Summary of key outcomes:

The future operator(s) of the new terminal, with advice from Sydney Ports Corporation, would prepare an Emergency Response and Incident Management Plan (ERIMP) prior to the new terminal commencing operations. The purpose of the ERIMP would be to provide an organised and practised response to incidents and emergency situations to protect employees, the public and the environment.

The ERIMP would be considered in the context of the existing Port Botany Emergency Plan (PBEP), which was developed by Sydney Ports Corporation in conjunction with existing terminal operators and emergency services organisations. The ERIMP for the new terminal would essentially represent an extension of the existing emergency and incident management system which has proven to be effective in the past.

Emergency response is among the port safety functions mandated by statute for Sydney Ports Corporation. To be able to respond to spills, Sydney Ports Corporation has the largest inventory of oil spill equipment of any Australian port. In addition, under national mutual aid arrangements, supplementary equipment is available from other states, the Navy and industry.

The new terminal would be a Customs controlled area and would be equipped with security features consistent with the requirements of the International Maritime Organisation *International Ship and Port Facility Security Code*.

It is considered that the combination of internal and external emergency response and incident management resources that would be made available to the proposed Port Botany Expansion and the terminal security measures would adequately minimise risks to employees, the public and the environment.

32.1 Introduction

Over the twenty years that the existing facilities at Port Botany have been operating there have been no major emergency incidents such as significant fires or oil spills. Therefore, whilst there may be a risk of the incidents described below occurring, the track record of the existing operations augmented by the improved spill containment design of the new terminal suggests that the procedures to guard against such incidents would be effective.

Potential incidents related to the operation of the proposed Port Botany Expansion have been identified in this EIS (refer to **Chapter 28** *Preliminary Hazard Analysis*). These include:

- container handling incidents such as dropped containers or vehicular accidents;
- ship/berth strikes;
- leaks; and
- external incidents like aircraft impacts, releases from the Sydney to Newcastle fuel pipeline, or incidents at neighbouring facilities that escalate onto the new terminal.

These incidents could lead to a loss of containment which could result in the release of toxic, corrosive, or flammable materials into the environment and/or escalate into spill fires, flash fires, BLEVEs (boiling liquid expanding vapour explosion), or vapour cloud explosions.

The future operator(s) of the new terminal, with advice from Sydney Ports Corporation, would prepare an ERIMP to manage these potential emergencies prior to the new terminal commencing operations. The purpose of the ERIMP would be to provide an organised and practised response to incidents and emergency situations to protect employees, the public and the environment.

This chapter describes the main elements that would be contained in the ERIMP.

32.2 Emergency Response and Incident Management Plan

The ERIMP would:

- ensure that the appropriate emergency response equipment is provided;
- ensure staff understand their roles and responsibilities and undergo training as required;
- put specific procedures in motion to manage an incident or emergency;
- establish an emergency response team;
- ensure that an emergency or incident is managed in a systematic way;
- deal with enquiries from the public and staff;
- allow the continued delivery of essential services during an incident or emergency situation without increasing risk;
- establish procedures for interaction with other agencies and neighbouring facilities throughout an incident or emergency situation;

- clearly define responsibility for emergency and incident management, including clear lines of accountability throughout the organisation;
- validate emergency preparedness through exercises and testing of emergency procedures;
- allow for monitoring and review to continually update and improve the system; and
- allow for independent auditing.

The ERIMP would differentiate between minor and major incidents, with a nominated Terminal Emergency Management Officer (TEMO) making the decision on the magnitude of the incident.

The TEMO would be a person nominated by the operator(s) of the new terminal to act as an emergency management officer for the new terminal and provide advice to the relevant emergency services representatives during an emergency.

32.2.1 Onsite Incident Strategy

Minor incidents may be defined as those which can be contained and managed by terminal personnel without exposing them to significant risks. An example would be the spill of a material, which because of the nature of the material or the amount spilt, would not pose significant risk to personnel such as an oil leak from machinery. For minor incidents, the attendance of external emergency services would not be required.

Major incidents, such as a significant fire or toxic gas release, would be managed by emergency services. The TEMO would liaise with emergency services to facilitate assistance by the terminal personnel, without compromising their safety, by way of:

- providing information on the type and quantity of the material involved;
- moving containers and equipment as required; and
- providing access to the spill control, fire fighting and other emergency equipment and supplies available on site as required.

In the case of major incidents, the TEMO would activate the Port Botany Emergency Plan (discussed in Section 32.3).

32.2.2 Offsite Incident Strategy

Management of all offsite incidents, both minor and major, would be the responsibility of emergency services. Terminal personnel would extend assistance as required by way of:

- providing information on the material involved; and
- assisting in managing loss of containment at source.

In the case of major incidents, the TEMO would activate the Port Botany Emergency Plan.

32.2.3 Incident Reporting System

The ERIMP would include an incident reporting system. Specific incidents and corrective action taken (where required) shall be registered. If an incident occurs that had caused, or would be likely to cause harm to the environment, the terminal operator(s) would report the event to the relevant authority and Sydney Ports Corporation as soon as practicable.

32.2.4 Specific Sub-Plans

The ERIMP would include a number of specific sub-plans including those discussed below.

Spill Containment and Management

The proposed new terminal would be equipped with emergency response equipment typically comprising absorbent materials, absorbent pads to block drainage points and protective equipment consisting of gloves, rubber boots, eye protection etc.

Accidents resulting in oil spills or loss of containment on the terminal during port operations would be contained through the new terminal's first flush system. Major accidental spills could be in the order of up to 20,000 L (20 m^3). Spills at this scale could be easily contained in the proposed first flush system's retention tanks/trenches which have a capacity of 6,000 m^3. Following containment, the spill would be disposed of in an appropriate manner.

Oils spills on the water around the new terminal would be prevented from reaching Penrhyn Estuary through the deployment of a permanent floating oil boom across the tidal channel under the road bridge to the new terminal.

For large incidents, including those involving dangerous goods, external emergency services would be contacted and control of the incident would pass to the emergency services on arrival at the new terminal. At the discretion of the TEMO (or the Controller of the attending agency) the emergency may be escalated, resulting in the activation of the Port Botany Emergency Plan. This may be achieved by the use of the Port Botany Radio and Emergency Alarm System which is located at each facility in the Port Botany area, Sydney Ports Corporation's Harbour Control and the Botany Bay Police Local Area Command. This system allows all facilities to be notified of the emergency, listen to the communications and respond. This type of integrated communications system is vital because it allows an effective and co-ordinated response between the emergency services and all the facilities at Port Botany.

