Construction Environmental Management Plan

Sydney Port Botany Terminal 3 Project

Supply and Installation of 11kVPower Cables and Construction and Commissioning of 11kV Main substation

Downer Project Number: 11-484

Revision No: 3.5

Downer

Document Details

Submission information

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1. BACKGROUND

1.1 Introduction

The expansion of the Sydney Port Botany container port facilities is key to the long term trade growth of freight activities at Port Botany, with the Terminal 3 Advanced Works Contract 04 providing critical infrastructure to progress the site.

On behalf of Sydney International Container Terminals (SICTL), Downer has been contracted to construct the 11kV Main substation, incoming 11kV feeder cables and associated electrical, civil and connection works.

Terminal (T3) at Port Botany is due to be operating for trade by 2013.

1.2 Project Description

The proposal for Terminal 3 Advanced Works Contract 4 is to bring 11kV power supply from the Ausgrid's Penrhyn Road Zone Substation to the Sydney Port Botany Terminal 3 site, including the construction of a substation bench; construction of an 11kV Main substation, cable trenches and electrical conduits; installation of 11kV equipment, supply and installation of power cables, connection works and commissioning of the Main substation.

Other work packages may include installation of electrical conduits from the Ausgrid Penrhyn Road Zone Substation to the GSW boundary.

1.3 CEMP context

This Construction Environmental Management Plan (CEMP) is appropriate for the works Downer is responsible for. However Downers works fall within the Laing O'Rourke's footprint, therefore some controls cannot be fully implemented and monitored without considering Laing O'Rourke Main Works Construction Environmental Management Plan. For example, access to the site is being constructed by Laing O'Rourke, therefore Downer will comply with their access requirements.

This CEMP addresses environmental issues, risks and impacts associated with the construction of the project.

This CEMP encourages best construction practice and ensures that environmental damage during construction is minimised, moreover, the purpose of this document is to control the potential negative environmental impacts associated with the construction phase of the project and/or to enhance any positive environmental impacts. The effective implementation of this CEMP will ensure that the construction activities are conducted and managed in an environmentally sound and responsible manner.

1.4 CEMP objectives

The environmental objectives for the project and aims of this CEMP are listed in Table 1:

Table 1 Environmental objectives of the project and this CEMP.

Objectives	Targets	Implementation and Planning
Compliance with environmental legislation	• 100 % compliance with all legal requirements and Licenses	Review of Audit reports and monthly reports.
Conformance with the CEMP	• Environmental incidents and non-conformance reported and logged within 24 hours of occurrence • Corrective actions assigned and completed within designated time frame	Environmental surveillance /weekly inspections undertaken Review of non-corrective action register Review monthly reports
Ensure commitments made to relevant stakeholders are implemented throughout construction	• Respond to all complaints within a 24 hour period	Review of complaints register
Ensure compliance to CEMP requirements by undertaking inspections and audits	• Environmental surveillance /weekly inspections undertaken • Audits completed as per the audit program	Review of audit schedules Review of non-conformance register Review monthly reports
Environmental training and awareness of all staff to ensure competence and compliance with management controls in CEMP	• Environmental inductions conducted • Specific environmental training delivered by appropriately qualified personnel prior to construction work	Review of training records Monitoring and Auditing Review Monthly reports

1.5 CEMP distribution and document control

This plan is a 'living document' and will be reviewed and updated as necessary in response to changing site conditions or work methods, following any environmental incidents or where

there is considered a need to improve environmental performance during the life of the project.

1.6 Distribution Policy

1.6.1 Controlled Copies

Controlled copies of this CEMP are allocated a copy number. The list of holders issued with controlled copies as follows:

Copy No.	Issued To
Master	Project Manager
01	Safety and Environment Advisor
02	Site Supervisor
03	Project Environmental Representative
04	SICTL
05	Laing O'Rourke

The personnel to whom these copies have been issued will be sent amendments as they occur, and it is their responsibility to discard superseded pages and insert new pages.

1.6.2 Uncontrolled Copies

Uncontrolled documents will not be allocated a copy number and will not be followed by amendments.

1.6.3 Revision and Re-issue

Revisions to this CEMP may be required during the project to reflect changing circumstances or identified deficiencies. Revisions may result from:

- Management Review
- Audit (either internal or by external parties)
- Complaints or non-conformance reports
- Changes to the Company's standard system.

Revisions shall be reviewed and approved by the Downer Project Manager prior to issue.

Updates to this Plan are numbered consecutively and issued to holders of controlled copies.

Date	Description
June 2012	Initial Development

Records of subsequent updates are shown on the revision history.

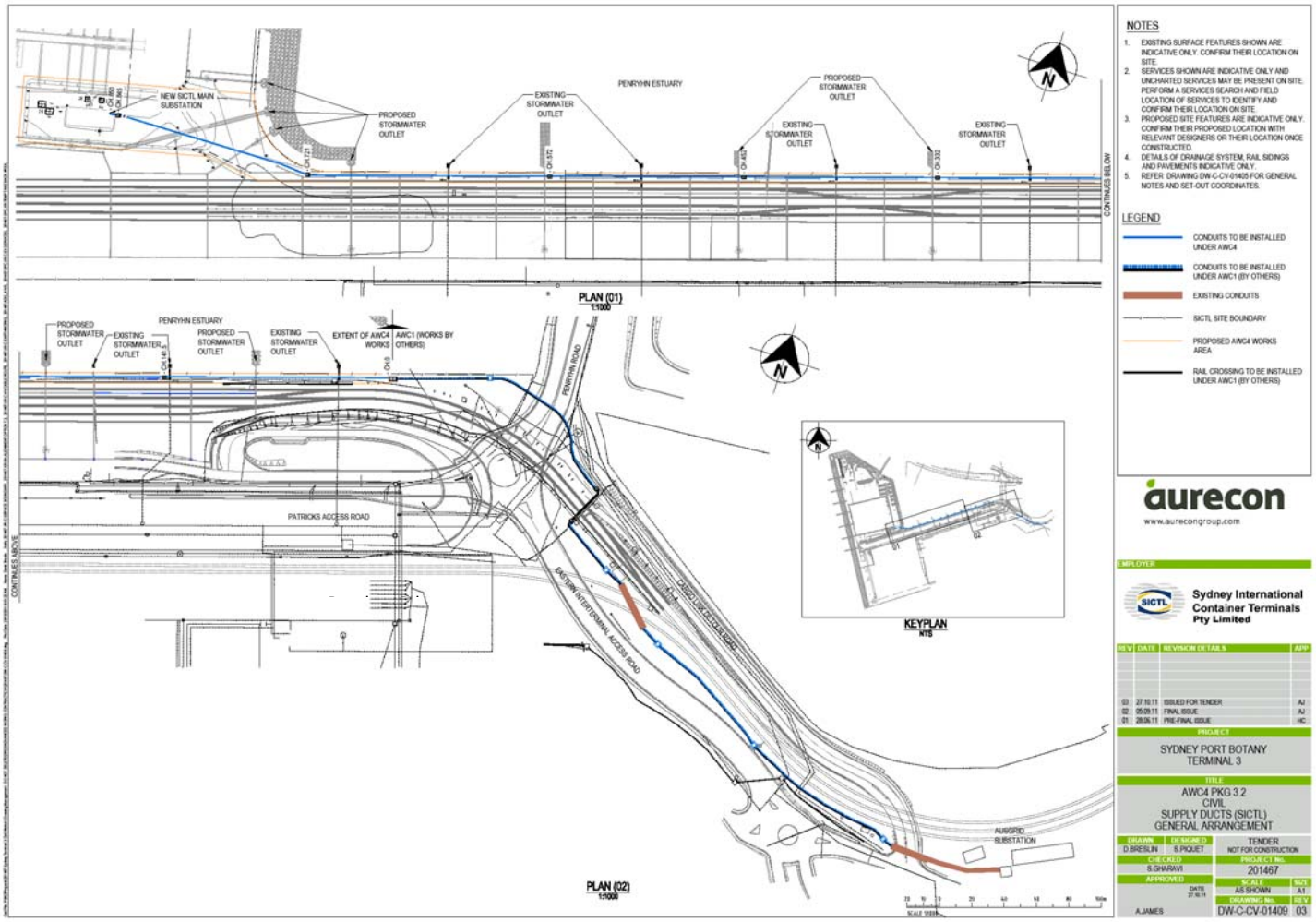
2. SITE DESCRIPTION AND SCOPE OF WORKS

2.1 Site location and layout

Port Botany is Sydney's main commercial port, having overtaken Sydney Harbour in the mid 1980's. It was constructed during the 1970's, mostly from sand dredged from the entrance to Botany Bay, and is now a specialised port, handling containers and bulk liquids.

The site is located at GateB103, Penrhyn Road Port Botany, NSW and has access to major arterial roads (see Figure 1).

Figure 1 Site Layout



2.2 Scope of works

2.2.1 Separable Portion 1

The Works under this Separable Portion shall comprise:

- Stripping of all grass and vegetable matter from the surface on which fill is to be placed,
- Removing loose or unsuitable areas of ground and replacing with suitable material,
- Saturate prepared subgrade surface and compact with a heavy vibratory roller,
- Placing geofabric and geogrid layer, followed by compacted layer of DGS40,
- Placing second geogrid layer followed by further layers of compacted DGS40, as required, up to platform level;

2.2.2 Separable Portion 2

The Works under this Separable Portion shall comprise:

- Site preparation including exploratory trenching to detect potential existing services at the main substation Site and along proposed cable duct route,
- Design, supply and installation of piles and construction of capping beam for the main 11kV substation,
- Supply, installation, testing and commission of earth grid system,
- Construction of the main 11kV substation at the south east corner of the site,
- Excavation for cable trenches and pits between the main substation and the GSW boundary and between the main substation and the northern and western boundary of the substation bench,
- Construction of pits between the main substation and the GSW works boundary and between the main substation and the northern and western boundary of the substation bench,
- Laying of conduits including spare conduits in the cable trenches between the main substation and the GSW boundary and between the main substation and the northern and western boundary of the substation bench,
- Bedding infill and concrete encasement of conduits and
- Backfilling trench with compacted fill.

2.2.3 Separable Portion 3

The Works under this Separable Portion shall comprise:

- Unloading of Principal supplied one 750kVA 11/0.433 kV transformer and 11kV switchgear panels for the main substation,
- Supply and installation of 11kV cable supports and cable for connection of the transformer to the main substation,
- Installation, testing and commission of one 750kVA 11/0.433 kV transformer and 11kV switchgear panels in the main substation,
- Supply and installation of cable trays, pathways and electrical and communication conduits within the substation,

- Supply and installation of LV switchboard and all LV cabling (including substation LV switchboard, MP&L board, and DC Board),
- DC auxiliary supply system and all in-building lighting and general power, fire protection and mechanical services,
- All secondary system connections for the 11kV equipment and the 11kV main substation
- Supply and installation of control cables with sufficient coils of wires for termination,
- Supply and installation of metering panel,
- Supply, installation, testing and commissioning of three individual control panels for the control of the two sump pumps and a sub- soil drainage pump located in the basement of the main substation,
- Supply and installation of air conditioning and ventilation,
- Supply, installation, testing and commissioning of two individual control panels for the control of the two air conditioners located on the south side of the main substation, and the split system air conditioner in the metering room,
- Supply, installation, testing and commissioning of a lightning protection system for the main substation;
- Liaison and coordination with Ausgrid with respect to connection works and commissioning of the main substation;
- Supply, installation and testing of two power circuits, with each comprising two 11kV cables, between the main substation and AusgridPenryhn Road Zone Substation,
- Supply, installation, testing and commissioning of fibre optic cables for protection interface for two circuits between the main substation and AusgridPenryhn Road Zone Substation, and
- Commissioning of the main substation

2.2.4 Separable Portion 4

- Supply, installation and testing of two power circuits, with each comprising two 11kV cables, the from Ausgrid substation to GSW Boundary
- Supply, installation, testing and commissioning of fibre optic cables for protection interface for two circuits from Ausgrid substation to GSW Boundary, and
- Testing of Cabling

2.3 Construction Plant and Equipment

Indicative type, usage and proposed operating hours of plant that is likely to be required for the construction of the project are listed in Table 2.

Table 2: Proposed type, usage and indicative operating hours of plant:

Aspect	Description of Activity	Plant / Equipment	Hours of Use
Trenching	• Excavation; • Compacting; • Concreting.	• 8 and 5 tonne Excavator; • 3 tonne Tipper Trucks; • 8 tonne Tipper Trucks • Hand Vibratory Compactor; • Street Sweeper • Water	Daytime works.
Substation	• Excavation • Compacting	• 8 and 5 tonne Excavator; • 3 tonne Tipper Trucks; • 8 tonne Tipper Trucks • Smooth Drum Roller;	Daytime works.
Site Compound	• Deliveries; • Plant and Equipment; • Maintenance; • Refuelling • Storage Areas.	• Light Vehicles; • Excavator; • Tippers; • Storage of 200L Diesel and 20L containers of Diesel and Unleaded;	Daytime works.

2.4 Construction Hours and Schedule

Hours of work unless otherwise approved shall be restricted to those nominated by the contract and are:

- 7.00 am to 6.00 pm Monday to Friday
- 8.00 am to 1.00 pm Saturday

2.5 Timing and scheduling

Construction at the proposed site is scheduled to commence in November 2012 and be completed in May 2013.

Description of Activity	Month
Site Establishment	Nov 2012
Trenching and Substation Footing	Nov 2012 – April 2013
Above Ground Works	Nov 2012 – April 2013
Commissioning	May 2013

3. ENVIRONMENTAL MANAGEMENT STRUCTURE AND RESPONSIBILITIES

3.1 Environmental Policy

Downer is engaged in Australia wide civil engineering and project management including design, construction and infrastructure maintenance services.

Downer is committed to delivering profitable projects and services in a safe and environmentally responsible manner.

Downer's environmental policy shall be:

- Displayed at prominent locations
- Communicated to site personnel during induction and training
- The policy is to be adopted by all project personnel

3.2 General

- All personnel are required to attend environmental induction prior to commencement of works
- All personnel are required to implement environmental practices within their work area
- Comply with relevant Acts, Regulations and Standards and conditions of project approval and licensing requirements
- Promptly report to management on any non-conformance and/or breaches of the system
- Undergo training in environmental awareness as directed by management
- To undertake remedial action as required

Responsibilities of key personnel for this project are summarised below.

3.2.1 Project Manager

The role of the PM is to manage the delivery of the project. Responsibilities include:

- Develop and approve CEMP
- Be fully conversant with the requirements of the CEMP
- Appoint the Project Safety and Environment Advisor
- Ensure that the CEMP is fully implemented, monitored and adjusted to suit the requirements of the operations system and the client's requirements.
- Ensure that all employees are conversant with their responsibilities and duties under the CEMP
- Liaison with Approval Authorities
- Take action to correct non-conformance

- Ensure that the requirements of any operating procedure from the Operations System are fully complied with when administering the CEMP.

3.2.2 Project Safety and Environmental Zero Harm Advisor

- Overall responsibility for the implementation of environmental matters on the project
- Ensure that all sub-contractors and other workers appointed by the Contractor are aware of their environmental responsibilities while on site
- Operate the induction and training program for all personnel involved with construction
- Maintain a register of environmental training for all site staff and sub-contractors for the duration of the project
- Review project Environmental Management Sub-Plans to ensure compliance with specified requirements
- Comply with the Environmental Specifications and legislative requirements contained in the CEMP
- Planning of necessary environmental controls
- Undertake weekly site inspections (as specified in the CEMP) to monitor environmental performance and conformance with environmental Specifications
- Review all complaints received from public members and authorities and give directions to implement corrective actions
- Supply environmental information as and when required
- Ensure environmental records and files are maintained
- Update CEMP, licenses and permits and environmental controls as required

3.2.3 Project Supervisor

- Supervise-day-to-day construction activities at the relevant sites
- Directly responsible for the day-to-day implementation of the CEMP and will ensure that the projects operations comply with all relevant obligations for the period of this contract
- Review project Environmental Management Sub-Plans to ensure compliance with specified requirements
- Ensure that all sub-contractors and other workers appointed by the Contractor are aware of their environmental responsibilities while on site
- Carry out and document weekly inspections
- Ensure effective environmental controls are implemented and maintained
- Liaise with the Safety and Environment Advisor as appropriate to ensure conformance with legislative requirements and report any breaches of the system

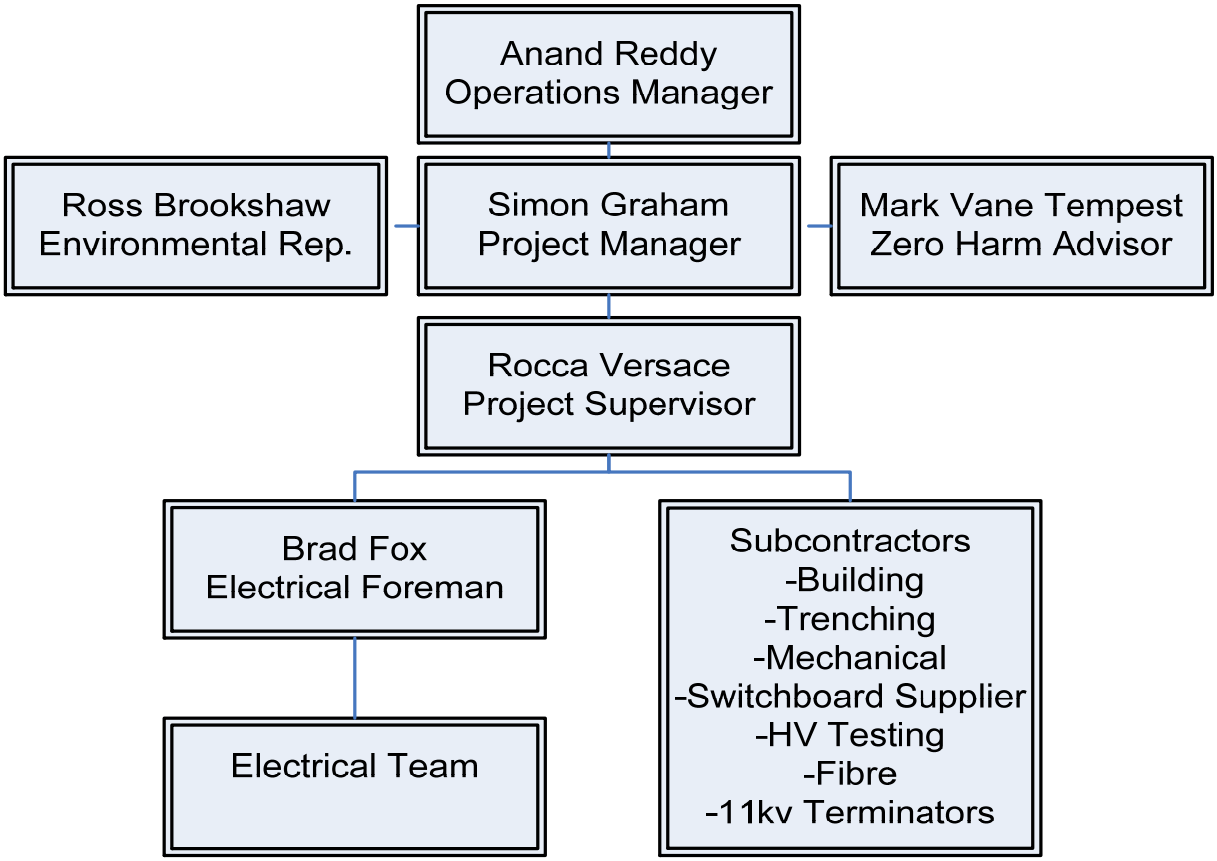
3.2.4 Site Supervisors

- Carry out and document weekly inspections
- Ensure effective environmental controls are implemented and maintained

3.2.5 Subcontractors/Consultants

- Be familiar with the contents of the CEMP and Environmental Policy
- Comply with all relevant conditions of the project approval and licensing requirements
- Comply with directions from management and supervisors
- Undertake induction and any environmental training required
- Stop work at the direction of management

3.2.6 Project Organisation Chart



3.3 Licenses, Permits and Approvals

This CEMP is to be approved by the Director General of the Department of Planning and Infrastructure.

The list of licences and consents is provided below. These will be tracked on the Project Permits and Licences Register;

- NSW Minister for Planning Conditions of Approval for the Port Botany Expansion Project
- MOD 1 – MOD-107-9-2006-i approved 11 September 2007
- MOD 2 – MOD-134-11-2006-i approved 11 September 2007
- MOD 3 – MOD-149-12-2006-i approved 11 September 2007

- MOD 4 – MOD-78-9-2007-i approved 17 September 2007
- MOD 5 – MOD-60-9-2008 approved 21 September 2008
- MOD 6 – MOD-68-12-2008 approved 12 December 2008
- MOD 7 – MOD-08-03-2009 approved 20 March 2009
- MOD 8 – 494-11-2003-i MOD 8 approved 30 May 2009
- MOD 9 – DA-494-11-2003-i MOD 9 approved 18 June 2009
- MOD 10 – DA-494-11-2003-i MOD 10 approved 13 July 2009
- MOD 11 – DA-494-11-2003-i MOD 11 approved 21 November 2011
- MOD 12 – DA-494-11-2003-i MOD 12 approved 7 June 2012
- Commonwealth of Australia Environment, Protection and Biodiversity Conservation Act 1999 approval – reference 2001-543
- Port Botany Expansion Environmental Impact Statement
- Sydney Port Corporation Green Port Guideline – May 2006
- Future modifications to Sydney Container Terminal 3 under Section 75W of the Environmental Planning and assessment Act 1979
- Construction Environmental Management Plan (CEMP) and associated plans approval from relevant authorities
- Approval for works undertaken outside the hours approved by the Director General
- Penrhyn Estuary Habitat Enhancement Plan

3.4 Downer's Operations System

Downer is currently in transition to a Downer Infrastructure integrated Management System documented but maintains the requirements of:

- AS/NZS ISO 31000:2009 Risk Management
- AS/NZS ISO 9001:2008 Quality Management System
- AS/NZS 4801:2000 Occupational Health & Safety Management System
- AS/NZS ISO 14001:2004 Environmental Management System

3.5 Reporting

3.5.1 System documentation

The Project Manager will ensure Document and Records Control is carried out in accordance with Downer procedures. The procedure includes standard protocols for the identification, approval, distribution, maintenance, review, archiving and disposal of all documents and records associated with the project. Downer's Operations Systems Documents are listed in the EMP.

