

DEEPENING, LENGTHENING AND WIDENING OF BERTH 203 TO 205, PIER 2, CONTAINER TERMINAL, PORT OF DURBAN

Integrated Waste Management Approach

Authority Reference No: 14/12/16/3/3/2/275

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Executive Summary

Waste management has become a complex area and from an international perspective, there has been a move to focus on integrated waste management. This often includes the compilation of reports or plans. For example, European Union legislation requires the competent authority in each Member State to draw up one or more waste management plans in accordance with relevant directives. Further, waste management plans have a key role to play in achieving sustainable waste management.

At a Port level, the protection of the world's oceans from pollution is an environmental issue of immense international concern. By analysing the actual individual samples, it has been deduced that merchant shipping accounts for 15-35% of the total waste (Palabiyik, 2003). In recent years, developing a Port Waste Management Plan and establishing an efficient ship waste handling system designed to ensure proper waste management services in compliance with national and international legislation attracts a great deal of interest for ports.

Waste management planning and its implementation is an important economic, environmental, technical and administrative issue for national and international agendas. As in the case of ports, port waste management planning and its implications form a rapidly growing subject of interest in the city management context. Because ports are sources of considerable volumes of valuable wastes, one of the main subjects of local authorities dealing with urban sustainable development matters is ship and port waste management. However, according to the related national and international regulations ports expose good examples as the best examples of practices for sustainable waste management efforts within their distinct determined jurisdictions.

At a national level, the overarching goal reflected in the White Paper on Integrated Pollution and Waste Management for South Africa (Department of Environmental Affairs and Tourism, 2000) is integrated pollution and waste management, with the intention being to move away from fragmented and uncoordinated pollution control and waste management towards integrated pollution and waste management as well as waste minimisation.

Waste management in South Africa is governed by the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) which came into effect on 1 July 2009. Following the enactment of the Waste Act, the Minister of Environmental Affairs established the National Waste Management Strategy in terms of Section 6(1) for achieving the objects of the Act. The Waste Act supports the waste management hierarchy in its approach to

waste management, by promoting cleaner production, waste minimisation, reuse, recycling and waste treatment with disposal seen as a last resort in the management of waste.

Transnet National Port Authority plans to upgrade Berths 203 to 205, Pier 2, Container Terminal, Port of Durban. The existing Blockwork Quay wall structure along Pier 2 Berth 203 to 205 was designed in the 1970s to support dockside cranes with the lifting capacity of 4 tonnes. The quay walls are presently operating beyond their original design limitations. Recent studies have concluded that the existing quay walls do not meet the minimum Eurocode 7 Safety Standards and that there is a risk of potential quay wall failure (PRDW, 2011)

The proposed upgrade would include the following activities:

1. The westward lengthening of Berth 205 by 170m;
2. The eastward lengthening of Berth 203 by 100m;
3. The seaward widening of Berths 203 to 205 by 50m;
4. The deepening of the berth channel, approach channel, and vessel turning basin from the current -12.7m CDP to -16.5m CDP;
5. The excavation of trench to -19m CDP for the Caisson Quay Wall;
6. The construction of caissons, storage of sheet piles or precasting of elements of the Deck on Pile at Bayhead Lot 10;
7. The offshore disposal of dredge material;
8. The offshore sand winning for infill material; and
9. The installation of new Ship to Shore cranes and associated infrastructure.

Nemai Consulting was appointed by Transnet National Port Authority to undertake the requisite Environmental Authorisation Process for the Proposed Berth 203 to 205, Pier 2 upgrade and the Department of Environmental Affairs granted the Environmental Authorisation for the Berth 203 to 205 Expansion on 21 January 2015.

As part of this, Transnet National Port Authority is required to meet a number of specific conditions including the development of an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling and reuse options.

The purpose of this document is therefore to provide this approach for the Berth 203 to 205 Expansion for both construction and operation in line with the condition for approval of the authorisation. Whilst, this document is not an Integrated Waste Management Plan nor a Port Waste Management Plan, the aim is similar in that it will provide mechanism for management of waste based on waste minimisation including aspects such as reduction, recycling and reuse options.

Incorporating this approach into both the operation and construction of Berth 203 to 205 will ensure that the expansion incorporates waste minimisation techniques and mitigates negative impacts related to waste management.

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List of Abbreviations

| | |
|-------------------|--|
| CBD | Central Business District |
| CDP | Chart Datum Port |
| Chl-a | Chlorophyll -a |
| cm | Centimetre |
| CSD | Cutter Suction Dredger |
| DEA | Department of Environmental Affairs |
| EA | Environmental Authorisation |
| EIA | Environmental Impact Assessment |
| EMPr | Environmental Management Programme |
| EU | European Union |
| IWMA | Integrated Waste Management Approach |
| IWMP | Integrated Waste Management Plan |
| m ³ /s | Cubic metre per second |
| Mg/l | Milogram per litre |
| NEM: ICM | The National Environmental Management: Integrated Coastal Management Act (No 24 of 2008) |
| NEM:WA | The National Environmental Management Waste Act (No 56 of 2008) |
| NEMA | National Environmental Management Act (No. 107 of 1998) |
| NWA | The National Water Act (No 36 of 1998) |
| NWMS | National Waste Management Strategy |
| OHS Act | The Occupational Health and Safety Act (No 85 of 1993) |
| PM ₁₀ | Particulate matter with diameter of 10 µm |
| TEU | Twenty Foot Equivalent Unit |
| TNPA | Transnet National Ports Authority |
| TSHD | Trailing Suction Hopper Dredger |
| WMP | Waste Management Plan |
| AU | African Union |
| AMCEN | African Ministerial Conference on Environment |

1 INTRODUCTION

1.1 Overview of the Berth 203 to 205 Expansion

Transnet National Port Authority (TNPA) plans to upgrade Berths 203 to 205, Pier 2, Container Terminal, Port of Durban. The existing Blockwork Quay wall structure along Pier 2 Berth 203 to 205 was designed in the 1970s to support dockside cranes with the lifting capacity of 4 tonnes. The quay walls are presently operating beyond their original design limitations. Recent studies have concluded that the existing quay walls do not meet the minimum Eurocode 7 Safety Standards and that there is a risk of potential quay wall failure (PRDW, 2011)

The main motivation for the upgrade of the quay wall at Berth 203 to 205, Pier 2 was the current unsafe conditions at the berths. However, in order for the Port of Durban to remain competitive as a 'hub' port for southern Africa there was also a need to accommodate Super Post Panamax vessels which require deeper channels and longer berths. The combination of these motivating factors contributed to the decision to upgrade and extend Berth 203 to 205 thus providing safe berthing conditions and meeting the present demand of shipping companies for ports which can accommodate large container vessels.

Nemai Consulting was appointed by Transnet National Port Authority to undertake the requisite Environmental Authorisation Process for the Proposed Berth 203 to 205, Pier 2 upgrade which involves the following activities:

- The westward lengthening of Berth 205 by 170 m;
- The eastward lengthening of Berth 203 by 100 m;
- The seaward widening of Berths 203 to 205 by 50 m;
- The deepening of the berth channel, approach channel, and vessel turning basin from the current -12.7 m CDP to -16.5 m CDP;
- The excavation of trench to -19m CDP for the Caisson Quay Wall;
- The construction of caissons, storage of sheet piles or precasting of elements of the Deck on Pile at Bayhead Lot 10;
- The offshore disposal of dredge material;
- The offshore sand winning for infill material; and
- The installation of new Ship to Shore cranes and associated infrastructure.

The Department of Environmental Affairs granted the Environmental Authorisation for the Berth 203 to 205 Expansion on 21 January 2015 and the authorisation was subsequently upheld against appeal on 9 September 2015.

As part of the authorisation and appeal decision, TNPA is required to meet a number of specific conditions including the following:

“Develop an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling and reuse options.”

Nemai Consulting has been appointed to develop this Integrated Waste Management Approach (IWMA) in line with conditions of the EA.

1.2 Integrated Waste Management

Waste management has become a complex area and from an international perspective, there has been a move to focus on integrated waste management. This often includes the compilation of reports or plans. For example, European Union (EU) legislation requires the competent authority in each Member State to draw up one or more waste management plans in accordance with relevant EU directives. As such, waste management planning has become a permanent element in public planning efforts in all EU Member States. In Africa, the African Union (AU) highlights the importance of sustainable development including waste management in line with the African Ministerial Conference on Environment (AMCEN) Declarations 19 and 20 which call for the sound management of chemicals and waste in Africa.

Waste management plans have a key role to play in achieving sustainable waste management. Their main purpose is to give an outline of waste streams and treatment options. More specifically they aim to provide a planning framework for the following:

- Compliance with waste policy and target achievement: Waste management plans, national as well as local/regional are important instruments contributing to implementation and achievement of policies and targets set up in the field of waste management at the national and the international level;
- Outline of waste characteristics and sufficient capacity for managing waste: Waste management plans give an outline of waste streams and quantities to be managed. Furthermore, they contribute to ensuring that the capacity and the nature of collection and treatment systems are in line with the waste to be managed;
- Control of technological measures: An outline of waste ensures identification of areas in which technological measures should be taken to eliminate or minimise certain types of waste; and

- Outline of economy and investment requirements: Waste management plans make way for a statement of financial requirements for the operation of collection schemes, treatment of waste etc. On this basis, the needs for future investments in waste treatment plans may be determined.

At a Port level, the protection of the world's oceans from pollution is an environmental issue of immense international concern. By analysing the actual individual samples, it has been deduced that merchant shipping accounts for 15-35% of the total waste (Palabiyik, 2003). In the past decade, developing Port Waste Management Plans and establishing an efficient ship waste handling system designed to ensure proper waste management services in compliance with national and international legislation has become more important to Port managers. The AU has also recently developed the 2050 Africa's Integrated Maritime Strategy (2050 AIM Strategy) which highlights the threat of illegal dumping of waste and encourages Member States to ensure, through appropriate legislation in collaboration with relevant stakeholders, the safe handling and transport of hazardous goods and materials (including waste) (African Union, 2012).

Waste management planning and its implementation is an important economic, environmental, technical and administrative issue for national and international agendas. As in the case of ports, port waste management planning and its implications form a rapidly growing subject of interest in the city management context. Because ports are sources of considerable volumes of valuable wastes, one of the main subjects of local authorities dealing with urban sustainable development matters is ship and port waste management.

At a national level, the overarching goal reflected in the White Paper on Integrated Pollution and Waste Management for South Africa (Department of Environmental Affairs and Tourism, 2000) is integrated pollution and waste management, with the intention being to move away from fragmented and uncoordinated pollution control and waste management towards integrated pollution and waste management as well as waste minimisation. Within this framework of the overarching goal, the following strategic goals apply:

- effective institutional framework and legislation;
- pollution and waste minimisation, impact management and remediation;
- holistic and integrated planning – the intention is to develop mechanisms to ensure that integrated pollution and waste management considerations are integrated into the development of government policies, strategies and programmes as well as all spatial and economic development planning processes and in all economic activity.

Integrated Pollution and Waste Management is defined as:

“Integrated pollution and waste management is a holistic and integrated system and process of management, aimed at pollution prevention and minimisation at source, managing the impact of pollution and waste on the receiving environment and remediating damaged environments.”

White Paper on Integrated Pollution and Waste Management for South Africa, 2000, p.11)

1.3 Waste Management in South Africa

Waste management in South Africa is governed by the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008 – NEM:WA) which came into effect on 1 July 2009. Following the enactment of the Waste Act, the Minister of Environmental Affairs established the National Waste Management Strategy (NWMS) in terms of Section 6(1) for achieving the objects of the Act. The Waste Act supports the waste management hierarchy in its approach to waste management, by promoting cleaner production, waste minimisation, reuse, recycling and waste treatment with disposal seen as a last resort in the management of waste.

Further, waste management in South Africa faces numerous challenges which include:

- A growing population and economy resulting in increasing volumes of waste;
- Increased complexity of waste streams because of urbanisation and industrialisation;
- Absence of a recycling infrastructure which enable separation of waste at source and diversion of waste streams to material recovery and buy back facilities;
- Few waste treatment options available; and
- Too few adequate, compliant landfills and hazardous waste management facilities, which hinders the safe disposal of all waste streams.

The objects of the Waste Act are structured around the steps in the waste management hierarchy, which is the overall approach that informs waste management in South Africa. The waste management hierarchy consists of options for waste management during the lifecycle of waste, arranged in descending order of priority: waste avoidance and reduction, re-use and recycling, recovery, and treatment and disposal as the last resort

According to the National Waste Information Baseline Report, South Africa generated approximately 108 million tonnes of waste in 2011, of which 98 million tonnes was disposed of at landfill. In the order of 59 million tonnes is general waste, 48 million tonnes is currently unclassified waste and the remaining 1 million tonnes hazardous waste. In the order of 10% of all waste generated in South Africa was recycled in 2011 (Department of Environmental Affairs, 2012). Waste management in South Africa is thus still heavily reliant on landfilling as a waste management option, with 90.1% of waste generated being disposed of to landfill in 2011.

The objects of the Waste Act are structured around the steps in the waste management hierarchy, which is the overall approach that informs waste management in South Africa. The waste management hierarchy consists of options for waste management during the lifecycle of waste, arranged in descending order of priority (Department of Environmental Affairs, 2011).

The foundation of the hierarchy, and the first choice of measures in waste management, is **avoidance and reduction**. This step aims for goods to be designed in a manner that minimises their waste components. Also, the reduction of the quantity and toxicity of waste generated during the production process is important.

The next stage of the hierarchy is **re-using** waste. Re-using an article removes it from the waste stream for use in a similar or different purpose without changing its form or properties.

After re-use comes the **recycling** of waste, which involves separating articles from the waste stream and processing them as products or raw materials.

These first four stages of the waste management hierarchy are the foundation of cradle-to-cradle waste management. This approach seeks to re-use or recycle a product when it reaches the end of its life span. In this way, it becomes inputs for new products and materials. This cycle repeats itself until as small a portion as possible of the original product eventually enters the next level of the waste management hierarchy: recovery.

Recovery involves reclaiming particular components or materials, or using the waste as a fuel.

As a last resort, waste enters the lowest level of the hierarchy to be **treated and / or disposed of**, depending on the safest manner for its final disposal.

Where the quantity of waste cannot be reduced during production, the purpose of implementing the waste management hierarchy is to use waste as a resource and divert these potential resources from landfill. Although landfill is widely considered the most affordable way to manage waste, this view does not take into account factors such as the environmental impacts of landfills; the costs of developing and maintaining additional landfill

capacity to accommodate the increasing rate of waste disposal; and the cost of closing and remediating the landfill (Department of Environmental Affairs, 2011).

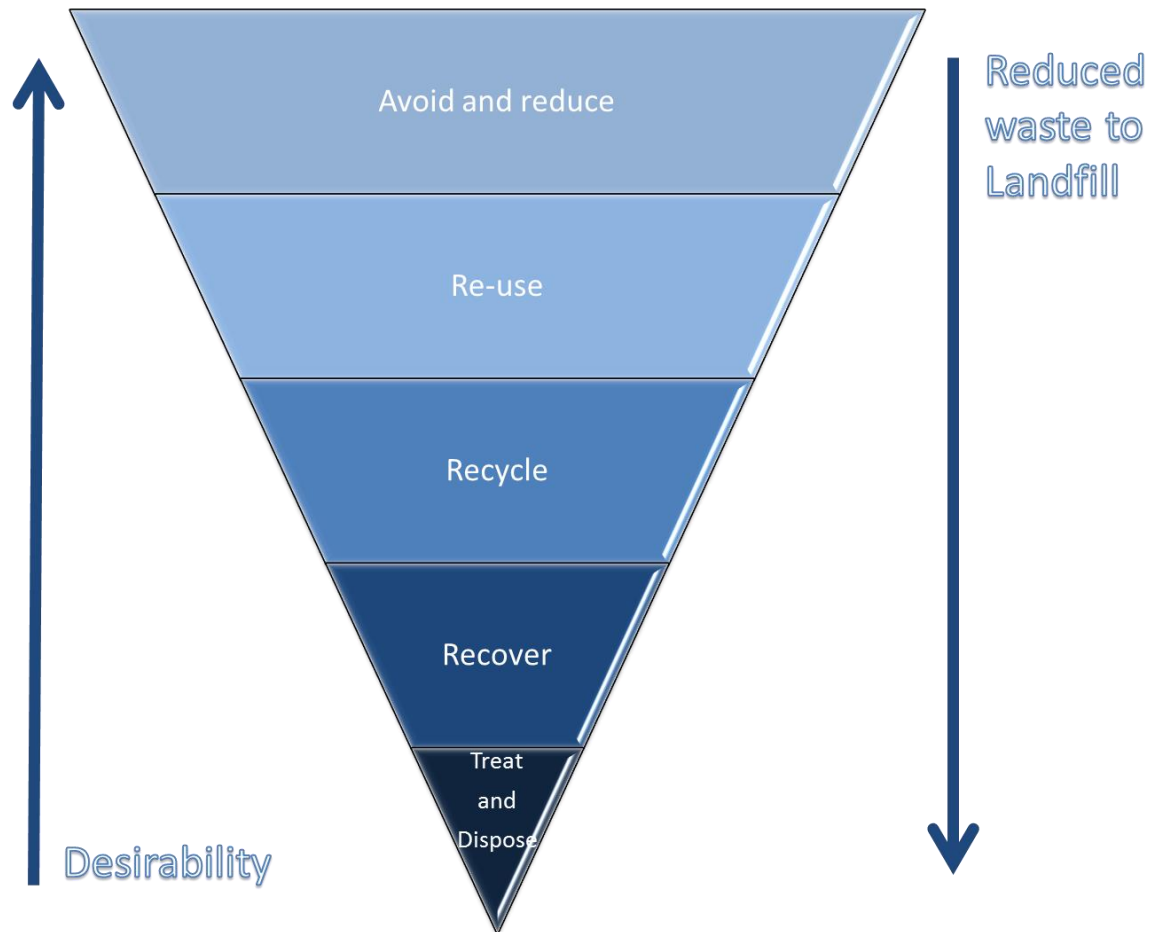


Figure 1: Waste Hierarchy

1.4 Purpose of this Document

The purpose of this document is to provide an IWMA for the Berth 203 to 205 Expansion EIA for both construction and operation in line with the condition for approval of the EA. Whilst, this document is not an Integrated Waste Management Plan (IWMP) nor a Port Waste Management Plan (as mentioned above), the aim is similar in that it will provide mechanism for management of waste based on waste minimisation including aspects such as reduction, recycling and reuse options.