Fire Fighting

The fire fighting system would be designed to meet the requirements of the NSW Fire Brigade, Australian Standards and the Building Code of Australia. A Fire Management Plan would be developed and implemented at the site, which would incorporate signage and training requirements for all personnel at the new terminal.

The principal fire fighting system would include a fire hydrant system that could be utilised by emergency services. Clear access to all fire fighting equipment would be maintained on the site as a requirement of the Fire Management Plan. All new terminal buildings would be fitted with heat or smoke detection equipment at

appropriate locations, which would be connected to the fire alarm system and would be fitted with a sprinkler system and fire extinguishers as appropriate.

The fire fighting system would be provided with automatic alarm connections to the Fire Brigade. Typical response times to an alarm are five to seven minutes from either Matraville or Botany Fire Stations (DUAP 1996). Local fire stations have basic hazardous material (HAZMAT) response equipment.

The system would also include access to fire fighting equipment of neighbouring facilities through mutual aid arrangements.

For ship and waterside fires, Sydney Ports Corporation owns and operates two dedicated fire fighting tugs. In addition to these specialist tugs, there are also several other tugs owned and operated by private contractors which have fire fighting capabilities. These tugs would be made available in the event of an emergency. There would always be a tug available with fire fighting capabilities in the event of a fire at Port Botany.

It is considered that the combination of internal and external fire fighting resources would be adequate to respond to any fire which may occur at or near the new terminal.

32.3 Integration with Existing Plans

32.3.1 Port Botany Emergency Plan

The ERIMP would be prepared in the context of the existing PBEP, which was developed by Sydney Ports Corporation in conjunction with existing terminal operators and emergency services organisations. The PBEP provides a coordinated response and mutual aid to any facility in the Port Botany area. The PBEP has been providing effective control and coordination of emergency and incident management for the existing facilities at Port Botany for many years.

The PBEP incorporates procedures for Sydney Ports Corporation to investigate and respond to all reports of oil and chemical spills within its area of operation. To be able to undertake this task, Sydney Ports Corporation has trained staff available 24 hours a day with the largest inventory of oil spill equipment of any Australian port. The inventory comprises in excess of 10 km of different types of oil spill containment booms, skimmers that can recover up to 100 tonnes of oil per hour as well as a variety of vessels, including two specialist fire fighting tugs. In addition, under national mutual aid arrangements, supplementary equipment is available from other states, the Navy and industry.

Sydney Ports Corporation is also responsible for attending to sea transport incidents like ship to ship collisions and grounding of vessels, within its area of operation.

The PBEP is a sub-plan of the Sydney East District Disaster Plan (DISPLAN) and is supported by the following:

- Botany Bay City Local Disaster Plan;
- Randwick City Local Disaster Plan;
- State Enviroplan;
- NSW State Waters Marine Oil and Chemical Spill Contingency Plan;

- Hazardous Materials Major Incident and Emergency Sub-Plan; and
- Botany Bay/Port Hacking Marine Emergency Sub-Plan.

There is a PBEP Committee which meets quarterly to review and update individual site arrangements and communication links and conduct exercises.

32.3.2 Coverage of the Plan

The PBEP currently applies to the area bounded by:

- Penrhyn Road to the north;
- Bumborah Point Road and Prince of Wales Drive to the south;
- Botany Road to the east; and
- the waters of Botany Bay to the south and west.

However, the PBEP Committee's resources may be made available to respond to and provide mutual aid, assistance and executive advice outside this area. Mutual aid of this nature has been provided for various offsite incidents in the past (e.g. overturned road tankers).

With the development of the new terminal, the boundary of the PBEP would be extended to include the area bounded by Foreshore Road to the north thereby covering the new terminal area in addition to the existing terminals. The ERIMP would apply only to the new terminal area but would be within the boundary of the revised PBEP.

32.4 Refueling of Ships

Refueling activities associated with container ships using the Port Botany Expansion is recognised as a major potential source of an oil spill incident. The refueling operation, carried out by a ship and a bunker (refueling) barge, is planned by means of an International Maritime Organisation (IMO) checklist, which requires a signed agreement between the personnel from the bunker barge and ship regarding transfer rates, pressures, means of communication and emergency shutdown arrangements. Sydney Ports Corporation conducts audits of all such refueling operations to ensure conformance with the IMO requirements.

Currently, approximately 10% of container ships using Port Botany refuel with an average of 950 tonnes of fuel delivered on each occasion. This is expected to be similar for operations at the new terminal, although with the increase in ship size expected at Port Botany the average amount may increase.

Whilst ships are not boomed during refueling, risk analysis conducted by Sydney Ports Corporation shows that the existing management and control systems are adequate. If an incident was to occur, the spill containment and management resources described in Section 32.3.1 would be available to control the incident effectively.

32.5 Terminal Security

32.5.1 Risk Assessment and Security Planning

To improve security for ships and port facilities, the IMO has issued an *International Ship and Port Facility Security Code* (ISPS Code) that will apply to passenger and cargo ships and port facilities serving such ships on international voyages.

The ISPS Code provides a framework for assessing the risk of terrorist and related unlawful acts against ships and port facilities, and for developing and implementing Ship Security Plans (SSPs) and Port Facility Security Plans (PFSPs) which focus on deterring and preventing the maritime sector from being a target for terrorist activity or being used as a means of transporting terrorists and/or materials or equipment that may be used in other areas. The Commonwealth Department of Transport and Regional Services is the national agency which will oversee the security plan preparation under the ISPS Code by port operators, port facility operators, maritime contractors and the shipping industry.

Sydney Ports Corporation is preparing risk assessments and security plans consistent with the ISPS Code for the two passenger terminals at Sydney Cove and Darling Harbour. It is likewise planning:

- a "whole of port" risk assessment for the port estates of Sydney Harbour and Port Botany, which would cover the security requirements of the Port Botany Expansion; and
- risk assessment and security plan for the Bulk Liquids Berth.

This will ensure that all the port facilities managed by Sydney Ports Corporation will have appropriate security plans in place. Sydney Ports will also oversee, with the assistance of a Port Security Committee, the development of security plans for other port facilities.