The Environmental Manager is responsible for maintaining legible up to date environmental records to demonstrate compliance with the project CEMP. All monitoring data is to be provided to Laing O'Rourke for consolidation and publishing in monthly and annual reports. Other documents that may be used to describe the system and records control procedure include:

- Project quality plans (PQP)
- Project Safety Plans (PSP)
- Inspection and checklists
- Monitoring
- Auditing
- Corrective actions
- Complaints
- Site induction
- Document control

3.6 Environmental Training

3.6.1 Site induction

All personnel will undergo a site induction prior to commencing on site. The Safety and Environment Advisor and Site Supervisor is responsible for ensuring all staff/sub-contractors have been appropriately inducted into the site and are aware that it is the responsibility of all personnel to adhere to environmental requirements. The induction will cover the site specific environmental issues and will include (as a minimum) the following:

- CEMP, related Plans and documents
- Legal obligations and potential consequences of departure from procedures
- understanding individual authorities and responsibilities
- project environmental objectives and targets
- significant project aspects, impacts and controls
- Exclusion zones
- Location and objective of erosion and sediment control measures
- Emergency procedure and response
- Location and use of spill kits
- Minimising potential environmental impacts including noise, air and water quality
- Waste management and disposal of materials

- Procedures for handling and storage of waste materials
- Washing, refuelling and maintenance of vehicles, plant and equipment
- Efficient use of plant, equipment and materials
- Entry and exit points/traffic routes
- Hours of operation
- Noise and Vibration limits

Staff /subcontractors whose activities have the potential to significantly impact upon the environment or who have a specific role in implementing a sub-plan (such as Weed management) will undergo specific, tailored training providing detailed instructions of procedures to be followed.

3.6.2 Visitor Induction

All visitors must undergo a visitor's induction which may be tailored where there is minimal potential for harmful effects to health and the environment. Sub-contractors are responsible for the actions of their visitors. All visitors must be accompanied at all times.

3.6.3 Tool Box Talks

Tool box talks will be conducted for employees and subcontractors regularly. Tool box talks will be undertaken in response to evolving issues on the ground, particularly in response to significant environmental incidents and non-conformance issues.

3.7 Emergency Response

Incident Response Procedures for environmental emergencies will be in accordance with Downer Incidence response Plan. All incidents are to be reported to the Project Environmental Representative who will ensure that all appropriate procedures are adhered to. All incidents are to be recorded within the incident database known as INX.

4. IMPLEMENTATION

Aspect	Potential Impacts	Consequences	Probability	Risk Ranking	Controls
Hydrology and Water Quality	Degradation of groundwater quality	3 – High	3 - Likely	C	Refer to section *Hydrology and water quality*
	Degradation of surface water	4 – Severe	3 - Likely	C	Refer to section *Hydrology and water quality*
Terrestrial ecology	Spread of noxious weeds	2 – Medium	1 - Rare	D	Refer to section *Terrestrial Ecology*
	Impacts to the shorebirds roosting on the northern shoreline of Botany Bay between the Parallel Runway and the existing port	4 – Severe	2 - Unlikely	C	Refer to section *Terrestrial Ecology*
Bird Hazard	Increase in the existing bird hazard to aircraft operating from Sydney Airport	5 - Extreme	3 - Likely	C	Refer to section *Bird Hazard*
Noise & Vibration	Noise generation from tipper movements and machinery cause an environmental nuisance at a 'noise sensitive place'	3 – High	3 - Likely	C	Refer to section *Noise and Vibration*
Traffic and Access Management	Blocking lanes and thus increasing congestion	3 – High	3 - Likely	C	Refer to section *Traffic and Accessibility*
Hazards and Risk	Injuries from occurring to workers while onsite	5 - Extreme	2 - Unlikely	B	Refer to Integrated Site Management Plan

Aspect	Potential Impacts	Consequences	Probability	Risk Ranking	Controls
Visual Impacts	Visual intrusion from construction activities	3 – High	1 – Rare	D	No further action required
Erosion, drainage and sediment control	Outflow environment through elevated turbidity or pollutant levels	4 – Severe	2 - Unlikely	C	Refer to section *Erosion, drainage and sediment control.*
	Erosion on site resulting in sedimentation of drainage systems	3 – High	2 - Unlikely	C	Refer to section *Erosion, drainage and sediment control..*
Air Quality and Dust Management	Dust/particle matter from excavation works and vehicle movement cause an environmental nuisance	4 – Severe	2 - Unlikely	C	Refer to section *Air Quality and Dust Management*
	Dust from stockpile areas cause an environmental nuisance	4 – Severe	2 - Unlikely	C	Refer to section *Air Quality and Dust Management*
Waste Management	Inappropriate disposal of waste	4 – Severe	1 – Rare	C	Refer to section *Waste Management and Minimisation*
	Contamination of the surrounding environment from inappropriate storage and handling	2 – Medium	1 - Rare	D	Refer to section *Waste Management and Minimisation*
Hazardous Materials	Storage and handling of hazardous materials can cause material harm to the environment	4 – Severe	2 - Unlikely	C	Refer to section *Hazardous materials*

Aspect	Potential Impacts	Consequences	Probability	Risk Ranking	Controls
Cultural Heritage	Discovery of cultural heritage artefacts.	3 – High	1 – rare	D	Refer to section *Cultural Heritage*
Potential and Actual Acid Sulphate Soils	Disturbance of Potential Acid Sulphate soils and Actual Sulphate soils	3 – High	1 – rare	D	Refer to Acid Sulphate Soil Management Procedure

5. ENVIRONMENTAL MANAGEMENT AND CONTROLS

5.1 Hydrology and Water Quality

Legal requirement:

- Managing Urban Stormwater: Soils and Construction Vol 4 (Landcom)
- POEO Act 1997
- Water Management Act 2000
- MCOC

From discussion with the previous contractors working on the site and within the Caltex terminal, Downer discovered the groundwater is at a depth of at least 1.7m from the current site ground level. Therefore, it is unlikely groundwater will be encountered during the trenching works as the excavation is not likely to be greater than a depth of 1m. The substation excavation for the footings will be to a depth of 2m and could encounter groundwater. In the event that ground water is encountered, Downer will pump this water back into site. Should Downer require to pump water off site, the water will be tested to ensure its compliance with DECCW Waste Classification Guideline and Protection of the Environment Operations (Waste) Regulation 2005.

Surface Water management is managed in Erosion and Sediment Control.

Table 1 below describes the relevant Environmental Controls to be implemented for the effective control of groundwater and surface water quality as a result of the project. This table is considered to provide adequate environmental controls applicable to the project, and is sufficient to act as the main Management Plan.

Table 1 Environmental Management Controls

	Environmental Management Controls	Person Responsible	Timing/Frequency
Groundwater Infiltration Pits			
1.	Where groundwater is flowing into any excavation works, shallow groundwater infiltration pits will be used at no greater than 1.5m in depth and as long as is necessary for appropriate dewatering.	Civil Supervisor	During dewatering
2.	All groundwater infiltration pits will be covered with bird netting.	Civil Supervisor	During dewatering
3.	Flow into groundwater infiltration pits will be monitored continuously whilst pumping is undertaken to ensure adequate infiltration rates are maintained	Civil Supervisor	During dewatering

	Environmental Management Controls	Person Responsible	Timing/Frequency
	and the pits do not overflow		
4.	The distance between the pumping pit and the receiving pit will be reduced to the extent practicable.	Civil Supervisor	During dewatering
5.	Pumping must cease, if overflowing is imminent, until the groundwater infiltration pit is considered at a level capable of accepting more groundwater.	Civil Supervisor	During dewatering
6.	Upon completion of dewatering works, excavated soil materials will be replaced in original source pits.	Civil Supervisor	During dewatering
Contaminated water			
7.	It is unlikely acidic or other contaminated waters are discovered. If suspected contaminated water is discovered through sight and smell, the Downer and Sydney International Container Terminals (SICTL) Project Manager will be contacted immediately to prepare a suitable plan treatment or disposal plan as per the DECCW Waste Classification Guideline and Protection of the Environment Operations (Waste) Regulation 2005	Civil Supervisor	During dewatering

5.2 Terrestrial Ecology Management

Downer's scope of works will not interfere with the shorebirds Penrhyn Estuary Shorebirds that habitat the area between October and March. All work will be occurring during the day, refer section 2.4, to ensure lighting does not impact on the Shorebirds and the size of the equipment within section 2.3 table 2 has been carefully considered to reduce noise. For further noise procedures, please refer to section 5.4 Noise and Vibration.

Legal requirement:

- MCOC
- Native Vegetation Act 2003
- Noxious Weeds Act 1993
- Threatened Species Conversation Act 1995

Table 2 below describes the relevant Environmental Controls to be implemented for the effective control of the shorebirds, weeds and rubbish as a result of the project. This table is considered to provide adequate environmental controls applicable to the project, and is sufficient to act as the main management plan.

Table 2 Environmental Management Controls

	Environmental Management Controls	Person Responsible	Timing/Frequency
	Shorebirds		
1)	Trenching work will start at the eastern side of the site in November to be at the greatest distance from the shorebird territory as possible.	Civil Supervisor	Commencement of trenching
	Weed Management		
2)	Earth-working equipment would be cleaned of excess soil prior to arrival to site to minimise the likelihood of the spread of weed seeds and plant pathogens.	All	Prior to arrival to site
	Rubbish Management		
3)	All mobile equipment will carry appropriate reciprocals which will be emptied at the end of each shift at a central reciprocal. Waste will be managed as per the Waste Management section.	Project Manager	Prior to arrival to site/ ongoing

5.3 Bird Hazard

Downer will not increase the current bird hazard, in particular Silver Gulls, Australian Pelicans and Australian White Ibises.

Legal requirement:

- National Parks and Wildlife Act 1974
- Threatened Species Conservation Act 1995
- EPBC Act 1999

Table 3 below describes the relevant Environmental Controls to be implemented for the effective control of birds as a result of Downers works. This table is considered to provide adequate environmental controls applicable to Downers works, and is sufficient to act as the main management plan.

Table 3 Bird Hazard Environmental Management Controls

	Environmental Management Controls	Person Responsible	Timing/Frequency
Pooling Water Management			
1)	Waste reciprocals to be bird and animal proofed	Project Manager	Prior to Construction
2)	The trench works will be completed in sections of approximately 50m at a time which can be returned to the grade prior to the end of the day. All backfilling will be conducted and strictly monitored as per the Inspection and Test Plan to prevent/ minimise depression and water pooling which could attract birds.	Civil Supervisor	During trench works
3)	The substation footing will be installed as quickly as possible following excavation. Should the excavation show signs of water pooling, dewatering will occur. Bird netting will be placed over the exposed excavation when work is not occurring such as overnight or on public holidays.	Civil Supervisor	During excavation of substation
4)	All infiltration pits will be covered with bird netting to prevent birds gathering in the areas.	Civil Supervisor	Dewatering Activities.

5.4 Noise and Vibration

Hours of work will be restricted to the following:

- 7.00 am to 6.00 pm Monday to Friday
- 8.00 am to 1.00 pm Saturday
- At no time at night, on Sundays or public holidays

Should works outside of these hours need to occur, the requirements of the Laing O'Rourke Out of Hours Works Protocol will be instigated.

This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons. Note: 'safety or emergency reasons' refers to emergency works which may need to be undertaken to avoid loss of life, property loss and/or to prevent environmental harm.

All work will be occurring during the day and the equipment within section 2.3 has been carefully considered to reduce noise without compromising the standard of work. Downer does not envisage rock breaking equipment will be used on site.

The Port Botany area is currently subject to noise emissions from existing port operations, road traffic (particularly Foreshore Road), rail traffic from the Botany Freight Rail Line, Sydney Airport and other industrial activities. Noise from existing terminals at Port Botany are a result of activities such as transporting and loading containers onto trucks, trains and ships.

Background noise levels have been considered and monitoring will occur to ensure there is limited impact to residents as per the Laing O'Rourke Construction Noise and Vibration Management Plan.

Ground Born vibration levels generated by Downer's activities associated with the Port Botany Expansion are not likely to impact on sensitive receivers given they are at least 300m from the activities.

Legal requirement:

- Interim Construction Noise Guideline (2009, DECCW)
- Green Port Guidelines: Sustainable strategies for port developments and operations

Table 4 Mobile Plant Noise Analysis

Plant Type	A weighted sound pressure levels at 10m
5 tonne Excavator	75 Laeq
8 tonne Excavator	80 Laeq
3 tonne Tipper Truck	75 Laeq
8 tonne Tipper Truck	75 Laeq

Plant Type	A weighted sound pressure levels at 10m
Concrete Truck	76 Laeq

Any complaints received in relation to noise from Downer's activities will be handled in accordance with the measures outlined in the Community and Consultation section of the CEMP.

Table 5 below describes the relevant environmental controls to be implemented for the effective control of noise as a result of the project. This table and the Laing O'Rourke Construction Noise and Vibration Management Plan is considered to provide adequate environmental controls applicable to the project, and is sufficient to act as the main Management Plan for noise and vibration control.

Table 5 Environmental Noise Management Controls

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
1)	All mobile plant will be fitted with noise reduction reversing beepers such as broadband beepers.	Project Manager	Best Practice	Prior to plant arriving on site
2)	Regularly maintain plant as per the manufactures instruction.	Project Manager Civil Supervisor	Best Practice	Prior to plant arriving on site Ongoing
3)	Switch off equipment when not in use.	All	Best Practice	Daily
4)	Idling and 'revving' to be minimised.	All	Best Practice	Daily
5)	All construction equipment and personnel should access the site via the nominated traffic management plan entrances	All	Best Practice	Daily
6)	All project staff to be made aware of noise issues through induction presentation.	Project Manager	Best Practice	Prior to construction
7)	All spoil will be centrally stockpiled and removed (where required) once a week. The central stockpile will be at the site compound which is situated as far from sensitive receptors as is reasonably	Civil Supervisor	Best Practice	Ongoing

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
	practicable.			
8)	Construction activities associated with the project that would generate an audible noise at any residential premises are restricted to the following hours: a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive; b) 8:00 am to 1:00 pm on Saturdays; and c) at no time on Sundays or public holidays. This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons. Note: 'safety or emergency reasons' refers to emergency works which may need to be undertaken to avoid loss of life, property loss and/or to prevent environmental harm.	Project Manager Environment Manager	MCoA B2.19	Throughout construction
9)	Director-General's approval is required to conduct construction activities audible at residential premises outside the hours specified under condition B2.19 on a case-by- case basis.	Project Manager Environment Manager	B2.19A	Throughout construction
10)	For activities subject to an environment protection licence issued by the EPA under the Protection of the Environment Operations Act 1997, conditions B2.19 and B2.19A do not apply if the EPA has approved activities to be conducted outside the hours permitted by condition B2.19.	Project Manager Environment Manager	B2.19B	Throughout construction
11)	Arrange work sites to avoid or minimise truck reversing movements, and ensure vehicles enter and exit work sites in a forward direction.	Project Supervisor Civil Supervisor	MCoA B2.20 EIS ch 22.5.1	Throughout construction
12)	Ensure that where options exist, use least noisy construction methods and equipment.	Project Engineer	MCoA B2.20 EIS ch 22.5.1	Throughout construction
13)	Use vibration or rotary piling techniques for all piles where applicable. Where impact piling is required, limit the impact of noise emissions using measures such as limiting hours of operation, lowering	Project Manager Project Supervisor	MCoA B2.20, EIS ch 22.5.9	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
	the height of use of hammers, shielding the pile driving by the positioning of construction equipment or use of acoustic shrouding and resilient dollies.	Civil Supervisor		
14)	Use silenced generators and compressors.	Civil Supervisor	MCoA B2.20 EIS ch 22.5.1	Throughout construction
15)	Where possible, position and orientate noisy plant and equipment away from sensitive receivers and wildlife in Penrhyn Estuary. Work compounds, offices, parking areas and stockpile areas are all located away from noise sensitive receivers.	Project Supervisor Civil Supervisor	MCoA B2.20	Throughout construction
16)	Position noisy plant and equipment as far apart as is practical from each other.	Civil Supervisor	MCoA B2.20 EIS ch 22.5.1	Throughout construction
17)	Install all noise controls identified in this plan as early as is practical prior to the relevant stage of construction.	Project Supervisor	MCoA B2.25	Throughout construction
18)	Prevent vehicles and plant queuing and idling outside the site prior to the morning start time.	Civil Supervisor	MCoA B2.20	Throughout construction
19)	Prevent vehicles and plant idling when not in use.	Civil Supervisor	MCoA B2.20	Throughout construction
20)	Ensure that equipment is operated in the correct manner including repair of defective silencing equipment, tightening of rattling components, and repair of leakages in compressed air lines.	Project Supervisor Civil Supervisor	Best Practice	Throughout construction
21)	Blasting is not permitted on the SPBT3 Project.	Project Manager	MCoA B2.26	Throughout construction
22)	Notify residents of construction activities likely to affect amenity due to noise or vibration 5 days in advance and no greater than 14 days in advance.	Project Manager	MCoA B2.20 EIS ch 22.5.1	Throughout construction
23)	Construction Method Statements will include the relevant control measures from this CNVMP in particular issues relating to the need for early consultation with receptors likely to be	Project Supervisor Civil	MCoA B2.20	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
	affected by the works, the incorporation of the smallest feasible equipment to complete the works, the opportunity to include additional noise attenuation measures.	Supervisor		
24)	Plant noise audit: Noise emission levels of all critical items of mobile plant and equipment should be checked for compliance with noise limits appropriate to those items prior to the equipment going into regular service.	Project Manager Project Supervisor	MCoA B2.20 EIS ch 22.5.1	Throughout construction
25)	Where practical, excessively noisy processes will be substituted with alternative processes.	Civil Supervisor	MCoA B2.20	Throughout construction
26)	Plant and equipment on site will be fitted with non-tonal reversing alarms.	Project Manager	MCoA B2.20 EIS ch 22.5.1	Throughout construction
27)	The operation of high noise generating plant simultaneously close together or adjacent to sensitive receptors will be avoided where possible.	Civil Supervisor	MCoA B2.20	Throughout construction
28)	High efficiency mufflers will be fitted to all plant and equipment to minimise the generation of noise. All plant will be maintained in accordance with the manufacturer's requirements.	Civil Supervisor	MCoA B2.20 EIS ch 22.5.1	Throughout construction
29)	Undertaking loading and unloading activities away from sensitive and wildlife in Penrhyn Estuary areas and during designated construction hours.	Project Supervisor	MCoA B2.20	Throughout construction
30)	Site personnel will be provided with induction training including the following; • all relevant project specific and standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas	Project Manager	MCoA B2.20 EIS ch 22.5.1	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
	and procedures • site opening/closing times (including deliveries) environmental incident procedures			
31)	Toolbox training on noise management requirements and measures will be completed by the Environmental Manager during the project.	Project Supervisor	MCoA B2.20 EIS ch 22.5.1	Throughout construction
32)	Install the permanent noise barrier along northern and eastern boundaries of the site as early as possible during construction	Laing O'Rourke Environment Manager	MCoA B2.23	As early as possible during construction
33)	Ground vibration from construction activities is not expected to exceed the levels outlined above when measured at building foundations. Where structural vibration criteria are exceeded, the offending process will be ceased and substitute equipment or methods shall be evaluated.	Project Manager	EIS ch 22	Throughout construction
34)	Administrative controls will be incorporated into construction method statements and documentation to ensure the requirements are transferred to the workface	Project Supervisor Civil Supervisor	LORAC Procedure	Throughout construction
35)	Reduce noise levels from piling hammers by placing resilient dollies in between pile and hammer, where practical. The hammer would be shrouded to provide acoustic attenuation	Civil Supervisor	EIS ch 22	Throughout construction

A noise monitoring program is to be carried out by Laing O'Rourke for the duration of the works to assess the construction noise impacts at the relevant receivers. Attended noise monitoring is to be conducted by a suitability qualified Environmental Representative or approved consultant for the SBPT3 project. Monitoring of noise including LAMAX (15 minute), LA90 (15 minute), and LAeq (15 minute) are to be measured by Laing O'Rourke.

Attended noise monitoring is to be undertaken at the nominated locations during the initial commencement of each of the specific construction activities identified above and for all works undertaken outside the standard construction hours. This will serve to check and validate compliance with the project noise goals.

Ongoing attended noise monitoring will be conducted throughout the project on a monthly basis. It shall be conducted during normal work hours and at such a time to be

representative of generating work activities (i.e. when maximum impacts are likely to occur) with the attended measurements are to be repeated on a three-monthly basis. Works being undertaken outside of standard construction times will require attended monitoring.

Vibration monitoring associated with the works will be the responsibility of the Laing O'Rourke Environment Manager. If monitoring is required, it may include a combination of attended and unattended vibration monitoring at the nearest potentially affected locations during vibration generating activities. Monitoring shall be conducted by the Laing O'Rourke Environment Manager or approved consultant using a calibrated vibration monitor.

