Portion of Portion 112, Kings Flats 16344
iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	Not required.

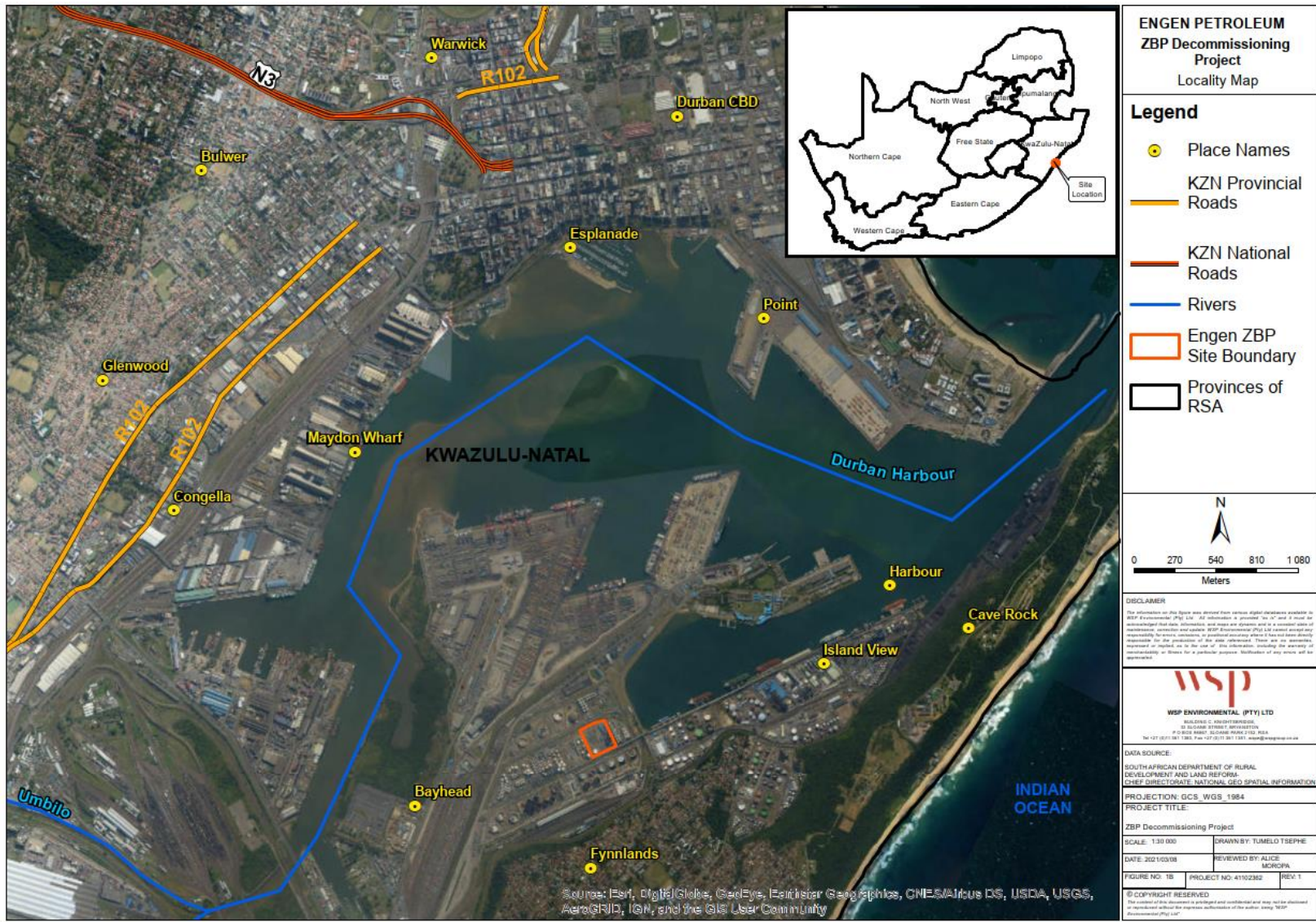


Figure 1-1: Regional Location of the ZBP Site



**Figure 1-2: ZBP Site Layout**



## 1.6 POLICY AND LEGAL CONTEXT

The Project will be carried out with due regard to local and international applicable legal and other environmental requirements. **Table 1-4** identifies all national environment legislation applicable to the project. No additional policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments were identified as being applicable to the project.

**Table 1-4: Summary of National Legislation Applicable to the Project**

TITLE OF LEGISLATION, POLICY OR GUIDELINE	APPLICABILITY TO PROJECT
<b>The Constitution Of The Republic Of South Africa (No. 108 Of 1996)</b>	<p>The Bill of Rights, in the Constitution of South Africa (No. 108 of 1996), states that everyone has a right to a non-threatening environment and requires that reasonable measures are applied to protect the environment. This protection encompasses the preventing of pollution and promoting conservation and environmentally sustainable development. These principles are embraced in NEMA and given further expression.</p> <p><b>Applicability</b></p> <p>This report is in line with the constitutional requirements on the basis that it identifies activities that may cause environmental and socio-economic damage from the associated impacts occurring as a result of the decommissioning activities.</p> <p>The impacts are evaluated and mitigation measures developed to minimise the negative impacts and promote positive impacts associated with the project, thereby ensuring that the Project is undertaken in a sustainable manner. This also ensures that the Project proponent does not contravene Section 24 of the Act.</p>
<b>National Environmental Management Act (No. 107 Of 1998)</b>	<p>The National Environmental Management Act (No. 107 of 1998), as amended, (NEMA) is South Africa's overarching environmental statute concerned with integrated environmental management (IEM) and the underlying principles by which environmental management must be undertaken. Its primary objective is to provide for co-operative governance, thus binding all organs of state by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance, and procedures for co-ordinating environmental functions exercised by organs of state and to provide for matters connected therewith</p> <p>NEMA requires that measures are taken to prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p> <p>The Act also requires that all environmental impacts (including social impacts) due because of the development and/or its activities are assessed and where possible, minimised or mitigated.</p> <p><b>Applicability</b></p> <p>The proposed development will require the consideration and implementation of environmental management practices in all stages of the project. The principles of NEMA have been integrated in the BA process by identifying and assessing all impacts associated with the decommissioning activities, and identifying the required management and mitigation measures for such impacts, to ensure pollution prevention, ecological conservation and the management of socio-economic impacts. An application for EA for the proposed Project is submitted in terms of GNR 326 of the EIA Regulations promulgated under NEMA.</p>
<b>National Environmental Management Act EIA Regulations 2014</b>	<p>In terms of Section 24(2) of the NEMA, the Minister may identify activities which may not commence without prior authorisation. The Minister thus published GNR 983 (Listing Notice 1), GNR 984 (Listing Notice 2) and GNR 985 (Listing Notice 3) listing activities that may not commence prior to authorisation (7 April 2017). These listed activities as well as</p>

	<p>the regulations outlining the procedures required for authorisation are published in GNR 982 [Environmental Impact Assessment Regulations (EIA)] (7 April 2017). Listing Notice 1 identifies activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require an S&amp;EIR process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 3 identifies activities to be undertaken within specific sensitive areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity.</p> <p><b>Applicability</b></p> <p>The EIA Regulations are applicable insofar that the BA process being undertaken is being conducted in accordance with EIA Regulation GNR 982 promulgated in terms of the National Environmental Management Act (No 107 of 1998) (NEMA).</p> <p>The following listed activities have been triggered:</p> <p><b>GNR 983 (2014) as amended: Listing Notice 1, Activity 31:</b></p> <p><i>The decommissioning of existing facilities, structures or infrastructure for (i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014;</i></p> <ul style="list-style-type: none"> <li>– <i>(ii) any expansion and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014;</i></li> <li>– <i>(iii) [any development and related operation activity or activities and expansion and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014:] ...</i></li> <li>– <i>(iv) any phased activity or activities for development and related operation activity or expansion or related operation activities listed in this Notice or Listing Notice 3 of 2014; or</i></li> <li>– <i>(v) any activity regardless the time the activity was commenced with, where such activity: (a) is similarly listed to an activity in (i)[,] or (ii)[, or (iii)] above; and (b) is still in operation or development is still in progress;</i></li> </ul> <p><i>excluding where—</i></p> <ul style="list-style-type: none"> <li>– <i>(aa) activity 22 of this notice applies; or</i></li> <li>– <i>(bb) the decommissioning is covered by part 8 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies.</i></li> </ul> <p>The project constitutes decommissioning of activities listed in the EIA Regulations, which includes but is not limited to:</p> <p><b>GN. R984: Listing Notice 2 Activity 4:</b></p> <p><i>The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.</i></p> <p><b>GN. R984: Listing Notice 2 Activity 5:</b></p> <p><i>The development and related operation of facilities or infrastructure for the [refining, extraction or] processing of a petroleum resource, including the beneficiation or refining of gas, oil or petroleum products with an installed capacity of 50 cubic metres or more per day.</i></p>
<p><b>National Environmental Management, Waste Act (No 59 of 2008)</b></p>	<p>The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA) is subsidiary and supporting legislation to the NEMA. The Act is a framework legislation that provides the basis for the regulation of waste management. The Act also contains policy elements and gives a mandate for further regulations to be promulgated. On 29 November 2013 GNR 921 was promulgated (repealing GNR 718) which contains a list of waste management activities that if triggered require a Waste Management License (WML) and in turn a Basic Assessment (Category A activities) or Scoping and EIA (Category B activities) process to be undertaken in terms of the NEMA EIA Regulations. Category C activities are required to comply with the Norms and Standards for Storage of Waste 2013 (GNR 926) and do not require authorisation.</p>