The proposed new terminal would be an Australian Customs Service controlled area. In accordance with the ISPS Code, the new terminal would have the following minimum security requirements:

- a port facility security plan;
- port facility security officer(s); and
- appropriate security equipment.

Port security would also include monitoring and controlling access, monitoring the activities of people and cargo, and ensuring security communications are readily available. These security arrangements for the new terminal are briefly discussed below.

32.5.2 Road and Rail Access

Trucks entering or leaving the new terminal with containers would require clearance, including that from the AQIS.

Rail access would be via the rail bridge southeast of the main access road bridge. Gates across the line would be provided within a security fence and would be monitored 24 hours a day as part of normal port operations. The rail line would normally be gated off and all movements would be monitored from the gatehouse. An audible and/or visual warning system would be installed to indicate when the rail line gate is

open. The section of the rail line through Penrhyn Estuary would be fenced on both sides for safety and access control.

32.5.3 Access Controls

Visitors would be required to access the new terminal via the gatehouse, where they would be required to sign in and sign out at a security office. Car parking would be provided outside the security fencing, but within close proximity to the office buildings.

Persons from berthed container ships would not be allowed to come onshore without permission of the Australian Customs Office.

The new terminal would be secured from unauthorised access from adjoining lands using security fences at least 2 m high. A noise barrier approximately 4 m high would replace the security fencing along the northern and eastern perimeters of the new terminal area.

32.5.4 Inspection and Monitoring

The new terminal would have access to the recently established container X-ray facility on Bumborah Point Road where random inspections of containers can be undertaken.

Site security would include lighting and monitoring using strategically placed video cameras. Wired and wireless communication links with appropriate back-up systems would be provided.

32.5.5 Public Recreation Areas

The new terminal would be separated from the replacement boat ramp and Foreshore Beach by a 130 m wide channel. Pedestrian access to Penrhyn Estuary would be restricted using appropriate fencing to a boardwalk and bird viewing platform on the northwest corner.

Waterways adjacent to the new terminal would be monitored by both Customs and State Police, similar to the existing arrangement within Brotherson Dock. Channel markers would be provided for recreational craft, with the channel leading to Penrhyn Estuary considered as a restricted area. A floating oil boom across the 130 m channel under the road bridge would provide a physical barrier to recreational craft.

The development of the public recreations areas would incorporate appropriate lighting.

32.6 Conclusion

An ERIMP would be prepared prior to the commencement of operation of the proposed development. The ERIMP would ensure that an organised and practised response is provided to incidents and emergency situations which might affect the provision of port services at the new terminal or impact human or environmental health or cause offsite damage.

The ERIMP would differentiate between minor and major incidents, with a nominated TEMO making the decision on the magnitude of the incident.

For minor incidents with no offsite impacts, not requiring emergency services, the incident would be handled by personnel onsite. For major incidents, such as a significant fire or toxic gas release, the incident would be managed by emergency services. The TEMO would liaise with emergency services to facilitate assistance by terminal personnel, without compromising their safety, by way of providing information on the type and quantity of the material involved, moving containers and equipment as required, and providing access to the spill control, fire fighting and other emergency equipment and supplies available on site as required. In the case of major incidents, the TEMO would activate the PBEP. Management of all offsite incidents, both minor and major, would be the responsibility of emergency services, although the emergency and incident management resources at the new terminal may be made available in accordance with mutual aid arrangements.

The fire fighting system at the new terminal would be designed to meet the requirements of the NSW Fire Brigade, Australian Standards and the Building Code of Australia. A Fire Management Plan would be developed and implemented at the site, which would incorporate signage and training requirements for all personnel at the new terminal. Fire fighting equipment would include internal devices such as hydrant systems and external equipment such as specialised fire fighting tug boats. The combination of fire fighting resources would be adequate to respond to any fire which may occur at or near the proposed new terminal.

Emergency response is among the port safety functions mandated by statute for Sydney Ports Corporation. To be able to respond to spills, Sydney Ports Corporation has trained staff available 24 hours a day with the largest inventory of oil spill equipment of any Australian port. The inventory comprises in excess of 10 km of different types of oil spill containment booms and skimmers that can recover up to 100 tonnes of oil per hour. In addition, under national mutual aid arrangements, supplementary equipment is available from other states, the Navy and industry. Accidents resulting in oil spills or loss of containment on the terminal during port operations would be contained through the new terminal's first flush system.

The ERIMP would be considered in the context of the existing PBEP, which was developed by Sydney Ports Corporation in conjunction with existing terminal operators and emergency services organisations. The ERIMP for the new terminal would essentially represent an extension of the existing emergency and incident management system which has proven to be effective in the past.

The proposed new terminal would be a Customs controlled area and would be equipped with security features consistent with the requirements of the International Maritime Organisation ISPS Code.

It is considered that the combination of internal and external emergency response and incident management resources that would be made available to the proposed Port Botany Expansion and the terminal security measures would adequately minimise risks to employees, the public and the environment.

Summary of key outcomes:

During construction of the proposed Port Botany Expansion, water would be initially supplied by water trucks prior to extension of the existing Sydney Water Corporation water mains, which will provide a permanent connection to the site.

Sydney Water Corporation advises that sufficient capacity exists in the water mains to provide the required volume of water during the operation and construction of the new terminal and recreation area.

Potable water consumption would be minimised by storing up to 20,000 L of treated stormwater for use in maintenance and washdown activities and irrigation.

Wastewater from construction activities would be collected in onsite proprietary disposal systems and removed from the site by licensed waste disposal contractors prior to connection to the Sydney Water Corporation sewerage system.

During the operational phase, domestic wastewater would be discharged directly to the Sydney Water Corporation sewerage system. The wastewater generated at the recreation area including the new boat ramp would also be discharged to the sewerage system.

Trade waste would discharge to the Sydney Water Corporation sewerage system in accordance with a Trade Waste Agreement. The Trade Waste Agreement would determine the level of treatment required prior to discharge.

Sydney Water Corporation advises that sufficient capacity exists in the sewerage system to accept the volume of wastewater expected to be generated during the operation of the proposed new terminal and from the recreation area.

Water usage and wastewater discharge at the site would be subject to a Water Resources Management Plan, which would form part of the site construction and operational EMPs and would cover both the construction and operational phases.

33.1 Introduction

Water is a renewable resource, however the consumption of water and generation of wastewater may impact on the environment. The Port Botany Expansion would adopt the principles of minimising water consumption, reducing wastewater and reuse / recycling water where feasible, during site construction works and terminal operation.