Monitoring requirements are outlined below in table 6.

Table 6 Noise and Vibration Monitoring

	Environmental Management Controls	Person Responsible	Standards	Timing/Frequency
36)	Construction day & night attended noise monitoring	Project Environment Rep. Project Manager	LAeq(15 min) from construction related works aim not to exceed RBL plus 5dB(A) at sensitive receivers AS 1055	Monthly, and at commencement of construction stages
37)	If a noise or vibration-related complaint is received, investigate within one hour. If requested, undertake attended monitoring at complainant's property	Project Environment Rep. Project Manager	Noise: LA10(15 min) from construction related works not to exceed RBL plus 5dB(A) at sensitive receivers. AS 1055 Vibration: DIN 4150	If requested by a complainant, or at the request of EPA
38)	Construction equipment monitoring to assess compliance with expected noise levels, and to allow any increase in noise levels to be detected and addressed.	Project Manager	As per NSW Industrial Noise Policy AS 2012	When equipment is commencing work on site Three-monthly If equipment is perceived as being noisy or noisier than other similar equipment

5.5 Traffic and Access Management

Downer will be subject to the requirements within the Laing O'Rourke Traffic Management Plan for site access, deliveries and Haul Routes, including obeying all signage and traffic control personnel. This includes the use of the main works construction access point currently being constructed by Laing O'Rourke. The access point is off Foreshore Road at the access road over the Penrhyn Estuary Bridge. All material deliveries to site will be via this bridge access and where possible will be limited to after 9.00am and prior to 3.00pm on weekdays.

The only exception to the Traffic Management Plan will be the trenching works across and adjacent to the junction of Patricks Access Rd/ Eastern Interterminal Access Road and Penrhyn Road. In this situation, a separate location specific traffic management plan will be developed to minimise congestion and ensure safety of the public and Downer staff.

The contribution of Downer's works to the traffic and access management issue may be the potential use of concrete trucks. Downer could have up to 4 concrete truck movements a day, spread throughout the day to minimise the impact on Foreshore Rd and Botany Rd. This is calculated from the encasing of the conduits within the trenching works of 0.45m^2 for about 35m per day. Downer will manage the concrete washouts associated with their concrete trucks in accordance with Laing O'Rourke CEMP.

The other contribution could be from the potential removal of waste soil. Downer aims to reuse most excavated material on site which would mitigate any impacts off site. The worst case scenario is the disposal of 1300 cubic meters of soil which equates to 5 loads transported off site per week for 6 months.

The impact of Downers activities to the existing traffic is minimal compared to the predicted 103 truck movements per day quoted within the EIS.

Legal requirement:

- Roads Act 1993
- MCOC Condition B2.14

Table 6 below describes the relevant Environmental Controls to be implemented for the effective control of traffic and access as a result of Downers works. This table and the Laing O'Rourke Traffic Management Plan is considered to provide adequate environmental controls applicable to Downers works, and is sufficient to act as the main management plan.

Table 6 Traffic and Access Management Controls

	Environmental Management Controls	Person Responsible	Timing/Frequency
1)	Haulage of waste soil will be restricted to 1 day a week to reduce impact on other road users.	Civil Supervisor	During excavation

	Environmental Management Controls	Person Responsible	Timing/Frequency
2)	The haulage route will be planned to reduce impact on the public and follow the requirements set out within the Laing O'Rourke Traffic Management Plan	Civil Supervisor	During excavation
3)	Truck loads will be covered to avoid impact on local residents during transportation on public roads.	All	Ongoing
4)	Construction plant, machinery and staff parking will be within the site.	Project Manager	Prior to construction
5)	Stable access point will be installed at the site entrances to reduce the spill mud onto public roads.	SICTL	Prior to construction
6)	All traffic coming onto and leaving site shall abide by the Laing O'Rourke haulage routes, all signage and traffic control personnel at all times	Project Manager	Ongoing

5.6 Erosion and Sediment Control

Downers disturbance will be minimal compared to the whole project. Therefore Downer will manage Erosion and Sediment control as part of the more holistic sites Soil and Water Quality Management Plan developed by Laing O'Rourke.

Legal requirement:

- MCOC conditions B2.5, B2.6 and B2.7
- Australian Standards, NSW Dangerous Goods (General) Regulations 1999 and NSW EPA
- guidelines
- Managing Urban Stormwater: Soils and Construction Vol 4 (Landcom)
- POEO Act 1997
- Water Management Act 2000

Table 7 below describes the relevant environmental controls to be implemented for the effective erosion and sediment control as a result of the project. This table along with appendix 1 and the Laing O'Rourke Soil and Water Quality Management Plan are considered to provide adequate environmental controls applicable to the project, and is sufficient to act as the main Management Plan for Erosion and Sedimentation control.

Table 7 ESC Environmental Management Controls

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
1)	A stockpile, storage and maintenance area has been identified for the works which is away from the sea wall and stormwater pits. The area will be fenced, sediment fenced and sign posted.	Project Manager	Best Practice	Prior to construction
2)	Where spoil is suitable for reuse on site the spoil will be reused within a week. Where this is not possible, the spoil will be stockpiled and chemically analysed to determine waste classification as per the waste management section.	Civil Supervisor	Best Practice	Prior to construction
3)	Sediment fences along the down slope edges of the stockpiles and groundwater infiltration pit sites to avoid effecting water quality contamination. Sediment fences to be installed as per Figure 2 drawing SD-6-8 (see below).	Civil Supervisor	Best Practice	Prior to construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
4)	Inlet protection will be installed where there is a risk to down slope stormwater inlets as per Figure 3.	Civil Supervisor	Best Practice	During excavation
5)	The trenching works will only be open for a day and cover approximately 50m. Compaction will occur to minimise erosion.	Civil Supervisor	Best Practice	During excavation
6)	The Trenching works will only disturb 10 meters of area along the cable route.	Civil Supervisor	Best Practice	During excavation
7)	All trenching will be undertaken from the land side of the trench. Any spillage of spoil on the sea wall side will be cleared immediately. Spoil will be separated into its components (ie. road base & subsoil) and temporarily stockpiled land side of the trench for backfilling. The road base will be the last layer to go back into the trench as an erosion control. All waste spoil at the end of the day will be loaded into the tipper trucks for temporary central storage.	Civil Supervisor	Best Practice	During excavation
8)	Monitoring of all installed erosion and sedimentation devices and maintenance of controls weekly as a minimum and after rainfall greater than 2mm in a 24hour period.	Project Manager/ Civil Supervisor	Best Practice	Daily
9)	Stockpiles will be removed weekly. (refer to Waste Management Plan)	Civil Supervisor	Best Practice	Weekly
10)	Earthworks will be avoided or minimised during extreme wet weather, in order to minimise water-induced soil erosion and increased sedimentation to the surrounding environment. A return to excavation work maybe delayed until the soil has dried out to an extent as to minimise soil tracking.	Project Manager	Best Practice	During wet weather
11)	Wash down areas will be avoided. Where required, facilities near the exit maybe provided to brush down vehicles. A sediment fence will be installed on the downslope of the	Project Manager	Best Practice	Prior to construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
	brush down area.			
12)	Unloading of concrete trucks into the trench or for the foundation of the substation will be completed over a temporary plastic area to protect from spillage.	Civil Supervisor	Best Practice	Ongoing
13)	Concrete truck washouts will be managed by Downer in accordance with the Laing O'Rourke CEMP	Project Manager	Best Practice	Ongoing
14)	Install and maintain temporary erosion and sedimentation controls, such as sediment fences, diversion drains, etc, where identified by Progressive ESCPs prior to commencing works in each area.	Civil Supervisor	EIS ch18; 18.5.1	Throughout construction
15)	Limit as far as practicable the total area disturbed at any one time.	Project Supervisor	EIS ch37	Throughout construction
16)	Progressively revegetate or seal disturbed areas when works in the area are complete to reduce dust emissions and the total erodible surface.	Civil Supervisor	EIS ch18; 18.5.1	Throughout construction
17)	Minimise traffic volumes on unsealed areas within the construction site. Provide parking and hardstand areas where possible.	Project Manager	EIS ch37; 37.2	Throughout construction
18)	A member of the environmental management team to undertake environmental inspections on a weekly basis or before predicted and after significant rainfall events.	Project Manager Project Supervisor	EIS ch16; 16.8.1	Throughout construction
19)	Provide rumble grids for spoil trucks to pass through prior to leaving the site and accessing public roads.	Project Manager	EIS ch18; 18.5.1	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
20)	Store all fuels, oils and chemicals in secure bunded areas. Cover all permanent bunded areas. Use temporary bunds for short-term (<7-10 days) storage where required.	Project Supervisor	EIS ch16; 16.8.1	Throughout construction
21)	Ensure permanent fuel and chemical bunds have a capacity of 120% of the total volume stored.	Project Supervisor	Best Practice	Throughout construction
22)	Train field staff in the contents and use of spill kits.	Project Supervisor	EIS ch16; 16.8.1	Throughout construction
23)	Implement the spill management procedure in the event of a land based oil or chemical spill. Procedure contained in Emergency Response Plan.	Project Manger All Personnel	EIS ch37; 37.2	Throughout construction
24)	Prohibit alterations to the storm water pipes discharging from the Foreshore Beach unless a drainage analysis of the impacts is undertaken.	Project Manager	EIS ch16; 16.8.1	Throughout construction
25)	Maintain drainage at existing public areas throughout construction.	Project Manager	EIS ch37; 37.2	Throughout construction
26)	Minimising the exposure of fill and excavated material to active work fronts	Civil Supervisor	Best Practice	Throughout construction
27)	Locate soil stockpiles away from drainage lines and in cleared areas or areas to be cleared as part of the works, protect drainage lines. Ensure stockpiles are appropriately covered or stabilised to minimise any run-off being impacted by the material.	Project Supervisor Civil Supervisor	Best Practice	Throughout construction
28)	Revegetate or stabilise soil stockpiles that will be on site for more than one month	Civil Supervisor	Best Practice	Throughout construction
29)	Divert water around any soil stockpiles and install sediment fences on the down slope side of soil stockpiles	Civil Supervisor	Best Practice	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
30)	Maintain temporary erosion and sediment controls so that sediment storage capacity is maximised at all times.	Project Supervisor Civil Supervisor	Best Practice	Throughout construction
31)	Test rainwater collected in bunds prior to dewatering. Criteria include pH between 6.5 and 8.5, and no visible oil on the water surface. Keep records of testing in the onsite environmental filing system.	Project Supervisor Civil Supervisor	POEO Act	Throughout construction
32)	Report spills immediately to the Site Supervisor and Environment Manager	All Personnel	Best Practice	Throughout construction
33)	Report spills reaching water to SPC. Report all spills that cause or are likely to cause environmental harm to OEH's Environment Line (131 555). Report immediately.	Project Manager	Contract	Throughout construction
34)	Implement spill management procedures in the event of an oil or chemical spill.	Project Manager	EIS ch37; 37.2;	Throughout construction
35)	Diverting stormwater runoff around disturbed areas of the site where possible to prevent contamination with runoff from the disturbed areas. Where this is not possible, control measures such as diversion drains will be constructed to ensure stormwater runoff does not cause additional erosive impacts	Project Manager Project Supervisor Civil Supervisor	Best Practice	Throughout construction
36)	Ensuring all personnel is appropriately trained in erosion and sediment controls and environmental awareness	Project Manager	Best Practice	Throughout construction
37)	Washout of concrete trucks will be undertaken in a designated washout area a minimum of 20m away from any watercourses or drainage lines. Concrete is to be	Project Manager Project Supervisor	Best Practice	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
	reused or recycled at an appropriately licensed waste facility.	Civil Supervisor		
38)	Concrete Washout areas will be set up in accordance with the intent of the NSW EPA guideline 'Environmental Best Management Practice Guideline for Concreting Contractors' (2002).	Project Manager Project Supervisor Civil Supervisor	Environmental Best Management Practice Guideline for Concreting Contractors' (2002).	Throughout construction
39)	Turbidity monitoring will be undertaken throughout construction, along with sediment deposition monitoring at location where the underground fuel tank is to be constructed. A relationship will be established between NTU and PAR and NTU and TSS, which will be regularly verified.	Laing O'Rourke Environment Manager	Aurecon FCEMP	Throughout construction
40)	Removal of soil from vehicle wheels and under carriages before departing the site to reduce soil carried off site	Civil Supervisor	Best Practice	Throughout construction
41)	Regular inspection of machinery to identify any leaks	Civil Supervisor	Best Practice	Throughout construction
42)	Ensure construction activities are conducted in a manner that minimises the potential for spills or leaks, including the regular inspection and maintenance of plant and equipment, providing bunding or similar spill containment structures for onsite fuel and oil storage. Contain and clean up any spills or leaks as quickly as possible.	Project Supervisor Civil Supervisor	EIS	Throughout construction

5.6.1 Monitoring

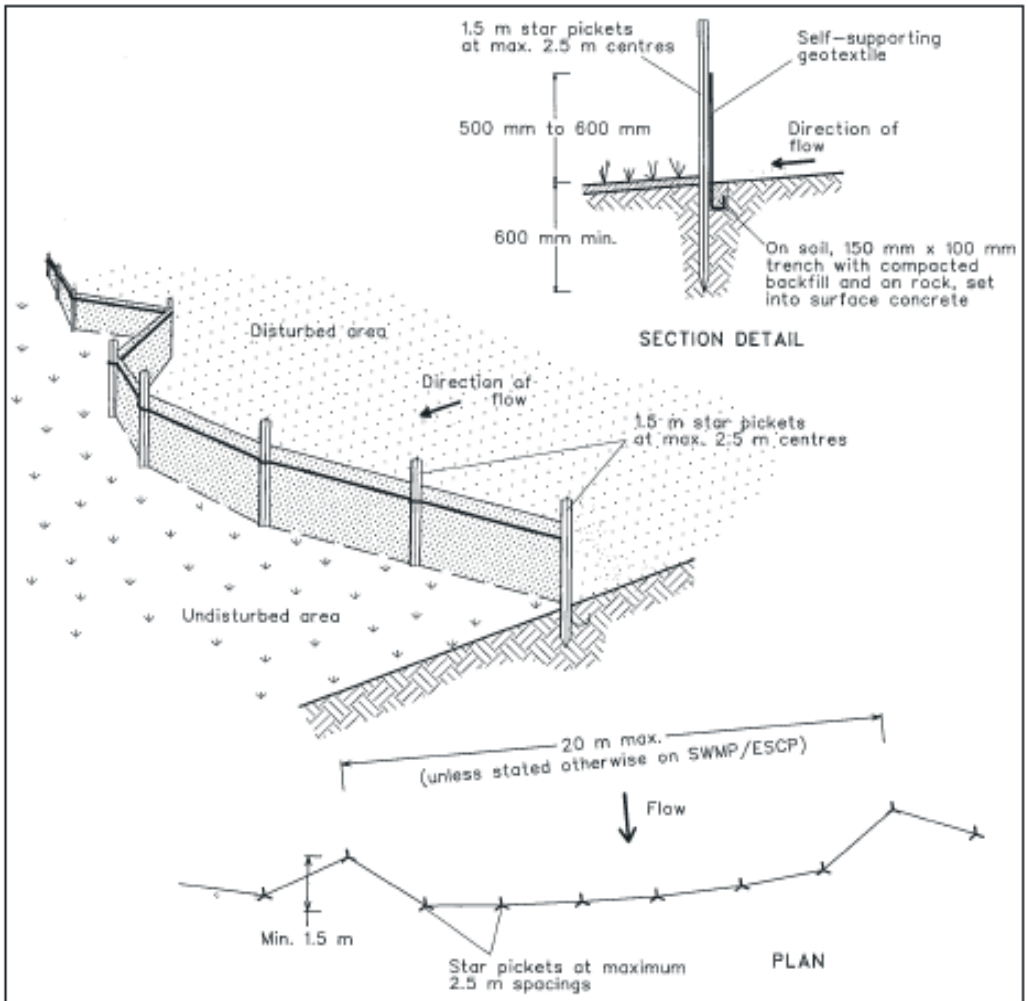
All water quality control and sediment control structures will be regularly inspected and maintained throughout the project.

Water monitoring will be undertaken as outlined in Table 8 below.

Table 8 Water Monitoring

Aspect	Criteria	Means	Location	Construction Stage	Time-frame	Action by:
Ambient water quality during construction	No pollution of waters. In-situ turbidity measurements outside of silt curtain <25ntu, (or as described in the EIS for various weather conditions), pH 6.5-8.5, no visible oil and grease.	In-situ measurement using site water quality meter Laboratory testing and assessment where required	Outside turbidity curtain as active drainage outlet construction and scour protection works progress.	Whole Project	Prior to any discharge from site. Weekly monitoring outside of the turbidity curtains during active drainage works, monthly during other works.	Project Environment Rep.
Discharge water quality	No pollution of waters. Turbidity <25ntu, (or as described in the EIS for various weather conditions), pH 6.5-8.5, no visible oil and grease.	In-situ measurement using site water quality meter Laboratory testing and assessment where required	Sediment basins, Water treatment tanks, Excavations.	Whole Project	Prior to any discharge from site. Weekly monitoring of sediment basins to determine performance.	Project Environment Rep.

Figure 2 Construction of a sediment fence

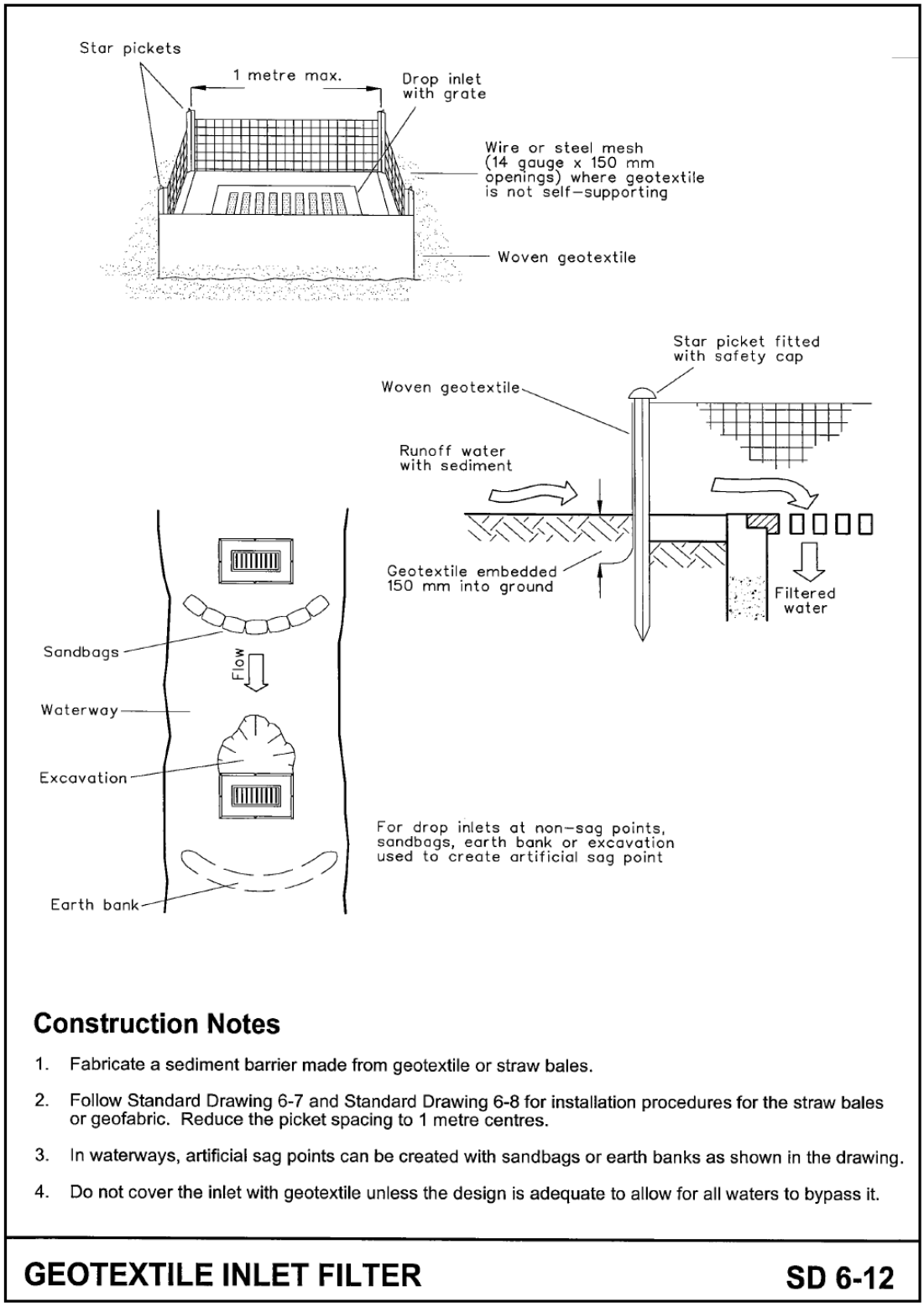


Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE **SD 6-8**

Figure 3 Construction of inlet protection



Construction Notes

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Follow Standard Drawing 6-7 and Standard Drawing 6-8 for installation procedures for the straw bales or geofabric. Reduce the picket spacing to 1 metre centres.
3. In waterways, artificial sag points can be created with sandbags or earth banks as shown in the drawing.
4. Do not cover the inlet with geotextile unless the design is adequate to allow for all waters to bypass it.

GEOTEXTILE INLET FILTER **SD 6-12**

5.7 Air Quality and Dust Management

The site is already established with sealed roads to prevent dust emissions.