	<p><b>Applicability</b></p> <p>The facility and associated decommissioning does not constitute a Listed Activity requiring a Waste Management Licence (WML) as defined in GNR 921. However, the contents of this BA Report will include reasonable measures for the prevention of pollution and good international industry practice (GIIP).</p>
<p><b>National Environmental Management, Air Quality Act (No 39 of 2004)</b></p>	<p>The National Environmental Management Air Quality Act (Act No. 39 of 2004), seeks to reform the law regulating air quality to protect the environment by providing reasonable measures for i) the prevention of pollution and ecological degradation; and ii) securing ecologically sustainable development while promoting justifiable economic and social development. The act also seeks to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measure; and for matters incidental thereto.</p> <p>According to Section 22 of the NEMAQA, no person may without a provisional atmospheric emission licence or an atmospheric emission licence (AEL) conduct an activity that is i) listed on the national list anywhere in the Republic; or ii) listed on the list applicable in a province anywhere in that province.</p> <p>Listed activities and associated minimum emission standards (MES) were published in Government Notice 248 of 2010, Government Gazette 33064 in-line with Section 21 of NEMAQA. An amended list of activities was published in Government Notice 893 of 2013, Government Gazette 37054, in Government Notice 551 of 2015, Government Gazette 38863 and further in Government Notice 1207 of 2018, Government Gazette 42013.</p> <p>The National Dust Control Regulation (Government Notice.827), which were promulgated on 1 November 2013, define acceptable dust fall rates for residential and non-residential areas.</p> <p><b>Applicability</b></p> <p>Although Engen will not require an AEL for the decommissioning activities, measures have been detailed in the EMPr (<b>Appendix B</b>) to ensure that the emission of dust is controlled and that the dust -limits not exceeded as per the National Dust Control Regulations</p>
<p><b>The National Water Act, (No 36 of 1998)</b></p>	<p>The National Water Act, 1998 (Act No. 36 of 1998) (NWA) provides the framework to protect water resources against over exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment. The Act defines water source to include watercourses, surface water, estuary or aquifer. A watercourse is defined in the Act as a river or spring, a natural channel in which water flows regularly or intermittently, a wetland, lake or dam into which or from which water flows, and any collection of water which the Minister may declare a watercourse.</p> <p>Section 21 of the Act outlines a number of categories which require a water user to apply for a Water Use License (WUL) and Section 22 requires water users to apply for a General Authorisation (GA) with the Department of Water and Sanitation (DWS) if they are under certain thresholds or meet certain criteria.</p> <p><b>Applicability</b></p> <p>According to the SANBI NFEPA (National freshwater Ecosystem Priority Areas) Map, the Project area falls within an NFEPA wetland area and forms part of the coastal area, however, the area also forms part of the existing port/harbour and has been transformed to such. Apart from the ocean body (approximately 200m from the site), there are no other regulated waterbodies or wetlands located on or within a 500m radius of the Project site. The proposed decommissioning is not anticipated to trigger Section 21 water uses requiring licencing in terms of the National water Act (NWA). Comment from the Department of Water and Sanitation (DWS) on the absence of any WUL requirements for the Project will be requested as part of the stakeholder engagement process.</p>
<p><b>National Heritage Resources Act, 1999, (Act No. 25 of 1999)</b></p>	<p>The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites and resources, the conservation and care of cemeteries and graves by the South African Heritage Resource Agency</p>

	<p>(SAHRA), and lists activities which require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development.</p> <p>In terms of the Section 34 of NHRA, No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.</p> <p><b>Applicability:</b> A cultural heritage impact assessment is required for projects at locations where there are culturally or historically significant elements including archaeological or palaeontological sites, on or within 20m of the site.</p> <p>The plant area has been fully transformed from its natural state and due to its brownfields nature is unlikely to contain significant cultural heritage resources other than buildings older than 60 years. An application for Heritage Review associated with the decommissioning project will be submitted to AMAFA and comments included in the Final BAR.</p>
<p><b>Asbestos Abatement Regulations (GNR 1196, November 2020)</b></p>	<p>The new Asbestos Abatement Regulations replaces the Asbestos Regulations and will be implemented in partnership with National Institute for Occupational Health (NIOH). The regulations introduce several changes for employers whose employees may be exposed to asbestos dust during the course and scope of their employment. The primary purpose of the act is to assist the Department of Employment and Labour to ensure best practice management of asbestos health risks to workers. The new regulations aim to ensure employers identify and manage asbestos in the workplace and where it is no longer possible to maintain asbestos in a safe condition – the asbestos is safely removed and disposed.</p> <p><b>Applicability:</b> Appointed Demolition Contractor will be a registered asbestos contractor with the Department of Labour and method statements in compliance with new regulations.</p>

## 1.7 ASSUMPTIONS AND LIMITATIONS

### 1.7.1 SUBSURFACE CONTAMINATION AND REMEDIATION

In accordance with Part 8 of the National Environmental Management: Waste Act of 2008 (NEM: WA), the Island View Contamination Forum (IVCF) has prepared a consolidated Site Assessment Report (SAR) and Remediation Action Plan (RAP) for the Island View Complex at the Port of Durban, KwaZulu-Natal. The ZBP site is a facility within the complex that is subject to the outcomes of the RAP. Engen will dispense its obligations strictly in terms of the RAP and the associated regulatory framework. The consideration of environmental and social impacts associated with subsurface contamination is not within the legal remit of the application for decommissioning of ZBP, and is accordingly not dealt with in this Basic Assessment Report.

## 2 PROJECT DESCRIPTION

### 2.1 PROJECT JUSTIFICATION (NEED AND DESIRABILITY)

The decommissioning of the ZBP site is part of a broader set of business improvement initiatives that focus on attainment of business full potential for Engen.

The project is thus needed and desirable from Engen's perspective as it is a critical process within this broader set of initiatives.

### 2.2 PROJECT OVERVIEW

The decommissioning activity will occur within the ZBP operational area, which is one of two operational areas in the Transnet lease area (together with the Island View D (IVD) facility / chemicals site (**Figure 2-1**).

The decommissioning of ZBP entails the demolition and removal of above and below surface structures, infrastructure and buildings from the ZBP operational area. Engen proposes to relocate some of the equipment and infrastructure from the ZBP site to the IVD Chemicals site for storage purposes and/or future installation and use at IVD chemicals. Any such future installation at IVD Chemicals will be subject to review of, and if required, compliance with the environmental legislation.

On completion of demolition and removal activities at ZBP, all rubble and scrap will be removed from site and the entire area levelled. Additional detail on the decommissioning tasks is discussed in the sections below.



**Figure 2-1: IVD and ZBP Operational Areas within the Lease Area**

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## 2.3 PROPOSED DECOMMISSIONING ACTIVITIES

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### 2.3.1 TANKS (INCLUDING ASSOCIATED EQUIPMENT (PIPES, CABLING ETC.) AND FOUNDATIONS)

Prior to any work being undertaken, all tanks will be emptied of any contents including residual material (sludge, product etc.), isolated, decontaminated and made safe.

Some tanks will be dismantled and removed off site for scrapping / disposal. Some tanks may be relocated to IVD Chemicals for storage. The tanks to be relocated may include, but are not limited to this in **Table 2-1**. The current material stored in the tanks listed below includes lubrication oil (raw materials, additives, intermediates and final products).

**Table 2-1: Preliminary list of Tanks to be relocated to IVD Chemicals for Storage**

ENGEN TANK REF	VOLUME (M <sup>3</sup> )
HT34	122
HT4	122
JB1	122
23	385
25	385
27	385
29	385
209	140
210	122
126	30
127	30
24	385
26	385
114	860
39	948
116	860
115	860

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### 2.3.2 INFRASTRUCTURE

Buildings and structures on the site that have no value for re-use will be demolished and removed for disposal. These may include the substation, boiler house, OCP (Olefin Co-polymer) Plant, blend plant, maintenance workshop, canteen, laboratory, loading bays, administration building, and security building.

It is possible that some buildings and structures will not be demolished if they are agreed to remain by Transnet in terms of the lease exit agreement.

Other buildings and structures may be relocated to IVD Chemicals for storage, this may include, but is not limited to the Warehouse, Filling Plant, Rail Siding and Gantry, Bulk Road Tanker Loading Gantry. The proposed location for storage of relocated buildings and structures at IVD Chemicals is illustrated in **Figure 2-2**.