Water consumption and wastewater production are expected to be different in the construction and operational phases of the new terminal. The purpose of this chapter is to assess the water requirements of the proposed Port Botany Expansion and identify measures that would minimise total water consumption. The feasibility of water supply and the removal of wastewater are discussed. Reuse of treated surface water runoff is proposed.

This chapter includes information provided by Arup in their report titled *Sydney Ports Corporation Port Botany Expansion EIS Advice – Stormwater Management* (2003) which is presented in full in **Appendix K**.

33.2 Water Usage

33.2.1 Construction

During construction water would be used for:

- general domestic purposes such as washing, cooking, drinking and amenities;
- washing down and cleaning equipment at localised work sites;
- concrete batching and curing;
- dust reduction measures; and
- fire water for use during emergencies.

Water trucks would initially be used to supply water to individual work sites as required by the contractor undertaking the works. Once core water utility services for the Port Botany Expansion are constructed and connected, water would be sourced from the Sydney Water Corporation main water supply as described in Section 33.4.1.

It is anticipated that during the construction works domestic, potable water use would be approximately 80 L per person per day. For significant periods of the construction program up to 160 construction workers would be onsite. Therefore, peak domestic water use during construction would be about 13 kL per day.

For construction purposes, the quantities of water required would be highly variable and dependent upon the type of work activity and weather conditions. As an approximation, where earthworks and other general construction works are planned, it is estimated that up to 50 kL of potable water would be required per day.

It is estimated that during construction of the new terminal, approximately 15 ML of potable water would be required per year.

33.2.2 Operation

During operations, activities at the new terminal that would require water include:

- maintenance activities;
- equipment washdown;
- potable water for domestic use;
- potable water supplied to ships; and
- fire fighting.

Activities at the public recreation areas that would require water include:

- potable water for domestic use;
- fish cleaning; and
- irrigation.

Potable water would be supplied by the Sydney Water Corporation mains water as described in Section 33.4.1.

Water used for operational activities that do not require potable water, would be sourced from treated surface water runoff stored in two 10,000 L tanks at the northern end of the new terminal. Operational reuse of this water would include maintenance activities, washdown and irrigation.

Once the new terminal is fully operational, the anticipated water use would be 42 ML per annum. Sydney Water Corporation advises that sufficient capacity exists in the water supply mains to provide the volumes of water required for the operation of the new terminal and recreation area.

33.3 Wastewater

33.3.1 Construction

During construction works, wastewater would be generated from activities including maintenance, washdown, cleaning of equipment and general domestic use.

Proprietary wastewater collection and holding tanks would be used to collect wastewater from individual work activities, or work sites during construction. These tanks would be supplied and operated by the contractors.

Domestic wastewater would be managed by the use of onsite proprietary sanitary units, which would be located close to individual work site areas.

During the dredging and reclamation works, domestic wastewater would be managed on board the dredge vessels. The vessel storage tanks would be emptied by normal, onshore sanitary disposal facilities.

A licensed waste management company would handle the transport and disposal of all wastewater from the site during the construction works.

Once core wastewater utility services for the Port Botany Expansion are constructed and connected, wastewater generated at the site from subsequent construction activities would be discharged via the new sewer connection. Trade waste discharged during construction would be in accordance with a Trade Waste Agreement with Sydney Water Corporation.

The volume of wastewater generated during construction would depend on the number of construction workers at the site and the nature of the construction activities being undertaken. For significant periods of the construction program, up to 160 construction workers would be on site. With this number of workers, the peak domestic wastewater volume during construction would be about 14 kL per day.

33.3.2 Operation

Wastewater discharged to the Sydney Water Corporation sewerage system would comprise domestic sewage and trade waste discharge.

Domestic sewage would be generated at the new terminal from the following activities:

- employee facilities such as showers, toilets and wash basins; and
- tea rooms and canteens.

Trade waste discharge from the new terminal would arise from:

- maintenance and washdown facilities at the new terminal;
- runoff from bunded storage areas such as the fuel storage and refuelling areas; and
- waste from the stormwater first flush treatment system.

Domestic sewage and wastewater would also be generated at the public recreation areas from toilets, wash basins and from the fish cleaning facility.

There would generally be no greywater or sewerage generated from ships as this activity is not permitted at Port Botany.

All trade waste generated during the operation of the new terminal would discharge to the Sydney Water Corporation sewerage system under a Trade Waste Agreement. The Trade Waste Agreement would determine the level of treatment required prior to discharge. All areas where washdown or maintenance activities are to be undertaken would be bunded and provided with sump pits, grit traps and oil/water separators. This would also be the case for any additional bunded storage areas, such as those used for refueling and fuel storage. Water collected in these areas would be tested and disposed to the sewerage system, or if unsuitable for disposal to sewer would be disposed offsite by a licensed waste disposal contractor.

Domestic sewerage and treated wastewater from the new terminal and public recreation areas would be discharged to the Sydney Water Corporation sewerage system via pumping station No. 570 located at Penrhyn Road. **Table 33.1** presents the approximate quantities of wastewater likely to be discharged from the site once the new terminal is fully developed. Sydney Water advises that sufficient capacity exists in the sewerage system to accept the volumes of wastewater expected to be generated during the operation of the new terminal and recreation area.

Table 33.1 Discharge to Sewer from the New Terminal

WASTEWATER SOURCE	EXPECTED DISCHARGE (2025) (KL/YEAR)
Domestic wastewater	12,000
Trade waste	7,500

33.4 Infrastructure Requirements

33.4.1 Water

Currently, there is a 450 mm diameter water main operated by Sydney Water Corporation running along Penrhyn Road. This main feeds from a single larger water main (500 mm) at the intersection of Foreshore Road, Botany Road and Penrhyn Road.

To provide water to the new terminal it is proposed to extend this existing water supply system. The existing 450 mm main would be extended from Penrhyn Road along the eastern edge of the new terminal and out onto Foreshore Road over the proposed road access bridge. The main would then run along the southern side of the Foreshore Road reserve and connect to the 500 mm main at the intersection of Foreshore, Botany and Penrhyn Roads. This would provide a dual feed point for the water supply into the new terminal in case of damage to the mains or in case of fire.

A water supply would also be connected to the amenities at the proposed new boat ramp and tug berths on western Foreshore Beach.