Legal Requirement:

- POEO (Clean Air) Regulation 2010
- Office of Environment and Heritage National Environment Protection Measure for Ambient Air Quality: Air Monitoring Plan for NSW - June 2001
- MCOC B2.4

Table 9 below and the Laing O'Rourke Air Quality and Dust Management Plan describe the relevant environmental controls to be implemented for the effective control of air and dust as a result of Downers works. This table is considered to provide adequate environmental controls applicable to Downers works, and is sufficient to act as the main management plan.

Table 9 Air Quality Management Controls

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
1.	Access for vehicles would be limited to sealed and stabilised areas as far as practicable. This is to reduce dust generation and sediment tracking onto local roads.	Civil Supervisor	Best Practice	As required and ongoing
2.	Street sweepers will be used to clear foreign material from the sealed roads.	Civil Supervisor	Best Practice	As required during excavation
3.	Establishment and enforcement of 20km/hr onsite vehicle speed limits.	Civil Supervisor	Best Practice	Prior to construction
4.	Vehicle loads involving loose materials are to be covered when travelling off site.	Civil Supervisor	Best Practice	As required during excavation
5.	Disturbed area's will be minimised and stabilised at the end of each day. This includes the removal of any fill material.	Civil Supervisor	Best Practice	As required during excavation
6.	Where visible dust is being generated, a water cart or hand held water sprays will be used to wet active earthwork areas, stockpiles, gravel roads and loads of soil being transported to reduce windblown dust emissions.	Civil Supervisor	Best Practice	As required during excavation
7.	Works will be immediately stabilised and stopped when the water cart and sprays are not working and visible dust is still present.	Civil Supervisor	Best Practice	As required during excavation

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
	At these times, the stockpile(s) will be covered in plastic and weighed down with sandbags.			
8.	Stockpiles will be removed from site weekly.	Civil Supervisor	Best Practice	During stockpiling
9.	Vehicles and machinery will be regularly serviced and maintained to manufacturers specifications to optimum working conditions so that emissions would comply with the State Environment Protection Policy (The Air Environment)	Plant Operator	Best Practice	Daily
10.	Any complaints relating to air emissions from construction activities will be promptly investigated and where required, additional controls implemented	Project Manager Project Environment Rep.	Best Practice	As required
11.	Apply water, through the use of water trucks, to active earthwork areas, stockpiles, gravel roads and loads of soil being transported to reduce windblown dust emissions.	Civil Supervisor	EIS 23.8.1	Throughout construction
12.	Site roads to consist of coarse gravel and to be kept wet where required to minimise wheel generated dust emissions	Civil Supervisor	EIS 23.8.1	Throughout construction
13.	Place a thin bituminous membrane layer to sections of the reclaimed area not being used for more than 3 months, but where subsequent construction activities are to take place on site, to stabilise and reduce windblown dust emissions	Civil Supervisor	EIS 23.8.1	Throughout construction
14.	Keep the working face and areas of open excavation to a minimum	Civil Supervisor	EIS 23.8.1	Throughout construction
15.	Vegetate or stabilise stockpiles where material is to remain on site for a long period of time (unused for longer than 1 month)	Civil Supervisor	EIS 23.8.1	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
16.	Cease work if excess dust is observed, or phase down while the source is being actively investigated and suppression measures are implemented	Project Supervisor Civil Supervisor	EIS 23.8.1	Throughout construction
17.	Restrict construction traffic to defined roads and keep to 20km/hr site speed limit. Signpost the speed limit along all construction roads	Project Supervisor	EIS 23.8.1	Throughout construction
18.	Remove soil adhering to the wheels and undercarriage of vehicles prior to departure from the site	Civil Supervisor	EIS 23.8.1	Throughout construction
19.	Progressively landscape and vegetate areas as the construction activities proceed, where practical	Civil Supervisor	EIS 23.8.1	Throughout construction
20.	Visually monitor dust generation from work zones to ensure that excessive dust is not being produced.	Civil Supervisor All Personnel	EIS 38.5	Throughout construction
21.	Inspect sites to ensure that adequate dust controls are being used such as regularly watering unsealed areas.	Project Manager Project Supervisor	EIS 38.5	Throughout construction
22.	Ensure that all vehicles entering and leaving the site and carrying a load that may generate dust are covered at all times, except during loading and unloading. Any such vehicles shall be covered or enclosed in a manner that will prevent emissions of dust from the vehicle at all times	Civil Supervisor Project Supervisor	Best Practice	Throughout construction
23.	Remove mud spilt by construction equipment on to public roads or other sealed pavements	Civil Supervisor	Best Practice	Throughout construction
24.	Maintain exhaust systems of construction plant, vehicles and machinery in accordance with manufacturer specifications and undertaking periodic visual checks of exhaust systems emissions	Civil Supervisor	Best Practice	Throughout construction
25.	Locate stockpiles as far away from residences as practical	Civil Supervisor	Best Practice	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing/Frequency
26.	Install and use rumble grids at exit points to prevent mud being tracked onto public roads	Civil Supervisor	Best Practice	Throughout construction
27.	Do not leave machinery and vehicles running or idling when not in use	All Personnel	Best Practice	Throughout construction
28.	Undertaken pre-operation inspections of plant and equipment to ensure maintenance regimes are being implemented.	Civil Supervisor	Best Practice	Throughout construction
29.	Review operations when wind speed exceeds 8m/s and complete excessive wind/dust generation form	Civil Supervisor Project Supervisor	LOR and Downer Management	Throughout construction
30.	Cease operations when dust cannot be controlled	Project Supervisor	Best Practice	Throughout construction
31.	Monitoring through dust deposition gauges. Review monitoring results for daily and monthly trends and correlate with construction activities	Project Environment Rep.	Best Practice	Throughout construction
32.	Review forward forecasts and re-program works during periods of high winds to ensure that a dust nuisance is not caused external to the site	Project Manager Civil Supervisor	Best Practice	Throughout construction
33.	Install a weather station to detail meteorological conditions and wind speeds	Project Environment Rep.	EIS	During major foreshore works
34.	High volume air sampler to monitor air quality	Project Environment Rep.	EIS	During major foreshore works

5.7.1 Monitoring

Ambient background data and project specific air quality objectives have been set out in the project EIS. Monitoring through dust deposition gauges will be undertaken by Laing O'Rourke as detailed in their Construction Environmental Management Plan. These results will be submitted to Downer Australia on a monthly basis. Monitoring results will be reviewed for daily and monthly trends and correlate with construction activities.

Table 10 Dust Monitoring

Aspect	Average Background for EIS Impact Assessment	Current Criteria	
		NSW EPA Criterion	Project Specific Criterion
Dust Deposition	1.5-2 g/m2/month	4 g/m2/month	2 g/m2/month

Daily monitoring will be undertaken by Downer in the form of visual inspections of the site by each Supervisor and the General Foreman. Results of visual inspections will be recorded in the relevant site diary and on the weekly checklist as appropriate.

Visual monitoring will be undertaken continually throughout construction for air quality and dust. If excessive dust or air quality impacts are observed, works are to cease and the source to be actively investigated and suppression measures implemented before proceeding.

5.8 Waste Management and Minimisation

A waste management plan has been developed and is located within Appendix 2. The objective of this plan is to ensure that all risks associated with construction waste management are considered and managed effectively during construction to avoid any environmental incident.

Downer Australia will develop and undertake an induction program that promotes environmental safeguards and the adoption of environmentally sensitive work practices to minimise waste and advance the project's sustainability agenda. Appropriate quantities of materials will be ordered to minimise wastage, form work will be reused as often as possible and waste timber, formwork and concrete will be sent to a recycling facility. Recycling of general waste such as paper, cardboard, aluminium cans and similar materials from offices and site facilities will be provided for these facilities as seen in figure 4 below.

All general solid waste (putrescibles and non-putrescible) generated shall be stored in the waste container to be located at the site compound. Hazardous waste is to be kept separate at all times.

Waste Classification has been conducted using DECCW Waste Classification Guideline and the following:

Liquid waste:

- Has an angle of repose of less than 5 degrees above horizontal, or
- Becomes free-flowing at or below 60 degrees Celsius or when it is transported, or
- Is generally not capable of being picked up by a spade or shovel.

General solid waste (putrescible) is:

- Household waste that contains putrescible organics
- Food waste

General solid waste (non-putrescible) is:

- Glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal
- Paper or cardboard
- Grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices and/or stormwater management systems that have been dewatered so that they do not contain free liquids
- Drained oil filters (mechanically crushed), rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids
- Drained motor oil containers that do not contain free liquids
- Virgin excavated natural material
- Building and demolition waste
- Asphalt waste (including asphalt resulting from road construction and waterproofing
- works)
- Cured concrete waste

Hazardous Containers containing Dangerous Goods, lead-acid or nickel-cadmium batteries, lead paint.

Legal requirement:

- Waste Avoidance and Resource Recovery Act 2001
- EPA Act Part 15
- Protection of the Environment Operations Act 1997
- EPA's Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes (1999)
- Botany Bay DCP 29 and the National Minimisation and Recycling Strategy
- DEC'S Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes
- MCOC B2.33 to B2.36

Table 11 below describes the relevant environmental controls to be implemented for the effective control of waste as a result of the project. This table is considered to provide adequate environmental controls applicable to the project, and is sufficient to act as the main Management Plan for Waste Control and Minimisation.

Table 11 Waste Environmental Management Mitigation Controls

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing / Frequency
1)	Materials would be sourced so as not to result in the creation of excess waste. Accurate estimation and ordering of construction and electrical materials to avoid excess waste and minimise associated costs.	Project Manager	Best Practice	Prior to construction and ongoing
2)	Return excess construction materials suitable for reuse to the supplier or store for future use.	Project Manager	Best Practice	Ongoing
3)	Components of each of the waste streams will be kept separate.	Project Manager	Best Practice	As required
4)	Excavated spoil will be segregated into spoil to be reused on site and construction fill and reused/ disposed of as per the Waste Management Plan. Should contaminated material be discovered, the SICTL Project Manager will be contacted.	Civil Supervisor	Best Practice	During stockpiling
5)	All waste streams will be segregated and the waste management hierarchy will be followed: 1. Avoidance and Reduction; 2. Re-use; 3. Recycle; 4. Recover; and, 5. Disposal.	Project Manager	Best Practice	As required
6)	The handling, storage and transport of hazardous materials and waste shall be in accordance with the National Code of Practice and the relevant	Project Supervisor	Best Practice	As required

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing / Frequency
	Material Safety Data Sheet (MSDS) for the product.			
7)	All general inert and solid waste generated would be stored in covered, sealed waste containers located at the site compound adjacent to the south west corner of the Patricks site, isolated from surface water drains as per Figure 4 Segregated Waste Collection	Project Supervisor	Best Practice	During storage
8)	Waste will be removed at regular intervals and disposed of, as required, at an approved waste facility.	Project Supervisor	Best Practice	As required
9)	Vehicles used for the transportation of waste will be covered when loaded so as to prevent spillage and loss of waste, and the emission of odours.	Plant operators	Best Practice	During transportation
10)	Compilation of a waste data form for recording waste movement including: solid and inert waste materials, provision of a description of the waste types, physical nature of wastes, proposed treatment, dates of movement, transporters and waste destination details.	Project Supervisor Project Manager	Best Practice	Recording
11)	Waste oils, grease cartridges, chemical containers, oil contaminated rags and spill kits will be stored in a 240L bin and removed as per the waste management plan.	Project Manager	Best Practice	During disposal
12)	Site is to be kept clean and tidy and regular housekeeping inspections would be carried out and waste removed on a regular basis	All	Best Practice	Ongoing
13)	All sewage waste generated on site shall be stored within the holding tanks of the portable toilets provided. On a regular basis sewage waste shall be collected and transported by a transport company licensed to transport liquid waste.	Project Manager	Best Practice	Ongoing
14)	Implement measures and strategies in line with this plan	Project Manager	B2.33	Throughout construction
15)	Only the hazardous and/or industrial and/or Group A waste listed below may be generated and/or stored on site: • waste oil/water, hydrocarbons/water mixtures or emulsions; and	Project Manager Project Supervisor	B2.36	Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing / Frequency
	grease trap waste			
16)	Minimise construction waste that requires disposal by accurately calculating materials brought to the site and limiting materials packaging.	Project Supervisor	EIS 34.4.1	Throughout construction
17)	Excess construction materials which are suitable for reuse will 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.	Project Supervisor	EIS 34.4.1	Throughout construction
18)	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.	Project Supervisor	EIS 34.4.1	Throughout construction
19)	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	Project Supervisor	EIS 34.4.1	Throughout construction
20)	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.	Project Manager	EIS 34.4.1	Throughout construction
21)	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.	Project Manager	EIS 34.4.1	Throughout construction
22)	Waste oils and fluids from maintenance activities would be collected and stored and would either be reused on site or removed by a licensed waste contractor.	Project Manager	EIS 37.2	Throughout construction
23)	Include in waste contractor sub-contract agreements requirements to comply with statutory requirements, report quantities, types, dates and destination of material removed from	Project Manager		Throughout construction

	Environmental Management Controls	Person Responsible	Source of Requirement	Timing / Frequency
	site and any other relevant waste production/transport information.			
24)	Adopt and promote the reduce, reuse, recycle dispose hierarchy	Project Manager	NSW legislation	Throughout construction
25)	Provide initial and ongoing education to staff and subcontractors regarding the importance of appropriately managing waste.	Project Manager	Best Practice	Throughout construction
26)	Keep site free of litter and maintain good housekeeping at all times. Place any litter found during inspections in the appropriate recycling or disposal receptacle.	All Personnel	Best Practice	Throughout construction
27)	Recycle / re-use all concrete waste generated at the batch plant through the on-site concrete recycling facility	Project Manager	Best Practice	Throughout construction

5.8.1 Waste Tracking

The OEH has identified certain wastes that represent a significant risk to the human health and the environment. The transport and disposal of these wastes must be tracked and the records of movement provided to the OEH.

All waste streams will be effectively tracked on the project through the waste register. The high risk wastes identified by the OEH must be tracked whether they are transported into, within or out of NSW.

The waste consignor, transporter and receiving facility all have obligations to ensure that the waste is properly tracked from its point of generation to its disposal location and to ensure that the required documentation is completed. There are specific offences in the POEO Act 1997 relating to waste.

Waste tracking as specified in the statutory requirements will include the following:

- Determine whether the waste to be transported requires tracking. A list of wastes that must be tracked can be found at http://www.environment.nsw.gov.au/resources/owt/trackwaste07522.pdf. A copy of this document is retained on the site server
- For waste that requires tracking, prior approval to transport the waste in the form of a consignment authorisation must be obtained
- A Transport Certificate must accompany the waste while it is being transported
- The certificate must be completed when the waste has been received by the receiving facility
- Each organisation must retain the relevant records

- Any non-compliances must be reported to OEH
- The transport certificate and consignment details must be entered into the OEH's online system
- A single printed copy of the transport certificate must accompany the waste during transport
- Any waste transported to a place that is not a licensed waste facility must be accompanied by a completed section 143 Notice received from the landowner.

Figure 4 Segregated Waste Collection

5.9 Hazardous Materials and Management of Spills

Downer has limited the major storage of hazardous materials to 200L of diesel and 20L containers of diesel and unleaded petrol to supply plant.

Legal requirement:

- Environmentally Hazardous Chemicals Act 1985
- Environmentally Hazardous Chemicals Regulation 2008
- National Industrial Chemicals Notification and Assessment Scheme
- AS/NZS 1940: The Storage and handling of Flammable and Combustible liquids
- MCOC B2.34 to B2.36 and B4.1

Table 12 below describes the relevant environmental controls to be implemented for the effective control of hazardous materials as a result of Downers works. This table is considered to provide adequate environmental controls applicable to Downers works, and is sufficient to act as the main management plan.

Table 12 Hazardous Materials and Management of Spills Environmental Management Controls

	Environmental Management Controls	Person Responsible	Timing/Frequency
Hazardous Materials			
1.	Material Safety Data sheets will be available for all chemicals and fuels used on site to detail actions required in the event of a spill.	Project Manager/Site Supervisor	Ongoing
2.	Ensure a 200 L hydrocarbon spill kit is readily available and appropriately maintained next to the hydrocarbon storage area.	Project Manager/Site Supervisor	Prior to Construction
3.	Ensure a floating hydrocarbon boom is available in immediate vicinity of any works being performed within 10m of the sea wall or other water body.	Civil Supervisor	Ongoing
4.	Training at the weekly Toolbox meetings in the handling and clean up techniques for those substances will be provided.	Project Manager/Site Supervisor	Ongoing
5.	All mobile plant to contain hydrocarbon spill kits appropriately maintained within their plant.	Project Manager, Plant Operators	Prior to Construction, Ongoing
6.	All storage of hazardous chemicals will be within the site compound area which is at least 20 meters (preferably 40 meters) from any water body or stormwater drain.	Project Manager	Prior to Construction

	Environmental Management Controls	Person Responsible	Timing/Frequency
	Hazardous Materials		
7.	The storage of the 200l diesel will be in a covered temporary bund as per AS 1940.	Project Manager	Prior to Construction
8.	Transfer or handling areas to be on an impermeable hardstand to capture spills/drips. Dispensing pumps with self-closing metal taps (auto cut-off nozzles) shall be used, in order to reduce the hazards of splash filling, spillage and vapour escape.	Project Manager	Prior to Construction
9.	All containers storing hazardous materials will be stored in their original/ approved containers with the label intact at all times.	Project Supervisor	Ongoing
10.	Chemicals, pesticides and fuels to be transported in approved containers.	All	During transportation
11.	Should a spill occur (refer to Emergency Management Procedure): 1. Assess the situation 2. Control the spill 3. Contain the spill 4. Clean-up and dispose 5. Report the incident Contaminated material is to be removed and placed in the 240L plastic reciprocal as per the waste management section.	Project Supervisor	Ongoing
12.	Any spills onto land will be immediately reported to the (SICTL) Project Manager and following the incident reporting procedure detailed within DA-ZH-PR006 Incident Reporting and Investigation.	Project Manager	Ongoing
13.	Any incident with actual or potential significant off site impacts will be immediately to the SICTL Project Manager and the Director General in accordance with MCOC B4.1	Project Manager	Ongoing
14.	Keep records of all environmentally hazardous materials received, used and disposed of.	Project Manager	As required

5.10 Cultural Heritage Management

Downer has been advised is unlikely that their works will impact on cultural heritage values given its development as reclaimed land.

Legal requirement:

- National Parks and Wildlife Act 1974
- Heritage Act 1977
- The Burra Charter
- MCOC B2.39

Table 13 below describes the relevant environmental controls to be implemented for the effective control of cultural heritage as a result of Downers works. This table is considered to provide adequate environmental controls applicable to Downers works, and is sufficient to act as the main management plan.

Table 13 Cultural Heritage Management Controls

	Environmental Management Controls	Person Responsible	Timing/Frequency
1.	If an Aboriginal object is discovered during the construction of the development, works must cease immediately in the subject area and the Project Manager shall notify Office of Environment and Heritage (OEH) immediately.	All	Discovery of an Aboriginal Object.

5.11 Community and Consultation

Table 14 below describes the relevant environmental controls to be implemented for the effective control of community and consultation as a result of Downers works. This table is considered to provide adequate environmental controls applicable to Downers works, and is sufficient to act as the main management plan. A complaints escalation procedure has been developed and is included within Appendix 4.

Legal Requirements

- Environmental Planning and Assessment Act 1979
- MCOC B3.1 to B3.3

Table 14 Community and Consultation Management Controls

	Environmental Management Controls	Person Responsible	Timing/Frequency
1	This CEMP will be consulted with the relevant stakeholders and a record of the feedback will be kept, along with the mitigation measure. The feedback will be used to enhance this document. Records will be made publicly available upon submission to the Director General.	Project Manager	CEMP Submission
2	A project contact will be made available to Laing O'Rourke, SICTL and SPC in regards to community complaints. SPC will manage the Sydney Ports complaint line and will distribute any complaints to the appropriate contractor, as per the complaints escalation procedure in Appendix 4.	Project Manager	Prior to construction
3	Any complaints/inquiries relating to Downer activities will be raised in INX and include the following details: • the date and time, where relevant, of the comment, inquiry or complaint; • the means by which the comment, inquiry or complaint was made (telephone, fax, mail, email or in person); • any personal details of the commenter, inquirer or complainant that were provided, or if no details were provided, a note to that effect; • the nature of the complaint; • any action(s) taken by the Applicant in relation to the comment, inquiry or complaint, including any follow-up contact with the commenter, inquirer or complainant; and if no action was taken by the Applicant in relation to the comment, inquiry or complaint, the reason(s) why no action was taken.	Project Manager	CEMP Submission/ Ongoing

	Environmental Management Controls	Person Responsible	Timing/Frequency
	• Provide quarterly reports to the Department and DEC, where relevant, outlining details of complaints received.		
4	Where required, Downer will provide input into or attend the consultative committee.	Project Manager	Ongoing
5	Complaints response time and nature of response is in accordance with Appendix 4 – Complaints Escalation Procedure	Project Manager	Ongoing

6. MONITORING AND REVIEW

6.1 Environmental Monitoring

Activities will be regularly monitored and project environmental performance measured via Environmental Performance Reviews. These are based on the measurable outcomes identified in the CEMP and sub-plans. Conformance and effectiveness of environmental controls will be evaluated during inspections.

Inspections are in accordance with Downer Zero harm Inspection and Observation DA-ZH-PR116.