The IWMA will provide a background of relevant waste legislation, provide guidance for identification of waste streams and sources and assist with the implementation of waste management objectives. Information related to waste management contained in the Environmental Management Programme (EMPr) will also be provided.

2 LEGISLATION FRAMEWORK

“Everyone has the right –

a.) to an environment which is not harmful to their health or well-being;

b.) to have the environment protected for the benefit of present and future generations through reasonable legislation and other measures that:

- I. Prevent pollution and ecological degradation;*
- II. Promotes conservation;*
- III. Secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development”*

2.1 Legislation

2.1.1 The Constitution of South Africa (No 108 of 1996)

The Constitution of South Africa, 1996 (the Constitution), is the supreme law of the land and provides amongst others the legal framework for legislation regulating coastal and management in general. It also emphasises the need for co-operative governance. In addition, the Environmental clause in Section 24 of the Constitution provides that:

The constitution also provides the foundation for environmental regulation and policy in South Africa. The right to environmental protection and to live in an environment that is not harmful to health or well-being is set out in the Bill of Rights (section 24 of Chapter 2).

The Constitution assigns concurrent legislative competence to national and provincial government with respect to the environment and pollution control (section 146 of the Constitution). It assigns exclusive provincial legislative competence to the local government matters of cleansing and refuse removal, refuse dumps and solid waste disposal. The

Constitution allows national legislation to set national norms and standards relating to these matters in cases where national uniformity is required to deal effectively with the issue.

2.1.2 White Paper on Integrated Pollution and Waste Management

The White Paper represents formal government policy regarding integrated pollution and waste management and deals with related vision, principles, goals and objectives. It highlights a number of important issues such as:

- A lack of priority afforded to waste management;
- Unacceptable high levels of water and air pollution;
- Sub-optimal use of natural resources; and
- Insufficient resources to monitor and implement the extensive South African waste and environmental legislation.

The White Paper seeks to invoke a paradigm shift from the 'end-of-pipe treatment' of waste management to an integrated pollution and waste management system and process of management. This system is aimed at pollution prevention and minimisation at source, managing the impact of pollution and waste on the receiving environment and remediation of damaged environments.

It identifies the following relevant strategic goals:

- Effective institutional framework and legislation;
- Pollution and waste minimisation impact management and remediation;
- Holistic and integrated planning;
- Participation and partnerships in integrated pollution and waste management governance;
- Empowerment and education in integrated pollution and waste management; and
- Information management.

2.1.3 The National Environmental Management Act (No 107 of 1998)

The National Environmental Management Act (NEMA) articulates a number of principles such as "Polluter Pays" and "the Precautionary Principle". It also provides for ecosystems that require special attention

The fundamental rights provided for in the Constitution underpins environmental policy and law, in particular NEMA which is the fundamental environmental legislation framework for South Africa.

NEMA introduced a number of additional guiding principles into South African environmental legislation, including the life-cycle approach to waste management, producer responsibility,

the precautionary principle and the polluter pays principle. Chapter 5 of NEMA provides instruments for integrated waste management. NEMA also places a duty of care on any persons who may cause significant pollution or degradation of the environment, requiring them to institute measures to either prevent pollution from occurring, or to minimise and rectify the pollution or degradation where it cannot reasonably be avoided.

2.1.4 The National Environmental Management Waste Act (No 56 of 2008)

The National Environmental Management Waste Act (56 of 2008 - NEMWA) regulates waste management in order to protect the health and environment of South African citizens. This is achieved through pollution prevention, institutional arrangements and planning matters, national norms and standards and the licensing and control of waste management activities.

NEMWA fundamentally reforms the law regulating waste management, and for the first time provides a coherent and integrated legislative framework addressing all the steps in the waste management hierarchy. The waste management hierarchy provides a systematic and hierarchical approach to integrated waste management, addressing in turn waste avoidance, reduction, re-use, recycling, recovery, treatment, and safe disposal as a last resort.

2.1.5 The National Environmental Management: Integrated Coastal Management Act (No 24 of 2008)

The National Environmental Management: Integrated Coastal Management Act, 2008 (Act No 24 of 2008- NEM:ICM) aims to promote the coastal environment as well as to ensure that development and use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable.

Section 70 of the NEM:ICM deals with the prohibition of incineration or dumping at sea while Section 71 deals with Dumping Permits. When deciding on an application for a Dumping permit, the Minister must take into account the following:

- a.) The Waste Assessment Guidelines set out in Schedule 2;
- b.) Any coastal management programme applicable in the area;
- c.) The likely environmental impact of the proposed activity;
- d.) National legislation dealing with waste;
- e.) The interests of the whole community;
- f.) Transboundary impacts and International obligations and standards; and
- g.) Any other factors that may be prescribed.

Dumping at sea is only permitted for certain substances and this is governed by Section 71 (3). A Dumping at Sea permit can be obtained for dredged material if certain conditions are satisfied.

Section 71 (3):

*The Minister may not grant any dumping permit that authorises the dumping of any waste or other material, **other than**:*

- a.) dredged material;*
- b.) sewerage sludge;*
- c.) fish waste, or material resulting from industrial fishing processing operations;*
- d.) vessels and platforms or other man-made structures at sea;*
- e.) inert, inorganic, geological material;*
- f.) organic material of natural origin; or*
- g.) bulky items primarily comprised of iron, steel, concrete and similarly non harmful materials where the concern is physical impact and limited to circumstances where such waste is generated at locations such as small islands with isolated communities having no practicable access to disposal options other than dumping at sea.*

Schedule 2 (Section 71) sets out the Guidelimes for the Assessment of Wastes or other material that may be considered Dumping at Sea ("The Waste Assessment Guidelines"). The Waste Assessment Guidelines sets out that a Waste Prevention Audit should be conducted in order to assess alternatives to Dumping at Sea. This assessment should include an evaluation of the following;

- a.) the types, amounts and relative hazard of waste generated;
- b.) details of the production process and sources of wastes within that process; and
- c.) the feasibility of the following waste reduction or prevention techniques:
 - i) product reformulation;
 - ii) clean production technologies;
 - iii.) process modification;
 - iv) input substitution; and

v) on-site, closed loop recycling.

Specifically, for dredged material and sewerage sludge, the goal of waste management should be to identify and control the sources of contamination. In addition, all applications to dump wastes at sea must demonstrate that appropriate consideration has been given to the following hierarchy of waste management options which includes:

- a.) re-use;
- b.) off site recycling;
- c.) destruction of hazardous constituents;
- d.) treatment to reduce or remove the hazardous constituents; and
- e.) disposal on land, into air, and in water.

Characterisation of waste to be dumped must also be taken into account and includes:

- a.) origin, total amount, form, average composition;
- b.) properties: physical, chemical, biochemical and biological;
- c.) toxicity;
- d.) persistence: physical, chemical and biological; and
- e.) accumulation and biotransformation in biological materials or sediments.

2.1.6 National Environment Management Act: Waste Act: Waste Classification and Management Regulation (GN 614 of 10 August 2012)

The Waste Classification and Management Regulations provide an overview of waste which requires waste classification in terms of SANS 10234. Waste included in Annexure 1 does not require waste classification.

The Regulations also include the requirements for record keeping such as a Waste Manifest System for Hazardous Waste.

Chapter 5 (10) requires that waste generators must keep up to date and accurate records of the waste they generate including the classification of the waste, the quantity of each waste generated, the quantity of the waste which was re-used, recovered, recycled, recovered, treated or disposed of and by whom the waste was managed by.

Waste managers of waste classified as hazardous must keep a Waste Manifest System.

2.1.7 National Environmental Management: Waste Act: National Waste Information Regulations (GN 625 of 13 August 2012)

The purpose of these regulations is to regulate the collection of data and information to fulfil the objectives of the National Waste Information System.

Annexure 1 provides a list of waste generators that must register of SAWIS which include the following:

- Generators of waste
 - Generators of Hazardous waste in excess of 20 kg per day
- Recovery and recycling of waste
 - Recovery of energy for general waste in excess of 3 tons per day
 - Recovery of waste at a facility that has the capacity to process in excess of 10 tons of general waste or in excess of 500 kg of hazardous waste per day excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.
 - The scrapping or recovery of motor vehicles with an operational area of in excess of 500 m².
 - Recycling of general waste at a facility that has an operational area of in excess of 500 m².
 - Recycling of hazardous waste in excess of 500 kg per day calculated as a monthly average.
- Treatment of Waste
 - Treatment of general waste using any form of treatment at a facility that has the capacity to process in excess of 10 tons of general waste or 500 kg of hazardous waste per day excluding the treatment of effluent, wastewater or sewerage.
 - Treatment of health care risk waste regardless of the size or capacity of the facility.
- Disposal of waste
 - Disposal of general waste to land covering an area in excess of 200 m².
 - Disposal of any quantity of hazardous waste to land.

The record keeping and reporting requirements are also provided.

2.1.8 National Environmental Management: Waste Act: National norms and standards for the storage of waste (GN. 926 of 29 November 2013)

The purpose of the Norms and Standards for the Storage of Waste is to provide an uniform approach to the management of waste storage facilities, ensure best practice is the management of waste storage facilities and provide minimum standards for the design and operation of new and existing waste storage facilities.

The Norms and Standards require registration of new storage facilities.

They also provide details on the management of all storage facilities in terms of access control and notices, operation, general requirements of waste storage containers, minimum requirements for above ground storage facilities and minimum requirements for below ground storage facilities.

The Norms and Standards also require that training be undertaken and an emergency preparedness plan be compiled. In addition, specific monitoring and inspections need to be undertaken as well as internal and external audits.

2.1.9 National norms and standards for disposal of waste and landfill (GN 636 of 23 August 2013)

The norms and standards provide the requirements for disposal of waste to landfill.

2.1.10 National Norms and standards for the assessment of waste for landfill disposal (GN 635 of 23 August 2013)

In terms of GN 614 of 10 August 2012, waste generators must assess all waste generated in terms of the Norms and Standards. The norms and standards require that Total concentrations and leachable concentrations are assessed by a SANAS accredited laboratory within 3 years of the Regulations. The assessment must then be compared to the thresholds in the norms and standards

2.1.11 National Environmental Management: Waste Amendment Act: List of Waste Management Activities that have or are likely to have a detrimental effect on the Environment (GN 921 of 29 November 2013)

These regulations provide a list of waste management activities that require a waste management license:

Category A activities require a Basic Assessment Process be undertaken. Category B activities require a Scoping and EIA process and Category C require that the Norms and Standards be followed.

2.1.12 National Environmental Management: Waste Amendment Act: National Norms and Standards for the remediation of contaminated land and soil quality (GN331 of 2May 2014)

These regulations provide the norms and standards for the remediation of contaminated land.

2.1.13 Hazardous Chemical Substances Regulations (GN 1179 of 25 August 1995) as amended

The Hazardous Chemical Substances Regulations include requirements for the Disposal of hazardous chemical waste and thus as far as is reasonably practicable, Transnet must-

- recycle all hazardous chemical waste; and
- ensure that all vehicles, re-usable containers and covers which have been in contact with hazardous chemical waste are cleaned and decontaminated after use in such a way that the vehicles, containers or covers do not cause a hazard inside or outside the site concerned; and ensure that if the services of a waste contractor are used, a provision is incorporated into the contract stating that the contractor shall also comply with the provisions of these regulations.

The definition of **hazardous chemical substance** is as follows:

Any toxic, harmful, corrosive, irritant or asphyxiant substance, or a mixture of such substances for which -

- (a) *an occupational exposure limit is prescribed [see Table 1 of the list attached to this section as Annexure C1]; or*
- (b) *an occupational exposure limit is not prescribed, but which creates a hazard to health.*

2.1.14 The National Water Act (No 36 of 1998)

The National Water Act (Act 36 of 1998) (NWA) deals with, *inter alia*, the protection of South Africa's water resources, The NWA defines waste as:

“any solid material, or material that is suspended, dissolved or transported in water (including sediment) and which is spilled or deposited on land or into a water resource in such volume, composition or manner as to cause, or to be reasonably likely to cause, the water resource to be polluted”

Along similar lines to NEMA, Section 19(1) of the NWA contains a pollution prevention requirement placing a pollution prevention duty on landowners, persons in control, users or occupiers of land to take all reasonable measures to prevent water pollution from occurring, continuing or recurring.

Section 21 of the NWA defines water use and includes:

- (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- (g) disposing of waste in a manner which may detrimentally impact on a water resource; and
- (h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.

Section 22 deals with permissible water uses and deals with the use of water subject to a number of conditions which include registration and licensing provisions.

2.1.15 The National Health Act (No 61 of 2003)

The Act provides measures for the promotion of health of the inhabitants of South Africa.

Section One of the Act includes a lengthy discussion of nuisance, including:

- (c) any accumulation of refuse... which is offensive or is injurious or dangerous to health;
- (g) any factory or industrial or business premises causing or giving rise to smells or effluvia which are offensive or which are injurious or dangerous to health; and
- (h) any area of land kept or permitted to remain in such a state as to be offensive.

Section 14(1)(c) obliges the Department of National Health to ‘take steps for the promotion of a safe and healthy environment’.

2.1.16 The Occupational Health and Safety Act (No 85 of 1993)

The Occupational Health and Safety Act (No 85 of 1993) (OHSA) provides for the health and safety of persons at work and the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. It places duties on employers and employees not to endanger the health of others and to provide a safe place of employment.

A number of regulations promulgated under the Act are important with respect to the manager of hazardous substances (and therefore) hazardous wastes:

- Hazardous Chemical Substances Regulations;
- Asbestos Regulations; and
- Lead Regulations.

2.1.17 The National Road Traffic Act (No 96 of 1993)

Chapter 8 of the Road Traffic Act deals with the Transportation of Dangerous Goods. Regulations 31 in terms of Section 75 of Act have been promulgated which set out responsibilities in relation to transport of dangerous goods and substances which include hazardous wastes, *inter alia* : the prohibition of transportation of dangerous goods; the duties of operator, consignor and consignee; exemptions; compatibilities; classification of hazardous substances; driver training requirements; and documentation requirements. A number of South African National Standards have been incorporated into the regulations and thus are enforceable by law. These legal requirements must be incorporated into procedures covering the removal of hazardous wastes.

Waste generators and waste contractors must ensure that they review their responsibilities as detailed in the latest revisions of the following documents-

- SANS 10228 The identification and classification of dangerous substances and goods;
- SANS 10229-1 Packaging and large packaging for road and rail transportation in South Africa – Part 1 – Packaging;
- SANS 10231 - Transportation of dangerous goods-Operational requirements for road vehicles. This document defines roles and responsibilities of the consignor (generator of hazardous waste), the operator (transporter of hazardous waste) and the consignee (the disposer / treater / recycler of hazardous waste);
- SANS 10232-1 Transportation of dangerous goods-Emergency information systems, Part 1: Emergency information system for road transportation;
- SANS 10232-3 Transportation of dangerous goods-Emergency information systems, Part 3: Emergency response guides;

- SANS 10232-3: ANNEX A : 2000 : Emergency Response Handbook; and
- SABS 10232-4 Transport of dangerous goods - Emergency information systems Part 4: Transport emergency card.

2.1.18 The National Ports Act (No 12 of 2005)

The National Ports Act has relevance for the IMWA as it places a responsibility on TNPA to ensure that the infrastructure of ports is managed and maintained in a manner which ensures efficient, safe and orderly port operations.