**Figure 2-2: Infrastructure Relocation Areas within IVD**

### 2.3.3 EQUIPMENT AND SYSTEMS

All equipment and systems will be demolished except for any equipment and systems that may identified for possible re-use by Engen – this may include, but not be limited to the transformer oil system; equipment and piping located within transformer oil bay; white oils system equipment and piping located within white oil bay; filling lines located within the filling hall; and, the drum heating and decanting unit.

### 2.3.4 CONCRETE STRUCTURES

Concrete structures will be demolished and removed including but not limited to those associated with the base oil and OCP tank bunds; and, all paving, concrete slabs, foundations and roads. Appointed Demolition Contractor will be a registered asbestos contractor with the Department of Labour.

### 2.3.5 UNDERGROUND STRUCTURES

Underground structures<sup>1</sup> will be demolished and removed include but are not limited to: foundations; cabling; piping; storage tank; oily water separators; and, manholes and sumps.

### 2.3.6 UTILITIES AND PRODUCT LINES

Prior to any work, all product lines will be emptied of any contents including residual material (sludge, product etc.), isolated, decontaminated and made safe. The utilities and product lines that will be demolished and removed include but are not limited to potable water lines; electrical feeds to substation; product lines; sewerage; and, firewater.

<sup>1</sup> Excluding the *Underground Portnet Channel*

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### 2.3.7 MANAGEMENT OF WASTE FROM ALL DEMOLITION SOURCES

All demolition waste will be removed from site by third party waste contractors and either recycled or disposed in accordance with the South African Legislation. Residual chemicals in any of the tanks will be handled and disposed of in accordance with the relevant MSDS/SDS.

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### 2.3.8 SITE LEVELLING

On completion of decommissioning and waste removal, the site will be levelled using earthmoving equipment, prior to being handed over to Transnet. Construction aggregate will be used by Contractor to cover bare levelled ground.

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## 2.4 OTHER ACTIVITIES

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### 2.4.1 PLANT AND EQUIPMENT TO BE USED FOR DECOMMISSIONING

Standard demolition techniques will be used including the following:

- Manual and mechanical removal of hazardous or regulated materials including tank inventories.
- Manual dismantling to prevent damage of equipment and structures that are to be reused / relocated.
- Raising of buildings and other above ground infrastructure using hydraulic excavators or loaders fitted with attachments such as rakes. A wrecking ball may be used to demolish the structure down to a certain manageable height.
- Lifting and lowering of materials at height using various crane types.
- Dismantling of steel structural elements using excavators with shear attachments.
- Breaking up and crushing of concrete components using hydraulic hammers.
- Earthworks such as excavating and levelling using bulldozers and backhoe actors.

Explosives and/or implosion demolition techniques will not be used.

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### 2.4.2 CONTRACTOR'S FACILITIES AND MATERIALS LAY-DOWN AREAS

Contractors' facilities will be located within designated laydown areas inside the existing Engen ZBP operational area. Facilities/activities may include but are not limited to:

- Temporary offices and administration facilities (e.g. containers, portable cabins).
  - General materials storage and laydown areas.
  - Construction of chemicals storage facilities (oil, grease, solvents etc.) and associated infrastructure (bunds, secured / roofed areas etc.).
  - Above ground fuel storage (e.g. gasoil/ petrol) – it is unlikely that volumes would be stored in quantities exceeding 9000L which is considered sufficient for normal construction site requirements.
  - Workshops / areas (e.g. welding, mechanical repair, electrical etc.).
  - Change-houses which may include chemical toilets and showering facilities connected to sewer or conservancy tanks.
  - Temporary waste storage areas; these shall be established and managed in accordance with EMPr (**Appendix B**) requirements.
- 

### 2.4.3 WORKING HOURS

Due to the presence of residential areas to the east of the facility daytime working hours would need to be adhered to for any noisy activities.



# 3 ALTERNATIVES

An environmental impact assessment process ordinarily has to include an analysis of reasonable alternatives to the proposed Project such as alternative sites, routes, engineering options, layouts and technologies in terms of their potential environmental and social impacts, the feasibility of avoiding these impacts and, where this is not possible the approach to mitigating the identified impacts.

The objective of the comparison of alternatives is to outline how the Project represents an optimised design that is technically and financially feasible whilst minimising overall environmental and social impacts. As part of the alternatives assessment, it is important to consider the proposed Project not being implemented and therefore the 'Do Nothing' or 'No Go' alternative. The different categories of alternatives that were considered relevant for the Project include:

- 1 Site Alternatives – Alternative locations for the development;
- 2 Technology Alternatives – Alternatives to the type of technologies that are used for the decommissioning activities; and
- 3 No-Project Alternative – Retaining the status quo, i.e. not undertaking the decommissioning activities.

The concept level alternatives are presented in this section below.

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## 3.1 SITE ALTERNATIVES

The assessment of an alternative site entails investigating any alternative locations where the Project can be undertaken. The ZBP site is an existing site with all its facilities and infrastructure already in place. The objective of the proposed Project is to demolish the existing infrastructure on site, and as such, no site alternatives can be assessed.

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## 3.2 LAYOUT ALTERNATIVES

As is the case with the location of the site, the layout of the ZBP plant has already been established. The nature of the proposed Project requires no layout considerations as it entails the demolition of an existing plant.

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## 3.3 METHODOLOGY ALTERNATIVES

The demolition technique and associated plant and equipment is industry standard. No alternatives that are considered materially beneficial from an environmental and social perspective have been identified.

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## 3.4 NO-PROJECT ALTERNATIVE

The no-go alternative refers to the option of not undertaking the proposed development and entails continuation of the status quo and maintaining the baseline.

The project will not result in the loss of jobs as staff component from the ZBP site will be absorbed into Engen's main LOBP site at Island View.

The no-go alternative will prevent Engen from implementing a business improvement initiatives that focus on attainment of its full business potential.

# 4 DESCRIPTION OF ENVIRONMENTAL ATTRIBUTES

## 4.1 CLIMATE AND METEOROLOGY

### 4.1.1 CLIMATE

Durban falls within the Warm Ocean Climate/Subtropical Climate (cfa) as classified by the Köppen-Geiger Classification, and is characterised by warm and temperate weather. Daily average summer temperatures range between 22.5°C – 25.1°C, while the average winter temperatures range between 16.8 – 20.0°C. Mean maximum and minimum monthly temperatures for are 32.6°C and 5.8°C for January and July, respectively. The area receives predominantly summer rainfall, but with some rainfall in winter, and is characterised by high air humidity. Relative Humidity is highest during the summer months of December, January and February, and lowest during the winter months. It ranges from 72% in June and July to 80% in January, February and March.

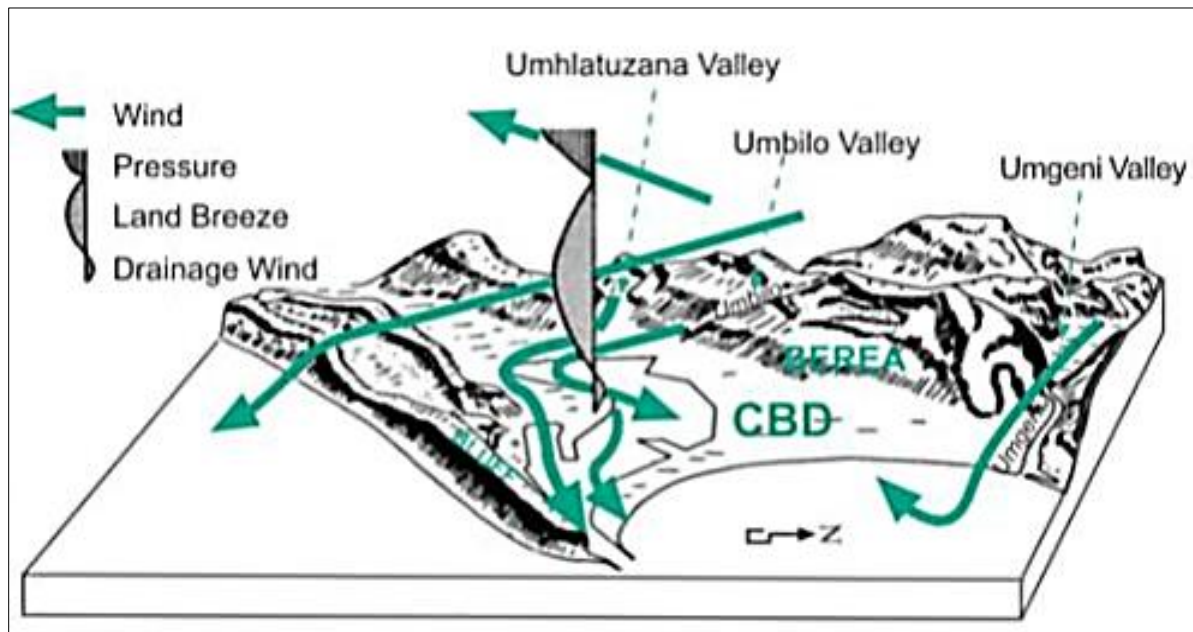
The city has an annual rainfall of 1,009 mm. The highest rainfall is recorded in the spring and summer months, with rainfall averaging at about 242.26mm and 250.76mm respectively. The winter months recorded the lowest average of precipitation with 92.24mm. **Table 4-1** below summarises the monthly temperatures, rainfall and relative humidity in Durban.