Downer is working within a larger site controlled by Laing O'Rourke. Project monitoring will be conducted to ensure water discharged, construction noise, construction vibration and air quality does not impact on the surrounding environment by Laing O'Rourke (refer to Laing O'Rourke Main Works Construction Environmental Management Plan). Where a non-conformance is raised Downer will assist in the root cause investigation and where required implement controls to prevent a recurrence.

6.2 Environmental Auditing

The program for periodic Environmental Auditing is outlined below.

Monitoring Activity	Reporting	Technique	Frequency	Responsibility
Inspection	Weekly Environmental Inspection	An inspection will be conducted and hazards identified will be rectified by project staff.	Weekly Environmental Inspection	Downer
Audit	6 Monthly	An audit will be conducted to monitor the implementation of this CEMP at approximately the 25% mark of the construction phase. A follow up audit will then be scheduled approximately 6 months thereafter.	6 Monthly	Downer
Waste Monitoring	Monthly	Waste Disposal Register	Monthly	Downer
Greenhouse and Energy Monitoring	Monthly	The gathering and reporting of relevant data as per the Downer process.	Monthly	Downer

6.3 Corrective Actions

Non-compliance, emergencies and environmental incidents shall be investigated and recorded within INX.

The occurrence of such an event will be brought to the attention of personnel responsible and environmental controls updated to prevent a reoccurrence.

The INX database will detail the issue, the corrective and preventative actions proposed, the responsibilities and timing for completion of the actions. The register will include any comments and completion date of corrective action to close the action.

The Project Manager shall review the INX database to ensure actions are completed. The Project Manager shall also review the CEMP if the above situations arise or when:

- project scope changes
- opportunities for improvement are identified

7. HOLD POINTS

The activities outlined in Table 15 below are not to proceed without objective review and approval by the nominated authority. These activities below are considered hold points.

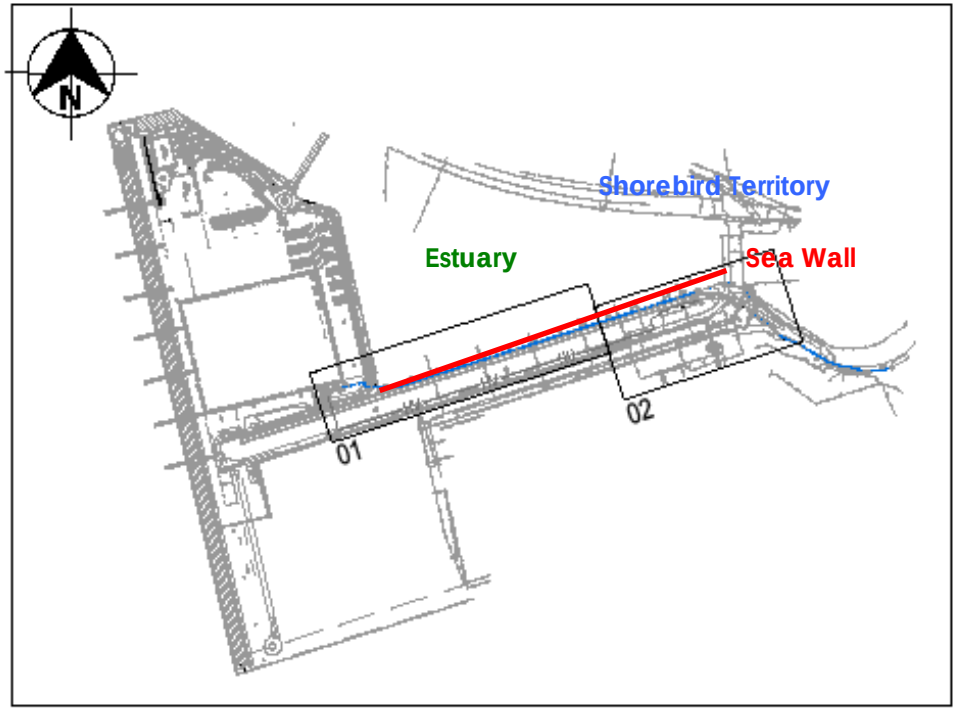
Table 15 Waste Environmental Management Mitigation Controls

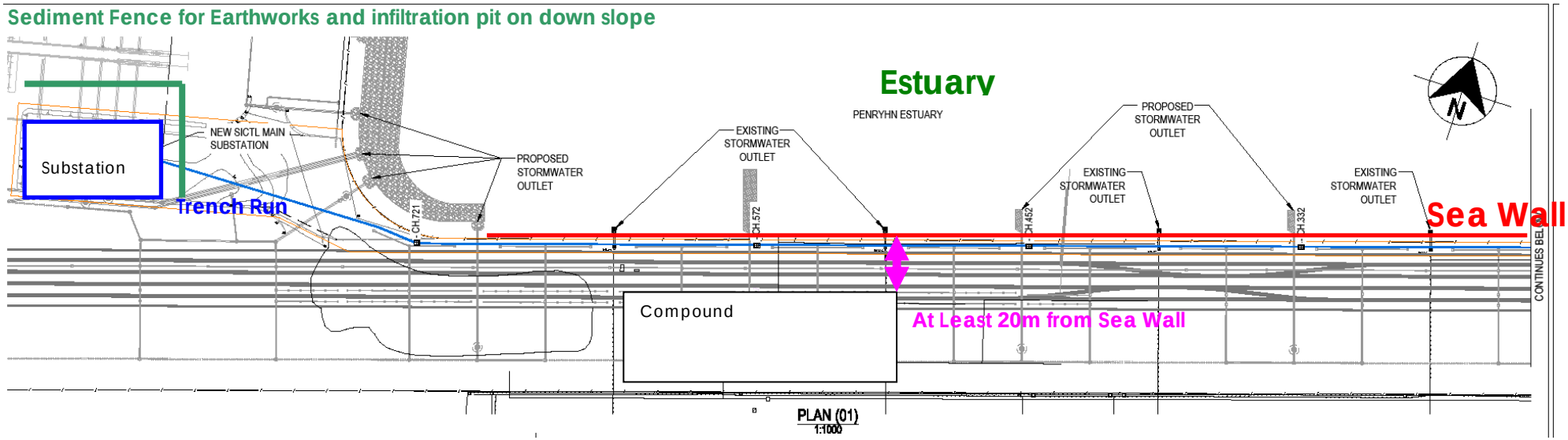
Item	Process Hold	Acceptance Criteria	Approval Authority
Environmental Management Plan	Site Activities	Site specific Environmental Management Plan has been developed, reviewed and approved by the relevant authorities	Project Manager Environment Manager Director General of the Department of Planning and Infrastructure
Dewatering	Dewatering / pumping water off the site	Verification that the water quality criteria have been met	Environment Manager
Sediment and erosion control measures	Construction activities involving ground disturbance	Sediment and Erosion Control Plan has been developed, reviewed, approved and implemented	Project Manager Environment Manager
Site Clearing / vegetation removal	Commencement of site clearing or vegetation removal	Clearing limits have been verified against the project approval environmental assessment, limits have been set-out and vegetation to be retained has been delineated and or protected	Project Manager Environment Manager
Plant and Equipment Inspection	Operation of plant / equipment items on site	Pre-mobilisation inspection completed, no damaged hoses or hydraulic lines identified, service records are up to date	Civil Supervisor Project Supervisor

Item	Process Hold	Acceptance Criteria	Approval Authority
Construction Methodologies – direct delivery and subcontract works	Construction process representing potential medium or high impact to the environment	Construction methodology / SWMS / JSEA have been reviewed by the Site Environmental Management Representative and addresses the requirements of the EMP ERAP's	Construction Manager
Dangerous Goods	Transport of dangerous goods	Verification that transport vehicles meet the requirements	Project Supervisor
Dangerous Goods	Storage of dangerous goods	Verification that bunded storage is provided and that the offset distances are maintained for the storage area	Project Manager
Controlled / Hazardous Waste	Transport of controlled / hazardous waste from the site	Verification that the waste has been classified in accordance with the guidelines, transport licensing in place and landfill can lawfully receive the waste	Project Manager Environment Manager
Spoil Transport	Removal of spoil from site	Verification that the spoil has been classified and the disposal location can lawfully receive the waste	Project Manager Environment Manager

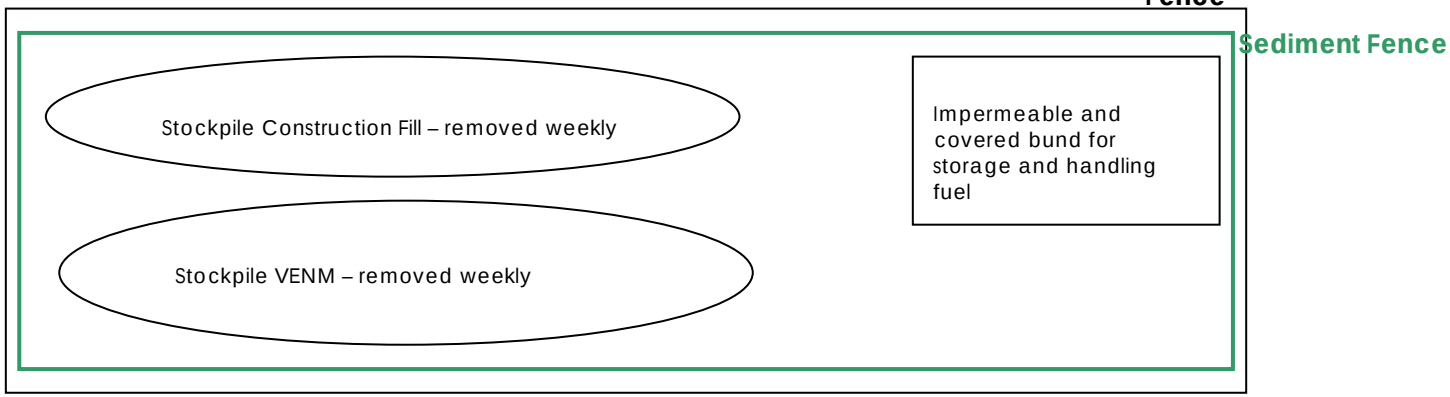
Proceeding past a specified Hold Point without authorisation is a system non-conformance.

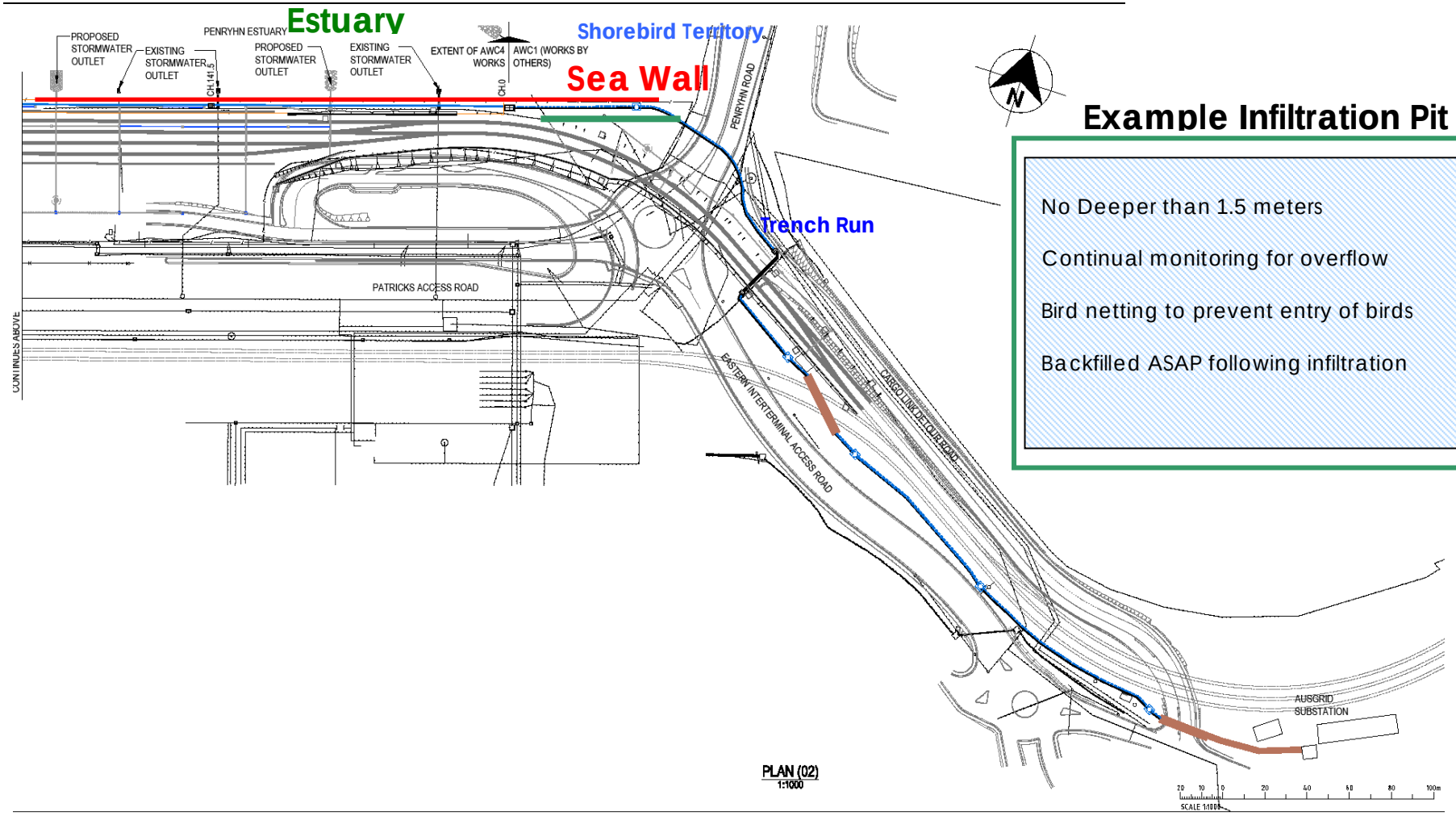
Appendix 1 – Site Diagram





Example Compound Setup





Example Infiltration Pit

No Deeper than 1.5 meters

Continual monitoring for overflow

Bird netting to prevent entry of birds

Backfilled ASAP following infiltration

Sediment Fence

Appendix 2 – Waste Management Plan

Waste Description (including possible contaminants)	**Method Of Storage**	**Quantity and Freq. Of Waste Production** (Continuous, once a day, monthly etc.)	**Category** (Regulated, hazardous, liquid etc.)	**Treatment** (Including Disposal Location)	**Monitored Test Program**	**Approved Contractor/ Destination**
Spoil used on site	Stockpile damp in designated area within site compound. In high winds, covered in plastic and sand bags.	Approx 1300m3 for the project and removed weekly.	Non Putrescible	Reuse on site	Site Investigation Documents Visual Inspection	Onsite to SICTL
Spoil taken off site	Stockpile damp in designated area within site compound. In high winds, covered in plastic and sand bags.	Removed weekly	Non Putrescible	Recycle off site	Chemical Analysis to classify waste is required.	Reused offsite with approval from council and receiver.

Waste Description (including possible contaminants)	**Method Of Storage**	**Quantity and Freq. Of Waste Production** (Continuous, once a day, monthly etc.)	**Category** (Regulated, hazardous, liquid etc.)	**Treatment** (Including Disposal Location)	**Monitored Test Program**	**Approved Contractor/ Destination**
Construction Fill (rocks, bricks etc.)	Segregated and stockpiled damp in designated area within site compound. In high winds, covered in plastic and sand bags.	Removed Weekly	Non Putrescible	Recycle off site	Chemical Analysis to classify waste is required.	Reused offsite with approval from receiver.
Contaminated land (Don't expect any)	Segregated and stockpiled on plastic covered in plastic and sand bags	Removed Weekly	Hazardous Waste	Transported and disposed by a DECCW registered company - TBA	Chemical Analysis to classify waste is required.	TBA
Dewatering	Nil storage/ immediate treatment	Only during substation footing works	Liquid Waste	Infiltration pits	Visual inspection	Downer and Civil Contractor

Waste Description (including possible contaminants)	**Method Of Storage**	**Quantity and Freq. Of Waste Production** (Continuous, once a day, monthly etc.)	**Category** (Regulated, hazardous, liquid etc.)	**Treatment** (Including Disposal Location)	**Monitored Test Program**	**Approved Contractor/ Destination**
Contaminated Dewatering (don't expect any)	Nil storage/ immediate disposal	Daily	Liquid Waste	Transported and disposed by a DECCW registered company - TBA	Chemical Analysis to classify waste is required.	TBA
General Waste	General waste bin	Removed Quarterly	Putrescible	Local landfill	Visual Inspection	TBA
Timber Packaging waste	Segregated in closed top bin	3m3 emptied once a year	Non Putrescible	Recycled	Visual Inspection	TBA
Paper/ Cardboard/ Aluminium Cans	Commingle closed top bin	1.5m3 emptied quarterly	Non Putrescible	Recycled	Visual Inspection	TBA
Scrap metal	Segregated in closed top bin	3m3 emptied quarterly	Non Putrescible	Recycled	Visual Inspection	TBA

Waste Description (including possible contaminants)	**Method Of Storage**	**Quantity and Freq. Of Waste Production** (Continuous, once a day, monthly etc.)	**Category** (Regulated, hazardous, liquid etc.)	**Treatment** (Including Disposal Location)	**Monitored Test Program**	**Approved Contractor/ Destination**
Oil and Hydrocarbon containing rags and absorbent material.	Segregated in 240L Wheelie Bin	240L emptied quarterly	Non Putrescible	Transported by a DECCW registered company - TBA	Visual Inspection	TBA

Appendix 3 – Risk Assessment Matrix

Downer

Risk Assessment Matrix

Risk Assessment Matrix		Likelihood				
		1. Rare	2. Unlikely	3. Possible	4. Likely	5. Almost Certain
Consequences	6 – Catastrophic	B	B	A	A	A
	5 – Extreme	C	B	B	A	A
	4 – Severe	C	C	B	B	A
	3 – High	D	C	C	B	B
	2 – Medium	D	D	C	C	B
	1 – Low	D	D	D	C	C

Rating	Criteria
5. Almost Certain	▪ Over 90% probability; or ▪ "Happens Often"; or ▪ Could occur within "days to weeks"
4. Likely	▪ Greater than 50% probability; or ▪ "Could easily happen"; or ▪ Could occur within "weeks to months".
3. Possible	▪ Greater than 10% probability; or ▪ "Could happen, has occurred before"; or ▪ Could occur "within a year or so".
2. Unlikely	▪ Greater than 1% probability; or ▪ "Hasn't happened yet but could"; or ▪ Could occur "after several years"
1. Rare	▪ Less than 1% probability; or ▪ Conceivable, but only in extreme circumstances; or ▪ Exceptionally unlikely, even in the longer term; ▪ A "100 year event"

Residual Risk Level	Action Required	Suggested Timing	Authority to proceed
A	Immediately cease the activity Take action to reduce residual risk to C or below	Immediate	Not applicable
B	Take action to reduce residual risk to C or below	Immediate	Not applicable
C	Review current controls to attempt to lower the risks further if possible. Closely supervise and monitor the effectiveness of existing risk controls	Normally within 1 month	Supervisor or above
D	Monitor the effectiveness of risk controls. Reduce the risk further if practicable.	Ongoing control as part of a management system	Worker

Consequence Rating	Likelihood Rating	Risk Rating

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Warning: Printed documents are UNCONTROLLED

Downer

Risk Assessment Matrix

Rating		Work Health and Safety	Environment and Community	Legal and Compliance	Management impact	Brand and Reputation	Financial impact AU$ EBIT	Investment Return AU$ NPV
Catastrophic	6	▪ Multiple fatalities, or significant irreversible effects to numbers of people	▪ Catastrophic widespread impact resulting in irreversible damage to habitat and species ▪ Complete loss of trust by affected community leading to long term social unrest and outrage. ▪ Highly significant impact reversible only in long term (10yrs)	▪ Major litigation with damages of $50m plus significant costs. ▪ Jailing of Executive or Snr Manager. ▪ Court or NGO imposed fine of $10m+ ▪ Prolonged class action.	▪ Long term significant impact on the business that requires considerable Executive Management time to handle over years. ▪ Leads to premature closure of the affected part of the Group.	▪ Total loss of shareholder and customer support ▪ Prolonged impact to share price. ▪ Group MD and/or Board members resign. ▪ International press reporting.	$100m+ loss or gain	▪ $300m + loss or gain
Extreme	5	▪ Single fatality and/or severe irreversible disability to one or more persons	▪ Serious medium term environmental effects. ▪ Prolonged community outrage. ▪ Impacts viability of the business.	▪ Major litigation costing $10m+. ▪ Class action. ▪ Possibility of custodial sentence for Manager.	▪ Critical event or disaster with significant impact on the business that requires considerable CEO and senior management time to handle over many months.	▪ Divisional CEO leaves. Short term impact on share price (months) ▪ Customers terminate contracts. ▪ Australia-wide press reporting.	$10m - $99m loss or gain	▪ $30m - $299m loss or gain
Severe	4	▪ Moderate irreversible disability or impairment to one or more persons ▪ Includes Serious Personal Injuries where a person is on WC for a continuous period of 1mth.	▪ Significant impact to localised area with medium-term reversible effects ▪ Long term community irritant leading to disruptive actions and requiring continual Management attention.	▪ Major breach of regulation with punitive fine. ▪ Significant litigation involving many weeks of Divisional Management time.	▪ Will require the involvement of Division Management and will take up significant time of business level General Managers for several weeks.	▪ Senior Executive leaves. ▪ Customers register strong concerns and threaten contract termination. ▪ State based media reporting.	$1m – $9m loss or gain	▪ $3m – $29m loss or gain
High	3	▪ Hospitalisation required. ▪ Medium term largely reversible disability to one or more persons ▪ Lost Time Injury	▪ Moderate short-term reversible impact (<1yr) ▪ Short term community outrage or longer term unrest and dissention.	▪ Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible.	▪ Significant event that can be managed with the careful attention Management. ▪ Will take some business-level Management time over several weeks.	▪ Manager disciplined. ▪ Customer complains strongly. ▪ Local media reporting.	$100k – $900k loss or gain	▪ $300k – $2m loss or gain
Medium	2	▪ Reversible disability requiring hospital treatment	▪ Minor reversible impact to area of low environmental significance. One off community protest requiring intervention and management attention.	▪ Minor legal issues, non-compliances and breaches of regulation.	▪ Will require some local management attention over several days.	▪ Employee disciplined. ▪ Customer aware and affected.	$10k – $99k loss or gain	$30k – $290k loss or gain
Low	1	▪ First Aid incident	▪ No adverse impact No complaint	▪ Minor breach of regulation.	▪ Impact of event absorbed in normal management activity	▪ No visible impact on business.	< $10k loss or gain	< $30k loss or gain