The National Ports Act entitles the Harbour Master to give such written or verbal instructions as may reasonably be necessary for:

- Regulating the removal or disposal of any residues and mixtures containing oil or noxious liquid substances, sewage and garbage from vessels in a port and requiring any such matter to be deposited in reception facilities in the port; and
- The detention of a vessel reasonably suspected of causing oil pollution and ensuring that the total cost of the pollution clean-up operation is recovered, or acceptable guarantees are provided, prior to the vessel being given permission to leave the port.

2.1.19 eThekwinini Refuse Removal By-Laws

Section 2(5) requires that persons who wish to provide a refuse removal service be approved in terms of the bylaws.

Section 2(6) requires a person can only use the services of a waste contractor other than the city, if that contractor has been approved.

Section 2(7) requires persons using waste contractors other than the city to notify the Head: Durban Solid Waste of this fact as well as when the use of the contractor is discontinued.

Section 4(a)(i) requires that written permission of the Head: Durban Solid Waste is required for selling or otherwise disposing of corrugated cardboard, paper, glass or other material being an element of trade refuse, for recycling in a manufacturing process. Furthermore the Medical Officer of Health's consent is also needed if any food wastes are sent for animal consumption.

Section 15 deals with special industrial refuse and requires that the Head: Durban Solid Waste is notified if any special industrial waste is disposed as far as-

- Composition;
- Quantity;
- Storage arrangements; and
- How, when, where to and by whom it will be removed.

Any changes to the above information must be communicated in writing to the Head: Durban Solid Waste

2.2 International Obligations

In terms of section 231 of the Constitution, an international agreement binds the Republic only after it has been approved by resolution in both the National Assembly and the National Council of Provinces, except in certain specific circumstances. Any international agreement becomes law in the Republic when it is enacted by national legislation, but a self-executing provision of an agreement that has been approved by Parliament is law in the Republic unless it is inconsistent with the Constitution or an Act of Parliament. The White Paper on integrated pollution and waste management indicates that of the 20 international agreements pertaining to integrated pollution and waste management, 19 have been acceded to or ratified by South Africa.

The South African government must give effect to the provisions of the international conventions to which the country has acceded.

2.2.1 Basel Convention

The convention was concluded at Basel on 22nd March 1989 and South Africa acceded thereto on 5 May 1994. It was published for general information in GN 1051 on 21 August 1998. This convention has not yet been enacted as domestic legislation but is envisaged that it will shortly form part of our legislation in terms of the NWMS.

The scope of the convention includes the following:

- The wastes which are subject to transboundary movement are be considered to be “hazardous wastes” for the purposes of this Convention:
 - wastes that belong to any category contained in Annex I of the Convention unless they do not possess any of the characteristics contained in Annex III; and
 - wastes that are not covered under the abovementioned but are defined as or are considered to be hazardous waste by the domestic legislation of the Party of export, import or transit.
- Wastes that belong to any category contained in Annex II to the Convention that are subject to transboundary movement shall be “other wastes” for the purposes of this Convention.
- Wastes which as a result of being radioactive are subject to other international control systems, including international instruments applying specifically to radioactive materials, are excluded from the scope of this Convention.

- Wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument, are excluded from the scope of this Convention.

This Article places numerous obligations on Parties subscribing to the Convention including that each Party is obliged ensure that the generation of hazardous wastes and other wastes within its own country is reduced to a minimum. The Parties to the Convention are also to ensure that the availability of adequate disposal facilities for the environmentally sound management of hazardous wastes and other wastes as far as it is possible are established within its own country. The parties also have an obligation to ensure that the persons involved in the management of hazardous wastes and other waste take the necessary steps to prevent pollution and, should pollution occur, to minimise the consequences thereof for human health and the environment. The Parties are to ensure that the transboundary movement of hazardous wastes and other wastes is reduced to a minimum and is conducted in a manner which will protect human health and the environment against adverse effects. Parties shall not allow the export of hazardous wastes or other wastes to a State belonging to an economic and/or political development organisation that are Parties and particularly to developing countries which have prohibited by legislation all imports, or if such a Party has reason to believe the waste in question will not be managed in an environmentally sound manner. The Parties are obliged to ensure that all information about a proposed transboundary movement be provided to the States concerned and to prevent the import of hazardous wastes and other wastes if there is reason to believe the waste in question will not be managed in an environmentally sound manner. All the Parties to the Convention are obliged to co-operate in activities with other Parties and interested organisations.

2.2.2 Convention on the Ban of Import into Africa and the Control of Transboundary Movement and Management of hazardous waste within Africa, 29 January 1991 (Bamako).

The Bamako Convention on the ban of import into Africa and the control of transboundary movement and management of hazardous wastes within Africa was signed in 1991. In terms of Article 4 of the Convention, parties are obliged to take appropriate legal, administrative and other measures within the area under their jurisdiction to prohibit the import of all hazardous wastes, for any reason, into Africa from non-contracting parties. The parties are obliged to make such import an illegal and criminal act. Furthermore, parties to the Convention are obliged to ensure that hazardous waste generators submit to the Secretariat reports regarding any waste that they generate. The parties must impose strict, unlimited, joint and several liability on hazardous waste generators and ensure that the generation of hazardous wastes within the area under their jurisdiction is reduced. They are also obliged to ensure the availability of adequate treatment and disposal facilities. As stated above, South

Africa is a signatory to the Basel Convention which deals with substantially the same subject matter, however, the Basel Convention is not as stringent on its control of the transboundary movement of hazardous wastes. In this regard, the Basel Convention permits, under certain conditions, the movement of hazardous waste. For this reason, South Africa is not a signatory to the Bamako Convention.

2.2.3 The Rotterdam Convention

This convention acceded to by South Africa in 2002, promotes and enforces transparency in the importation of hazardous chemicals.

2.2.4 The Stockholm Convention on Persistent Organic Pollutants (POPs)

South Africa became a signatory to this convention in 2001 and ratified in 2002, requires that member countries phase out POPs and prevent their import or export.

2.2.5 The Montreal Protocol

South Africa became a signatory to this protocol in 1990 and ratified subsequent amendments, phases out the production of certain substances and so protects the ozone layer.

2.2.6 The International Convention for the Prevention of Pollution from Ships, MARPOL 73/78

South Africa is the signatory to the International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978 relating thereto MARPOL 73/78. The MARPOL Convention is the universally accepted international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. It is a combination of two treaties adopted in 1973 and 1978 respectively and updated by amendments through the years. The combined instrument is referred to as the International Convention for the Prevention of Marine Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), and it entered into force on 2 October 1983 (Annexes I and II). The Convention includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes:

- Annex I : Regulations for the Prevention of Pollution by Oil
- Annex II : Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk
- Annex III : Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form
- Annex IV : Prevention of Pollution by Sewage from Ships

- Annex V : Prevention of Pollution by Garbage from Ships
- Annex VI : Prevention of Air Pollution from Ships (adopted September 1997 – not yet in force)

Under the provisions of the Convention, the international community of maritime states is mandated to put in place measures to ensure that ships do not engage in the unacceptable practice of discharging their waste and cargo residues at sea. MARPOL 73/78 prescribes that there must be a properly planned, easy-to-use and cost-effective system to manage incoming waste streams at the reception facilities of all operational ports.

The requirements of the MARPOL convention are addressed through various pieces of South African legislation, including (but not limited to) Marine Pollution (Prevention of Pollution from Ships) Act 2 of 1986, and the Reception Facilities for Garbage from Ships Regulations, (GNR 1491, 1992). In order to fulfil its obligations under the Convention, South Africa has delegated the responsibility by means of the National Ports Act and the Port Rules, to provide adequate ship generated Waste Reception Facilities to harbours, ports and terminals without causing any undue delay to ships and according to the needs of the ships using them.

The London Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (1972)

The London Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (1972) aims at preventing marine pollution by preventing dumping of wastes such as industrial waste, sewage sludge, dredged material and radioactive waste at sea, as well as incineration at sea. South Africa is a signatory to the convention and the associated 1996 Protocol.

This convention and its various protocols were incorporated into the following South African legislations:-

- Prevention of Pollution from Ships Act (Act 2 of 1986), and the regulations concerning the Prevention of Pollution by Garbage from Ships regulations (GN R140, published in Government Gazette No. 14000, dated 29 May 1992).
- The Dumping at Sea Control Act (Act 73 of 1980).

The primary responsible agency is the DEA Sub-Directorate of General Oceans and Coasts who issue permits for dredge spoils and sinking of old vessels. It occasionally issues permits for ships in trouble, typically grounded, to release their cargo into the sea.

2.3 Guidelines, Strategies and Management Plans

2.3.1 Guideline for the Development of IWMPs

The DEA has compiled a guideline for the development of IWMPs which focusses on the compilation of these reports by municipalities. This document however has also been used in the compilation of this approach.

2.3.2 European Union: Preparing a Waste Management Plan: A methodological guidance note

The aim of this document is to provide guidance on development of a waste management plan. This document has also been taken into account in the compilation of this IWMA.

2.3.3 TNPA National Waste Management Strategy

TNPA has developed a National Waste Management Strategy (NWMS) to ensure consistent and efficient waste management and serves as a guideline for the various ports to develop their port specific waste management plans. The TNPA NWMS has been used in the compilation of the IWMA (Transnet National Port Authority, 2014).

2.3.4 Port of Durban Waste Management Plan

In line with the NWMS discussed above, the Port of Durban has also developed a Waste Management Plan (WMP) for the Port which is intended to guide all Port related waste management activities and ensure all waste management activities are legally compliant. The WMP acknowledges that TNPA as a waste generator and landlord, retains the responsibility for ensuring that waste is handled, stored, transported and disposed of in an environmentally sound and responsible manner. As such it provides a number of requirements for the management of ship generated wastes, management of land generated wastes, including that of tenants, TNPA, and contractors as well as a Specific WMP for use by waste management contractors. The Port of Durban WMP has been utilised in the compilation of this IWMA (Transnet National Port Authority, 2015).

3 WASTE STREAMS AND SOURCES

An overview of the main activities which will be undertaken during construction as well as the main waste streams and sources is provided.

3.1 Overview of Activities

The main activities during construction include:

1. Extension of the Central Sandbank;
2. The construction of Caissons at Bayhead Lot 10;
3. The decommissioning and demolition of existing infrastructure at Berth 203 to 205;
4. Soft piling and soil improvement techniques;
5. Installation and infilling of the Caissons;
6. Infilling behind the Caisson quay wall;
7. Installation of new infrastructure, services infrastructure and electrical infrastructure;
8. Dredging of the Berth Channel, Entrance Channel and Turning Basin;
9. Excavation of the Caisson trench;
10. Placing of Scour Protection and Geofabric;
11. Disposal of dredge spoil at the Offshore Disposal Site;
12. Offshore Sand Winning for Infill material; and
13. Sandbank Extension.

3.1.1 Sandbank Extension Components

The following information is obtained from ZAA (2012d) which details the method for the Sandbank Extension. The figure below shows the Sandbank extension area in brown.

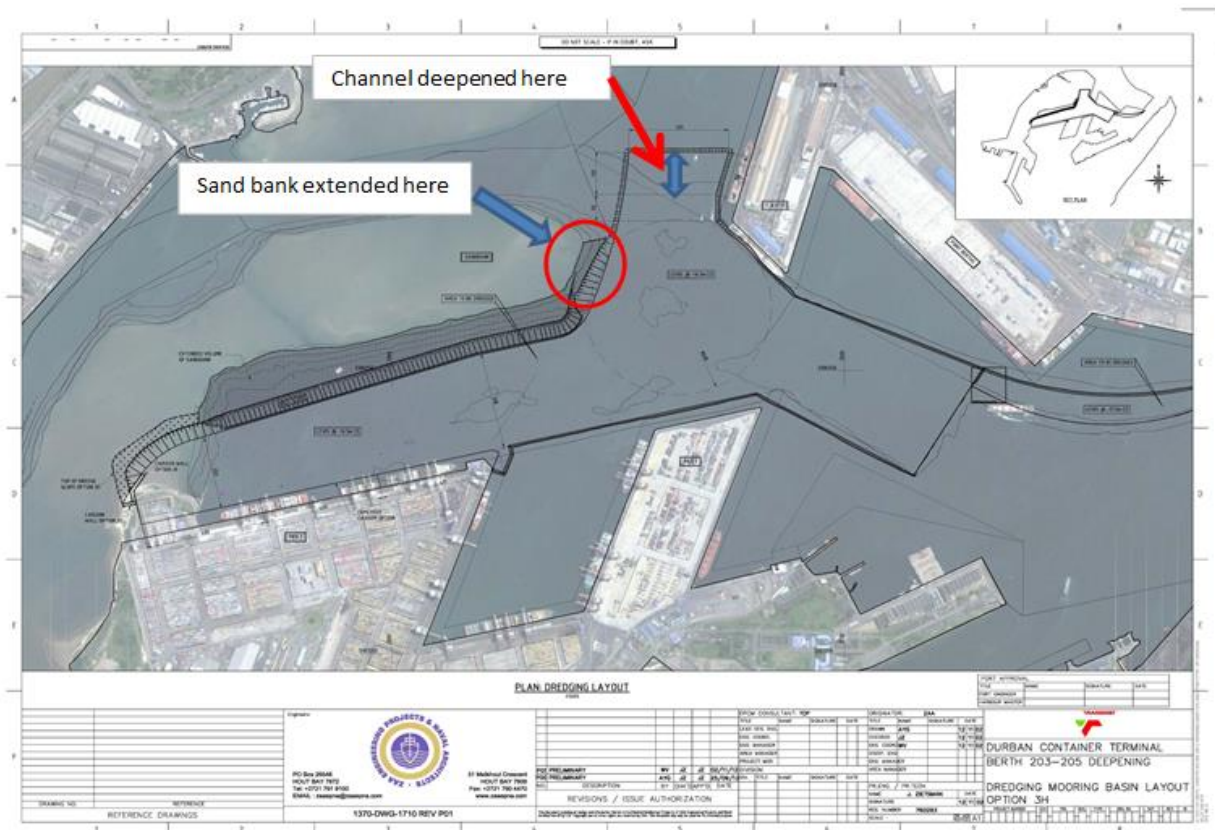


Figure 2: Sandbank Extension area (ZAA, 2012e)

The estimated quantity of sand to be dredged and placed is approximately 1,000,000 m³. Based on a single 2,700 m³ Trailing Suction Dredger (TSD) load and with a bulking factor of 1.12 a nett deposition of about 1,800 m³ could be expected per dredged load. This requires some 550 loads at a cycle time of some 6 hours. Thus the maximum sand deposition rate will be of the order of 5,400 m³ / day which would take at least 6 months of uninterrupted work. It should be noted that the actual equipment available to and selected by the contractor may change these rates and durations significantly.

The major part of this work will be carried out during Phase 1 of the work, during which the basin and turning circle will be dredged to its new depth and the slope protection installed. Phase 1 also includes the construction of the new Berth 205 and the deepened basin and turning circle must be available for the larger ships that will use Berth 205 after it is commissioned. Extension of the sandbanks will progressively follow the dredging work.

The following procedure provides a simplified, high-level overview of the Contractor's process of reclamation and extension of the sandbanks.

- Set up a survey programme, determining setting out points of the area to be filled. This must be compared with previous surveys and the baseline agreed;
- Conduct a video survey of the existing slopes for record purposes;
- Set up pollution control measures;
- Mobilise and commission suitable dredging equipment, marine operating staff, diving crews and support boats. The anticipated dredging equipment is a Trailing Suction Dredger (TSD), fitted with discharge pumps and hoses from a bow coupling;
- Dredge suitable material from within the Port;
- Provide samples for confirmation of suitability of material;
- Place sandbags along the line of the new toe of the extended sandbank to form a low retaining structure. Bio-degradable sandbags would be preferred;
- Pump the reclaim material behind the sandbag retaining structure in a sequence so that the area is filled evenly and rises in layers from below. This procedure will reduce entrainment of sand in the water column and thus reduce turbidity;
- Monitor turbidity in the water column and adjust deposition rates as needed;
- Fill to the pre-determined level, with periodic dives providing video records of the new profile; and
- Conduct interim and acceptance surveys for confirmation of final levels achieved and for measurement of quantities.

The following specific measures must be adopted to reduce pollution and turbidity to the absolute minimum.

- Grading of the sand selected for reclaim and sandbank extension shall match that of the existing sandbank as closely as possible. The material shall be free of clay, organic matter or other detritus;
- Pumping shall be controllable in rate so that it can be slowed if turbidity levels rise. It is expected that pumping can be maximized over both high and low tide periods, but may have to be reduced as tidal flows in both directions increase. In particular turbidity during tidal flows away from the sandbank and towards the new basin must be strictly controlled to prevent sand flowing back into the newly dredged areas; and
- Floating containment curtains extending well into the water will be required to restrict movement of the more turbid water until it has settled.

3.1.2 Dredging and Dredge Material Disposal

Two types of dredgers are anticipated:

1. Trailing Suction Hopper Dredger (TSHD); and
2. Cutter Suction Dredger (CSD).

The use of these will be based on the soil condition requirements.