**Table 4-1: Durban's Meso Climate**

Month	Record High (°C)	Average High (°C)	Daily Mean (°C)	Average Low (°C)	Record Low (°C)	Average Rainfall (Mm)	Average Rainy Days (≥ 0.1 Mm)	Average Relative Humidity (%)	Mean Monthly Sunshine Hours
Jan	36.2	27.8	24.1	21.1	14.0	134.0	15.2	80	184
Feb	33.9	28.0	24.3	21.1	13.3	113.0	12.9	80	179
Mar	34.8	27.7	23.7	20.3	11.6	120.0	12.6	80	202
Apr	36.0	26.1	21.6	17.4	8.6	73.0	9.2	78	206
May	33.8	24.5	19.1	13.8	4.9	59.0	6.8	76	206
Jun	35.7	23.0	16.6	10.6	3.5	38.0	4.5	72	225
Jul	33.8	22.6	16.5	10.5	2.6	39.0	4.9	72	230
Aug	35.9	22.8	17.7	12.5	2.6	62.0	7.1	75	217
Sep	36.9	23.3	19.2	15.3	4.5	73.0	11.0	77	173
Oct	40.0	24.0	20.1	16.8	8.3	98.0	15.1	78	169
Nov	33.5	25.2	21.4	18.3	10.3	108.0	16.0	79	190
Dec	35.9	26.9	23.1	20.0	11.8	102.0	15.0	79	190
Year	40.0	25.2	20.6	16.5	2.6	1019.0	130.3	77	2365

#### 4.1.2 LOCAL WIND PATTERNS

Preston-Whyte and Diab (1980) described localised airflow in South Durban as a system of drainage winds that flow down the Umhlatuzana and the Umbilo valleys at night, across the alluvial flats at the head of the bay to dam up against the Bluff ridge (**Figure 4-1**). From here, the air is diverted between the Bluff and Berea ridges as gentle south-westerly winds towards Durban's central business district (CBD). The accumulation of cold air in the South Durban Industrial Basin (SDIB) may lead to valley inversions at night, limiting vertical dispersion. This local wind pattern is regularly disrupted by the passage of coastal lows and westerly wave frontal systems that clear the boundary layer every three to five days during the winter months.



**Figure 4-1: Nocturnal air circulations in Durban (Diab and Preston-Whyte, 1980)**

Winds in the South Durban area blow most frequently from the south-west to south-west and north-north-east to north-east throughout the year as can be seen in **Figure 4-2**. The north-north-east to north-easterly winds are associated with high atmospheric pressure and fine weather, and the south-south-west to south-westerly winds are associated with the passage of coastal low pressure systems and cold fronts, which therefore prompt inclement weather. The direction of predominant winds parallel to the coast and the topography results in the channelling of pollutants within the basin.

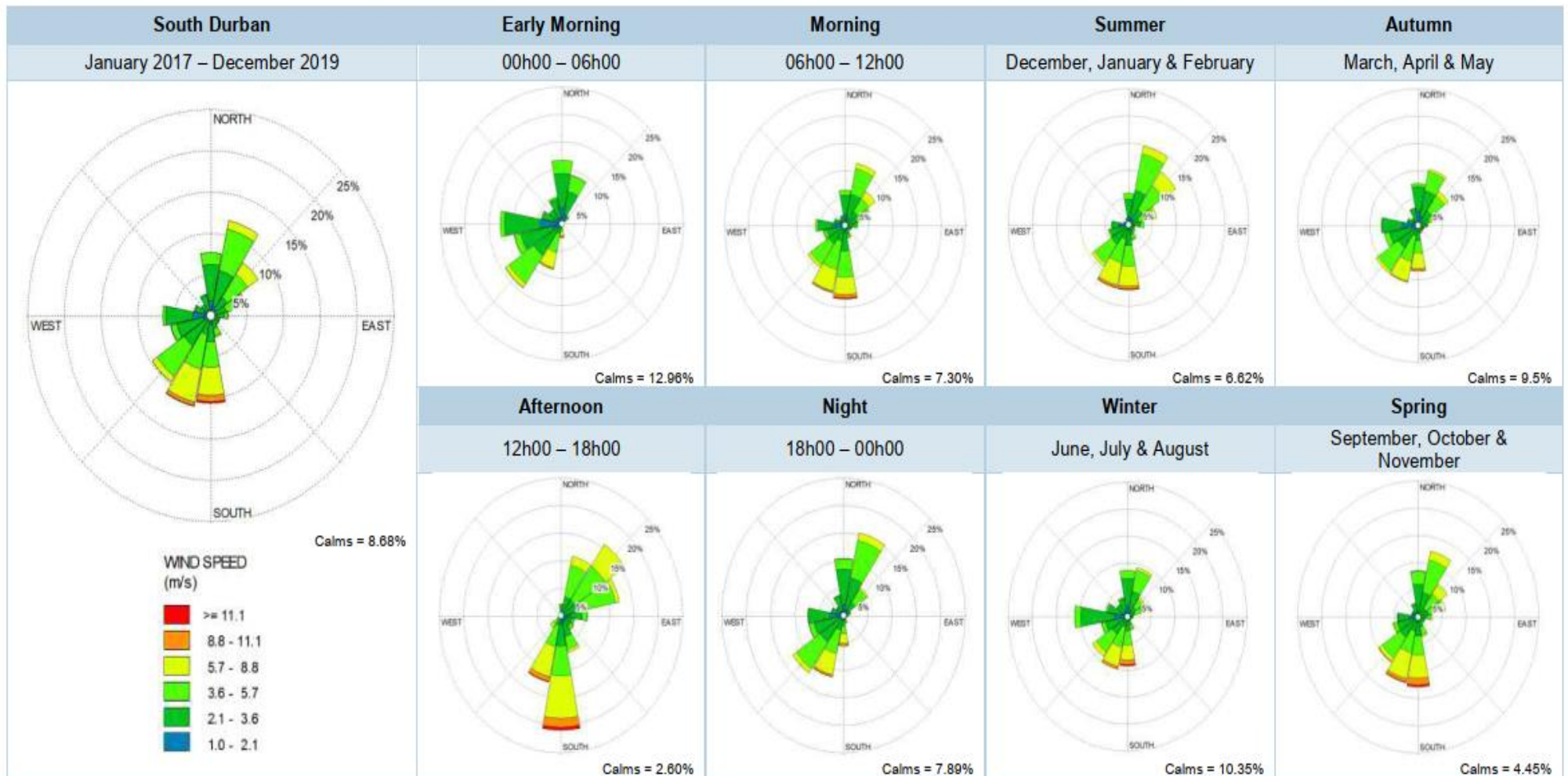


Figure 4-2: Local Wind Conditions at South Durban

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## 4.2 AIR QUALITY

The Project site is located within the Port of Durban, which is part of the SDIB. The SDIB stretches from the Port of Durban in the north to eZimkokodweni in the south and is home to two large petrochemical refineries, a large paper mill, motor vehicle manufacturers and at least 5 000 businesses, 22 000 households and 200 000 residents. The SDIB is also a focal point of major transport routes, including highways, a harbour and an international airport. The Basin also encompasses the residential areas of Bluff, Clairwood, Wentworth, Merebank, Isipingo, and Lamontville and the Industrial areas of Jacobs and Prospecton, and is home to about 200 000 residents.

The SDIB is the largest industrial centre in KwaZulu-Natal, comprising a variety of heavy and light industries, such as petrochemical refineries, chemical processing plants, and a paper and pulp mill. It is one of the most heavily polluted industrial areas in South Africa, particularly with respect to sulphur dioxide (SO<sub>2</sub>). A combination of meteorological and topographical conditions results in the area being conducive to the accumulation of air pollution. Air pollution tends to be worse during the winter months, due to the more stable high pressure conditions, frequent radiative inversions and lower rainfall, which together promote the accumulation of particulates and other pollutants within the topographical basin. In summer months, higher rainfall and a greater mixing depth associated with free convection reduce ambient pollution concentrations.

High levels of pollutants are generally connected to low wind speed conditions in winter at night-time and early morning. This is because of poor vertical mixing and low horizontal transport out of the source area.

The following are major sources contributing to atmospheric pollution within the area:

- Industry (refineries);
- Port Of Durban
- Transport; and
- Domestic fuel burning.