33.4.2 Wastewater

The existing sewer main connects to a Sydney Water Corporation sewerage pumping station No. 570 at Penrhyn Road.

It is proposed to service the new terminal via a 100 mm common rising main connecting to the western side of pumping station No. 570 at Penrhyn Road. This common rising main would be connected to other rising mains from various points within the new terminal. The sewer main would run in a services easement parallel to Penrhyn Road and along the eastern and northern boundaries of the new terminal. An extension would be installed under the new road bridge and along Foreshore Road to service the amenities at the new boat ramp area and tug berths including the fish cleaning tables. In addition, a small sewerage pumping station would be required on the new terminal and at the new boat ramp area.

33.5 Water and Wastewater Management

Mitigation measures for water and wastewater are targeted at the reduction in water usage and minimisation of wastewater generation. The following mitigation measures would be adopted for the proposed Port Botany Expansion:

- water use and wastewater discharge at the site would be subject to a Water Resources Management Plan (WRMP), which would form part of the construction and operational EMPs. These plans would include water minimisation strategies as well as monitoring and testing schedules for wastewater as required;

- clean, treated stormwater would be collected in two 10,000 L water storage tanks at the northern end of the new terminal to allow reuse for maintenance, washdown and irrigation;
- dual flushing toilets, minimal flow shower heads and regular maintenance to identify leaking or dripping taps and pipes would be implemented during construction and operation;
- prior to sewer reticulation, all wastewater generated during the construction works, would be discharged offsite by an appropriately licensed waste management contractor; and
- monitoring and testing would be undertaken prior to discharge of treated wastewater, to ensure compliance with the site Trade Waste Agreement.

33.6 Conclusion

During construction of the proposed Port Botany Expansion, i.e. prior to extension and connection of the existing Sydney Water Corporation water mains, trucks would supply water to the site. During operations, water would be supplied via extended water mains. Sydney Water Corporation advises that sufficient capacity exists in the water supply mains to provide the volume of water required for the latter construction and operation phases of the new terminal.

Treated stormwater would be stored to allow reuse of the water for maintenance activities, washdown and irrigation. This would minimise potable water usage.

Wastewater from construction activities would be collected in onsite proprietary disposal systems and removed offsite by licensed waste disposal contractors prior to connection to the Sydney Water Corporation sewerage system.

During the operational phase, domestic wastewater from the new terminal and public recreation areas would be discharged directly to the Sydney Water Corporation sewerage system. The sewerage system would service the entire site including the boat ramp and related infrastructure at the adjacent recreation area on western Foreshore Beach.

Trade waste would discharge to the Sydney Water Corporation sewerage system in accordance with a Trade Waste Agreement that would also determine the level of treatment required prior to discharge.

Sydney Water Corporation advises that sufficient capacity exists in the sewerage system to accept the volumes of wastewater expected to be generated during the operation of the new terminal and the recreational area, although sewage pumping station No. 570 may require upgrading in the future.

Water use and wastewater discharge at the site would be subject to a WRMP, covering both the construction and operational phases that would form part of the site Construction and Operational EMPs.

Summary of key outcomes:

Waste materials that would be generated during the construction of the new terminal would include construction materials, road and rail waste, domestic waste, human waste and green waste.

Waste materials that would be expected to be generated during the operation of the new terminal would include paper and office wastes, food wastes, maintenance materials, human waste, wastewater (trade waste), quarantine waste and ship waste.

Waste management arrangements would be put in place during the construction and operation of the new terminal to maximise the reduction, recycling and reuse of waste materials. This would be achieved through the implementation of a Waste Management Plan (WMP) for the construction and operation phases of the new terminal, although specific waste management practices for the operation of the new terminal would be the duty of the terminal operator(s).

34.1 Statutory Framework for Waste Management

The principles of waste avoidance, waste reduction, waste reuse and waste recycling would be adopted during the construction and operation of the new terminal in accordance with the following legislation and policies, which provide the framework for waste management in NSW.

Waste Avoidance and Resource Recovery Act 2001

The objectives of the Waste Avoidance and Resource Recovery Act 2001 are to encourage the most efficient use of resources, to reduce environmental harm, and to provide for the continual reduction in waste generation in line with the principles of ESD. To meet the objectives of the Act, a resource management hierarchy has been established, comprising:

1. avoiding unnecessary resource consumption;
2. recovering resources (including reuse, reprocessing, recycling and energy recovery); and
3. disposal (as a last resort).

The Act sets the framework for waste planning and management, based on the following objectives, which are outlined in section 3 of the Act:

a) to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development;

b) to ensure that resource management options are considered against a hierarchy of the avoidance of unnecessary resource consumption;

c) resource recovery (including reuse, reprocessing, recycling and energy recovery);

d) to provide for the continual reduction in waste generation;

e) to minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste;

f) to ensure that industry shares with the community the responsibility for reducing and dealing with waste;

g) to ensure the efficient funding of waste and resource management planning, programs and service delivery;

h) to achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis; and

i) to assist in the achievement of the objectives of the *Protection of the Environment Operations Act* 1997.

Protection of the Environment Operations Act 1997

The POEO Act 1997 plays an important part in the licensing and day to day regulation of waste in NSW.

The POEO Act contains the following information in Schedule 1:

- a list of waste definitions and classifications, i.e. the schedule identifies materials that are included in each waste type;
- a list of waste activities which require licensing; and
- a list of waste facilities which require licensing.

Quarantine waste or wastes generated from maintenance activities during operations at the new terminal (e.g. waste oils or hazardous materials) may be classified as Hazardous, Industrial or Group A waste under the POEO Act. The management of these types of wastes may need to be regulated under an EPA Environment Protection Licence for the operation of the new terminal. However, specific licensing requirements relating to the management and disposal of these wastes would be identified by the terminal operator(s) and would be the subject of a separate assessment process in accordance with Sydney Ports Corporation, EPA and AQIS requirements.

Environmental Guidelines: Assessment, Classification & Management of Liquid and Non – Liquid Wastes

These guidelines are prepared by the NSW EPA to outline the requirements for waste generation, management and licensing in NSW. All waste generated by the construction and operation of the new terminal would be classified and disposed of in accordance with these guidelines.

Botany Bay Development Control Plan 29 – Waste Minimisation and Management Guidelines.