The TSHD will be utilised for the majority of all dredging within the Port of Durban and at the Offshore Sand Winning site. The CSD may be necessary for the western edge of Berth 205 due to the presence of clay soils. **Table 1** below provides the dredging and dumping parameters.

Table 1: Dredging and Dumping parameters

| Parameter | Detail |
|------------------------------|--|
| Dredger types: | Trailing Suction Hopper and Cutter suction dredger |
| Average dredging rate: | 0.165 m ³ /s |
| Peak dredging rate: | 1.722 m ³ /s |
| Hopper Capacity | 2700 m ³ to 6200 m ³ |
| Average Dumping time: | 15 minutes |
| Dredging-Dumping Cycle time: | 4 hours |

The dredge footprint within the Port is provided in **Figure 3**. It includes the following:

- Provision of a Caisson quay wall along the western edge to prevent long term erosion;
- The Central Sandbank extension;
- The dredging of the Entrance channel to -17.0 m CDP;
- The dredging of the Turning basin to -16.5 m CDP;
- The dredging of the Berth channel to -16.5 m CDP; and
- The dredging of the Caisson trench to -19 m CDP.

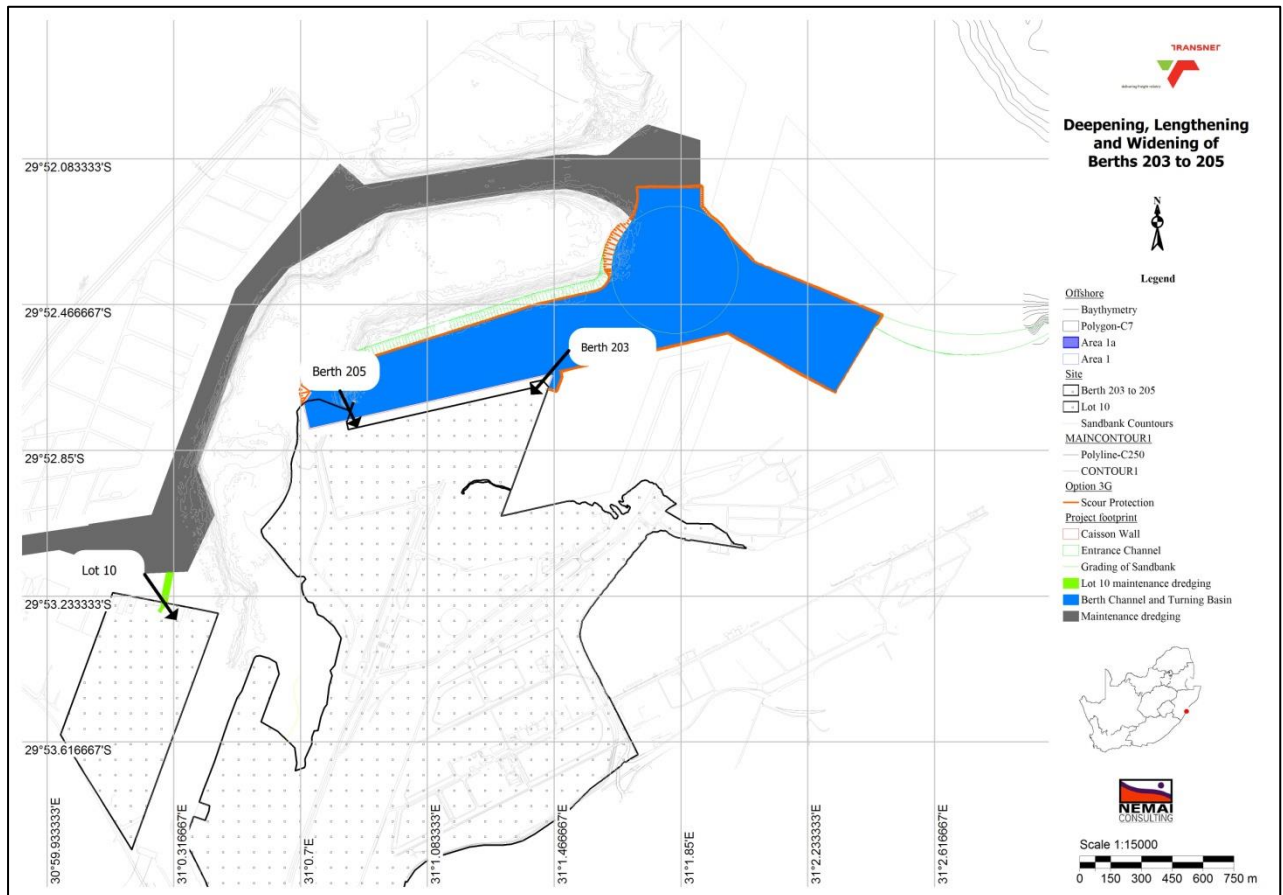


Figure 3: Dredge footprint

Offshore Sand Winning takes place in an area of 1.09 km². This is based on the preference of both the Marine Biologist and Maritime Archaeologist. Approximately 1.1 million cubic metres of infill is required from Offshore Sand Winning Area 1a (**Figure 4**).

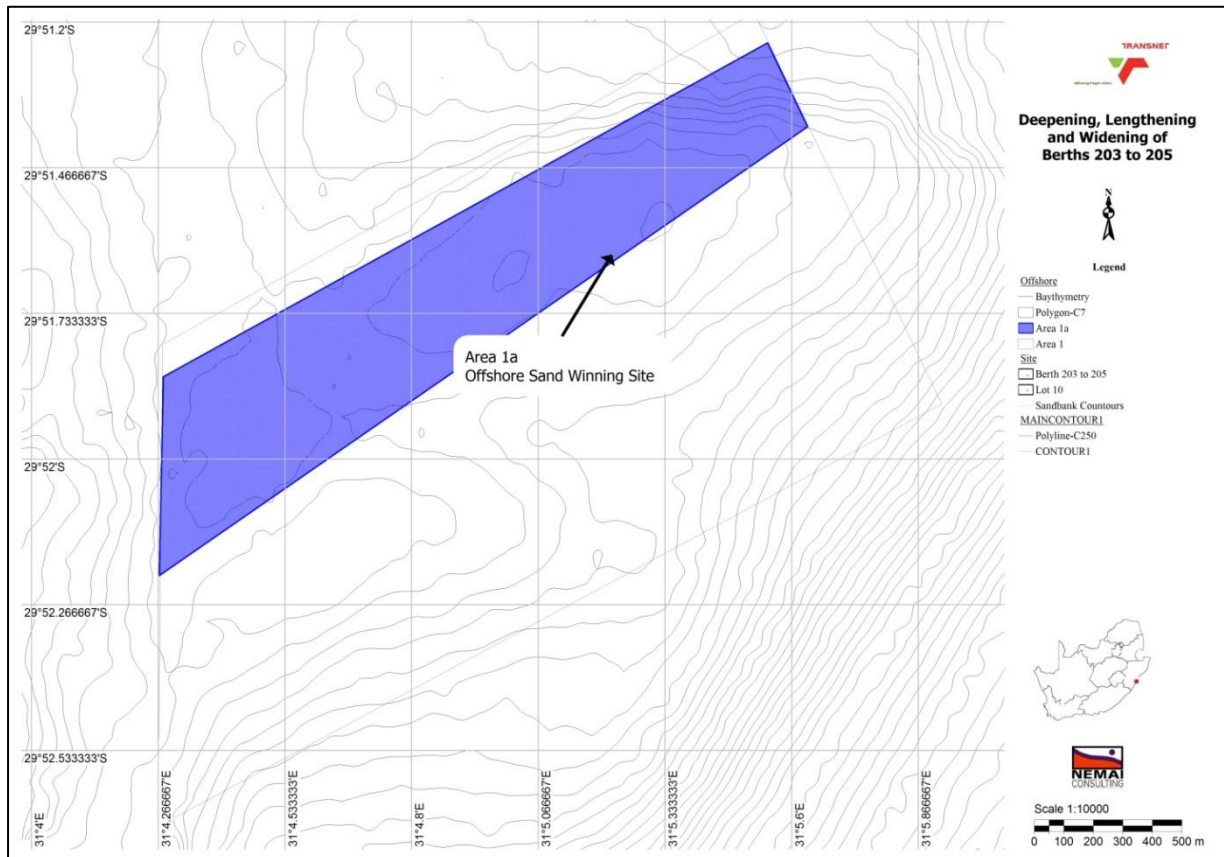


Figure 4: Offshore Sand Winning Site

No alternatives were assessed for the Offshore Disposal as it is a current permitted site further no Biodiversity assessment was undertaken as it was assumed that the current 'sacrificial' site would have been impacted by disposal of dredge material in the past. Thus continued use of the site is preferable to the use of a new site.

The coordinates of the disposal site is provided in **Figure 5**.

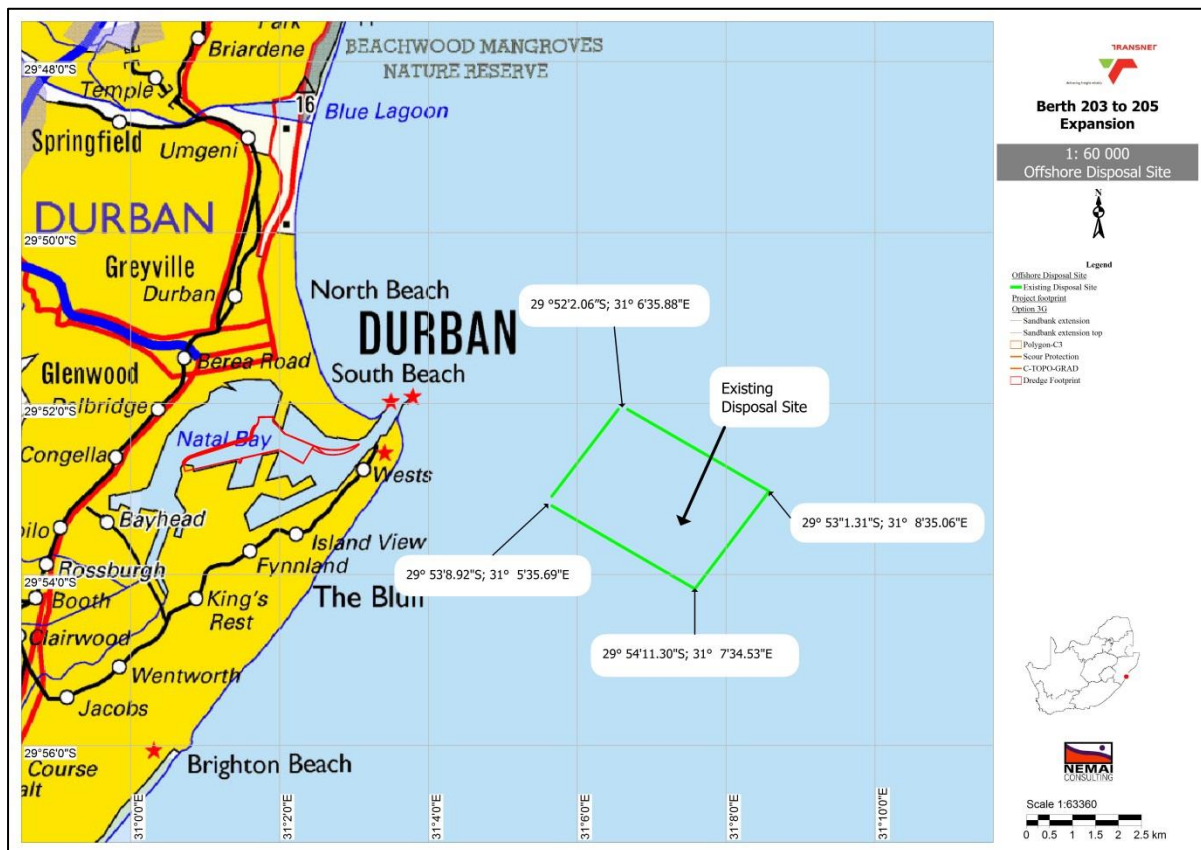


Figure 5: Offshore Disposal site

The site is approximately 4.7 km east from the entrance of the harbour and approximately 9.5 km² or 952 hectares. The bathymetry of the site varies from approximately -70 m in the west to -90 m in the far eastern edge.

The majority of metal concentrations in surficial sediment collected within and near the dredging footprint fall within baseline model upper and lower prediction limits or in the case of cadmium below the baseline concentration, that is, within the baseline concentration range for the metals in sediment in Durban Bay.

Two barium, two copper, four mercury, three lead and three zinc concentrations exceed baseline model upper prediction limits. The magnitude of enrichment of sediment by lead and zinc is low and it is in most cases impossible to conclude whether this reflects contamination or a limitation of the baseline models for these metals. Certain of the barium, copper and mercury concentrations exceed the baseline model upper prediction limit sufficiently to suspect contamination

The concentrations of all metals are lower than the Level I and Level II of the sediment quality guidelines used by the Department of Environmental Affairs to reach a decision on whether sediment identified for dredging in ports is of a suitable quality for unconfined openwater disposal.

With the exception of the copper concentration in surficial sediment at station CD1 and the lead concentration in sediment extracted from the core at a depth 2.75 m, the concentrations of all metals are lower than the Warning Level and hence also the Level I guideline. The latter mentioned copper and lead concentrations are well below the Level I guideline. There is consequently little likelihood that metals released into the water column during dredging and dredged spoil disposal will be present at toxic concentrations, or that metals in dredged spoil settling on the seabed at the spoil disposal ground will pose a risk to bottom-dwelling organisms.

A baseline model for Durban Bay was used to determine whether sediment within and near the dredging footprint has a higher than expected total organic content. The findings of this comparison show that sediment at none of the stations is enriched with particulate organic matter. The total organic content in four of the five sediment samples extracted from the core was, in contrast, highly depleted. The only sample with a total organic content falling within the baseline range for surficial sediment was extracted at 8.8 m depth. Whether the depletion reflects the situation in subsurface sediment across the dredging footprint is uncertain, but probable. The lack of enrichment of surficial sediment by particulate organic matter, and the depleted organic matter in sediment from the core implies that there is a low risk that the microbially mediated degradation of this matter will exert a significant oxygen demand when it is exposed during dredging and when it is disposed at the spoil disposal ground.

Dredging will occur simultaneously with Caisson construction at Lot 10. However, as part of the mitigation measures proposed as part of Option 3H, the Central Sandbank extension will be undertaken at least 6 months prior to dredging of the Central Sandbank area adjacent to the western edge of Berth 205. Monitoring of this extension will then take place.

3.1.3 Infrastructure construction

The Caisson option which was selected consists of a figure-of-eight, two cell reinforced concrete caisson with an extended base, measuring 17 m along the quay. It has a large tapering reinforced concrete foundation slab (20 m perpendicular to quay) and a single centre diaphragm wall. The outer walls are arched to reduce stresses due to hydrostatic pressures while floating (ZAA, 2012a) (**Figure 6**).

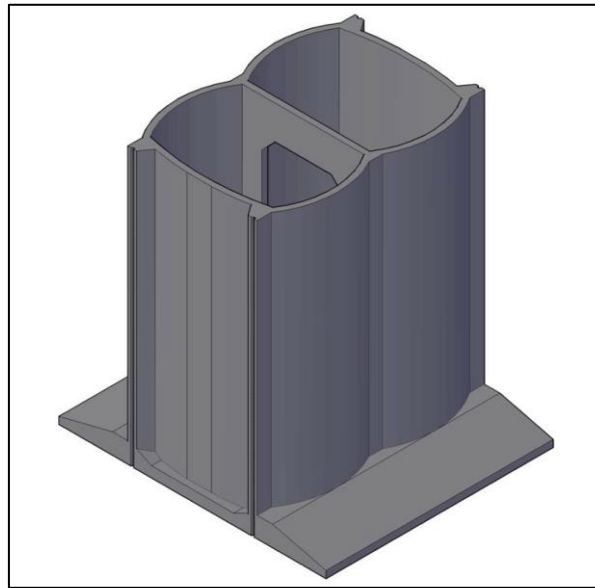


Figure 6: 3D view of the Caisson structure (ZAA, 2012a)

Table 2 provides the details of the caissons which will be used at Berth 203 to 205:

Table 2: Caisson parameters

| Parameter | Unit |
|--------------------|--------------------|
| Base volume | 370 m ³ |
| Base mass | 888 t |
| Total volume | 965 m ³ |
| Total mass | 2,316 t |
| Draft floating | 11.576 m |
| Clearance required | 1.0 , |
| Water depth needed | 12.6 m |
| Estimated quantity | 85 |

Construction of a crushed stone, sand or rockfill replacement foundation to a minimum total depth of 2.35 m below seabed level is required in order to achieve a minimum Factor of Safety of 2.0 for bearing capacity (ZAA, 2012).

The construction sequence requires the dredging and caisson manufacture to run largely in parallel, as the foundation bed must be dredged to level and prepared before a caisson is placed. Therefore, with this option, caissons are constructed at Bayhead Lot 10, and the preparation dredging takes place at the same time. The completed Caisson will then be

floated into position (ZAA, 2012a). Backfilling will then take place with vibro-compaction for below the water level and eccentric roller above the water level.