The communities within the area 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, when the air quality deteriorated even further with prevalent high pollution levels, odours, chemical leaks, flares, visible emissions. Elevated concentrations of pollutants are linked to various health effects, which has been the communities' major concerns.

As part of their Air Quality Monitoring Programme and management plan, the eThekweni Municipality conducts continuous monitoring in the Durban South Basin since 2009. Twelve monitoring stations were placed across the basin to monitor priority pollutants. Sulphur dioxide (SO<sub>2</sub>) is a recognised indicator pollutant as it is associated with industrial fuel burning. Elevated SO<sub>2</sub> concentrations are known to cause respiratory problems. eThekweni reported on decreased levels of SO<sub>2</sub> (SEA, 2020), but indicated that air quality in the area remains a challenge in terms of nuisance and potential health risks to adjoining communities, and the most impacted part of the municipal area given the diverse sources in the area and exposure to industrial activity, port and road traffic emissions (i.e. SO<sub>2</sub>, NO<sub>2</sub> and volatile organic compounds (VOCs)) as well as odour, fugitive dust and PM<sub>10</sub> issues.

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## 4.3 NOISE

Baseline noise levels in the south Durban basin are a function of a wide range of sources including industrial operations (heavy machinery and equipment, loading and unloading of materials, operational processes, etc.) and road traffic (heavy vehicular and commuter traffic).

Noise from air traffic was historically a significant source up until the relocation of the Durban International Airport to north of Durban. There is currently no systematic noise measurement program carried out in the area, from which an assessment of the environmental noise climate for the region can be performed. However, numerous complaints have been reported to eThekweni Municipality, clearly indicating that noise is a nuisance in the region.

The current offsite noise sources are road traffic and various activities associated with surrounding industries.

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## 4.4 GEOLOGY

Based on the Department of Mining and Energy Affairs Map Sheet 2930 (Durban), 1:250 000 scale, 1998, the Island View Complex is typically underlain by the following geological sequence:

- Quaternary Sands: beach sands (alluvial and estuarine); unconsolidated alluvial and estuarine deposits of red sand, subordinate white, yellow, brown and purple sand; basal conglomerate. This formation may be as much as 60m thick and is known to be highly variable with lenses of clay, gravel and boulders.
- Bluff Formation: calcarenite, highly calcareous sandstone; conglomerate in places; although, the exact profile of this formation below the Island View Complex is unknown.

Palaeochannels have been identified in the western parts of the Island View Basin, especially in the area of Berth 8 and Berth 7 towards Berth 9 at Salisbury Island.

Reclamation fill is present in the area associated with the development of the complex and the wider Port of Durban. This largely comprises fine- to coarse-grained reworked sand. Various anthropogenic inclusions (i.e. construction debris and general detritus) have been reported within shallow soils. Notwithstanding the lenses of clay, gravel and boulders, the bulk density for uniform medium sands representing the majority of the shallow soils across the complex are expected to be in the range 1.43–1.89Mg/m<sup>3</sup> with a porosity of approximately 46%; however, this will be locally variable due to differing consolidation and moisture content.

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## 4.5 HYDROGEOLOGY

Regionally, the natural geology underlying the Island View Complex represents a minor aquifer, a moderately-yielding system of variable water quality with a mean annual recharge of 75–100mm, moderate vulnerability to contamination, and a medium susceptibility to anthropogenic activities.

Groundwater quality is described within the published information as Type D, dominated by sodium, potassium, chloride and sulphate ions, with the concentration of dissolved solids being up to 1 500mg/l and electrical conductivity of 150–370mS/m. Although this composition is generally expected given the proximity of marine waters, based on electrical conductivity of groundwater it appears that limited or no sea water intrusion has occurred at the site.

Further, the palaeo-dune (The Bluff) to the east of the Island View Complex is suspected of inducing a driving hydraulic head. Together with the likely heterogeneity of soils across the complex, these factors will complicate the flow of groundwater.

Groundwater is expected to occur within both reclamation fill and unconsolidated natural deposits with a typical depth in the region of 1–4m below ground level (bgl) that is subject to seasonal fluctuations of ±1m.

Groundwater elevations correlate well with surface topography and available information suggests that normal daily tidal influence on groundwater elevations results in only minor fluctuations, probably due to the physical barrier/s represented by quay walls (relic or otherwise). However, the effects of bi-monthly high and low water spring tides when ranges are larger are not understood and it is plausible that these conditions will cyclically result in larger fluctuations and increases in flux.

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## 4.6 HYDROLOGY AND WETLANDS

### 4.6.1 RIVERS

The Project site is located in quaternary catchment U60F of the Pongola Umzimkulu Water Management Area (WMA). The quaternary catchment U60F has two main rivers draining to Durban Bay including the Umbilo River which flows south-east towards Durban Bay, and the Mhlatuzana River, which flows east towards Durban Bay. The quaternary catchment U60F is highly developed, and includes water uses by formal and informal residential, industrial, and a small portion being natural (North Park Nature Reserve).

Other than the stormwater channels on site there are no water resources on the Project site.

## 4.6.2 WETLANDS AND RIPARIAN ZONES

The ZBP site is classified as a wetland area under the NFEPA classification (**Figure 4-3**). However as indicated above, the site primarily comprises of a hard standing, built up area and is brownfield in nature. There are no rivers or watercourses traversing the site. The site is located approximately 200m south west of the Bay of Natal (Durban Harbour), and is part of a mosaic of industrial complexes that fringe the Indian Ocean.



**Figure 4-3: ZBP Decommissioning Site Hydrology Map**

## 4.7 ECOLOGY

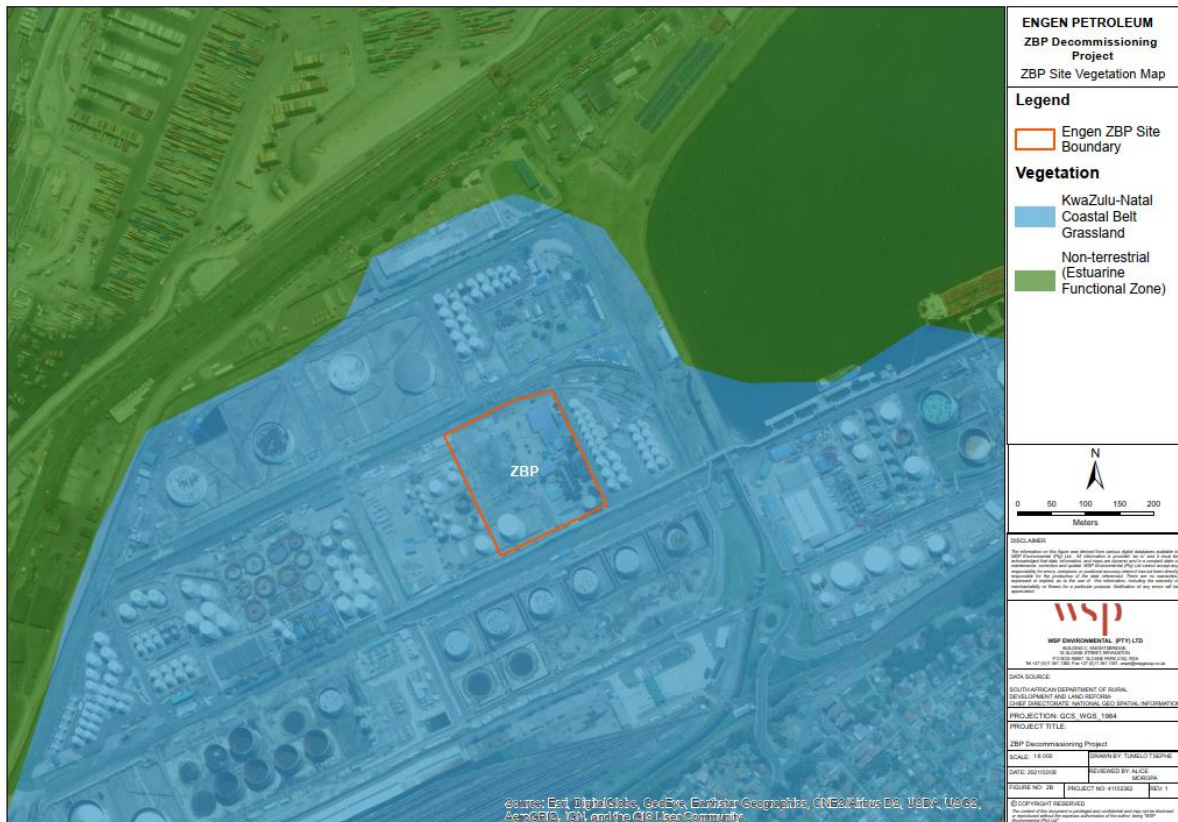
### 4.7.1 TERRESTRIAL ECOLOGY

The site is located in the Kwa Zulu-Natal Northern Coastal Grasslands vegetation type area (**Figure 4-4**), which forms part of the KwaZulu-Natal Coastal Belt (Mucina and Rutherford, 2006).