The City of Botany Bay Council has produced guidelines to encourage waste minimisation in their LGA. The objective of the Development Control Plan is to reduce the demand for waste disposal by:

- maximising the reuse and recycling of building/construction materials, household generated waste and industrial/commercial waste;
- assisting in achieving Federal and State Government waste minimisation targets;
- minimising the overall impacts of waste;
- requiring source separation and other design and location standards which complement waste collection and management; and
- encouraging building designs and construction techniques which will, in the future, minimise future waste generation.

National Waste Minimisation and Recycling Strategy

The National Waste Minimisation and Recycling Strategy prepared by the Commonwealth Environment Protection Agency sets out a hierarchy of waste management priorities for waste minimisation and recycling. In order of importance, these priorities are waste avoidance, waste reduction, waste reuse, waste recycling or reclamation, waste treatment and waste disposal. The Strategy outlines actions and controls aimed at pursuing waste minimisation and recycling objectives.

34.2 Construction Waste

Activities during the construction of the Port Botany Expansion resulting in the generation of waste would include:

- dredging and reclamation;
- construction of road and rail connections;
- construction of public recreation facilities;
- construction of wharf structures and pavements;
- installation of utility connections;
- construction of road and rail exchange facilities;
- construction of buildings; and
- landscaping.

A summary of the main waste materials expected to be generated during the construction of the proposed new terminal and the estimated quantities of these wastes to be disposed of are provided in **Table 34.1.**

Table 34.1 Construction Waste

CONSTRUCTION WASTE	ESTIMATED ANNUAL QUANTITY OF WASTE FOR DISPOSAL
Construction materials (rock, concrete, timber, masonry, bricks, plasterboards, metal and packaging materials)	3,000 tonnes
Road and rail waste (road stone/railway ballast/concrete and metal railway lines)	200 tonnes
Dredged material	None (contained on site)
Green Waste	None (reused on site)
Excavated soil	None (contained on site)
Domestic waste (glass, aluminium cans, paper and cardboard, milk bottles, soft drink bottles and food waste)	720 m^3
Human waste	14,000 kL

34.3 Operational Waste

Waste generated from the operation of the new terminal would not vary in type from that currently generated by the operation of the existing container terminals at Port Botany. The types and quantities of waste expected at the new terminal are presented in **Table 34.2.**

Table 34.2 Operational Waste

OPERATION WASTE	ANTICIPATED ANNUAL QUANTITIES OF WASTE FOR DISPOSAL 2025
Domestic waste (glass, aluminium cans, paper and cardboard, milk bottles, soft drink bottles and food waste)	4,500 m^3
Maintenance material - disused parts and components, machinery and scrap metal - hazardous/dangerous goods (including oils and solvents)	 2,500 m^3 100 kL
Sewage	12,000 kL
Wastewater (Trade waste)	7,500 kL
First Flush Stormwater	54,000 kL
Quarantine and Ship Waste	Negligible

34.4 Waste Management and Disposal

The following provides a summary of the mitigation measures that would be implemented to achieve waste minimisation and responsible waste disposal during the construction and operation of the new terminal.

34.4.1 Construction Waste

A Construction WMP would be developed and implemented for the construction phase in accordance with the requirements of the *Waste Avoidance and Resource Recovery Act* 2001, the *Protection of the Environment Operations Act* 1997, the EPA's *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes* (1999), the *Botany Bay DCP 29* and the *National Minimisation and Recycling Strategy.* The plan would be incorporated into the Construction EMP for the project.

The Construction WMP would require that all contractors carrying out construction works record the types, quantities and destinations of all waste material taken offsite. In addition, any licensing requirements (such as EPA licence) for the management and disposal of waste from the site would be identified in the Construction WMP. All personnel would be advised of the waste management and disposal procedures described in the Construction WMP prior to commencing work.

Construction Materials

Construction waste which requires disposal would be minimised by accurately calculating materials brought to the site and limiting materials packaging. Despite implementing these management measures, there would still be some waste materials requiring disposal.

Excess construction materials which are suitable for reuse would be returned to the supplier or stored for future use. Construction wastes which are not suitable for reuse, but are able to be recycled would be temporarily stored onsite in dedicated and secure skips prior to recycling. Construction wastes which can not be recycled would be stored in separate skips. These skips would be collected by a licensed waste contractor on a regular basis and transported for disposal to a licensed landfill or recycling facility as appropriate.

Dredged Materials

It is expected that some dredged material consisting of fine marine silt and mud would be selected during the dredging operations for creation of ecological habitat in Penrhyn Estuary. This material may have to be temporarily stockpiled prior to being spread over the intertidal flats to be created as part of the Penrhyn Estuary habitat enhancement works. The precise quantities of this material would depend on the volume of this material available in the dredged area and the required volume for habitat enhancement purposes. It is not intended to dispose of any dredged material offsite.

Green Waste

Vegetation waste (trees and shrubs) would be shredded or processed onsite into wood chip or mulch, and would be used in the rehabilitation of areas disturbed during construction and for landscaping.

Excavated Soil

Excavated soil generated during site preparation activities would be stockpiled for reuse in landscaping activities surrounding the new terminal area. Any soil which cannot be disposed of in this manner would be transported offsite to a licensed landfill, after appropriate classification of the material is carried out in accordance with the EPA's *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes* (1999).

Domestic Waste

Recycling facilities would be provided to maximise recycling of waste materials such as plastic and glass bottles/containers, aluminium cans and paper/cardboard. Separate bins would be provided for food waste. All domestic waste would be collected on a regular basis and transported offsite for disposal to a licensed landfill or recycling facility as appropriate. Litter bins would be designed in accordance with the bird hazard guidelines described in **Chapter 29** *Bird Hazard*.

Human Waste

Portable toilet facilities would be used during the construction period. These facilities would be emptied on a regular basis and the human wastes would be disposed of offsite in accordance with Council and NSW EPA requirements.

34.4.2 Operational Waste

In general, waste management practices for the operation of the new terminal would be the duty of the future operator(s) of the site. However, the following provides an indication of initiatives for sustainable waste management which operators of the new terminal would be required to adopt.

An Operational WMP would be developed and implemented for the new terminal in accordance with the requirements of the *Waste Avoidance and Resource Recovery Act* 2001, the *Protection of the Environment Operations Act* 1997, the EPA's *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes* (1999), the *Botany Bay DCP 29* and the *National Minimisation and Recycling Strategy.* The plan would be incorporated into the Operational EMP for the terminal.