The construction of the rear crane beam can proceed entirely independently of other activities (ZAA, 2012). This will require a ground beam on 914 diameter composite piles penetrating to rock sockets and tied back to the main slab structure which will minimize crane rail deflections. The services tunnel will be built just behind the cope beam and under the slab. The slab will be about 450 mm thick and will not be heavily reinforced.

A 90 kPA preloading of sand on the completed backfill for 30 days is required to minimise settlement. This preloading is equivalent to a superimposed stack of sand about 4,5 m high. This stack will be dozed forward as construction proceeds (ZAA, 2012a).

Bayhead Lot 10 was constructed for the purpose of constructing Caissons and therefore there is existing infrastructure which will be refurbished during the Berth Infrastructure Construction phase. The basic layout of the old Lot 10 Casting Yard consists of:

- Six concrete casting platforms, each accommodating a caisson base under construction. These have two transverse slots 2 m wide in each to accommodate the jacking and moving equipment.
- Six sets of transverse ground level beams for lateral movement of the cast bases.
- Six sets of transverse beams on to which the bases will be lowered to continue the construction by sliding shutter techniques and curing of the caissons.
- A set of longitudinal launching beams running down the whole site and forming a central spine. The caissons are sequentially moved onto and then along this beam to the launching dock.
- A launching dock and synchro-lift platform. This consists of two substantial upstand beams onto which eight sets of strand jacks will be mounted. These in turn will support, raise and lower a structural steel synchrolift platform to launch the caissons.

The following pictures (**Figure 7**) provide an overview of how the Caisson is constructed.



Figure 7: Caisson Construction

The project will be phased or staged so that two berths remain operational throughout the construction period. Baseline Monitoring of the Central Sandbank will take place prior commencement to the construction and dredging activities.

The main construction facilities will be located at Bayhead Lot 10 (**Figure 8**). However, temporary site offices will be set up at Berth 205, 204 and 203 respectively during the relevant phase of construction.

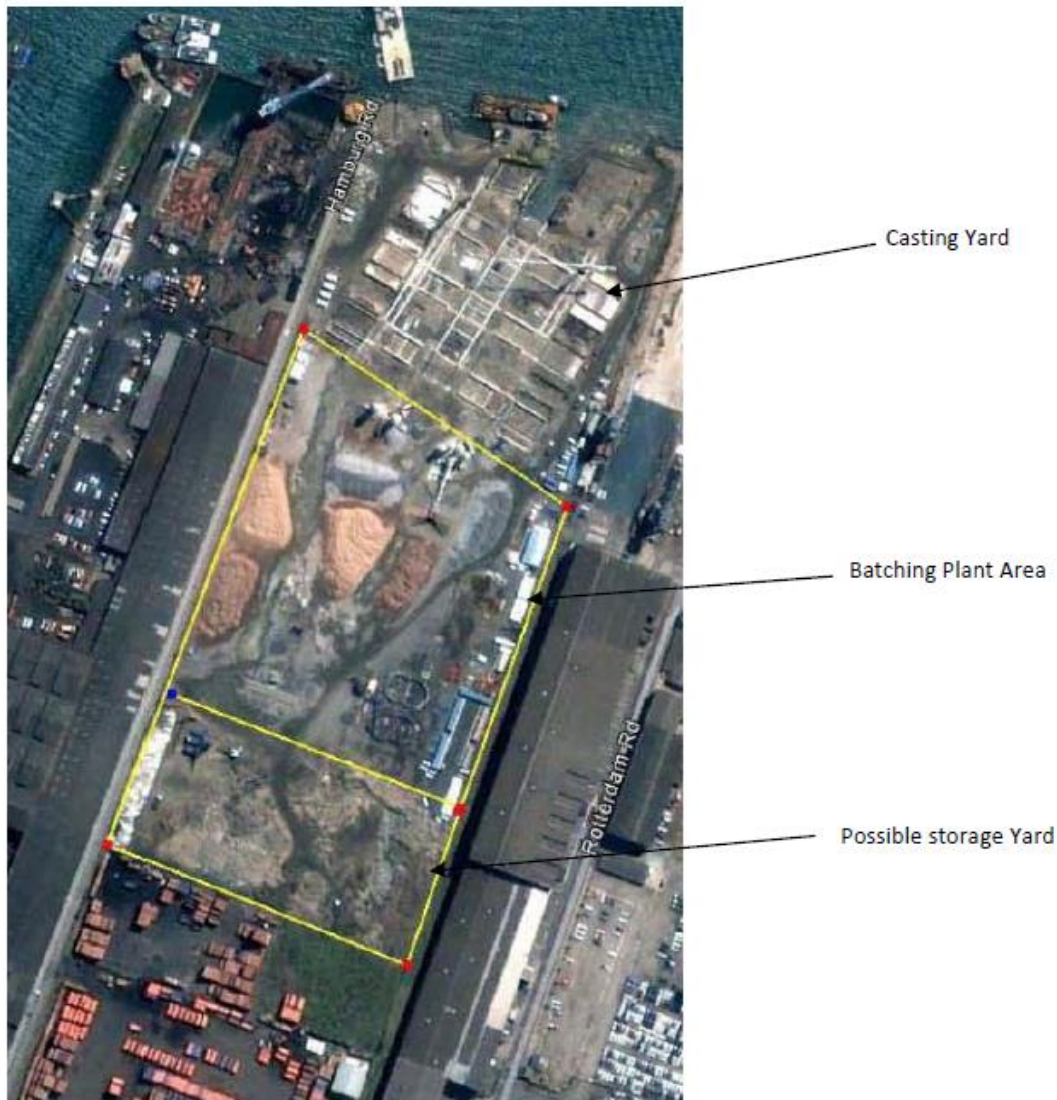


Figure 8: Bayhead Lot 10 construction site

3.1.4 Waste Sources and Streams

3.1.4.1 Construction

A summary of the main waste sources during construction is provided in **Figure 9** and include the following:

- Construction rubble including hazardous waste from the Old Crane Storage Area;
- Dredge Material; and
- Waste generated through activities –

- Cement batching;
- Vegetation from clearing of Lot 10;
- Effluent from toilets;
- Solid domestic waste from Site Camp and Site Offices;
- Ballast water from dredge hoppers;
- Waste/ unused steel; and
- Refuelling and storage of fuel.

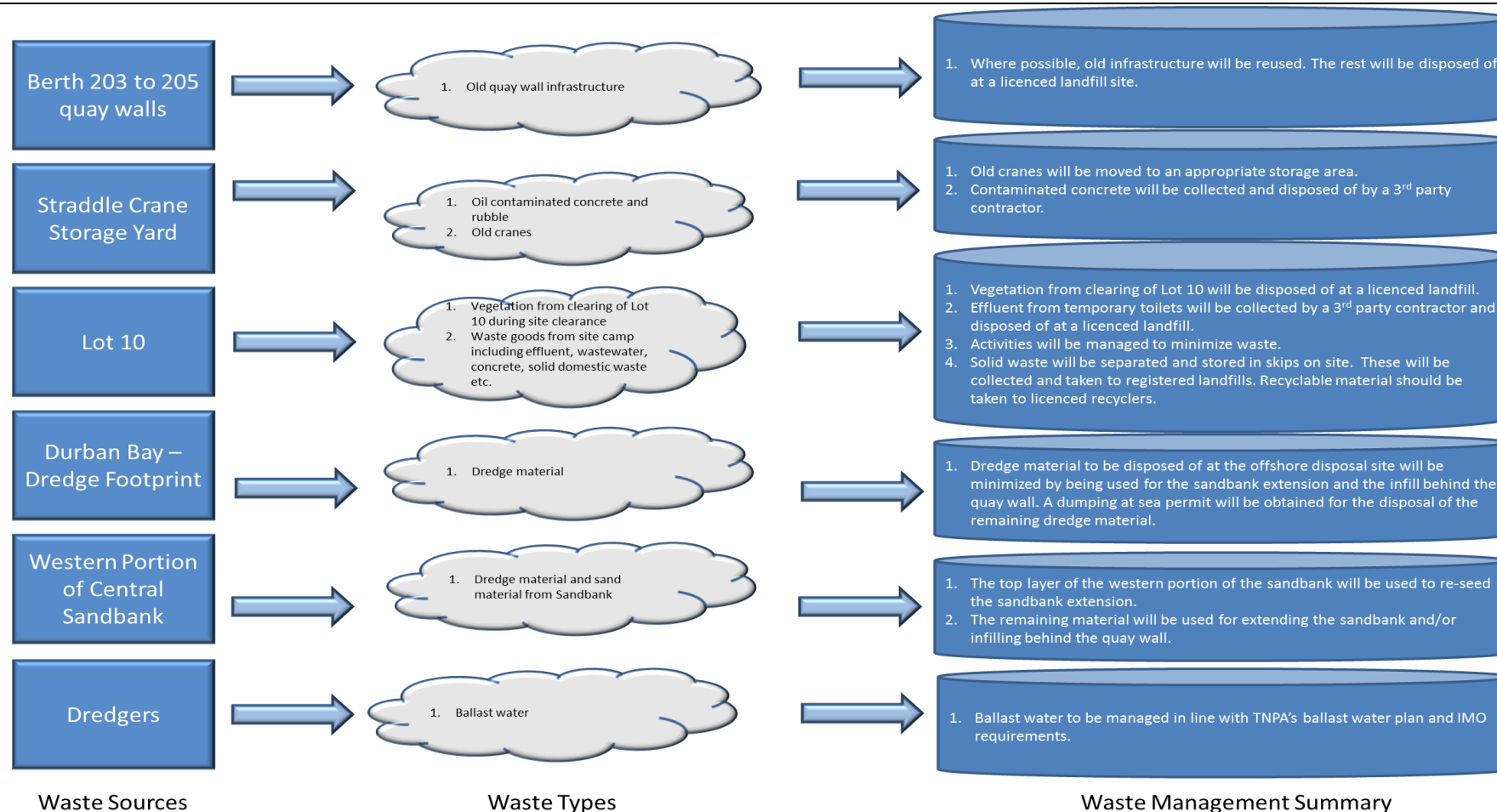


Figure 9: Waste Streams and Sources

3.1.4.2 Operation

1. Ship Generated Waste

In terms of Ship-generated waste, **Table 3** shows the categories of waste which are likely to be landed under the MARPOL Regulations at the Port, taking into account the types of ships and cargoes handled. Unusually large quantities of any type of waste will always require at least 24 hours' notice.

Table 3: Ship Generated Waste

| MARPOL Annex | Type of Waste | Responsibility |
|--------------|--|----------------|
| Annex I | Oil | Ship Agents |
| Annex II | Noxious liquid substances in Bulk | Ship Agents |
| Annex III | Harmful substances carried by Sea in Packaged form | Ship Agents |
| Annex IV | Sewage from Ships | Ship Agents |
| Annex V | Garbage from Ships (Non-quarantine waste) | Ship Agents |
| Annex V | Galley Wastes (Quarantine wastes) | TNPA |

A description of the wastes in Table 3 are provided below:

- Annex I – Oil
 - Ship agents, using licensed waste contractors, make arrangements for the collection of oily waste from all areas of the port. Collection is normally by road tanker. Ship agents must provide an advance notice to waste contractors to collect oily waste. Accidental oil spills must be reported to TNPA.
- Annex II- Noxious Liquid Substances in Bulk
 - Dry bulk vessels are not generally considered to require the provision of fixed facilities for reception of tank washings at present time.
 - Washing from tankers can be readily disposed by approved waste contractors, generally removed by road tanker, with arrangements being made through the ship agents. Ship agents must provide an advance notice to waste contractors to collect waste. Tank washing are not allowed to be discharged into the dock waters. Accidental spillages must be reported.
- Annex III- Harmful Substances Carried by Sea in Packaged Form

- In the Port of Durban, Annex III waste is managed via the direct contract arrangements between a ship agents and an approved waste management contractor as are in place for Annex I and II substances.
- Annex IV-Sewage
 - Ship agents, using licensed waste contractors, make arrangements for the collection of sewage waste from all areas of the port. Collection is normally by road tanker. Ship agents must provide an advance notice to waste contractors to collect oily waste. Sewage waste must be disposed of at an approved treatment works.
- Annex V- Garbage - Non-quarantine waste -
 - Wastes that are non-quarantine should be managed in an environmental responsible manner. Ship agents, using TNPA licensed waste contractors, make arrangements for the collection of non-quarantine waste from all areas of the port. Collection is normally by skips that are place on the quayside. Ship agents must provide an advance notice to waste contractors to collect waste. Waste must be disposed of at an approved landfill site.
 - Terminal operators or stevedoring companies normally arrange for the collection of dunnage. An approved waste contractor must be appointed for this purpose. Dunnage needs to be presented to the Department of Agriculture for inspection prior to its removal. If not presented for inspection, it must be handled as galley waste.
- Annex V – Garbage - Galley or Quarantine Waste –
 - It is essential that the controls to prevent the introduction of pests and diseases be maintained and enforced. One of the controls is the management and disposal of wastes of international origin from ships and boats. The current controls in South Africa are described in the National Department of Agriculture Standard operating procedure for management system of imported waste at seaports, airports and land borders.
 - It is essential that galley or quarantine waste are not mixed with non-quarantine wastes, otherwise all wastes will need to be classified as quarantine waste and disposed of in a more controlled and potentially, more expensive manner.
 - The management of galley waste is only confined to the waste contractor that is appointed by TNPA Port of Durban for ship generated waste. Two red wheelie bins are provided throughout to each vessel when requested in advance by the

vessel master or agent to accommodate galley waste. Waste contractors providing garbage waste bins to vessels, must ensure that proper system for separation of quarantine and non-quarantine waste is implementing, otherwise all wastes will be classified as quarantine waste and disposed of by TNPA Galley Waste Contractor in a more controlled and potentially, more expensive manner.

2. Landside generated waste

Waste generated via landside activities are dependent on the specific tenant or port users. In terms of Berth 203 to 205 which once completed will be a container terminal, the main wastes associated with the area are related to office waste. In general the following will apply:

- All land generated waste is to be deposited into the appropriately sized receptacles located at the points of generation by the respective business unit for temporary storage of recyclable waste, collection and removal by TNPA appointed waste management contractors.
- The responsibility for the management of waste is contracted to waste contractors, and includes:
 - Providing suitable type and size of colour coded receptacles at each location (TNPA) operational area.
 - Providing suitable location of separate receptacles for the various types of recyclable wastes viz. Scrap metal, Paper, and Used oil.
- Special and specific provision for all hazardous waste at the points of generation by the waste generators and includes:
 - Provision for separate receptacles in terms of type, size and location and their frequent and adequate servicing for each class of hazardous waste (e.g. oils, fluorescent tubes etc.);
 - Secondary containment containers for liquid hazardous wastes; and
 - Contractor(s) as are appointed by TNPA for the transportation of each category of waste, so that such waste reaches the intended destination (e.g. recycling, landfill disposal etc.).

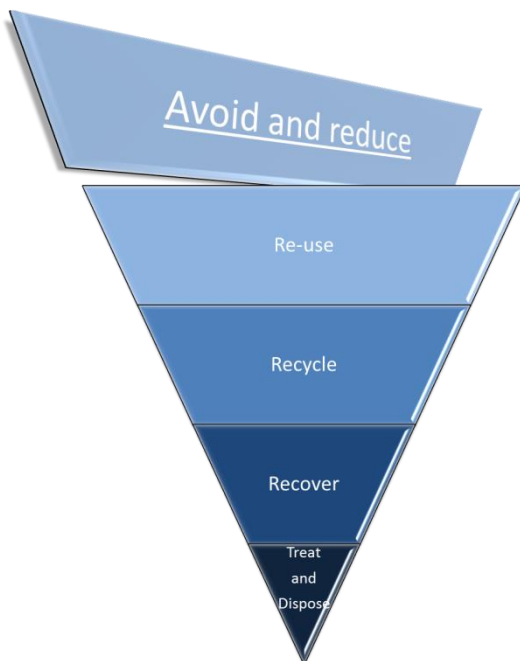
4 WASTE MINIMISATION AS PART OF THE BERTH 203 TO 205 EXPANSION

Condition 25 of the Berth 203 to 205 Expansion EA requires that an IWMA be implemented that is based on waste minimisation and must incorporate reduction, recycling and re-use options.

Waste minimisation has been taken into account in the planning of the Berth 203 to 205 Expansion and detailed management objectives, actions and targets are provided in **Section 5** below. However, in order to highlight the approach, this section highlights how the concept of the waste hierarchy has been incorporated into the development. It also provides an overview of the related targets for waste minimisation and therefore provides guidance regarding the implementation of waste management objectives.