The Kwa Zulu-Natal Coastal Belt stretches along the KwaZulu-Natal coast, from near Mtunzini in the north, via Durban to Margate and just short of Port Edward in the south, and entails highly dissected undulating coastal plains, which presumably used to be covered by various types of subtropical coastal forest (the remnants of which are described as Northern Coastal Forest). The belt also contains primary grasslands dominated by *Themeda triandra* in hilly, high-rainfall areas that may have been subjected to pressure from natural fire and grazing regimes. Currently the belt is affected by an intricate mosaic of sugarcane fields, timber plantations and coastal holiday resorts, with scattered secondary *Aristida* grasslands, thickets and patches of coastal thornveld.

The Northern Coastal Grassland is classified as a Critically Endangered vegetation type in terms of the National List of Ecosystems that are Threatened and in Need of Protection, as well as the KwaZulu-Natal Biodiversity Sector Plan's Provincial Conservation Status. Only about 12% of its original extent remains, with only 1% being conserved in formal protected areas.

Worthy of noting, is that the entire ZBP site predominantly comprises of a hard standing built up industrial area, and a portion of bare ground that is regarded as a brownfield. As such, the site contains no natural vegetation and does not provide suitable habitat for any flora, fauna, and avifauna.



**Figure 4-4: ZBP Decommissioning Site Vegetation Map**

## 4.8 LANDUSE

The Project site is located within the SDIB, which extends from the Durban Central Business District (CBD) southward to Umbogintwini. The basin 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. Receptors situated within 500m of the site includes residents in the Fynnlands residential area, which is located approximately 0.4km south of the site. The site is otherwise surrounded by other industrial holdings within the port. Other nearby residential areas include Ocean View (2km south east of the site), Grosvenor (2.8km south west of the site) and Clairwood (4km west of the site).

Currently the site is used as a processing plant for the processing of lubricating oils. Present on site are buildings, boilers, blending kettles where the oils are manufactures, as well as storage tanks and vessels where the products are stored. The site is therefore primarily built up and used for manufacturing purposes. To the west of the side is an open brownfield that has been left bear with no vegetation cover or infrastructure. **Figure 4-5** depicts the landuse within and around the site.





Figure 4-5: ZBP Decommissioning Site Land Use Map

## 4.9 SOCIO-ECONOMIC ENVIRONMENT

### 4.9.1 REGIONAL SOCIO-ECONOMIC CONTEXT

The eThekweni Municipality spans an area of approximately 2 297km<sup>2</sup> and is home to about 3,8 million people in 2016. The municipality consists of a diverse society, which faces a variety of social, economic, environmental and governance challenges. eThekweni is characterised as having a growing economy, and is the primary economic contributor (65.5%) to KZN’s Gross Domestic Product (GDP). The eThekweni economy grew by 0.9% in 2016. eThekweni’s economy is dominated by tertiary industries including contributions from the finance (20%), manufacturing (19%), community services (20%), trade (18%) transport (14%) and construction (5%) sectors. The production of fuel and petroleum are significant contributors to the manufacturing sector in the municipality (eThekweni, May 2012).

According to the eThekweni IDP (2019), the unemployment rate within the municipality increased from 27.1% in Q2 2018 from 26.7% in Q1 2018. It was however also noted that the labour force absorption rate showed an insignificant increase 0.4% (from 45.8% to 43.1%) whilst the participation rate decreased (from 59.31% to 59.1%) over the same period. This is indicative of the fact that there are more people looking for employment, and the likelihood of them finding employment has decreased. Approximately 60% of eThekweni’s households are low income and earn less than R38 400 per annum (as compared to about 48% for Cape Town and 46% for Joburg).

The tertiary sector accounts for the largest portion of the workforce which includes community services, finance and trade, followed by manufacturing. In terms of skill levels, the largest portion of the workforce is employed at semi-skilled level followed by skilled and low skilled.

The eThekweni Municipality has improved infrastructure delivery, with 86% having access to electricity for cooking and 89.9% for lighting.

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#### 4.9.2 LOCAL SOCIO-ECONOMIC CONTEXT

The refinery falls within with Ward 32 of the eThekweni Municipality and comprises of:

- Community areas: Clairwood and Bulwer
- Industrial areas: Bayhead, Congella and Island View.

The communities within close proximity to the ZBP site include Fynnlands (located about 0.5km south of the site), Clairwood (located 3.5km south west of the site), Ocean View (located 2km south of the site) and Umbilo (located 3.5km north-west of the site). The neighbouring ward to the south is Ward 66, which consists of the communities of Wentworth, Grosvenor, Brighton Beach, Treasure Beach, Ocean View and Fynnland, as well as an industrial section of Island View.

#### DEMOGRAPHY AND EDUCATION

The information presented here was obtained from the 2011 census data .

The Project site falls within Ward 32 of the eThekweni Municipality, comprising a land area of 26.3km<sup>2</sup>. According to Statistics SA 2011, Ward 32 has a population of 25 109, comprising of a predominantly Black African population (79%), followed by an Indian/Asian population (12 %), a white population of (3%) and a coloured population (3%).

Education levels are fairly average with 53% of the population having completed their matric, but only about 9% of the population having completed their undergraduate studies, and 4% having completed their postgraduate studies.

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#### 4.10 TRAFFIC AND SITE ACCESS

The SDB is the focal point of many of the city's major transport routes, e.g. the northsouth N2 (which connects to the N3 inland) and M4 highways, South Coast Rd, and the east-west M7 (Edwin Swales Dr, which also connects to the N3), and it is home to an international airport. The site is accessed from Trinad road in bayhead, wich connects to Bayhead road and ultimately the R102 and M4.

# 5 IMPACT ASSESSMENT

## 5.1 IMPACT ASSESSMENT METHODOLOGY

In this section the potential impacts of the Project on the physical, biological and socio-economic environmental components has been assessed. The assessment is limited to the environmental components where potential interactions are present.

### 5.1.1 RISK ASSESSMENT METHODOLOGY

The assessment of impacts and mitigation evaluated the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to validate impacts identified through a matrix, identify any additional potential environmental issues and associated impacts likely to arise from the proposed Project, and to assign significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts.

A standard semi-quantitative risk assessment methodology was used for the ranking of the identified environmental impacts pre-and post-mitigation. The significance of environmental aspects was determined and ranked by considering the criteria presented in **Table 5-1**. Detailed scoring tables for each impact assessed in the EIA report are contained in **Appendix C**.

**Table 5-1: Impact Assessment Criteria and Scoring System**

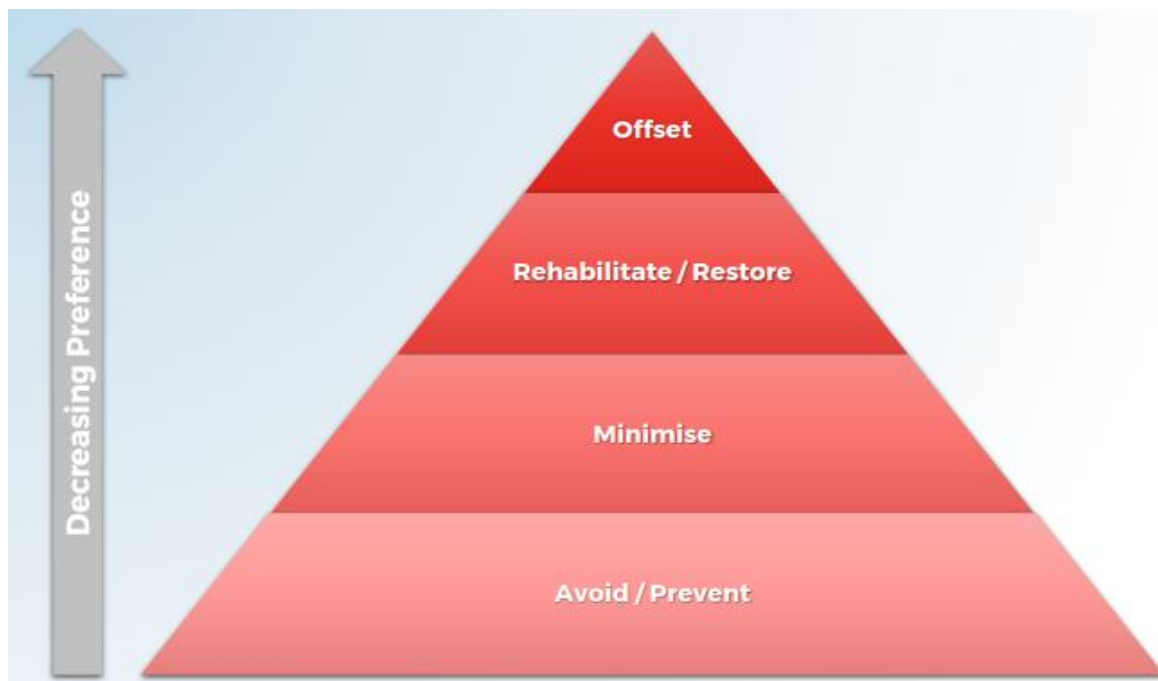
CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
<b>Impact Magnitude (M)</b> The degree of alteration of the affected environmental receptor	Very low	Low	Medium	High	Very high
<b>Impact Extent (E)</b> The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
<b>Impact Reversibility (R)</b> The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
<b>Impact Duration (D)</b> The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
<b>Probability of Occurrence (P)</b> The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probably	Definite
<b>ENVIRONMENTAL SIGNIFICANCE (S) = (MAGNITUDE + EXTENT + REVERSIBILITY + DURATION) x PROBABILITY</b>					