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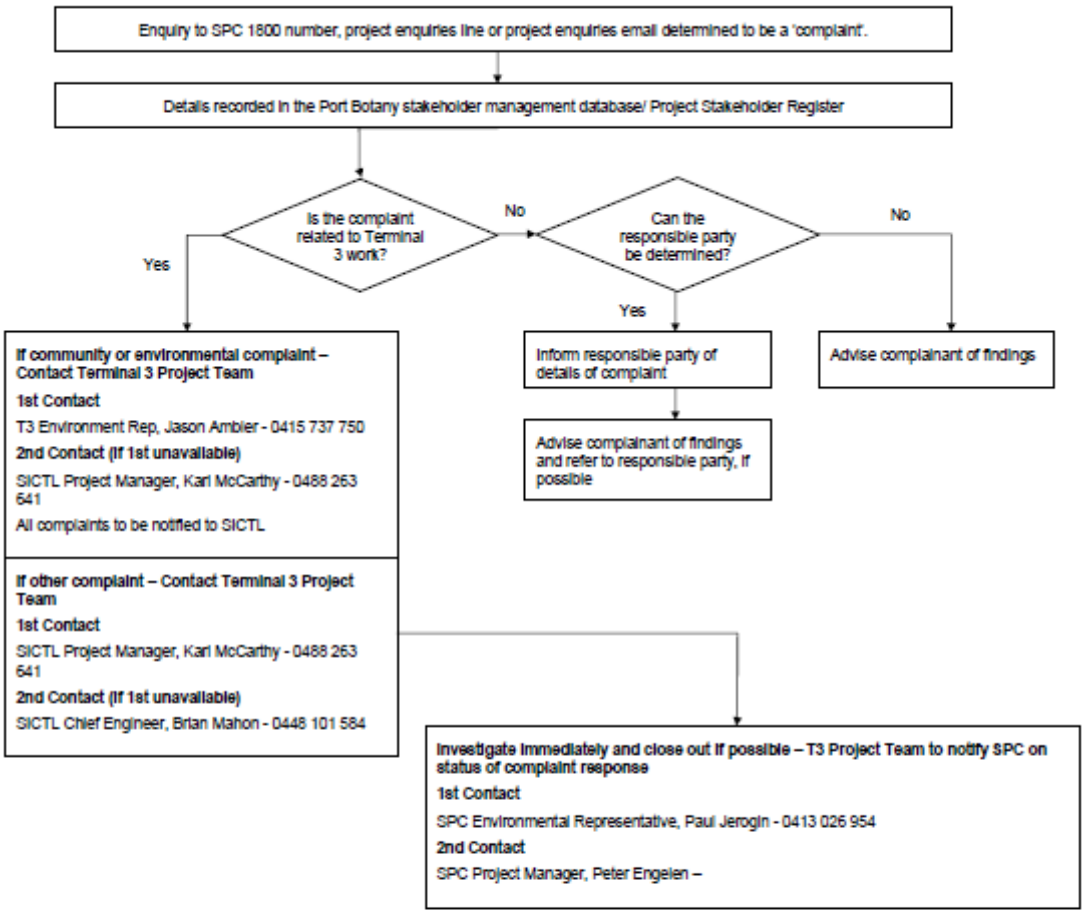
Warning: Printed documents are UNCONTROLLED

Appendix 4 – Complaints Escalation Procedure

Sydney Port Botany Terminal 3 Project
Complaints Escalation Procedure



Communication method	Nature of enquiry and when received	Response time and nature of response
Phone calls or personal contact	General - during times when construction is taking place including standard working hours, work at night and 24 hours per day 7 days a week.	Will verbally respond to determine the nature of the enquiry immediately (if possible) and at least within 24 hours.
	Noise related – at any time	Will initiate investigation within one hour of receiving the complaint. Will provide an offer to undertake noise monitoring. If requested or required, will attend as soon as practical with a noise meter to determine noise levels.
	General – outside of construction hours	Will endeavour to verbally respond at least within 24 hours with response times likely to be quicker than this.
Written communication – email or letter	Any communication from a stakeholder.	Will be provided with a written response as soon as possible but within 5 working days unless otherwise discussed with stakeholder.

Appendix 5 – Emergency Management Plan

ABN: 53 000 983 700

Emergency Management Plan

Port Botany Terminal 3 - AWC4

Sydney, NSW, Australia

Contract No:

DOCUMENT PREPARATION	DOCUMENT REVIEW	DOCUMENT AUTHORISATION
Ross Brookshaw **Manager Environmental Sustainability**	**Simon Graham** **Project Manager**	**Name** **Position**

REVISION STATUS

Issue/Revision/Date	Summary of Section Changes	Reviewed By:	Authorised By:
1.0	Template Updated to First Draft		
2.0	Review against Laing O'Rourke Plan		
3.2	Environmental Spill Response		
3.4	Inclusion of LORAC approved Emergency and Incident Management Plan		

DISTRIBUTION AND AMENDMENT

The master 'controlled' Emergency Management Plan (EMP) document forms part of the project's CEMP as an Appendix. This document is authorised, distributed and amended in accordance with the Downer Australia Management Procedure DA-QA-PR001 Document Management. Records of controlled copy distribution of this document are maintained by the Project Manager or his delegate.

Revisions of this EMP may be required throughout the duration of the project to reflect changing circumstances or identified opportunities for improvement.

Revisions may result from:

- Management Review
- Changes to the Company's standard system
- Audit (either internal or by external parties)
- Client complaints or non-conformance reports.

Revisions shall be reviewed and approved by the Project Manager prior to issue. Registered controlled copy recipients will automatically receive updates as and when amendments are made. Amended pages will be issued together with a transmittal form, and recipients are to ensure superseded versions are replaced and destroyed to prevent inadvertent use.

A hard copy of this document shall be maintained within the site office for the duration of the project and may be accessed by Employees, Contractors, Zero Harm Representatives and project personnel.

On project completion the EMP and associated documents are to be stored with the Project Files.

The client representative will be provided with a copy in conjunction with the submission of the CEMP.

COPY NO:	
ISSUED TO:	

CONTENTS

1 Purpose and Scope of the Emergency Management Plan

This Emergency Management Plan (ERIMP) has been developed to address the construction activities associated with the Sydney Port Botany Terminal 3 Advanced Works Contract 04 Project and works in conjunction with the Port Botany Emergency Plan and the Laing O'Rourke Emergency Response and Incident Management Plan. This EMP outlines the site specific management structure, resources, procedures and practices that will be implemented in the event of an emergency situation. This Plan has been prepared to satisfy the requirements of Minister's Consent of Approval (MCoA) No. B2.43

The Applicant shall develop an Emergency Management Plan in consultation with DEC, DOP, Council and the Community Consultative Committee. The Plan must be approved by the Director-General prior to the commencement of construction and shall detail:

(a) terminal security and public safety issues;

(b) effective spill containment and management;

(c) effective fire fighting capabilities;

(d) effective response to emergencies and critical incidents; and

(e) a single set of emergency procedures, consistent with the existing Port Botany Emergency Plan, that can be scaled as appropriate for any incident or emergency.

Further to the above and in compliance with MCoA No. B4.1 the Director-General shall be notified of any incident with actual or potential significant off-site impacts on people of biophysical environment within 12 hours of Downer Australia becoming aware of the incident. Full written detail of the incident shall be provided to the Director-General within seven days of the date on which the incident occurred. The Director-General may require additional measures to be implemented to address the cause or impact of any incident, as it relates to this consent, reported in accordance with this condition, within such period as the Director-General may require.

This Emergency Management Plan comes under the umbrella of the Port Botany Emergency Plan which is a sub-plan of the Sydney East District Disaster Plan (DISPLAN).

Development of Sydney Port Botany Terminal 3 Advanced Works Contract 04 will involve the construction of a new substation building and cable trenching from Ausgrid zone substation to the Laing O'Rourke Terminal 3 site.

The key components of the Sydney Port Botany Terminal 3 Advanced Works Contract 04 include:

- Construction of Cable Trenches
- Construction of new Substation building within Terminal 3
- Supply and installation of 11kV HV Cable

The scope of works for this project will include, but not necessarily be limited to the provision of all labour, materials, plant, equipment, supervision and all other things necessary to perform the work as detailed under the contract. In particular, the work involves the following:

2 Site Emergency Profile

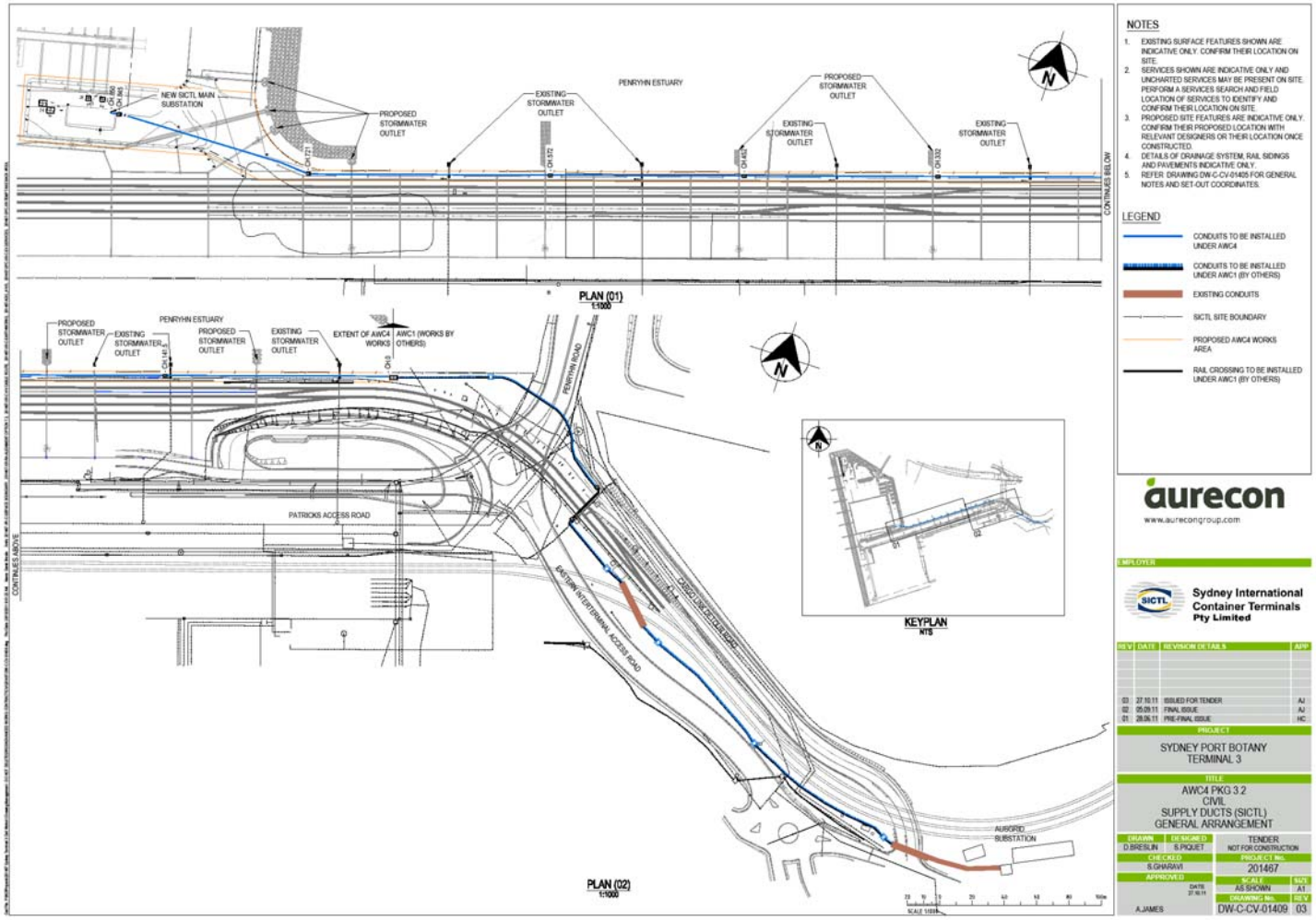
2.1 Site Location

Port Botany is Sydney's main commercial port, having overtaken Sydney Harbour in the mid 1980's. It was constructed during the 1970's, mostly from sand dredged from the entrance to Botany Bay, and is now a specialised port, handling containers and bulk liquids.

The subject site is part of Lot 6 in Deposited Plan 1053768. The site area is approximately 63 hectare and is generally bound by Penrhyn Road, the Inter-Terminal Access Road and the Caltex site (see Figure 1).

Currently, the majority of the site is vacant land covered by vegetation. To the south, the site is adjacent to an operational Freight Rail Line. To the north of the site is the Caltex terminal. The site has access to major arterial roads and abuts a mixture of heavy industrial and port related land uses.

2.2 Site Layout



3 Incident Planning & Response

Minor incidents defined as non-critical, regarding both Safety and Environment are managed through the Project Safety Management System and Construction Environmental Management Plan and their related procedures.

This plan operates alongside other functional project plans such as the Port Botany Emergency Plan, Project Integrated Site Management Plan, Traffic Management Plan and Construction Environmental Management Plan. A single set of emergency procedures for the project is included in Annex 2 of this EMP.

Aviation related emergencies and incidents are to be managed by SACL in accordance with their emergency response plan.

Emergencies related to dangerous goods within the Patricks Terminal and other SPC controlled areas are to be managed through their respective emergency response and incident plans.

An emergency situation is an event that could present significant risk to the environment, personnel or the community, as determined by the Environment Manager or the Environmental Representative.

Environmental incidents will be reported immediately to a Supervisor who will contact the Environment Manager or appointed Environmental Representative. All incidents will be investigated and the appropriate course of action will be taken to address the issues. Environmental incidents that harm or are likely to harm the environment will be reported to OEH immediately (131 555) in accordance with the Protection of the Environment Operations Act 1997 – Duty to Notify.

The Environmental Representative has the authority and independence to require reasonable actions to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such actions, to instruct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.

Sydney Ports provides a 24-hour emergency response that can deal with incidents in Botany Bay. Any port related emergencies will be reported to Sydney Ports on (02) 9296 4000.

3.1 Objective

The objective of this EMP is to ensure incident planning and response procedures are managed effectively during construction and outlines the general procedures for initiating an emergency response that could occur as a result of project construction works or natural causes.

This plan will also provide guidance on the subsequent management and communications in response to, potential and actual emergencies which may occur on or impact the Sydney Port Botany Terminal 3 expansion.

During construction some specific areas may require alterations to the planned control measures due to changing circumstances. In these situations, the planned control measures will be reviewed, risk assessed and, where appropriate and practical, amended as necessary prior to commencing new or modified activities.

This EMP aims to satisfy the following objectives:

- Address the requirements of the planning approval for the SPBT3 Project
- Address the requirements of the Environmental Impact Statement (EIS) for the Port Botany expansion

- Address the requirements outlined in the Aurecon Framework Construction Environmental Management Plan
- Address the requirements of the relevant environmental legislation as it applies to this project
- Document environmental procedures to control potential environmental impacts.

Responsibilities for the implementation and management of this EMP are in accordance with the Project's Construction Environmental Management Plan.

3.2 Legislation

The following legislation, regulation and standards were also considered in the development of this Plan:

- NSW State Emergency and Rescue Management Act, 1989, as amended
- NSW State Waters Marine Oil and Chemical Spill Contingency Plan
- Work Health & Safety Regulation 2011 NSW Part 3 Division 4
- AS 3745:2002 Emergency Control Organisation and procedures for buildings
- Protection of the Environment Operations Act NSW 1997
- Environmental Planning and Assessment Act NSW 1979
- Marine Pollution Act NSW 1987
- Fisheries Management Act 1994

3.3 Area covered by the plan

This Emergency Response and Incident Management Plan applies to the project area bounded by any area in which Downer Australia personnel are required to undertake works required under the Project Deed.

3.4 Emergency response team (tbc)

Role	Name
Emergency Response Coordinator:	Rocco Versace
Assistant Emergency Response Coordinator/ Communications Officer:	Simon Graham
Project safety advisor:	Rita Valvasori
Area Warden:	Rocco Versace
Traffic Controller:	LORAC (Steven Montgomery)
Roll Call Coordinator:	Rocco Versace
First Aiders:	Simon Graham Rocco Versace Rita Valvasori

4 Roles and Responsibilities

Project Manager

The Project Manager shall:

- Be the issuing authority for this EMP
- Ensure effective implementation of this Plan, including provision of adequate resources;
- Ensure this Plan, as part of the Integrated Site Management Plan is reviewed at least every 3 months.
- Maintain a working knowledge of the emergency management system, plan and processes;
- Act as Assistant Emergency Response Coordinator and Communications Officer during emergencies.
- Ensure all positions in the ERT are staffed and maintain a roster to provide coverage for absences and planned leave
- Initiate corrective actions and ensure effective implementation of actions as required.
- Ensure SWMS's for HRCA's, include appropriate emergency response and rescue procedures for that activity

Project Supervisor

The Project Supervisor shall:

- Act as initial Emergency Response Controller during emergencies until relieved by authorised emergency services or control is handed over to another member of the Project Team
- Maintain a working knowledge of the emergency management system, plan and processes;
- Maintain familiarity with this EMP
- Participate in the scheduled review of the EMP
- Ensure that drills and exercises are conducted throughout the Project to test the plan;

Project Safety Zero Harm Advisor

The Project Safety Advisor or designated person shall:

- Maintain the Project Emergency Response Plans and associated processes;
- Ensure that adequate emergency response information and instructions are provided at inductions etc;
- Conduct planned inspections to ensure emergency response equipment and facilities are complete;

5 Duties of the emergency response team

Emergency Response Coordinator

On becoming aware of an emergency, the emergency response coordinator shall take the following actions:

- Raise the alarm for an emergency response
- Contact / communicate with emergency services
- Coordinate emergency response and monitor the effectiveness;
- Communicate with area / floor wardens
- Coordinate the activities of all personnel in the emergency response team and make further directions as required by the situation;

- Give the all clear when authorised to do so by the emergency services, if appropriate;
- Chair the operational debrief on completion of the emergency situation;
- Assist with the completion of the incident reporting and notification, in accordance with the Downer Australia Integrated Site Management Plan and legislative requirements.
- Arrange deputy when absent;
- Schedule emergency drills for all shifts and conduct debriefing of the results. An initial evacuation drill shall be carried out within 3 months of site possession. Ongoing evacuation drills will be conducted – frequency / timing to suit varying stages of construction, however not to exceed 6 monthly intervals.
- Coordinate training requirements for the emergency response team and all other site personnel.

Where the emergency response coordinator is unable to perform these tasks, the deputy chief warden is to carry out this function.

Assistant Emergency Response Coordinator

The deputy emergency response coordinator shall assume the responsibilities normally carried out by the emergency response coordinator if the emergency response coordinator is unavailable and otherwise assist as required.

Area/ floor warden

- On becoming aware of an emergency, the area / floor warden shall take the following actions:
- Conduct a search sweep of the designated area, ensuring all persons have cleared the area;
- Report to the emergency response coordinator that search sweep is complete and advise of any area or room unable to be searched, any persons unaccounted for;
- After completion of the search sweep, assemble at the designated emergency assembly area;
- Confirm that activities of the wardens are completed and report this to the emergency response coordinator;
- Await roll call and / or further directions as given by the emergency response coordinator;
- Assist the emergency response coordinator as requested and attend de-briefing of the ERT.

First aiders

Apply and record first aid treatment where required.

Traffic coordinator

On hearing an alarm or at the direction of the emergency response coordinator:

- Proceed to the site entry point;
- Ensure that no vehicles enter or exit the premise and that emergency vehicles have clear access to site;
- Manage the evacuation of truck drivers on site at the time of the emergency;
- Control movement and/or placing of all vehicles.
- Attend de-briefing of the ERT.
- Participate in emergency drills and attend debriefing;
- Attend scheduled ERT meetings and training as required.

6 Interface with neighbouring tenants at Port Botany

Downer Australia and this Emergency Management Plan may interface with neighbouring tenants of Port Botany through the existing Port Botany Emergency Plan. In case of a notifiable emergency at the Downer Australia project site, the Downer Australia Emergency Controller will contact and alert the Site Controller and Local Emergency Operations Controller (LEOCON) as required in the existing Port Botany Emergency Plan. Also, the Downer Australia Emergency Controller (or appointed delegate) will be the contact for the Port Botany Site Controller and LEOCON to notify Downer Australia of any emergencies and evacuations.

In addition, the Downer Australia Emergency Controller will also participate, if required, in the quarterly meetings of the Port Botany Emergency Response Committee to keep abreast of any pertaining issues that could effect or require changes to be made to the Downer Australia Emergency Management Plan. The Emergency Controller will advise the Port Botany Emergency Response Committee of any impending changes to the Downer Australia Emergency Management Plan.