Domestic Waste

Recycling facilities would be provided at the new terminal and in public recreation areas to maximise recycling of waste materials such as plastic and glass bottles/containers, aluminium cans and paper/cardboard. Separate bins would be provided for food waste and fish remains from fish cleaning facilities in the public recreation area. All domestic waste would be collected on a regular basis and transported off site for disposal to a licensed landfill or recycling facility as appropriate. Litter bins would be designed in accordance with the bird hazard guidelines described in **Chapter 29** *Bird Hazard*.

Maintenance Material

Waste oils and fluids from maintenance activities may be classified under the POEO Act as being Hazardous, Industrial or Group A Waste. The management of these substances may need to be regulated by an EPA Environment Protection Licence which would be obtained by the terminal operator(s). It is expected that these materials would be collected and stored in proprietary facilities and either be reused onsite or removed by a licensed waste contractor.

Scrap metal, used parts, components and machinery would be recycled where practicable.

Sewerage, Wastewater and First Flush Stormwater

During operation of the new terminal, personnel would use the amenity blocks located within the various buildings around the new terminal which would discharge to the Sydney Water sewerage system.

All wastewater (trade waste) from the maintenance, washdown and quarantine areas would discharge to the Sydney Water Corporation sewerage system.

Further details of the sewerage and wastewater treatment system are provided in **Chapter 33** *Water and Wastewater.*

Water from the stormwater first flush system would be directed to the onsite stormwater treatment system. Clean stormwater would be collected in two 10,000 L tanks for reuse onsite or discharged into Botany Bay. Potentially contaminated stormwater or waste material from the stormwater treatment system would be discharged to the sewage system in accordance with a Trade Waste Agreement with Sydney Water Corporation or disposed of offsite by a licensed waste disposal contractor.

Further details of the first flush system are provided in **Chapter 16** *Hydrology and Water Quality*.

Quarantine and Ship Waste

Generally, only small quantities of quarantine waste would be generated by AQIS during routine inspections. This waste would be disposed of in accordance with the requirements of Sydney Ports Corporation, EPA and AQIS.

Whilst in port, container ships usually keep all waste onboard other than quarantined waste. Licensed quarantine waste contractors would be used to dispose of quarantine waste from ships in accordance with the requirements of AQIS.

Where required, slops from ships (i.e. oily water/sludges) would be disposed of by an EPA licensed contractor and then recycled. Greywater/sewerage discharge within the port is prohibited.

34.5 Conclusion

Waste management arrangements would be put in place during the construction and operation of the site to maximise the reduction, recycling and reuse of waste materials. This would be achieved through the implementation of separate WMPs for the construction and operation phases of the new terminal. The WMPs would be developed and implemented in accordance with the requirements of relevant waste management legislation and policies and incorporated into the Construction and Operational EMPs for the site.

Summary of key outcomes:

Energy conservation measures would be implemented to ensure that the use of non-renewable resources is minimised. Energy conservation would be a key consideration in the selection and operation of equipment. Specifications for lighting, heating, ventilation and air-conditioning of the office and industrial buildings on site would be in accordance with the *City of Botany Bay Energy Efficiency Development Control Plan* (2000). Overall waiting times for ships, trucks and trains would be minimised, to reduce fuel consumption, by maximising efficiency in container transfers and implementing efficient terminal scheduling and work practices. Additionally, an increase in rail mode share of container freight movement would reduce the number of containers to be moved by road, further minimising fuel consumption.

A key component of achieving energy conservation would be through the development of an Energy Management Action Plan. This plan would be included as part of the Construction and Operational EMPs and would include detailed measures to minimise energy consumption during the construction and operation of the proposed development.

35.1 Introduction

The majority of energy sources are based on the combustion of non-renewable fossil fuels including diesel, petrol, natural gas and coal for the generation of electricity. Consumption of energy from non-renewable resources has both a direct and indirect impact on the environment. Direct impacts from the combustion of non-renewable resources include effects on local, regional and global air quality and the depletion of non-renewable resources.

During the construction of the Port Botany Expansion, energy would be primarily consumed through the operation of construction equipment and transport of construction materials. During operations, energy would be consumed mainly by terminal equipment, terminal lighting, and the movement of trucks, trains and ships associated with port operations.

The purpose of this chapter is to assess the energy requirements for the proposed Port Botany Expansion and to identify measures which would be applied in order to reduce total energy consumption.

35.2 Construction Phase

During the construction phase, energy consumption would result from activities including:

- dredging and reclamation works, enhancement of public recreation areas and Penrhyn Estuary;
- berth and port infrastructure works;
- development of terminal facilities; and
- procurement and delivery of construction materials.

Table 35.1 shows the fuel type for the typical equipment that would be utilised during construction of the new terminal

Table 35.1 Fuel Types Required During Construction Phase

EQUIPMENT	FUEL TYPE	EQUIPMENT	FUEL TYPE
Trucks	Diesel	Compactors	Diesel
Water Trucks	Diesel	Rollers	Diesel
Mobile Cranes	Diesel	Bitumen Spray Trucks	Diesel
Front End Loaders	Diesel	Asphalt Paving Machine	Diesel
Bobcats	Diesel	Concrete trucks	Diesel
Large Crane	Diesel	Cutter-suction Dredge Rig	Marine fuel oil
Piling Rig	Diesel	Heavy lift ships	Marine diesel
Welding equipment	Diesel	Transport Vessels	Marine diesel
Excavators	Diesel	Tugs	Marine diesel
Dozers	Diesel	Work Boats	Marine diesel
Scrapers	Diesel	Barges	Marine diesel
Graders	Diesel	Hopper Barges	Marine diesel
Backhoe	Diesel		

Electricity would be used for small hand-held construction tools and site office equipment.

Marine fuel oil required for vessels would be provided from existing bunkering facilities in Port Botany. Small road tankers would fuel onsite land-based plant and equipment. Onsite storage of fuel would generally not be necessary during construction, except for minor quantities for small equipment like generators. Some earthmoving contractors, however, may require aboveground fuel storage tanks of up to 20,000 L capacity to provide "standby" fuel supply for their equipment.

The use of fuels and electricity would be minimised during the construction phase for environmental reasons as well as economic savings.

35.3 Operational Phase

During the operational phase, many of the site operations would be powered by electricity. Electricity would be required for:

- quay cranes;
- rail mounted gantries (RMGs);
- powering of refrigerated containers;
- normal building functions (such as lighting, heating, computer and telecommunications facilities);
- lighting and traffic signals;
- maintenance facilities and equipment;
- washbay facilities;
- computer control systems;
- any remote monitoring systems; and
- emergency management facilities and systems.