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
<b>TOTAL SCORE</b>	4 to 15	16 to 30	31 to 60	61 to 80	81 to 100
<b>ENVIRONMENTAL SIGNIFICANCE RATING (-)</b>	Very low	Low	Moderate	High	Very High
<b>ENVIRONMENTAL SIGNIFICANCE RATING (+)</b>	Very low	Low	Moderate	High	Very High

### 5.1.2 IMPACT MITIGATION

The following mitigation hierarchy (illustrated in **Table 5-1**) was applied when proposing prevention, compensation and mitigation measures:

- **Avoid / Prevent:** Avoidance or prevention refers to the consideration of options in Project location, siting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services, and people. This is referred to as ‘the best option’, but it is acknowledged that avoidance or prevention is not always possible..
- **Minimise:** Minimisation refers to the consideration of alternatives in the Project location, siting, scale, layout, technology and phasing that would minimise impacts on the physical, biological, and socio-economic environment. and people. As defined in IFC PS1; “acceptable options to minimise will vary and include: abate, rectify, repair, and/or restore impacts, as appropriate”.
- **Rehabilitate / Restore:** Rehabilitation refers to the consideration of the rehabilitation of areas where impacts are unavoidable and measures are provided to return impacted areas to a near-natural state or an agreed land use.
- **Offset:** Offsetting refers to the consideration of measures over and above rehabilitation to compensate for the residual negative effects on biodiversity ecosystem services and people, after every effort has been made to minimise and then rehabilitate impacts.



**Figure 5-1: Impact Assessment Mitigation Hierarchy**

## 5.2 RESULTS

In this section the potential impacts of the proposed decommissioning on the physical, biological and socio-economic environmental components have been assessed.

### 5.2.1 AIR EMISSIONS

#### a) Localised air quality deterioration due to dust emissions from decommissioning activities

<b>Impact Description:</b>	The operation of excavators and earthworks machinery for the demolition of infrastructure and the removal of sub-surface infrastructure may result in the release of dust over a short period (~4 months) resulting in nuisance factors to surrounding land users. Negligible emissions are also expected from vehicles and equipment operating during the decommissioning.													
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>– Ensure that vehicles and equipment used are adequately maintained to limit any potential emissions.</li> <li>– Implement effective and environmentally-friendly dust control measures during drilling activities.</li> </ul>													
<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
	2	2	1	1	4	24	N2	2	1	1	1	3	15	N1
	N3 - Low							N1 - Very Low						

### 5.2.2 NOISE EMISSIONS

#### b) Elevated noise levels from decommissioning activities

<b>Impact Description:</b>	The operation of excavation and haulage machinery and to a lesser extent, the operation of vehicles, will result in an increase in ambient noise resulting in a potential nuisance factor to nearby receptors. The proposed Project site is located within an industrial area with existing noise sources. These noise related impacts are limited to the short term period expected for the duration of the decommissioning activities. Therefore, no significant changes in noise levels are anticipated beyond the site boundary.													
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>– Ensure that noisy vehicles and equipment used are equipped with silencers.</li> <li>– Undertake noisy construction activities during daylight hours to minimise disturbance to the surrounding receptors.</li> <li>– Maintain vehicles and machinery in good working order. Ensure that all vehicles and machinery are serviced prior to being operated on site.</li> <li>– Instances of excessive noise and complaints must be investigated and possibilities for mitigation assessed.</li> </ul>													
<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
	2	2	1	1	4	24	N2	2	1	1	1	3	15	N1
	N2 - Low							N1 - Very Low						

### 5.2.3 SOIL EROSION/INSTABILITY

#### c) Soil erosion instability as a result of excavations during decommissioning activities

<b>Impact Description:</b>	The site is located in an area of the harbour that was reclaimed, and is therefore underlain by deep unconsolidated, estuarine/marinal sediments, and is comprised of sandy clayey soils. The poorly consolidated material may therefore have a generally collapsible fabric as well as rapid lateral and vertical variability in clay content and moisture conditions. These materials are also likely to be sensitive to changes in moisture content. Therefore any excavations are likely to have a variable stability depending on moisture conditions. As such excavations should be considered to be unstable and allowances should be made for safe excavation practices to be followed.													
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>– Backfilling of excavations should be undertaken using compacted lifts of materials of similar or greater strength to the in situ soil profile. This is to ensure that the filled void does not settle excessively after filling.</li> <li>– All disturbed areas susceptible to erosion must be suitably covered and/or stabilised via the implementation of effective erosion control measures.</li> <li>– This assessment does not account for any redevelopment of the area where tanks will be removed. If any structures are to be placed on the area of concern a geotechnical investigation will need to be performed in accordance with the foundation requirements of the proposed structures.</li> </ul>													
<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
	3	1	5	1	2	20	N2	3	1	3	1	1	8	N1
	N2 - Low							N1 - Very Low						

### 5.2.4 SOIL AND GROUNDWATER CONTAMINATION DUE TO ACCIDENTAL SPILLAGE OF HAZARDOUS SUBSTANCE

#### d) Soil and groundwater contamination due to accidental spillage of hazardous substance

<b>Impact Description:</b>	<p>The handling of any hazardous substances (such as diesel and oil during the decommissioning activities) has the potential to result in accidental spillage of small quantities of hazardous substances. Such spillages can lead to the contamination of groundwater sources. The potential for such spillages to occur and result in groundwater contamination exists under the following circumstances:</p> <ul style="list-style-type: none"> <li>– The presence of any potential cracks on the paved surface, creating a pathway for spills to reach groundwater resources through infiltration.</li> <li>– The exposure of bare soil from the excavation and removal of some of the sub-surface structures.</li> </ul> <p>Contamination of surface water is unlikely as the site is paved, with stormwater channels directing all runoff to the effluent system.</p>													
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<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>– Contaminated soil must be removed as soon as possible and managed appropriately as hazardous waste.</li> <li>– Utilise the existing Storm water Management Plan (SWMP) to control the flow of stormwater and limit the potential of dirty water from mixing with clean water sources.</li> <li>– All stormwater generated by the medium to high risk contamination ‘dirty’ areas must not be allowed to discharge into the surrounding environment.</li> <li>– Machinery must be regularly checked to ensure hydrocarbon leaks (including fuel and hydraulic fluids) are not occurring.</li> <li>– Provide and utilise drip trays for immobile vehicles and machinery that will be operated on site.</li> <li>– Acquire spill kits to clean up any hydrocarbon or chemical spills during closure to prevent seepage.</li> <li>– Storage of hazardous materials if any, should be undertaken within impermeable bunded, ventilated and covered storage areas, capable of containing 110% of total volume stored therein.</li> <li>– Spill and response equipment must be accessible on-site.</li> <li>– Suitable spill containment must be provided for transfer points outside of bunded areas.</li> <li>– Spillages / leaks are to be contained immediately; deploy oil containment berms if the spill migrates to other areas.</li> <li>– Cover the spill with absorbent material.</li> <li>– Remediation of the spill areas will be undertaken to the satisfaction of the Environmental Manager/Environmental Control Officer (ECO).</li> <li>– Dispose of the clean-up material in line with (Material Safety Data Sheet) MSDS requirements of spilled material.</li> <li>– Staff handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment (PPE) must be made available.</li> </ul>													
<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	(D)x	P=	S	Rating	(M+)	E+	R+	(D)x	P=	S	Rating
	2	2	5	1	3	30	N3	3	1	3	1	2	16	N2
	N2 - Low							N2 - Low						

**e) Soil and groundwater contamination during tank removal**

<b>Impact Description:</b>	Potential leakage or spillage of residual hazardous substances (remnant in the tanks) during the emptying or relocation of tanks on site leading to localised contamination to surrounding soils and groundwater.													
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>– Ensure all tanks are emptied with caution (and completely) prior to their removal or relocation, and the residual chemicals are managed accordingly (i.e. disposed as hazardous waste at licensed facility).</li> <li>– Residual chemicals to be managed in accordance with the relevant Safety Data Sheets (SDS).</li> <li>– Validation analysis of the surrounding soils within the cavity must be undertaken following uplift of tanks, and prior to backfilling of excavation cavities to prove absence of contamination.</li> <li>– If encountered, material should be managed appropriately.</li> </ul>													
<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	(D)x	P=	S	Rating	(M+)	E+	R+	(D)x	P=	S	Rating
	3	2	5	1	3	33	N3	3	1	3	1	2	16	N2
	N3 - Moderate							N2 - Low						