4.1 Avoid and Reduce

4.1.1 Construction



The concept of avoidance and reduction of waste has been incorporated into the project through the reduction of dredge material requiring disposal at the offshore disposal site. Initially it was estimated that **4 637 584 m³** would be disposed of. However, in order to reduce this volume, a number of dredge footprints were assessed and the preferred dredge footprint (Option 3H), the volume of dredge material to be disposed of was reduced to **3 717 756 m³**. This is a **19.8% reduction** in dredge material which will be disposed.

In addition to the above, as per the Port of Durban Waste Management Plan (WMP) (Transnet, 2015), mechanisms for ensuring correct waste management (including avoidance and reduction) will be incorporated into all service contracts and

service level agreements. This should clearly define the contractor's responsibilities within the framework of waste management. This should include the following waste avoidance and reduction practices.

Table 4: Objectives and Targets for Avoidance and Reduction of Waste - Construction

Objective:

Reduce the generation of waste by changing behaviours of contractors throughout the Berth 203 to 205 Expansion.

Target:

- Waste management objectives should be included in all service level agreements/contracts.
- All contractors to provide feedback on waste reduction and avoidance practices.

Actions:

- Bulk buying of materials to reduce the volume of packaging required.
- Avoidance of materials/items/brands that are heavily packaged, have a short lifespan or are low quality.
- Buying items that last longer and can be repaired.
- Buying items in refillable containers.
- Environmental awareness training should focus on management of waste and all construction workers should be aware of the importance of waste minimisation and avoidance. Ongoing and stringent enforcement measures are required from the Contractor's management staff throughout the construction phase.
- Ensure for adequate storage facilities to allow for the separation and safe storage of waste.
- Ensure for adequate storage facilities for materials to be used, especially chemicals, in order to prevent spillages and contamination of other materials resulting in waste.

4.1.2 Operation

TNPA Port of Durban has a Waste Management Plan (WMP) which provides the roles and responsibilities regarding the management of waste within the Port. In addition, as part of the WMP, TNPA Port of Durban encourages all port users, vessel agents, ship agents etc. to avoid waste generation where possible. The WMP also notes that where the avoidance appears to be impossible, it is recommended that quantity of waste should be minimised. The elimination of waste in operations has benefits environmentally through reducing use of natural resources and reducing the amount of landfill space required and also has the benefits of saving money through using less raw materials and costs associated with waste treatment and disposal. In terms of waste avoidance and reduction the following objectives and targets will apply.

Table 5: Objectives and Targets for Avoidance and Reduction of Waste - Operation

Objective:

Reduce the generation of waste by changing behaviours of tenants, port users, vessel agents and waste management contractors.

Target:

- Waste management objectives should be included in all service level agreements/contracts.

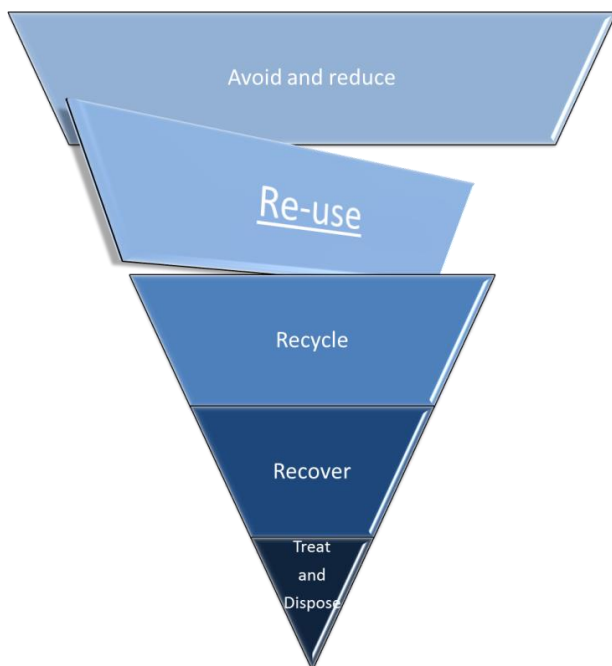
Actions:

- Tenants or port users may make use of the waste management services to manage their wastes independently. In whichever case, the tenant and port users shall be responsible as a minimum for-
 - Minimising wastes in accordance with the waste hierarchy (reduce, reuse, recycle, and dispose).
 - Ensuring goods and materials are handled and stored in a way that avoids damage and prevents goods and materials becoming waste.
 - Complying with the TNPA WMP as per the Port Rules and / or Lease Agreement entered into with TNPA.
 - Tenants are required to develop a waste management process as part of their Environmental Management Plan to be approved by TNPA. The process must comply with the provisions of this Part of the WMP, and the activities of the tenants waste management contractor.
- The vessel's agent shall be responsible as a minimum for-
 - Ensuring goods and materials are handled and stored in a way that avoids damage and prevents goods and materials becoming waste.
 - Ensuring that the handling, storage, transport, treatment and disposal of waste, is environmentally and socially sound.
- TNPA shall be responsible for-
 - Preparing and revising the Port WMP to ensure that adequate and convenient ship generated waste management process/facilities are available throughout the Port.
 - Exercising an oversight role within the Port with regards to the management of other ship generated waste.
 - Undertaking regular inspections or audits of waste storage areas for TNPA operations within the Port, waste management contractors from the transportation of wastes to their final re-use, recycling and/or disposal and audit of treatment, recycling and disposal facilities.
- Waste Management Contractors shall be responsible for-
 - Categorising their waste streams in line with the National Waste Information Regulations of 2012 and in consultation with the waste generator.
 - Compliance with the levels specified in the Terms of Reference and Contract entered into with TNPA or other parties to ensure that the type and quantity of Waste Reception Facilities required within the Port are provided.
 - Introducing innovative ways to reduce the volume of waste.

- General actions -
 - All employees and visitors are to be trained or informed of the requirements of waste management which include waste separation in their respective areas. Training will depend on the level of involvement of employees with regards to waste management. However, an awareness on the separation of waste in offices, workshops etc. must be undertaken for all employees.

4.2 Re-use

4.2.1 Construction



Re-use of waste was also incorporated into the project at the design stage in that where possible, dredge material will be used for infill behind the new quay wall as well as for the creation of the Sandbank Extension.

In addition, the following objectives and targets will be adhered to.

Table 6: Objectives and Targets for Re-Use of Waste - Construction

| |
|---|
| <p>Objective:</p> <p>Re-use waste generated by the Berth 203 to 205 Expansion thereby resulting in decreased waste disposal volumes.</p> |
| <p>Target:</p> <ul style="list-style-type: none"> • Waste management objectives should be included in all service level agreements/contracts. • All contractors to provide feedback on re-use techniques employed. • All waste generated should be separated at the source to facilitate waste re-use. |
| <p>Actions:</p> <ul style="list-style-type: none"> • Waste generators must segregate wastes into different categories to facilitate reuse. Skips/bins or waste receptacles should be labelled. • Oil drums to be re-used where possible. • Plastic containers should be re-used for storage where possible. • Where possible, steel should be re-used in the construction of the associated berth infrastructure. • Construction rubble should be re-used for levelling purposes where possible. • Contaminated rubble from the Straddle Crane Storage Yard should not be re-used. • If possible, non-contaminated concrete waste should be crushed and reused. |

4.2.2 Operation

The TNPA Port of Durban WMP (Transnet, 2015) notes that waste generators must segregate wastes into different categories to facilitate the reuse, recycling or disposal of the resource or waste. With the increase in recycling and waste processing, the segregation of materials within the waste stream is becoming of increasing value. Skips/bins or waste receptacles should be labelled. The WMP also highlights that the option of reuse of materials or products for other purpose should be considered prior to considering the recycling. The following specific objectives and targets apply.

Table 7: Objectives and Targets for Re-Use of Waste - Operation

Objective:

Re-use of waste generated by Berth 203 to 205 port users, tenants, vessel agents and waste management contractors resulting in decreased waste disposal volumes.

Target:

- Waste management objectives should be included in all service level agreements/contracts.
- All contractors to provide feedback on re-use techniques employed.
- All waste generated should be separated at the source to facilitate waste re-use.

Actions:

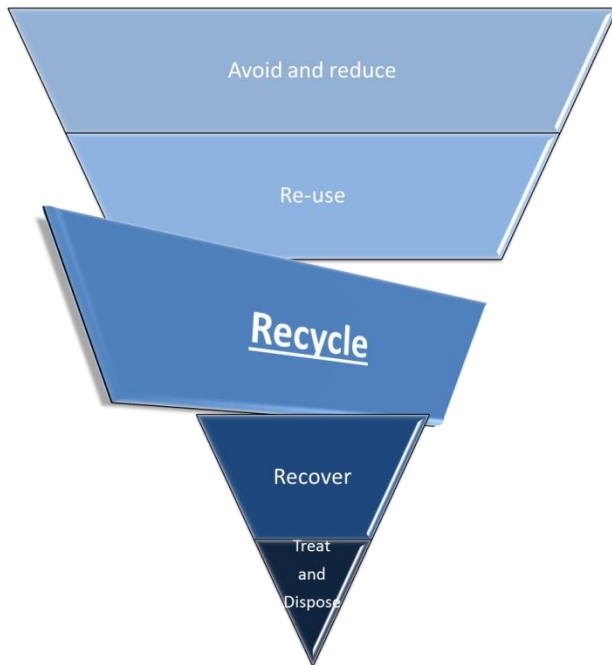
- Tenants and Ports users shall –
 - Categorising their waste streams in line with the National Waste Information Regulations of 2012.
 - Complying with the TNPA WMP as per the Port Rules and / or Lease Agreement entered into with TNPA.
 - Minimising wastes in accordance with the waste hierarchy (reduce, reuse, recycle, and dispose).
 - Segregating waste to ensure that waste types are recorded / logged and that general waste and recyclable materials are not disposed of at the more expensive hazardous waste rate.
 - Tenants are required to develop a waste management process as part of their Environmental Management Plan to be approved by TNPA. The process must comply with the provisions of this Part of the WMP, and the activities of the tenants waste management contractor.
- Vessel Agents shall –
 - Segregating waste to ensure that waste types can be recycled and that general waste and recyclable materials are not disposed of at the more expensive rate for hazardous waste;
- TNPA shall be responsible for –
 - Preparing and revising the Port WMP to ensure that adequate and convenient ship generated waste management process/facilities are available throughout the Port.
 - Exercising an oversight role within the Port with regards to the management of other ship generated waste.
 - Undertaking regular inspections or audits of waste storage areas for TNPA operations within the Port, waste management contractors from the transportation of wastes to their final re-use, recycling and/or disposal and audit of treatment, recycling and disposal facilities.
- Waste Management Contractors shall be responsible for–
 - Categorising their waste streams in line with the National Waste Information Regulations of 2012 and in consultation with the waste generator.
 - Compliance with the levels specified in the Terms of Reference and Contract

entered into with TNPA or other parties to ensure that the type and quantity of Waste Reception Facilities required within the Port are provided.

- Introducing innovative ways to re-use waste.
- General actions:
 - Waste generators must segregate wastes into different categories to facilitate the reuse, recycling or disposal of the resource or waste. With the increase in recycling and waste processing, the segregation of materials within the waste stream is becoming of increasing value. Skips/bins or waste receptacles Should be labelled.
 - The option of reuse of materials or products for other purpose should be considered prior to considering the recycling.
 - Containers used for storage of wastes must be in good condition and be maintained to minimise corrosion and wear. This will prevent any accidental spillage or leaking , weather affecting the container integrity and allowing waste to escape, waste blowing away or falling while stored or transported and the scavenging of wastes by vermin. Waste identified as hazardous will need suitable containers e.g. tanks, drums etc.
 - Each waste container must be adequately labelled. Skips, bins or drums (side of drums not lids) must be clearly marked with the name of the waste/substance. Any previous name of the contents must be removed as this may result in the waste being handled incorrectly.
 - Employees must be trained to separate waste and ensure that there is a responsible person to inspect the implementation of separation within different areas of operations.
 - All employees and visitors are be trained or informed of the requirements of waste management which include waste separation in their respective areas. Training will depends on the level of involvement of employees with regards to waste management. However, an awareness on the separation of waste in offices, workshops etc. must be undertaken or all employees.

4.3 Recycle

4.3.1 Construction



Recycling could not be incorporated into the Berth 203 to 205 Expansion design nevertheless; it is an integral component to the waste hierarchy which requires attention during construction. In this context, recycling means a process where waste is reclaimed for further use, which process involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material (source NEM: Waste Act 2008).

Recycling should be practiced whenever waste prevention or reuse is not possible, provided that any such recycling is cost effective, taking into consideration environmental benefits, financial costs and community interests. As is

in the case with prevention, some specific strategies are required to ensure optimum level of recycling. When reuse can no longer be carried out, the materials should preferably be recycled back into similar products or become secondary raw materials for the production of new products.

Potential priority recyclable waste streams include:

- Used Oil;
- Steel;
- Paper ;
- Glass;
- Tyres;
- Plastics;
- Building rubble; and
- Electronic waste.

To reduce or avoid the need for sorting after collection, the categories of distinctively marked waste receptacles must be provided in order to receive waste as it is generated. These receptacles shall be fitted with a tight cover. All types of waste collection receptacles shall be

clearly marked with the type of waste they are receiving. An example of colour coded receptacles is provided in **Figure 10**.



Figure 10: Colour coded receptacles

In addition, the following objectives and targets will be adhered to:

Table 8: Objectives and Targets for Recycling of Waste - Construction

Objective:

Waste separation and recycling must be undertaken as part of the Berth 203 to 205 Expansion.

Target:

- Waste management objectives should be included in all service level agreements/contracts.
- All waste generated should be separated at the source to facilitate recycling.
- Separated waste which cannot be re-used should be collected by third party recycling contractors for recycling.

Actions:

- Obtain and label recycling containers for office waste, aluminium, steel, glass, ferrous metals, nonferrous metals, waste timber.
- Locate these containers within temporary office buildings and trailers.
- Establish a recycled material collection schedule.
- Arrange full bins to be hauled away.
- Spent batteries, circuit boards, and bulbs require special.

4.3.2 Operation

As per the TNPA Port of Durban WMP (Transnet, 2015), once all options have been considered, waste that can be recycled should be identified and recycling is a better option than disposal. Recycling may involve the reclamation of the components of the waste such

as reprocessing wastes containing heavy metals to reclaim the metals or processing the waste to produce other by-products.

Table 9: Objectives and Targets for Recycling of Waste - Operation

Objective:

Waste separation and recycling must be undertaken by Berth 203 to 205 port users, tenants, vessel agents and waste management operators..

Target:

- Waste management objectives should be included in all service level agreements/contracts.
- All waste generated should be separated at the source to facilitate recycling.
- Separated waste which cannot be re-used should be collected by third party recycling contractors for recycling.