7 Interface with Sydney Airport Corporation Limited (SACL)

Downer Australia, for the duration of works at the Port Botany Expansion Project, will interface with SACL in relation to communicating our works and ensuring that we meet our obligations with respect to the management of security of the respective site boundaries and exclusion zones to the east of the third runway. The interface with SACL will be limited to the following proposed works:

- Associated works which will have limited impact on the Obstacle Limitation Surface (OLS)
- Consultation upon Bird Hazard Management Plan
- Consultation upon lighting both temporary and permanent to ensure compliance with regulations relating to lighting in the vicinity of aerodromes.
-

8 Media communications and external enquires

8.1 Project Director/ Leader

Downer Australia, in conjunction with Sydney Ports, shall manage all media communications in relation to The Terminal 3 expansion. No statements shall be made to the media without the approval of Laing O'Rourke Australia Legal Counsel, SICTL and Sydney Ports.

8.2 Legal Privilege

Legal Privilege may be imposed by the Legal Counsel. The contact details of persons making enquiries regarding an emergency shall be noted and passed to the Site Project Leader.

9 Evacuation Routes

Evacuation routes will be developed for each area as the project progresses. All personnel are required to follow the safest route to the Main Evacuation point.

All changes to evacuation routes are to be recorded on the site layout plan and communicated to the workforce via pre start meetings/ toolbox talks.

Emergency Evacuation

In an emergency all persons must proceed to the Emergency Assembly area, located on the roadway bridge.

10 Emergency equipment

The site must have readily available the correct equipment to effectively respond to emergency situations.

Emergency equipment must be maintained through preventive maintenance procedures (inspection and testing) in accordance with the manufacturer's recommendation to ensure that equipment is in ready condition for use.

Subcontractors providing their own requirement emergency equipment must maintain equivalent inventories and inspection protocols. These records are to be provided to Downer Australia.

Safe work method statements shall identify emergency equipment required for that task.

The inventory should be completed and an inspection of emergency equipment shall be conducted on a monthly basis to ensure that equipment is available and functioning properly.

The type of emergency equipment available on site should be reviewed periodically and form part of the 3 monthly review to reflect changing site conditions.

Any port related emergencies will be reported 24 hours a day to Sydney Ports on (02) 9296 4000.

11 Fire prevention and control measures

In order to control the risk of a fire, several measures must be taken. These include:

The enforcement of hot works permits. No hot work is to take place outside of a controlled hot works zone without first seeking authorisation from the Downer Australia supervisor, completing a hot work permit and following the correct procedure. A fire spotter must be present with suppression devices in the event of a fire breaking out.

Scheduled electrical inspections of all machinery and wiring throughout the site. This is conducted by approved, authorised electricians with site experience.

The provision of portable fire fighting equipment in line with the Building Code of Australia and the relevant state building code. All emergency equipment including portable fire extinguisher, hose reels, hydrants are maintained and inspected by a qualified contractor in accordance with the relevant legislation and Australian standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation and appropriately located, in a conspicuous position, on each evacuation route.

Sydney Ports provides a 24-hour emergency response that can deal with incidents in Botany Bay. Any port related emergencies will be reported 24 hours a day to Sydney Ports on (02) 9296 4000.

12 Training

12.1 Workers

All site workers must be trained on site-specific emergency procedures. This training should be done as part of site induction training and shall include the following:

- Alarms and other emergency communications used on the site.
- Evacuation procedures including routes and assembly areas to be used.
- Initial emergency response actions
- Location of first-aid kits and identification of first-aid providers.
- Location of spill contamination kits
- Emergency response team members

12.2 Visitors

Visitors are to be accompanied by an inducted person at all times. Visitors will receive emergency procedure training via the visitor's induction at the sign in register located at reception.

12.3 Terminal Security

The entire site will be secured from the existing terminal by secured fencing. The SPBT3 site security personnel will be conducting daily routine inspections of these areas to ensure the fencing has not been compromised.

Sydney Ports have a dedicated Emergency protocol; this will be relayed to site via a dedicated two way radio.

If an emergency arises from Sydney Ports the SPBT3 evacuation procedure will be utilised.

12.4 Public Security

The only designated access point into the site (Via Penrhyn Bridge) will be manned by professional security guards at all times, whilst construction activities are present.

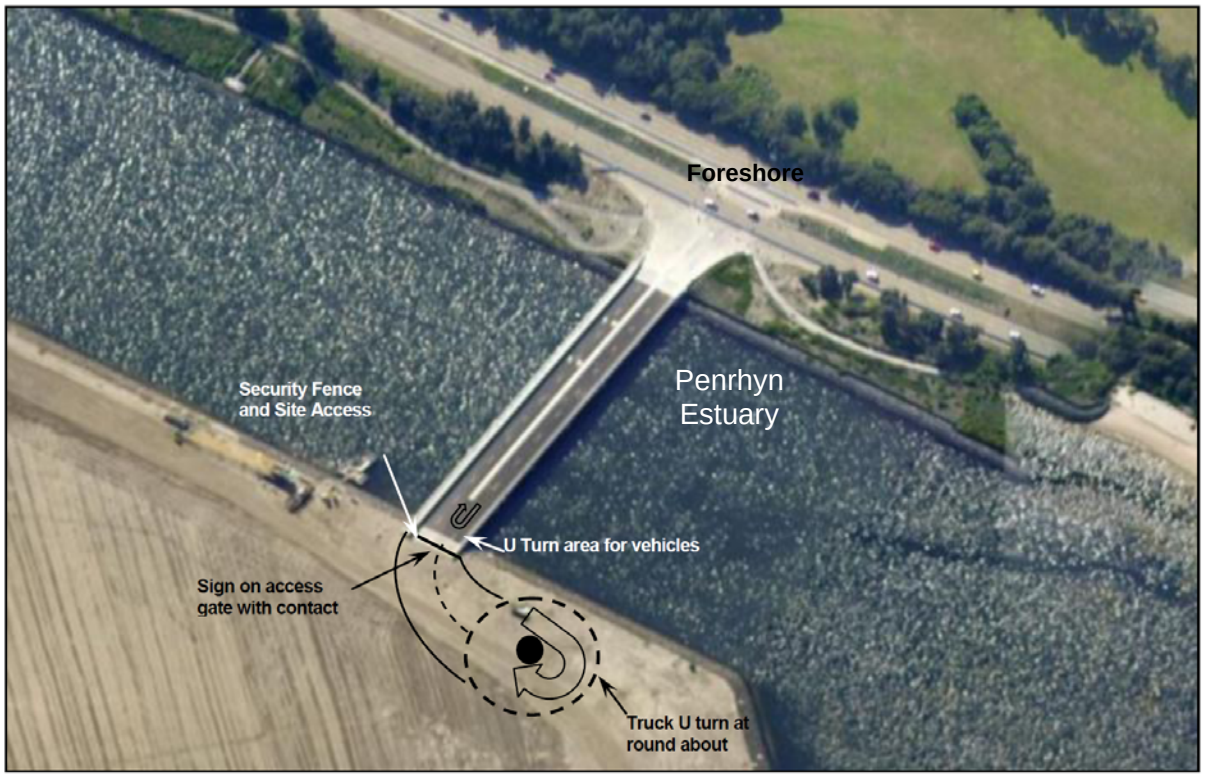
Pedestrian access onto the bridge will be limited to one side with the opposite side secured by fencing.

12.5 Re-direction of Unauthorised Vehicles

The potential for unauthorised access from the traffic signals on Foreshore Road has been considered. A fence would be constructed at the entrance of the site at the end of the Penrhyn

Estuary Bridge with gates and security personnel to monitor vehicles entering and exiting. A Security Personnel hut would be posted at the entrance. Security would check identification and log all vehicles entering the site. Security will be on site 24 hours a day for the duration of the project.

Security would direct any vehicles to turn around and leave the site. Direction would be given prior to entry to the site and a turning area has been provided. This is shown below.



Access Intersection

Perimeter fencing checks will be undertaken daily to ensure the segregation of the Terminal 3 expansion project and other port users or other unauthorised people within the immediate area.

12.6 Emergency Response Teams Coordination Training

Emergency Response team members must receive specific training for the duties they are to undertake. Training for emergency response team personnel will include relevant topics related to their role including

- Training in the content of the EMP
- First aid and CPR for those identified as first aiders in this plan.

Emergency Evacuation and Response exercises are to be held as training activities to a schedule prepared by the Project Safety Advisor

12.7 Evacuation Practice

An initial evacuation drill will be undertaken within 3 months of taking possession of the site and at intervals not exceeding 6 monthly.

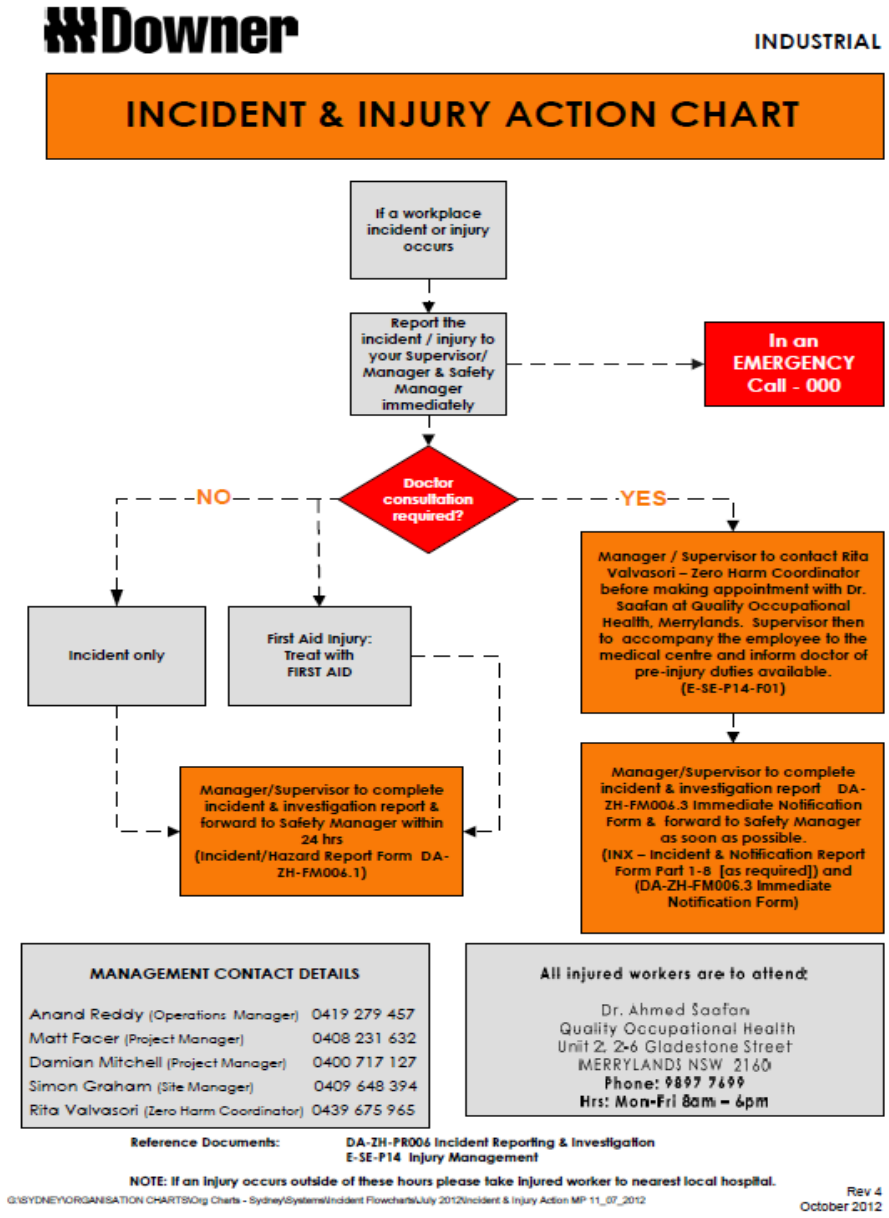
Note: Emergency Evacuation Drills shall be evaluated and recorded using DA-ZH-FM015.5 Emergency Evacuation Observer's Checklist

13 Reporting

The Downer Australia Project Manager must be informed of any incidents on site by the quickest possible means.

The Director-General shall be notified of any incident with actual or potential significant off-site impacts on people or the biophysical environment within 12 hours of the Applicant, or other relevant party undertaking the development, becoming aware of the incident. Full written details of the incident shall be provided to the Director-General within seven days of the date on which the incident occurred. The Director-General may require additional measures to be implemented to address the cause or impact of any incident, as it relates to this consent, reported in accordance with this condition, within such period as the Director-General may require.

All Incident Reporting and Investigation is to be recorded in INX, Downer Australia Online Incident Notification and Investigation Reporting Tool. INX can be accessed from the Downer Australia Intranet or remotely connected via the Internet where connection is possible and direct access to the Intranet is not available. The Downer Australia Zero Harm Co-ordinator shall be notified within 24 hours by telephone or via a completed INX Incident and Notification form. Incident and Injury action plan is as per the below table.



ANNEX 1: Emergency Contact Information

Downer Australia Internal Emergency Contacts			
24-Hour Emergency Number / Channel: 0409 648 394			
Administration (contact number and hours): 0439 675 965 7am – 5pm Mon-Fri			
Downer Australia Personnel	**Contact No.**	**After Hours No.**	**Details**
Emergency Controller	0429 915 820 0409 648 394	0429 915 820 0409 648 394	All Incidences and Emergencies
Emergency Response Team (ERT)	0429 915 820	0429 915 820	All Incidences and Emergencies
First Aid Officer	0429 915 820	0429 915 820	First Aid
Project Safety Zero Harm Advisor	0439 675 965	0439 675 965	All Incidences and Emergencies
Laing O'Rourke Contact	TBA	TBA	All Incidences and Emergencies
SICTL Contacts			All Incidences and Emergencies
Subcontractors Representatives	TBA	TBA	As applicable
Downer Australia External Emergency Contacts			
Ambulance, Fire, Police	**000** **Mobile: 112**		**Life Threatening Emergencies**
Sydney Ports Emergency Response Team	02 9296 4000		Notifiable incidents immediately
Medical			
Public Hospital Randwick Prince of Wales Hospital **Medical Centre** Quality Occupational Health, Unit 2, 2-6 Gladestone St, Merrylands	9382 2222 9879 7699		Serious Injury Injury
Poisons Information Centre	13 11 26	13 11 26	Poisons Information
Other Authorities as required by legislation **Reportable following instruction with Regional Zero Harm Manager or delegate**			
Fire and Rescue NSW	000	000	Notifiable incidents immediately
Botany City Council	02 9366 3666	02 9366 3666	Notifiable incidents immediately
Local Public Health Unit	02 9391 9000	02 9391 9000	Notifiable incidents immediately
Work Cover	13 10 50	13 10 50	Notifiable incidents immediately
Office of Environment and Heritage	131 555	131 555	Notifiable incidents immediately

ANNEX 2: Emergency Response Guidance

Note: The following Emergency Response Guides can be added to specific Site / Project Emergency Management (and/or Response) Plans and/or amended accordingly.

Emergency Evacuation Guide (Standard)

All attempts to respond to an emergency situation should at all times ensure personal safety and only be attempted if within the capabilities of the individual.

If an Emergency situation arises…

- Alarm is raised by either the First responder or Emergency Response Personnel (eg activate emergency alarm, radio or contact the emergency channel/line).
- Personnel are to prepare for Evacuation (shutdown plant and equipment if safe to do so) and await further instruction.
- Chief Warden determines appropriate action in line with nature of emergency & initiates evacuation procedure.
- Deputy Chief Warden or Area Warden responds to emergency.
- Area Warden commences immediate evacuation and directs personnel to nearest exit point.
- Warden to take Visitors book & Site Register of workers and contractors on site to Emergency Assembly / Muster Point
- Area Warden checks all areas clear of personnel.
- Area Warden directs and follows all personnel to Emergency Assembly / Muster point.
- Area Warden advises Chief Warden all areas are clear.
- Chief Warden and Area Warden hold personnel in muster area until directed by the Site Supervisor or Emergency Services Personnel.

Note: Emergency Evacuation Drills shall be evaluated and recorded using DA-ZH-FM015.5 Emergency Evacuation Observer's Checklist

Fire Response

All attempts to respond to an emergency situation should at all times ensure personal safety and only be attempted if within the capabilities of the individual.

Upon discovering a Fire, the First Responder should:

- Alert and evacuate nearby personnel located in the vicinity of the affected area.
- Immediately notify Emergency Response Team personnel and emergency services (if required).
- When contacting emergency services, state the following:
  - Your name
  - Company name
  - Type of incident
  - Address of incident and nearest cross street, state and suburb
  - Types of injuries
  - Any other relevant information
- Stay in communication until told otherwise.
- Attempt to contain, control and extinguish the fire (if safe and you are trained to do so).
- The ERT will raise the alarm and proceed with evacuation if necessary.
- Ensure the safety and well-being of personnel and attend to the injured.
- Secure the scene and assist external emergency services.
- Institute a roll-call of personnel, contractors and visitors.

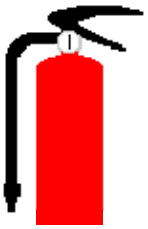
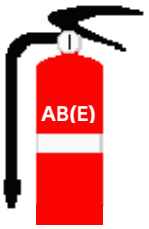
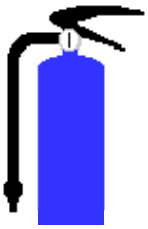
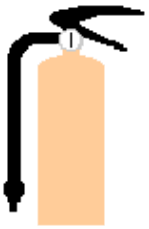
Further Guidance regarding Fire Extinguishers

The following requirements in accordance with **AS/NZS 2444** relating to fire extinguishers are to be adhered to:

- Inspection - Fire extinguishers are to be inspected and serviced every ***6 months*** in accordance with AS/NZS 1851
- Access - Clear access is to be maintained around fire extinguishers at all times. This should be checked regularly through inspection or audit.
- Location - Place fire extinguishers in readily accessible locations and in areas where risk of fire is likely, e.g. welding and fabrication workshops, areas where flammable products are stored, hazardous chemical storage areas, etc.
- Mounting - Fire extinguishers are to be located on purpose made hooks or brackets and suspended above the floor
- Signage - Signage is to be provided at each location, indicating the type of extinguisher and the fire types that they are suited for. The sign should generally be at eye level or higher to facilitate locating the extinguisher in an emergency.

Important: Water must never be used on Bitumen Fires. Use Dry Chemical Powder or Foam Fire Extinguishers only.

The diagram below illustrates the colour coding of fire extinguishers (so it should be printed in colour) and can be used as a guideline for Fire Extinguisher selection.

EXTINGUISHER TYPES / FIRE CLASSES	WATER Body: Signal Red	DRY CHEMICAL POWDER Body: Signal Red with White Band		CARBON DIOXIDE Body: Signal Red with Black Band	FOAM Body: Ultramarine (blue)	WET CHEMICAL Body: Oatmeal (Buff)
						
CLASS A **Paper, wood and textiles**	✓	✗	✓	✓ If Confined	✓	✓
CLASS B **Flammable liquids**	✗	✓	✓	✓	✓	✗
CLASS C **Flammable gases**	✗	✓	✓	✗	✗	✗
CLASS D **Combustible Metals**	**SPECIAL HAZARD** For Information regarding Extinguishers for Class D (Metal) Fires, contact the Fire Brigade					
CLASS E **Electrical hazards**	✗	✓	✓	✓	✗	✗
CLASS F **Cooking oil or fat**	✗	✓	✗	✗	✗	✓✓

Medical Emergency

All attempts to respond to an emergency situation should at all times ensure personal safety and only be attempted if within the capabilities of the individual.

- Make the area safe.
- Immediately call external emergency services and the **ERT** (specifically First Aid Personnel) for assistance.
- When contacting emergency services, state the following:
    - Your name
    - Company name
    - Type of incident
    - Address of incident and nearest cross street, state and suburb
    - Types of injuries
    - Any other relevant information
- Stay in communication until told otherwise.
- First Aid Personnel will attend and assist (conduct DRABC as appropriate until emergency services arrive).
- If conscious, try to ascertain what condition the affected person is suffering.
- Remain with the casualty and await emergency services arrival.

Personal Threat

In the event of a civil disturbance:

- Ensure your Supervisor is notified immediately
- Notify the Police by dialling “000” (112 for mobiles) and request assistance
- Do not say or do anything that may encourage irrational behaviour
- Alert other personnel in your vicinity of the threat
- Evacuation should be considered (if safe to do so)

Motor Vehicle / Road Transport Accident

All attempts to respond to an emergency situation should at all times ensure personal safety and only be attempted if within the capabilities of the individual.

- Make the area safe and contact Emergency Services if necessary;
- Ensure you and your passenger can move to a safe area (if not injured)
- Notify Emergency Services if there are injuries
- When contacting Emergency Services, state the following:
    - Your name
    - Company name
    - Type of incident
    - Address of incident and nearest cross street, state and suburb
    - Types of injuries, property damage or environmental harm sustained
    - Any other relevant information
- Stay in communication until told otherwise.
- Ensure all vehicles involved in the accident have their ignitions switches turned off;
- Extinguish any fires if safe to do so;
- First aid treatment to be administered if qualified to do so. Do not move casualties unless absolutely necessary;
- Immediately report the incident to the ERT and to your supervisor.
- Where possible, do not leave causalities alone;
- Place warning signs across the road to warn other traffic;
- Await emergency services arrival.