## 5.2.5 WASTE GENERATION

- a) Improper handling of hazardous waste during the decommissioning activities could result in offsite contamination

<b>Impact Description:</b>	The proposed Project will result in the generation of waste. Waste generation includes rubble, residual waste sludge/product (from the tanks), scrap metal, contaminated PPE, food waste, office waste and steel off-cuts. The accumulation of hazardous waste on site and improper storage / disposal has the potential to lead to soil and groundwater pollution (including offsite).													
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>– There must be adequate waste receptacles on site for general and hazardous waste.</li> <li>– Bins/skips must be emptied regularly and collected by a licensed contractor for disposal at an appropriate, licensed facility.</li> <li>– Proof of disposal is to be received and stored in Environmental File.</li> <li>– Bins/skips must not be allowed to overflow.</li> <li>– Storage of hazardous waste should be undertaken within impermeable, bunded and covered storage areas, with a capacity to contain 110% of total volume.</li> <li>– Personnel involved in the handling of hazardous waste must be provided with the necessary PPE as stipulated in the SDS.</li> <li>– Waste sludge/products are managed accordingly (i.e. disposed as hazardous waste at licensed facility).</li> </ul>													
<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	(D)x	P=	S	Rating	(M+)	E+	R+	(D)x	P=	S	Rating
	3	2	5	1	3	33	N3	3	1	3	2	2	18	N2
	N3 - Moderate							N2 - Low						

- b) Improper segregation of waste during decommissioning activities

<b>Impact Description:</b>	Improper segregation of waste will result in lost opportunity for reuse and recycling resulting in increased pressure on local landfills.													
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>– Waste should be stored in separate, labelled and secure skips / containers depending on management options – opportunities should be determined, in consultation with waste service providers, for re-use, recycle, or disposal options.</li> <li>– Contractors must be instructed not to litter and to place all waste in the appropriate waste bins provided on site.</li> <li>– Working areas are to be cleared of litter on a daily basis. No litter / waste is to be burnt on-site.</li> <li>– The contractor is required to implement systems at the construction site for the segregation of recyclable materials in order to divert waste from landfill.</li> <li>– Recover, recycle and reuse waste where possible.</li> <li>– Any recyclable material which is considered hazardous is to be collected and transferred by a permitted/trained waste contractor in accordance with the SANS 10228 for transport to the approved recycling/recovery facility.</li> <li>– Contaminated scrap metal can be taken to a hazardous waste landfill or to a dealer who is licensed to handle and clean the hazardous scrap metal before recycling.</li> <li>– Return excess construction materials which are suitable for re-use.</li> <li>– Train and inform all onsite personnel regarding general waste minimisation, management and disposal.</li> <li>– Working areas are to be cleared of litter on a daily basis. No litter / waste is to be burnt on-site.</li> </ul>													



<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
	1	3	4	4	4	48	N3	2	3	2	4	2	22	N2
	N3 - Moderate							N2 - Low						

### 5.2.6 ECOLOGICAL DISTURBANCE

The proposed Project site is located within an existing industrial facility near the Durban harbour, which has been completely transformed from its original natural state. There will be no impact on vegetation or biodiversity as all activities will be limited to the existing disturbed site footprint.

### 5.2.7 HERITAGE

#### c) Disturbance of features of heritage importance

<b>Impact Description:</b>	The Project site has been fully transformed from its natural state and consists of hard standing surface. Due to the brownfield nature of the site, it is unlikely that intact heritage resources will be found on the site. It is not anticipated that there are any structures present on site with cultural / historical significance as none precede 60 years. From Engen's Asset Records, the earliest structures on-site were built in 1967, with the permanent/fixed buildings in question (admin/lab) being built later.													
<b>Mitigation:</b>	— Should any archaeological features be discovered on site during excavations, it should be reported to SAHRA (AMAFA) and a qualified Heritage specialist should be notified (i.e. Chance Find Procedure followed as outlined in EMPr).													
<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
	2	1	4	1	2	16	N2	2	1	1	1	1	5	N1
	N2 - Low							N1 - Very Low						

### 5.2.8 TRAFFIC

#### d) Increased traffic congestion

<b>Impact Description:</b>	The site is located within an area that frequently experiences heavy traffic from trucks accessing the harbour. An increase in, traffic (including heavy vehicles transporting redundant equipment) associated with the transport of equipment and waste removal is expected which will result in increased congestion.													
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>— The movement of vehicles into and out of the site must be managed such as ensuring that abnormal loads are moved outside of peak traffic hours.</li> <li>— Ensure that there is sufficient parking and loading space for vehicles to limit congestion around the site.</li> <li>— Effective signage and traffic control measures must be implemented along the access route to ensure that public and staff safety is managed adequately.</li> </ul>													

<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
	3	2	1	1	3	21	N2	3	2	1	1	1	7	N1
	N2 - Low							N1 - Very Low						

## 5.2.9 HEALTH AND SAFETY

### e) Potential health and safety risks to workers

<b>Impact Description:</b>	During the decommissioning activities the labour force may be involved in high risk activities such as the use of appropriate PPE and implementation of health and safety measures is required for the decommissioning activities													
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>– The management of worker health and safety falls outside of the remit of the EIA Regulations and this BA Report, and the associated EMPr thus excludes mitigation measures. Engen and its appointed contractors are required to manage worker health and safety in accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). This must include: <ul style="list-style-type: none"> <li>– Detailed Project / activity specific hazard identification and risk assessment (HIRA) process; and;</li> <li>– Implementation of appropriate mitigation measures e.g. safe work procedures, use of PPE; design safety, occupational monitoring, training and awareness programmes, and performance assessment and reporting.</li> </ul> </li> </ul>													
<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
	4	1	4	4	2	26	N2	4	1	4	4	1	13	N1
	N2 - Low							N1 - Very Low						

## 5.2.10 EMPLOYMENT

### f) Employment opportunities

<b>Impact Description:</b>	<p>A limited number of temporary semi-skilled and skilled opportunities will be generated during the decommissioning period. The majority of employment opportunities will be through contractors (demolishers and waste service providers). The majority of these opportunities are unlikely to be new opportunities, as labour is sourced through existing contractors. Demolition Cost is estimated at R21 million. Total cost of employment by third party is ~30-35% of this.</p> <p>It is noted that the decommissioning of ZBP will not result in job loss / retrenchment as staff component from the ZBP site will be absorbed into Engen's main LOBP site at Island View. Contracted labour will be adjusted accordingly.</p>													
<b>Mitigation:</b>	– Where possible, unskilled labour will be sourced from within the local communities.													

<b>Significance Rating:</b>	Pre-Mitigation							Post-Mitigation						
	(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
	3	2	1	1	2	14	P1	3	2	1	1	2	14	P1
	P1 - Very Low							P1 - Very Low						

# 6 CONCLUSION AND RECOMMENDATIONS

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## 6.1 SUMMARY OF IMPACT ASSESSMENT

In assessing the environmental feasibility of the proposed Project, and all its resultant impacts, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented in order to minimise potentially significant impacts associated with the Project, has been informed by best practice principles, past experience and the relevant legislation (where applicable).

The BA process has found that the proposed Project will involve activities which will lead to a limited number of direct and indirect negative impacts on the biophysical and socio-economic environment. These impacts were found to vary in terms of their consequence and probability. Positive impacts are limited to the small scale employment of contractors. Where appropriate, mitigation measures to reduce the negative impacts, and enhance positive impacts have been proposed (**Section 5.2**).

11 Potential impacts on various aspects of the environment were identified.

- 3 were evaluated as having Moderate (-) significance (approx. 27%);
- 7 were evaluated as having Low (-) significance (approx. 64%); and
- 1 was evaluated as having Very low (+) (approx. 9%).

Both the initial and residual (post-mitigation) significance of impacts have been presented in **Section 5.2** so as to obtain an indication of the effectiveness of the mitigation measures. All negative impacts can be reduced to *low* and *very low* significance with implementation of mitigation measures.

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## 6.2 CONCLUSION

The overall objective of the BA process was to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed Project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

All negative potential environmental and social impacts associated with the Project have been assessed as having very low significance (residual i.e. assuming that mitigation is implemented).

Mitigation measures have been developed where applicable for the above aspects and are presented within the EMPr (**Appendix B**). It is imperative that all impact mitigation recommendations contained in the EMPr are implemented.

It is the opinion of WSP that the Project should be authorised; and, that information contained in this BA Report is sufficient for an informed decision to be made.

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# APPENDIX

## A STAKEHOLDER ENGAGEMENT REPORT





# APPENDIX

# B

## CURRICULUM VITAE







# APPENDIX

## C ENVIRONMENTAL MANAGEMENT PROGRAMME