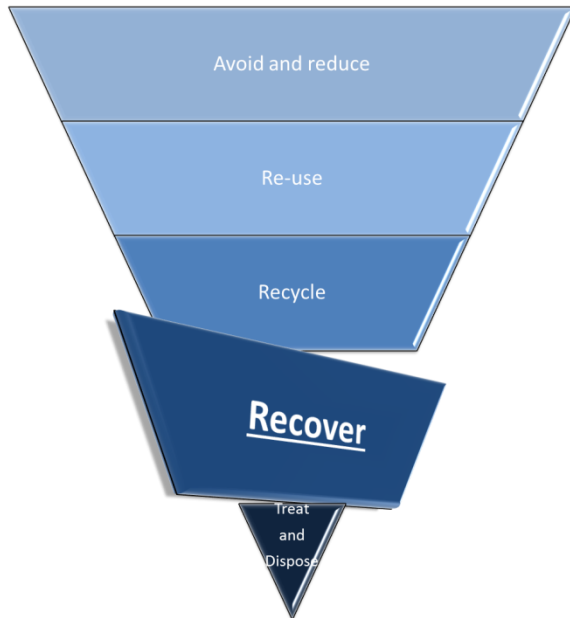
Actions:

- Tenants and Ports users shall –
 - Categorising their waste streams in line with the National Waste Information Regulations of 2012.
 - Complying with the TNPA WMP as per the Port Rules and / or Lease Agreement entered into with TNPA.
 - Fulfilling their duty of care requirement in ensuring that waste is transported by a TNPA licensed carrier and goes to a licensed recycling facility for the waste type where possible.
 - Minimising wastes in accordance with the waste hierarchy (reduce, reuse, recycle, and dispose).
 - Segregating waste to ensure that waste types are recorded / logged and that general waste and recyclable materials are not disposed of at the more expensive hazardous waste rate.
 - Appointing waste contractors to manage waste and ensure that waste is recycled or disposed of in an approved site.
 - Tenants are required to develop a waste management process as part of their Environmental Management Plan to be approved by TNPA. The process must comply with the provisions of this Part of the WMP, and the activities of the tenants waste management contractor.
- Vessel agents shall –
 - Appointing and managing one or more waste TNPA licenced waste management contractors to collect, transport and dispose/recycle of wastes ship generated waste, with the exception of galley waste.
 - Fulfilling the duty of care requirements and ensuring that waste is transported by a TNPA licensed carrier and goes to a licensed recycling facility for the waste type where possible.
 - Keeping records of waste volumes, types of waste, and disposal and

- recycling of wastes.
 - Ensuring that the recycling of waste, where possible, is environmentally and socially sound.
 - Segregating waste to ensure that waste types can be recycled and that general waste and recyclable materials are not disposed of at the more expensive rate for hazardous waste.
- TNPA shall be responsible for –
 - Preparing and revising the Port WMP to ensure that adequate and convenient ship generated waste management process/facilities are available throughout the Port.
 - Maintaining and publishing a list of approved licensed waste contractors and waste management facilities that are able to provide waste collection and waste management to port users for all MARPOL Annex wastes.
 - Providing the reception facilities for ship galley waste. An approved waste contractor shall be appointed by TNPA to manage all galley waste generated from vessels visiting the Port. The galley waste management shall only be confined to the appointed contractor and no other waste contractor operating within the Port shall be permitted to collect galley waste.
 - Exercising an oversight role within the Port with regards to the management of other ship generated waste.
 - Ensuring that the Port does not become contaminated as a result of poor waste management practices (or any other reason), and must ensure that adequate processes are available for the removal of waste. In practice this will be achieved through the delegation of responsibilities to waste generators, for example tenants are responsible for the management of waste. As with each of the stakeholders within the Port, TNPA also has a responsibility to minimise waste generated as a result of its own activities.
 - Compiling procedures for handling of waste are developed and communicated to different Business units.
 - Appointing of licenced waste contractors to remove and dispose of waste for TNPA operational activities.
 - Signing of service level agreement signed with the waste contractor prior to commencement with the work.
 - Conducting regular inspections or audits of waste storage areas for TNPA operations within the Port, waste management contractors from the transportation of wastes to their final re-use, recycling and/or disposal and audit of treatment, recycling and disposal facilities.
- Waste Management Contractors shall be responsible for–
 - Categorising their waste streams in line with the National Waste Information Regulations of 2012 and in consultation with the waste generator.
 - Compliance with the levels specified in the Terms of Reference and Contract entered into with TNPA or other parties to ensure that the type and quantity of Waste Reception Facilities required within the Port are provided.
 - Introducing innovative ways to reduce waste and encourage recycling.
- General Actions:

- All land waste generated waste is to be deposited into the appropriately sized receptacles located at the points of generation by the respective business unit for temporary storage of recyclable waste, collection and removal by TNPA appointed waste management contractors. The responsibility for the management of waste is contracted to waste contractors, and includes:
 - Providing suitable type and size of colour coded receptacles at each location (TNPA) operational area.
 - Providing suitable location of separate receptacles for the various types of recyclable wastes viz.
 - Scrap metal
 - Paper,
 - Glass; and
 - Used oil.
 - Special and specific provision for all hazardous waste at the points of generation by the waste generators and includes:
 - Provision for separate receptacles in terms of type, size and location and their frequent and adequate servicing for each class of hazardous waste (e.g. oils, fluorescent tubes etc.), and
 - Secondary containment containers for liquid hazardous wastes;
 - Contractor(s) as are appointed by TNPA for the transportation of each category of waste, so that such waste reaches the intended destination (e.g. recycling, landfill disposal etc.).
- All employees and visitors are to be trained or informed of the requirements of waste management which include waste separation in their respective areas. Training will depend on the level of involvement of employees with regards to waste management. However, an awareness on the separation of waste in offices, workshops etc. must be undertaken for all employees

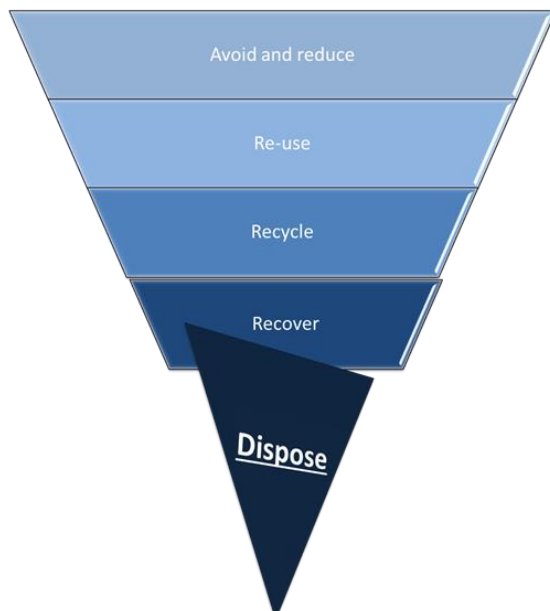
4.4 Recover



Recovery means the controlled extraction of a material or the retrieval of energy from waste to produce a product (source NEM: Waste Act 2008). No recovery of energy is planned as part of the Berth 203 to 205 Expansion construction. Should recovery be undertaken during operation by specific waste management contractors, the contractors will be required to ensure that all authorisations are in place in terms of NEM:WA.

4.5 Dispose

4.5.1 Construction



Disposal means the burial, deposit, discharge, abandoning, dumping, placing or release of any waste into, or onto, any land (source: NEM: Waste Act 2008).

In terms of the Berth 203 to 205 Expansion, waste which cannot be re-used or recycled will be disposed of to a licenced landfill site.

Table 10: Objectives and Targets for Disposal of Waste - Construction

Objective:

Waste generated during the Berth 203 to 205 Expansion to be disposed of at licenced landfills.

Target:

- Waste management objectives should be included in all service level agreements/contracts.
- All waste which cannot be reused or recycled should be disposed of at a licenced landfill site.

Actions:

- The contractor is responsible for removal of all waste from the site, generated through the contractor's activities. The contractor shall ensure that all waste is removed to an appropriate licenced waste management facilities (the following source may be utilised – www.sawic.org.za).
- The classification of waste determines the handling methods and the ultimate disposal of the material. The contractor shall manage waste that are anticipated to be generated by his operations as follows:
 - Characterise the waste to determine if it is general, construction or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required).
 - Obtain and provide acceptable containers with labels.
 - Place waste materials in the respective containers.
 - Inspect the containers on a regular basis as prescribed by the contractor's waste management plan.
 - Track the accumulation time for the waste and arrange for collection when the container reaches 75% of its designed capacity level.
 - Haul the full container to the licenced and correct disposal site.
 - Provide documentary evidence of proper disposal of the waste.
 - Keep an updated waste register.

4.5.2 Operation

In terms of TNPA WMP (Transnet National Port Authority, 2015), waste is classified as either hazardous or non-hazardous. The hazardous nature may be due to a mixture of constituents, or from a single chemical. In order to reduce the hazard associated with the waste, it is essential to understand the waste chemically as well as its predicted fate in the environment. The Material Safety Data Sheets (MSDSs) can be used to obtain this information. This information will assist in the treatment of waste to form a less hazardous or toxic waste. For example: a waste containing certain heavy metals can be treated to raise the pH making the toxic heavy metals less likely to leach into the environment.

No waste material should be dispatched off site without first ascertaining what it is. If necessary, the waste contractor must take a sample for analysis prior to disposal.

Once the waste stream has been subjected to the scrutiny of the hierarchy of waste, the leftover or residual waste may be considered for responsible disposal to the landfill site. Everyone has a 'Duty of Care' to dispose of waste responsibly in an approved disposal sites.

The following objectives and targets apply:

Table 11: Objectives and Targets for Disposal of Waste - Operation

Objective:

Waste generated by Berth 203 to 205 port users, tenants, vessel agents and waste management contractors to be disposed of responsibly at licenced landfills.

Target:

- Waste management objectives should be included in all service level agreements/contracts.
- All waste which cannot be reused or recycled should be disposed of at a licenced landfill site.

Actions:

- Tenants and Ports Users shall be responsible for –
 - Complying with all waste related legislation, policies and procedures.
 - Registering with SAWIS if they fall into any category as detailed in Annexure 1 of the National Waste Information Regulations of 2012.
 - Submitting quarterly reports if they fall into any category as detailed in Annexure 1 of the National Waste Information Regulations of 2012, excluding a hazardous waste generator.
 - Categorising their waste streams in line with the National Waste Information Regulations of 2012.
 - Complying with the TNPA WMP as per the Port Rules and / or Lease Agreement entered into with TNPA.
 - Fulfilling their duty of care requirement in ensuring that waste is transported by a TNPA licensed carrier and goes to a licensed disposal facility for the waste type;
 - Minimising wastes in accordance with the waste hierarchy (reduce, reuse, recycle, and dispose).
 - Ensuring goods and materials are handled and stored in a way that avoids damage and prevents goods and materials becoming waste.
 - Segregating waste to ensure that waste types are recorded / logged and that general waste and recyclable materials are not disposed of at the more expensive hazardous waste rate.
 - Maintaining a tidy site / exercise good housekeeping.
 - Ensuring that their waste is disposed of at a licensed disposal facility for the waste type involved or destined for and accepted at licensed and approved

- premises for further use or processing;
- Appointing waste contractors to manage waste and ensure that waste is disposed of in an approved site.
 - Preventing littering in all its forms, using the litter bins and encouraging their use as far as this is the responsibility of all persons entering or leaving the port area to desist from expedient.
 - Tenants are required to develop a waste management process as part of their Environmental Management Plan to be approved by TNPA. The process must comply with the provisions of this Part of the WMP, and the activities of the tenants waste management contractor.
- Vessel agents shall be responsible for –
 - Complying with all waste related legislation, policies and procedures.
 - Appointing and managing one or more waste TNPA licenced waste management contractors to collect, transport and dispose of wastes ship generated waste, with the exception of galley waste.
 - Fulfilling the duty of care requirements and ensuring that waste is transported by a TNPA licensed carrier and goes to a licensed disposal facility for the waste type.
 - Keeping records of waste volumes, types of waste, and disposal of wastes.
 - Ensuring that the handling, storage, transport, treatment and disposal of waste, is environmentally and socially sound;
 - Completing the Waste Advance Notification Form (Annexure 1A) which details type and quantities of waste on board for offloading and delivery to Waste Reception Facilities. This information shall be required a minimum of 24 hours before the scheduled time of arrival of the vessel at the Port of Durban. The vessel agent shall also ensure that the vessels receive a copy of the returned prior notification form for its records.
 - Making advance arrangements for the removal and disposal of all non-galley waste with a licensed waste contractor. This includes MARPOL Annex I (oil and oily waste), Annex II (Hazardous or noxious substances in liquid form), Annex III (Harmful Substances Carried by Sea in Packaged Form) and Annex IV (sewage). If the vessel intends to discharge any of these wastes, they shall fill in the appropriate figures on the Prior Notification Form. The arrangements shall be made in advance in order to avoid delays on the vessel. The vessel shall be able to discharge the cargo whilst at the same time discharging waste.
 - Keep records of requests made by Ship' Masters for the provision of waste removal services as well as the amounts of these wastes being disposed of through approved waste contractors. The records include the notification forms and waste manifest documents generated by waste landed from their vessels. These records must be kept for a minimum period of 3 years.
 - To ensure proper housekeeping on the quayside through ensuring proper arrangements for the collection of waste skips immediately after the departure of the vessels in order to keep the quayside free of waste and obstruction for next vessel to berth.
 - Advising the waste management contractor regarding timely provision of

- waste receptacles in terms of type and respective quantities;
- Ensuring that sufficient receptacles are available to accept waste as per the Waste Advance Notification Form and upon request, with the completed Ballast Water Reporting Form (Annexure 1-D);
 - Collecting Annex I, II, III, IV and V (excluding galley waste) waste from the vessel and its placement in the correct receptacle(s).
 - Inspecting and certifying that sufficient space provision exists for waste storage and retention until berthing at the next intended port of call; and
 - Providing the master of the ship with the completed Waste Delivery Receipt (Annexure 1-C).
- TNPA shall be responsible for –
 - Preparing and revising the Port WMP to ensure that adequate and convenient ship generated waste management process/facilities are available throughout the Port.
 - Maintaining and publishing a list of approved licensed waste contractors and waste management facilities that are able to provide waste collection and waste management to port users for all MARPOL Annex wastes. The list shall not be exclusive and shall be open to addition and amendment upon production of necessary licence information. The current list is contained in Annexure 1-E. Enquiries relating to the list shall be addressed to the TNPA Environmental Management Department.
 - Providing the reception facilities for ship galley waste. An approved waste contractor shall be appointed by TNPA to manage all galley waste generated from vessels visiting the Port. The galley waste management shall only be confined to the appointed contractor and no other waste contractor operating within the Port shall be permitted to collect galley waste.
 - Exercising an oversight role within the Port with regards to the management of other ship generated waste.
 - Ensuring that the Port does not become contaminated as a result of poor waste management practices (or any other reason), In practice this will be achieved through the delegation of responsibilities to waste generators, for example tenants are responsible for the management of waste. As with each of the stakeholders within the Port, TNPA also has a responsibility to minimise waste generated as a result of its own activities.
 - Ensuring proper management of its operational activities generated waste, the following should be implemented-
 - Procedures for handling of waste are developed and communicated to different Business units.
 - Appointment of licenced waste contractors to remove and dispose of waste for TNPA operational activities.
 - A service level agreement signed with the waste contractor prior to commencement with the work.
 - Regular inspections or audits of waste storage areas for TNPA operations within the Port, waste management contractors from the transportation of wastes to their final re-use, recycling and/or disposal

and audit of treatment, recycling and disposal facilities.

- Waste Management Operators shall –
 - Waste management contractors shall be appointed by TNPA or ship agent or tenant for various aspects of waste management within the Port. These contractors shall be required to comply with all relevant legislation and contractual relationships with TNPA, including, but not limited to-
 - General Duty of Care requirements.
 - Maintaining registration / licensing requirements with the relevant authorities, for example: To obtain the waste management license with the Transnet National Ports Authority Port of Durban.
 - Licensing requirements as may be required in terms of the NEM: WA.
 - Registering with SAWIS if they fall into any category as detailed in Annexure 1 of the National Waste Information Regulations of 2012.
 - Submitting quarterly reports if they fall into any category as detailed in Annexure 1 of the National Waste Information Regulations of 2012.
 - Categorising their waste streams in line with the National Waste Information Regulations of 2012 and in consultation with the waste generator.
 - Compliance with the relevant Occupational Health and Safety Act requirements, including the duty to inform, and the provision of personal protective equipment where appropriate.
 - Compliance with the levels specified in the Terms of Reference and Contract entered into with TNPA or other parties to ensure that.
 - The type and quantity of Waste Reception Facilities required within the Port are provided;
 - Introducing innovative ways to reduce waste and encourage recycling.
 - Providing data required in terms of the Port's Waste Information System.
 - Provision of clearly marked skips or waste receptacles in order to ensure that vessel crew disposed of waste in the appropriate skips.
 - Inspect skips prior to removal in order to ensure that no galley waste disposed into those skips.
 - By law, waste manifest document is generated by the contractor when waste is collected from the port and a copy left with the organisation employing the contractor. The details of the waste manifest document and weigh bridge receipt form basis of the records to be kept by the waste contractor, ship agents or TNPA regarding the amount of waste transfer from the port to treatment or disposal sites in a given year. TNPA will use the information gathered from the Prior Notification Forms and the weighbridge receipt to provide more accurate picture of the amount of waste landed and taken for disposal. This information is required for waste information system reporting, but also for the TNPA's own records, as reported in the Company's annual environmental performance reporting
- General actions –
 - All land waste generated waste is to be deposited into the appropriately sized

receptacles located at the points of generation by the respective business unit for temporary storage of recyclable waste, collection and removal by TNPA appointed waste management contractors. The responsibility for the management of waste is contracted to waste contractors, and includes:

- Providing suitable type and size of colour coded receptacles at each location (TNPA) operational area.
- Providing suitable location of separate receptacles for the various types of recyclable wastes viz.
 - Scrap metal
 - Paper,
 - Glass; and
 - Used oil.
- Special and specific provision for all hazardous waste at the points of generation by the waste generators and includes:
 - Provision for separate receptacles in terms of type, size and location and their frequent and adequate servicing for each class of hazardous waste (e.g. oils, fluorescent tubes etc.), and
 - Secondary containment containers for liquid hazardous wastes;
 - Contractor(s) as are appointed by TNPA for the transportation of each category of waste, so that such waste reaches the intended destination (e.g. recycling, landfill disposal etc.).
- All employees and visitors are to be trained or informed of the requirements of waste management which include waste separation in their respective areas. Training will depend on the level of involvement of employees with regards to waste management. However, an awareness on the separation of waste in offices, workshops etc. must be undertaken for all employees

5 WASTE MANAGEMENT OBJECTIVES, ACTIONS AND TARGETS

5.1 Overview

Waste management objectives, targets and actions detailed in the Amended EMP are provided below for easy access. In addition, the IWMA has been incorporated into the Amended EMP which will be submitted to DEA for approval.

5.1.1 Management of Ablution Facilities

Management Objective:

- Minimise environmental impacts associated with ablution facilities.

Target:

1. No environmental contamination associated with ablution facilities.
2. Minimise visual impact associated with ablution facilities.