Plant and equipment not powered by electricity would require a supply of diesel or LPG. These include:

- mobile container handling equipment (e.g. forklifts, straddle carriers etc);
- locomotives;
- general terminal use vehicles; and
- small-scale maintenance equipment.

The estimated annual energy consumption over the operational life of the project is presented in **Table 35.2.** The estimates are based upon the power consumption per unit throughput of similar container handling operations, multiplied by the projected throughput of the new terminal from the initial operational phase in 2010 to 2025 when the new terminal would potentially be close to its maximum capacity.

Table 35.2 Estimated Annual Energy Consumption – Operational Phase

	2010	2015	2020	2025
Projected Throughput (TEUs)	320,000	800,000	1,000,000	1,200,000
Estimated consumption of electricity (MWh)	10,000	17,000	21,000	25,000
Estimated consumption of diesel fuel (litres)	1,462,400	3,656,000	4,570,000	5,484,000

The total estimated connected electricity load for the new terminal would be 18,000 kVA. The most energy intensive equipment for the new terminal would be the quay cranes and RMGs. Ten quay cranes are to be used in the new terminal.

Electricity to the new terminal would be supplied through dual 33 kV feeders from EnergyAustralia's network in Botany Road to an onsite 33kV main substation. The high voltage feeder cables would be buried along the road reserve of Penrhyn Road. From the terminal's main substation, underground cables would be run to a series of cable pits that would supply the quay cranes and RMGs.

Space would be allowed for the construction of smaller substations to supply the buildings, yard lighting and equipment, and possible future energy requirements (e.g. possible shore-based power for vessels at berth). The number of smaller substations, locations of cable pits and alignment of underground power conduits would be determined during the detailed design phase.

Sydney Ports Corporation has considered the provision of shore-based electric power to ships at berth, but has found that the option is not viable at this stage because container ships are not equipped for such connection and most international ships use a power frequency which is not compatible with the local supply (50 Hz vs 60 Hz). The provision of shore power is not common international practice, however, opportunity for future connection would be incorporated in the new terminal.

Diesel supply for mobile equipment and emergency generators would be provided from a 150 tonne aboveground storage diesel fuel tank. Limited quantities of LPG would be stored onsite in a cylinder yard.

35.4 Energy Conservation and Management

Energy conservation measures would be implemented to ensure that the use of non-renewable resources is minimised. A key component of achieving energy conservation would be the development of an Energy Management Action Plan. This plan would be included as part of the Construction and Operational EMPs.

The Energy Management Action Plan would be consistent with the energy conservation measures for commercial and industrial buildings as outlined in the *City of Botany Bay Energy Efficiency Development Control Plan, July 2000.* The DCP promotes efficiency in energy use, conservation of non-renewable energy resources and the reduction of greenhouse gas emissions.

35.4.1 Construction Phase

The following mitigation measures would be undertaken during construction works and would be detailed in the Construction EMP:

- efficient work scheduling and methods that minimise equipment idle time and double handling of material;
- throttling down and switching off construction equipment when not in use;
- switching off truck engines while they are waiting to access the site and while they are waiting to be loaded and unloaded;
- switching off site office equipment and lights and using optimum lighting intensity for security and safety purposes;
- careful design of temporary roads to reduce transportation distances;
- regular maintenance of equipment to ensure optimum operations and fuel efficiency; and
- the specification of energy efficient construction equipment.

35.4.2 Operational Phase

The following mitigation measures would be implemented during site operations and would be detailed in the Operational EMP:

Energy Efficient Design

Design of buildings and terminal layout would aim to achieve the following energy efficiencies:

- reduction of heating, cooling and lighting use in buildings through climate-responsive design and conservation practices;
- employing renewable energy sources such as daylighting and passive solar heating;
- optimising building performance and system control strategies, such as controlling lights with occupancy sensors and controlling comfort heating and cooling with time switches, timer delays or occupancy sensors;
- designing and configuring lighting in accordance with lighting power density and other performance criteria provided in Botany Bay Council's Energy Efficiency DCP;
- maximising the use of solar power for signage, navigation aids and pedestrian lighting; and
- designing roads and railway lines on the site to reduce transportation distances.

Energy Efficient Equipment

Large energy savings could be achieved in using energy efficient equipment. The following actions are examples of how energy savings could be achieved by the terminal operator(s):

- fitting energy intensive equipment like quay cranes and RMGs with energy saving devices such as power factor regulators, harmonic filters, voltage regulators, and drive controls;
- using energy efficient electrical appliances;
- installing lighting control devices where appropriate and linking to photo-electric dimming; and
- providing sufficient energy metering and switching for energy management.

Energy Efficient Work Scheduling and Practice

Energy would also be conserved through efficiency in work schedules and practices such as:

- use of modern container yard management systems for the efficient stacking and retrieval of containers and to minimise ship waiting times;
- road and rail transport scheduling to minimise energy use and wastage, e.g. increasing backloading and minimising waiting times;
- promoting the increase in rail mode share of container freight movement which would reduce the number of containers to be moved by road;
- setting energy use and reduction targets for site operations;
- switching off truck engines while they are waiting to access the site and while these are waiting to be loaded and unloaded;
- throttling down and switching off idle equipment;
- regular maintenance of all powered equipment to ensure appropriate fuel consumption rates; and
- communication and education of energy conservation measures to port employees.

35.5 Conclusion

Energy conservation measures would be implemented to ensure that the use of non-renewable resources is minimised. Energy conservation would be a key consideration in the selection and operation of equipment. Specifications for lighting, heating, ventilation and air-conditioning of the office and industrial buildings on site would be in accordance with the *City of Botany Bay Energy Efficiency Development Control Plan* (2000). Overall waiting times for ships, trucks and trains would be minimised, to reduce fuel consumption, by maximising efficiency in container transfers and implementing efficient terminal scheduling and work practices. Additionally, an increase in rail mode share of container freight movement would reduce the number of containers to be moved by road, further minimising fuel consumption.

A key component of achieving energy conservation would be through the development of an Energy Management Action Plan. This plan would be included as part of the Construction and Operational EMPs

and would include detailed measures to minimise energy consumption during the construction and operation of the proposed development.