Management Actions:

- Provide sufficient ablution facilities (e.g. mobile / portable / VIP toilets) at the temporary site offices at Berth 203 to 205, which conform to all relevant health and safety standards and codes.
- Toilets may not be situated within 100 meters of any water body including the Durban Bay Estuary or within the 1:100 year flood line.
- A sufficient number of toilets shall be provided to accommodate the number of personnel working in any given area. Toilets may not be further than 100m from any working area. Toilet facilities supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers.
- All temporary / portable / mobile toilets shall be secured to the ground to prevent them from toppling over due to wind or any other cause.
- Ensure utilisation, maintenance and management of toilet, wash and waste facilities.
- The entrances to the toilets will be adequately screened from public view.
- Toilet facilities to be maintained in a hygienic state and serviced regularly.
- Toilet paper to be provided.
- The Contractor will ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site. Disposal of such waste is only acceptable at a licensed waste disposal facility.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Maintenance register for ablution facilities.
- Disposal certificates.
- Contractor's method statement.

5.1.2 Management of Waste

Management Objective:

- Minimise environmental impacts associated with waste.
- Apply waste management principles of prevent, minimise, recycle or re-use, with disposal as a last option.

Target:

- No littering on construction site.
- Maintain a clean and tidy construction site.
- 100% record of all waste generated and disposed at waste disposal facilities.
- Valid disposal certificates for all waste disposed.
- Provision of adequate waste containers that are easily accessible and maintained.
- Waste bins to be removed and cleaned weekly.

Management Actions:

- Waste management activities must comply with the National Environmental Management: Waste Act (No. 59 of 2008).
- Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Where possible, waste must be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and hazardous wastes).
- Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs.

- Ensure suitable housekeeping.
- The Contractor will ensure that no burying, dumping or burning of waste materials, vegetation, litter or refuse occurs. All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous).
- Ensure that solid waste is transported so as to avoid waste spills en-route.
- No waste shall be buried or burned anywhere on the construction site.
- The working area and contractors camp must be cleared of litter on a daily basis.
- Littering shall not be tolerated.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Waste disposal certificates.
- Contractor's method statement.

5.1.3 Management of Contaminated Areas- Straddle Crane Yard

Management Objective:

- Minimise environmental impacts associated with the demolition of the Straddle Crane Yard.
- Minimise environmental impacts associated with the disposal of contaminated concrete from the Straddle Crane Yard.
- Ensure all contaminated concrete/soil/goods are collected by a third party contractor and disposed of at a licensed waste disposal facility.

Target:

1. 100% record of all contaminated waste generated and disposed at waste disposal facilities.
2. Valid disposal certificates for all contaminated waste disposed.

Management Actions:

- Waste management activities must comply with the National Environmental Management: Waste Act (No. 59 of 2008).
- Ensure that solid waste is transported so as to avoid waste spills en-route.
- Appoint third party contractor to properly collect and dispose of all contaminated waste associated with the demolition of the Straddle Crane yard.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Waste disposal certificates.
- Contractor's method statement.

5.1.4 Management of Demolition of Structures

Management Objective:

- To allow for more control of potential construction related impacts.
- To prevent contamination of the marine environment through demolition activities.
- To minimise contamination of soil and surface/ground water/

Target:

1. Compliance with blasting-related legislation and standards.
2. No blasting-related impacts to private property or human health.
3. No blasting within Durban Bay Estuary.

Management Actions:

- The Contractor shall employ industry standard methods to control the impact of demolition and limit the risk of impacts to Durban Bay Estuary.
- Demarcate the area surrounding the building to be demolished.

- Contractor to provide detailed method statement for the decommissioning and demolition.
- Provide sufficient waste facilities. Waste must be disposed of immediately to appropriate landfill sites.
- Safe disposal certificates to be submitted to the ECO.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Contractor's method statement.
- Waste Disposal Certificates.

5.1.5 Management of Workshop and Equipment

Management Objective:

- Minimise environmental impacts associated with workshops and equipment use.

Target:

1. No environmental contamination associated with workshops and equipment use.

Management Actions:

- Maintenance of equipment and vehicles will be performed in such a manner so as to avoid any environmental contamination (e.g. use of drip trays).
- No washing of plant may occur on the construction site.
- Drip trays will be provided for the stationary plant and for the "parked" plant.
- All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site.
- Suitable storage and disposal of hydraulic fluids and other vehicle oils.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Evidence of spillages.
- Training register.
- Contractor's method statement.

5.1.6 Management of Pollution Generation Potential

Management Objective:

- Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment (Durban Bay Estuary).
- Minimise risk of pollution.
- Prevent polluted water from entering the marine environment.
- Minimise noise disturbance to surrounding areas.

Target:

1. No complaints regarding pollution.
2. No measurable signs of pollution.
3. Water quality – construction activities may not cause an adverse impact that results in more than a 10% change in baseline values.

Management Actions:

- **Cement and Concrete Batching -**
 - Cement mixing to take place on an impervious surface (e.g. plastic or cement mixing pit).
 - Batching operations to take place in a designated area, which will be kept clean at all times.
 - Batching operations to take place in a designated area which 100 m away from the edge of Durban Bay Estuary.
 - Separation of clean and dirty water from batching plant.
 - Contaminated water will not be discharged to the environment.
 - Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement.
 - Used cement bags will be stored so as to prevent windblown dust and potential water contamination. Used bags will be disposed of adequately.

- Concrete transportation will not result in spillage.
- Cleaning of equipment and flushing of mixers will not result in pollution, with all contaminated wash water entering the waste water collection system.
- To prevent spillage onto roads, ready mix trucks will rinse off the delivery shoot into a suitable sump prior to leaving the site.
- Suitable screening and containment will be in place to prevent windblown contamination from cement storage, mixing, loading and batching operations.
- All contaminated water and fines from exposed aggregate finishes will be collected and stored in sumps and will be adequately disposed of.
- All visible remains of excess concrete will be physically removed on completion of the plastering or concrete pouring and disposed of in an acceptable manner.
- **Waste Water** -
 - The contractor is to ensure that clean run-off water is diverted away from potentially contaminated areas of the Camp.
 - Contaminated liquids and soil from the site must be disposed of at a permitted disposal site.
 - All waste water and contaminated run-off must be dealt with accordingly.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.
- Contractor to conduct environmental monitoring for air quality (dust and PM₁₀), noise and water quality.

Monitoring Requirements:

- Public complaints register.
- Evidence of pollution.
- Review periodic results from environmental monitoring (water quality, air and dust).
- Contractor's method statement.

5.1.7 Management of Disposal of Dredge Spoil at the Disposal Site

Management Objective:

- Ensure detailed records regarding disposal of dredge spoil are kept.

- Ensure dredge material is only disposed within the permitted site.
- Ensure only permitted volumes of dredge disposal are disposed.
- Ensure dredge spoil is disposed of in a thin layer as practicable.
- Ensure even distribution of dumping of dredge spoil.
- Ensure minimal mortality of benthos at disposal site.

Target:

- Maximum of **4 637 584 m³** (4.6 million cubic metres) plus 10% allowance for over dredging allowed.
- A daily long track plot must be recorded for **all** disposal events.
- No incidents where dredge material is dumped outside disposal site.
- Dredge spoil to be disposed of in a thin layer (as possible).

Management Actions:

- A GPS record must be kept. This record must include:
 - Time of departure from the dredge site
 - Time of arrival at the disposal site
 - Position of the vessel at the time of starting to discharge dredge spoil.
 - Heading and speed of the vessel at the time of starting to discharge the dredge spoil.
 - Position of the vessel at the time of completion of the discharge of dredge spoil.
 - Heading and speed of the vessel at the time of completion of discharging of dredge spoil.
- The daily track plot must be recorded electronically on a compact disc (CD) in ASCII format.
- This information must be provided to the ECO on a weekly basis.
- The ECO must be notified immediately if there is an incident whereby there is dumping of material outside the designated zone. The daily track plot must also be provided immediately if there is an incident.
- The hoppers must have load indicator equipment on board to ensure that the hopper doors are not leaking and that no part of the load is being deposited anywhere other than the designated disposal site.

- Load Indicator data must be provided to the ECO on a weekly basis. The load indicator graph shall be marked with the date and number of each load.
- Details of the load indicator equipment must be provided to the ECO prior to commencement of operations.
- The dredger must dispose dredge material in such a way that no large mounds are produced.
- The contractor must set up a matrix of the site to ensure there is even dumping distribution and no disposal should occur at locations where a sediment load has been deposited within the last week.
- The dredger must dispose of sediment in as thin a layer as possible.
- The volumes of disposal must be recorded and provided to the ECO weekly. This will also be provided to the EMC on a monthly basis.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Daily track plots
- GPS record
- Load Indicator data
- Incident reports
- Contractor's method statements

5.1.8 Management of Ballast Water

Management Objective:

- Ensure compliance with TNPA's Ballast water management plan.

Target:

1. 100% compliance with relevant Ballast Water Management protocols.

Management Actions:

- A detailed method statement regarding Ballast Water management to be produced.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Contractor's method statements

5.1.9 Spill Clean-up and Disposal**Management Objective:**

- Ensure occurrence of spills are minimized.
- Ensure that should a spill occur, that spill clean-up and disposal is undertaken correctly.

Target:

- No incorrect spill clean-up and disposal of spills.

Management Actions:

- Make every effort to avoid spills of hazardous materials.
- Develop and implement a Spill Clean-up Procedure that takes staff safety and environmental protection appropriately into consideration.
- Provide stock and maintain appropriate complete emergency spill kits at locations close to where hazardous substance are stored or used and ensure full availability at all times.
- Train all relevant staff members to use the emergency spill kit and on the procedures to deal with spills of hazardous substances such as e.g. oils, diesel, petrol, paints, pesticides, etc.
- Contain and clean-up any spills as soon as possible after the incident and thereafter remediate the affected area effectively and to the satisfaction of the ECO; including spills on un-bunded hard surfaces, stormwater drains, roads, laydown areas, etc.
- Report spills of hazardous substances immediately to the Emergency Services Department, Environmental Department and ECO and maintain a register for spills and all incidents involving hazardous materials.
- Dispose of spilled material recovered from bunded areas by either appropriate re-use, recycling or disposal to a suitably licensed disposal facility.

- Remove contaminated soil or yard stone immediately (do not leave in-situ) and disposed of this soil at a suitably licensed waste disposal site; or alternatively treat contaminated soil on site but ex-situ through bioremediation on an impermeable bunded area, provided such a method proof to be effective and prevents further or on-going environmental contamination.
- Develop and implement emergency procedures / protocols to quickly and effectively repair any hazardous substance leakages and follow effective spill clean-up procedures
- Keep bunded areas spill free by removing and mopping up any spilled material immediately in accordance with the spill clean-up; and remove or drain any accumulated uncontaminated water on a daily basis
- Ensure that materials are appropriately secured and contained to ensure safe passage between destinations without any loss or spill of material along the way.
- Ensure that adequate spill management equipment is available in the immediate vicinity where hazardous substances are used and/or stored. Where spill kits are used, they need to be properly stocked at all times.
- Clean up any accidental concrete spills that occur outside the designated concrete batching area immediately.
- Rehabilitate the ground of the batching plant area and any area where material has been spilled to render it uncontaminated, upon completion of works.
- Refuel vehicle or machinery only at a purpose-designed and designated refuelling area (with bunding or run-off containment system) on site or off-site; unless in cases of an on-site emergency repairs or for refuelling stationary equipment (e.g. generator) in which case drip tray are to be used to contain any fuel or oil spills.
- Place drip-trays that are suitably and practically designed to effectively contain spills (i.e. sufficient capacity and freeboard), and where necessary filled with appropriate absorbent material, under all parked construction vehicles and machines that are or may leak oil or fuel, maintained daily and regularly disposed of in an appropriate manner; unless such a vehicle is parked in an area provided with hard-standing that drains towards an oil-water separator to handle the amount of water expected to fall within the hard standing area.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Waste disposal certificates.
- Contractor's method statement.

5.1.10 Waste Classification and Correct Disposal

Management Objective:

- To ensure that all waste generated during construction is properly identified and correctly disposed of.

Target:

- All wastes to be correctly identified and disposed of at the correct licenced disposal facility.

Management Actions:

- Waste should be grouped into 'general' or 'hazardous' depending on its characteristics. The classification determines the handling methods and the ultimate disposal of the material.
- General waste expected during construction includes the following:
 - Trash (waste paper, plastics, cardboard etc.) and food wastes from offices, warehouses and construction personnel.
 - Uncontaminated construction debris such as used wood and scrap metal.
 - Uncontaminated soil and non-hazardous rubble from excavation or demolition.
- Hazardous waste means any waste containing organic or inorganic elements that may, owing to the inherent physical, chemical characteristics, such as toxic, ignitable, corrosive, carcinogenic or other properties or toxicological characteristics of that waste, have a detrimental impact on health and the environment.
- A hierarchical control approach to waste management is encouraged. Waste should be preferably managed in the following order:
 - Prevent – waste avoidance and minimisation during production.
 - Recycle – waste recycling, recovery and utilisation.
 - Treat – waste treatment in order to reduce the toxicity and minimise the quantities of waste.

-
- Disposal – waste disposal.
 - The contractor is responsible for removal of all waste from the site, generated through the contractors activities. The contractor shall ensure that all waste is removed to an appropriate licenced waste management facilities (the following source may be utilised – www.sawic.org.za).
 - The classification of waste determines the handling methods and the ultimate disposal of the material. The contractor shall manage hazardous waste that are anticipated to be generated by his operations as follows:
 - Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the **Norms and Standards for the Classification of Waste** for landfill to determine whether additional classification is required).
 - Obtain and provide an acceptable container with a label.
 - Place hazardous waste material in the container.
 - Inspect the container on a regular basis as prescribed by the contractors waste management plan.
 - Track the accumulation time for the waste.
 - Haul the full container to the licenced and correct disposal site.
 - Provide documentary evidence of proper disposal of the waste.
 - The contractors environmental office will work in conjunction with the contractors health and safety personnel to create a hazardous materials management programme. This programme will establish the necessary protocol for proper handling of hazardous materials on site.
 - Information on each hazardous substance will be available to all persons on site in the form of a Materials Safety Data Sheet (MSDS).
 - Training and education about the proper use, handling and disposal of material will be provided to all workers handling the material.
 - The contractors environmental office must be informed of all activities that will involve the use of hazardous substances to facilitate the prompt response in the event of a spill or release.
 - The contractor shall manage general waste as follows:
 - Determine if waste is non-hazardous and obtain containers for waste storage.
 - Notify waste hauler when container is full so that it can be removed and replaced with an empty container.

- No littering is allowed on site. In the event where staff mobility is high, refuse bags will be made available by the contractor.
- Waste generating entities must control the generation of non-hazardous waste by:
 - Eliminating waste generation or reducing the total volume.
 - Reducing the degree of contamination of waste generated.
 - Reclaiming materials otherwise considered waste.
- The contractor shall recycle general waste that is anticipated to be generated by its operations as follows:
 - Obtain and label recycling containers for office waste, aluminium, steel, glass, ferrous metals, nonferrous metals, waste timber.
 - Locate these containers within temporary office buildings and trailers.
 - Establish a recycled material collection schedule.
 - Arrange full bins to be hauled away.
- Spent batteries, circuit boards, and bulbs require special collection and handling.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Waste disposal certificates.
- Contractor's method statement.
- MSDS
- Training material and attendance registers.
- Inspection records.
- Hazardous materials management programme.
- Recycling bins on site.
- Waste classification evident when necessary.

5.1.11 Stormwater and Dewatering Management

Management Objective:

- To ensure that construction activities do not affect water quality and/or quantity of groundwater and surface water of the area.

Target:

- No complaints regarding pollution from stormwater and dewatering.
- No measurable signs of pollution from stormwater and dewatering.
- Water quality – construction activities may not cause an adverse impact that results in more than a 10% change in baseline values.

Management Actions:

- Temporary drainage must be established during the construction period until permanent drainage is in place. Contractors are responsible for maintaining the temporary drainage in their areas.
- Contractors must provide temporary drainage that prevents erosion.
- Contractors must employ good house-keeping in their areas to prevent contamination of drainage water.
- The contractor shall ensure that no contaminated surface water shall flow off-site as a result of construction operations. Silt traps shall be constructed to ensure retention of silt on site and cut off ditches shall be constructed to ensure no runoff from the site except where silt traps are provided.
- The contractor shall clear stagnant water.

Responsibilities:

- Project Manager and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Contractor's method statement.
- Water quality results.

6 CONCLUSION

DEA granted the EA for the Berth 203 to 205 Expansion on 21 January 2015. The EA contained a number of specific conditions including the need to develop an IWMA that is based on waste minimisation and incorporates reduction, recycling and reuse options.

This document has provided a background of relevant waste legislation, as well as guidance on identification of waste streams and sources. It also assists with the implementation of waste management objectives. Lastly, it provided an overview waste management actions contained in the EMPr.

Incorporating this approach into both the operation and construction of Berth 203 to 205 will ensure that the expansion integrates waste minimisation techniques and mitigates negative impacts related to waste management.

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