Note: Do not make any comments or liaise about any incidences to the media – this will be dealt with internally by authorised personnel as per DA-ZH-PR013 Communication & Consultation and Downer Group Media & Communications Policies.

Emergency Breakdown

What to do if you breakdown in transit:

- Pull on to the hard shoulder and stop as far to the left as possible, with your wheels turned to the left. Leave your sidelights on and use your hazard flashers.
- Leave the vehicle and ensure if you have passengers, they do the same. Ensure you are wearing a high-visibility vest and place safety triangles behind the vehicle if easily and safely accessible.
- Ensure yourself and passenger(s) (if you have any) keep away from the carriageway and hard shoulder. It is best to retreat onto the embankment, or behind a barrier if this is possible
- Contact your Supervisor / Scheduler and roadside assistance if needed; tag-out plant/equipment if unsafe to operate

Bomb / Substance Threat

Any person who receives a bomb / substance threat should remain calm and take the following steps:

Ask the following questions

- ❑ Where did you put the bomb/substance?
- ❑ When is the bomb going to explode?
- ❑ When did you put it there?
- ❑ What does the bomb/substance look like?
- ❑ What kind of bomb/substance is it?
- ❑ What will make the bomb explode?
- ❑ Did you place the bomb/substance?
- ❑ Why did you place the bomb/substance?
- ❑ Is the substance a liquid, powder or gas?
- ❑ What is your name?
- ❑ Where are you now?
- ❑ What is your address?

- Try to record the exact wording of the threat.
- Try to keep the caller talking and complete the following checklist (do not hang up because the call may be traced).

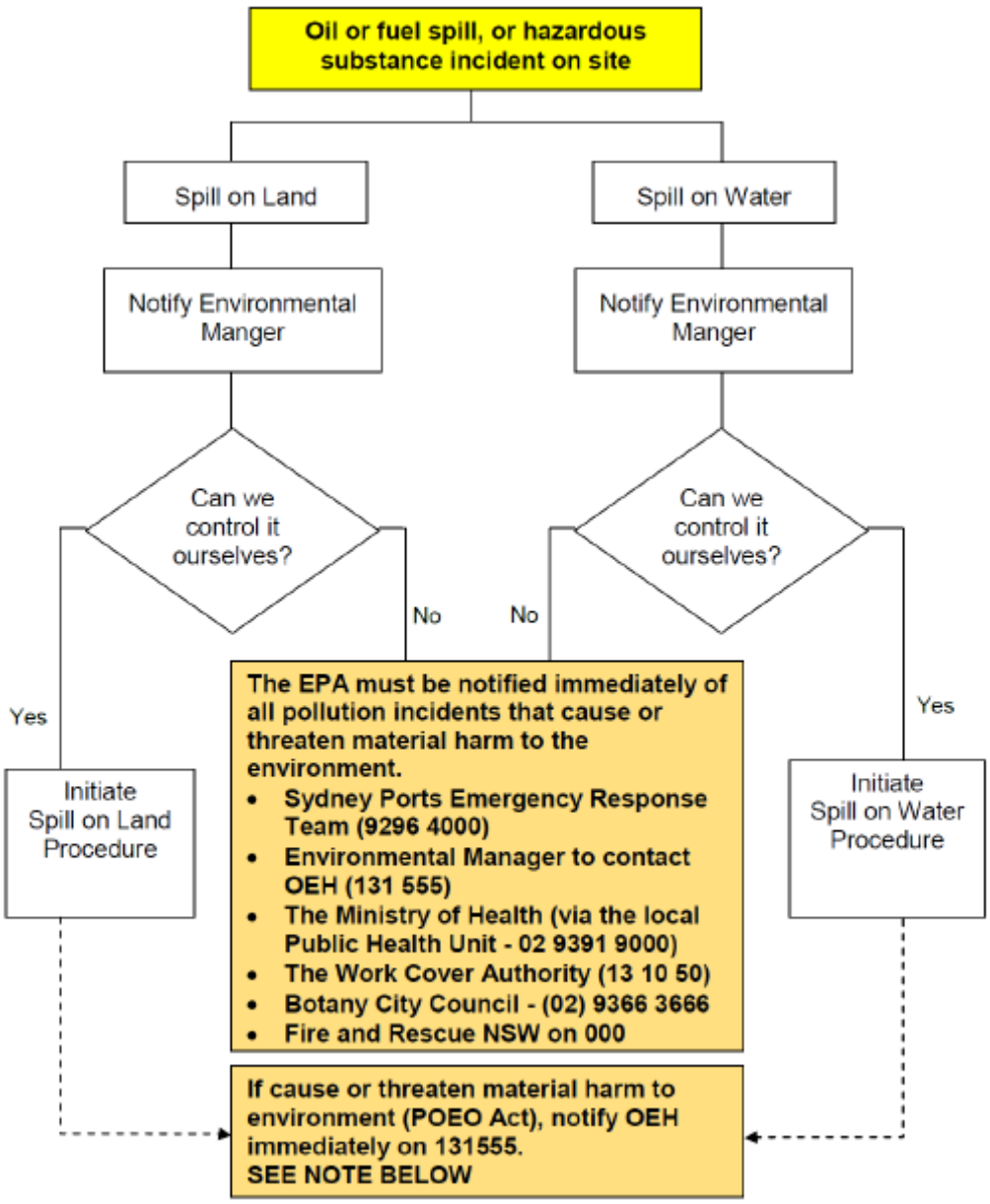
Voice		Speech			Telephone		Background	
	Man		Accent		Calm		Local		Music
	Woman		Stutter		Angry		STD		Voices
	Child		Fast		Slurred		Mobile		Traffic
	Taped		Slow		Drunk		Unknown		Aircraft
	Unknown		Loud		Other				Train
			Soft						Machinery

- Notify the **ERT** and your Supervisor.
- If a suspected bomb/substance is found you must take the following actions:
  - Do not touch it.
  - Clear the area.
  - Notify the **ERT** and your Supervisor; and
  - Prevent other people from entering the area near the suspected bomb/substance.

Product Spills

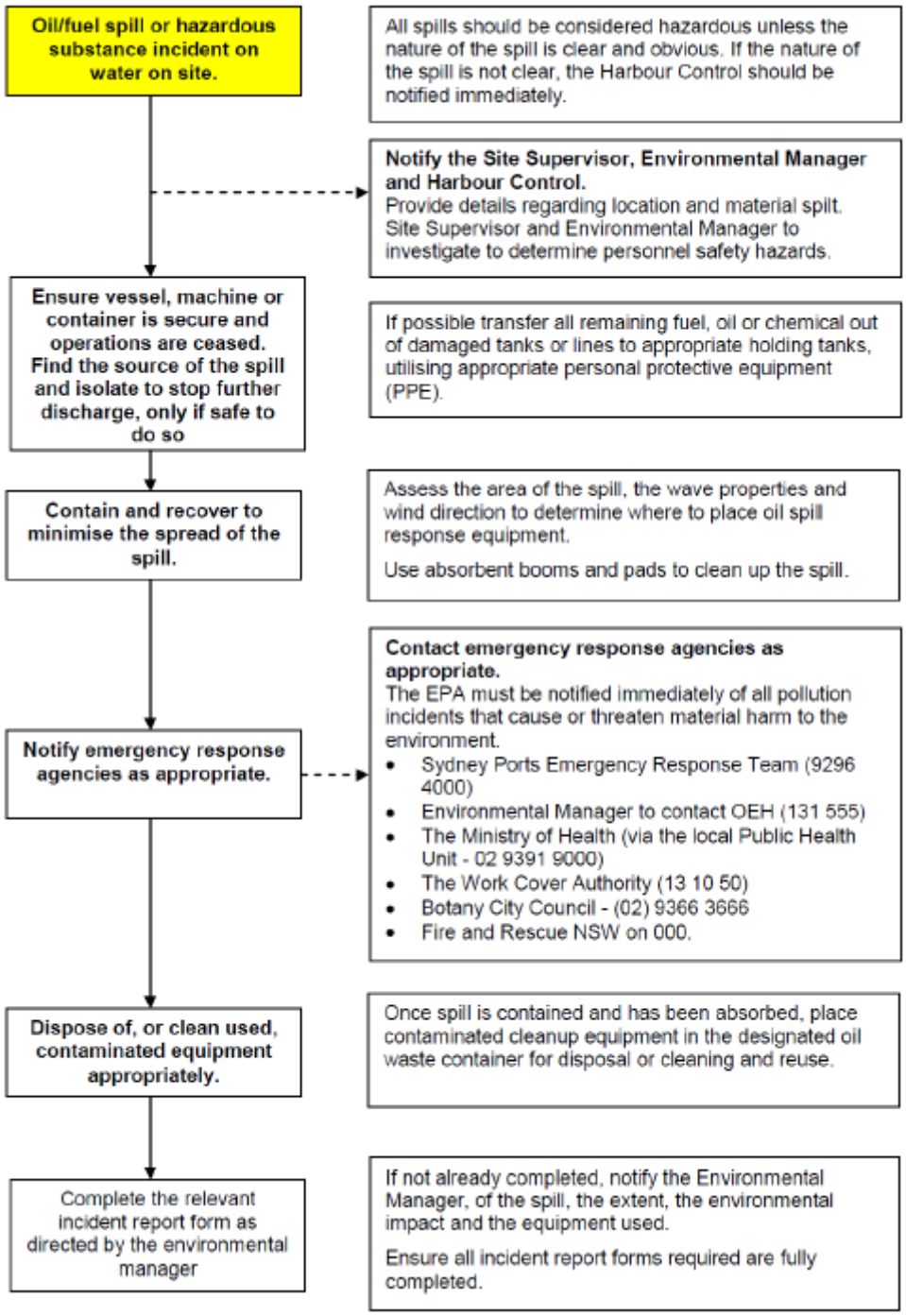
Environmental Spill Response - Decision Flow Chart

In the event where of an Environmental Product Spill the below decision making flow chart and associated procedures describes how to manage an oil spill of various sizes both on land and on water during construction activities. These procedures form part of the Emergency Response Plan and will be forwarded in the event of a spill. All personnel involved in refuelling and handling of oils and chemicals are to be familiar with this decision making flow chart and the procedures and are to respond accordingly in the event of a spill:

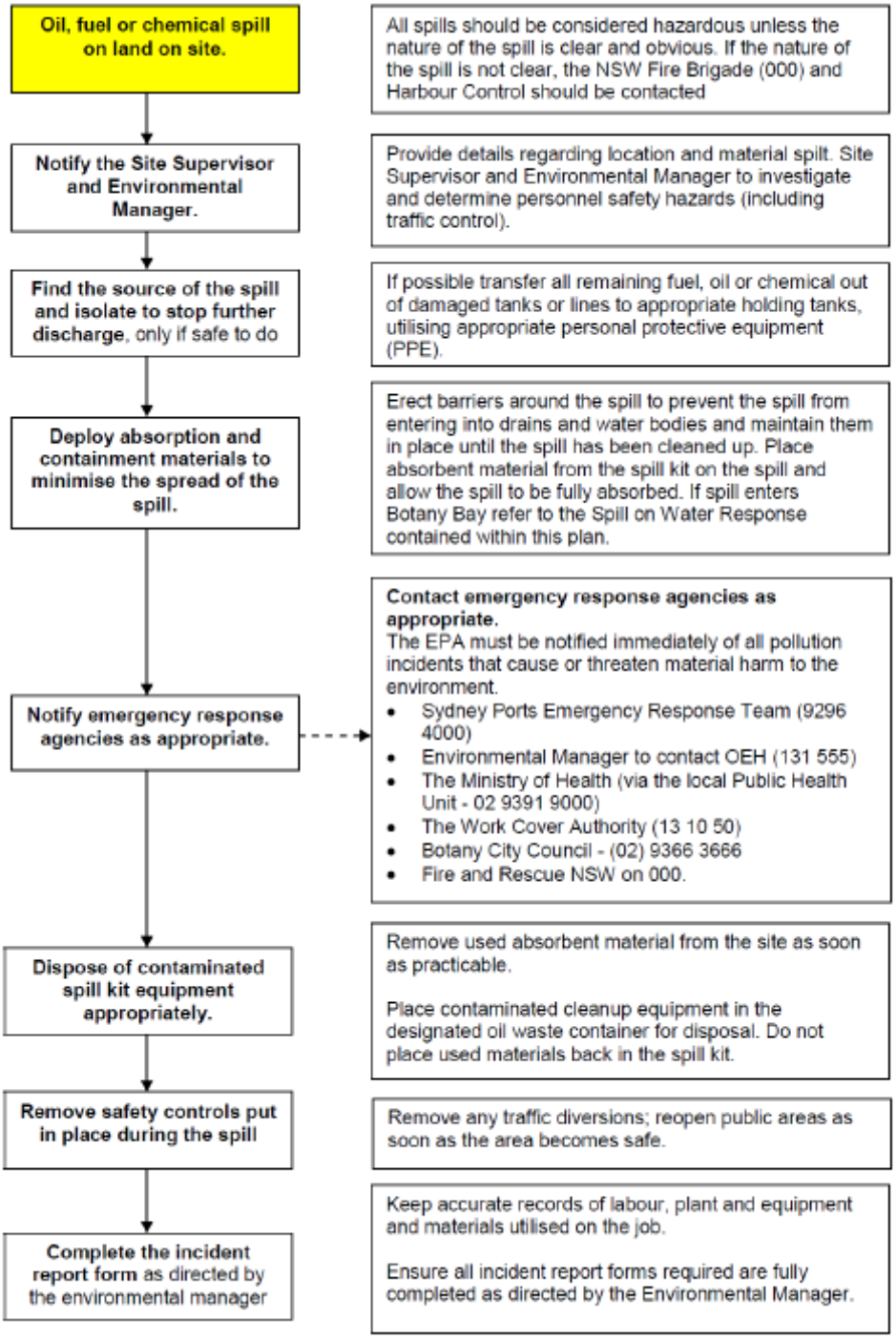


NOTE: There is a responsibility to notify incidents causing or threatening material harm to the environment immediately after a person becomes aware of the incident.

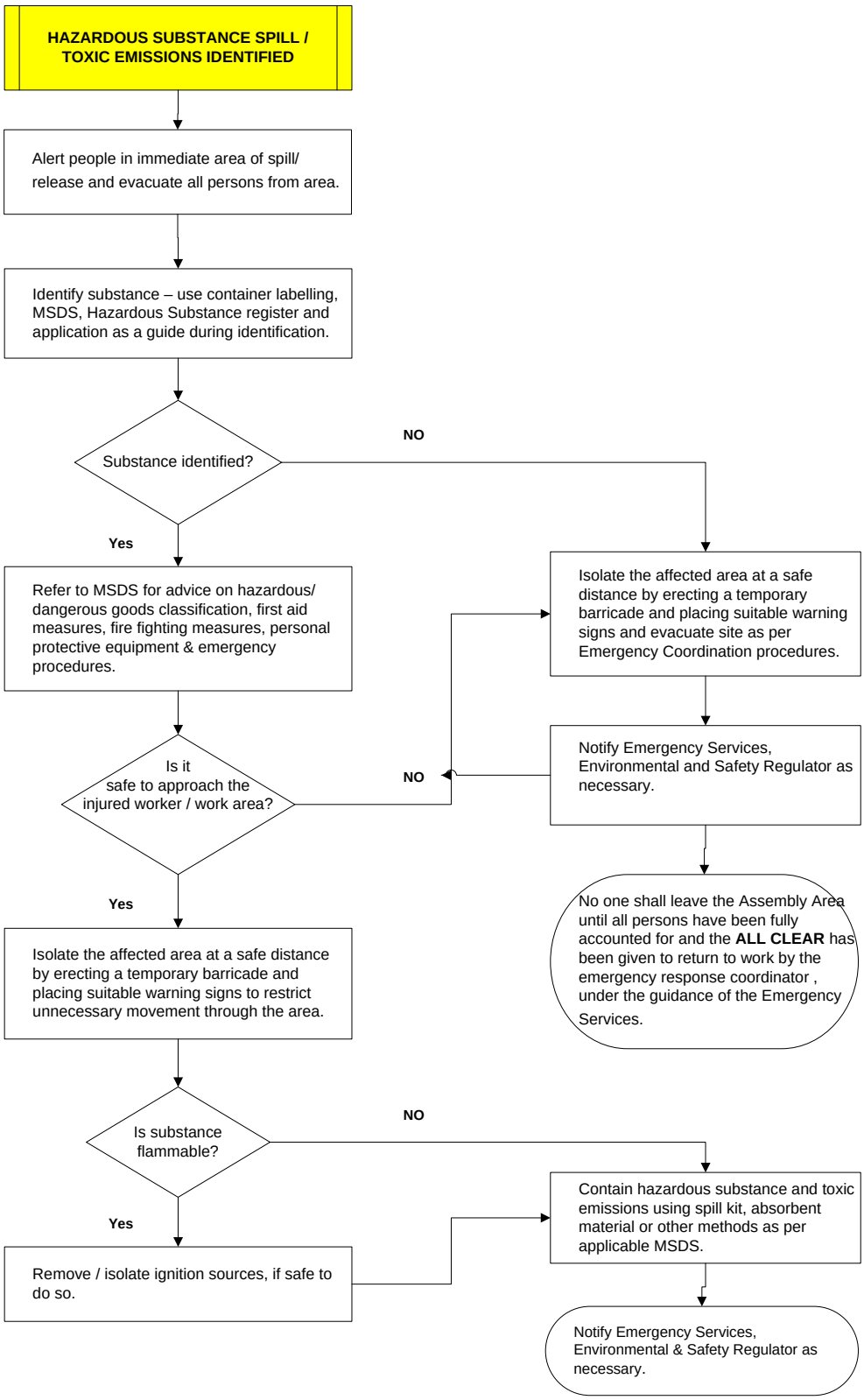
Environmental Spill Response - Spill on Water



Environmental Spill Response – Spill on Land



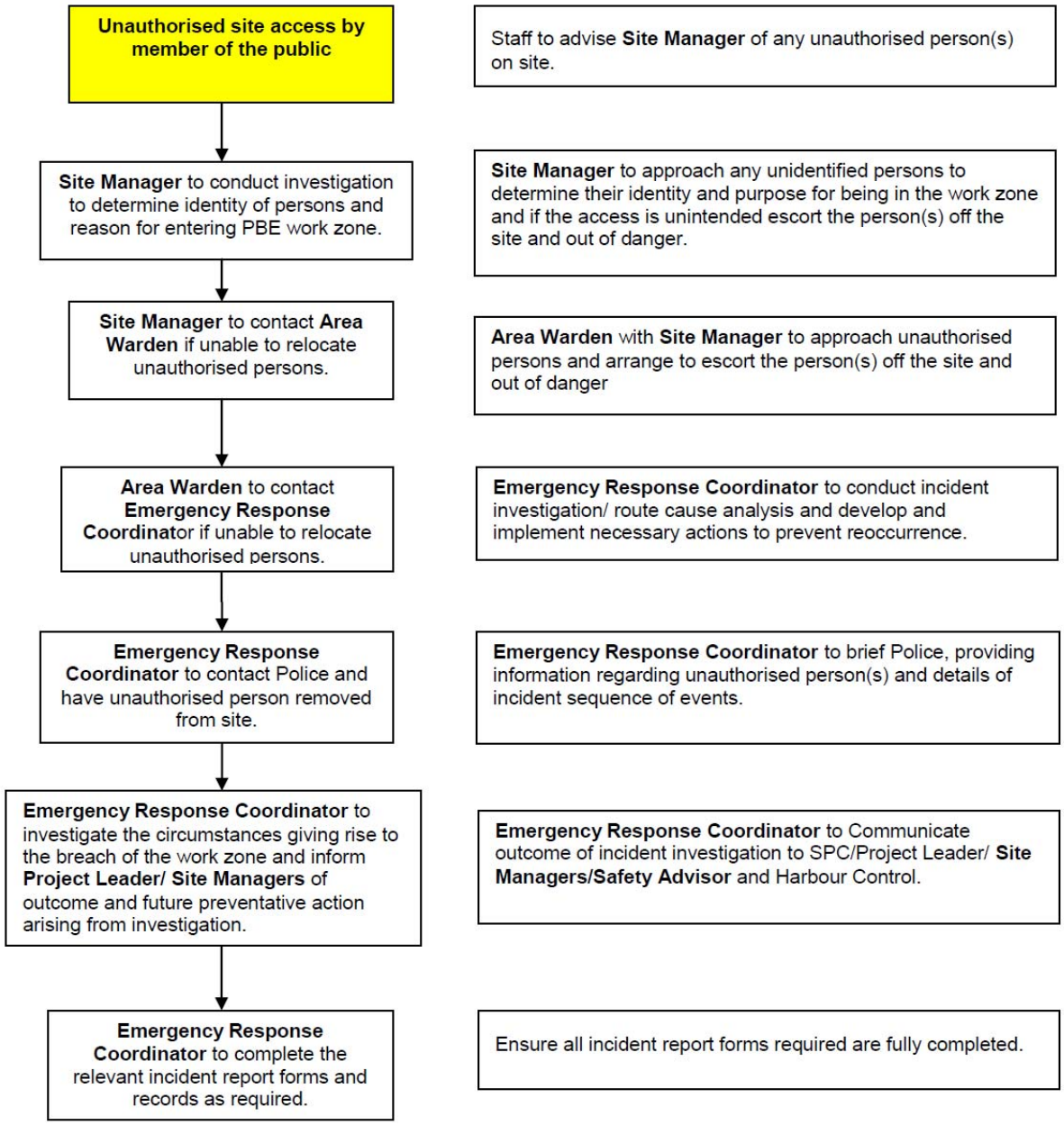
Response Procedure – Chemical Release or Explosion (Spill/ Gas Leak)



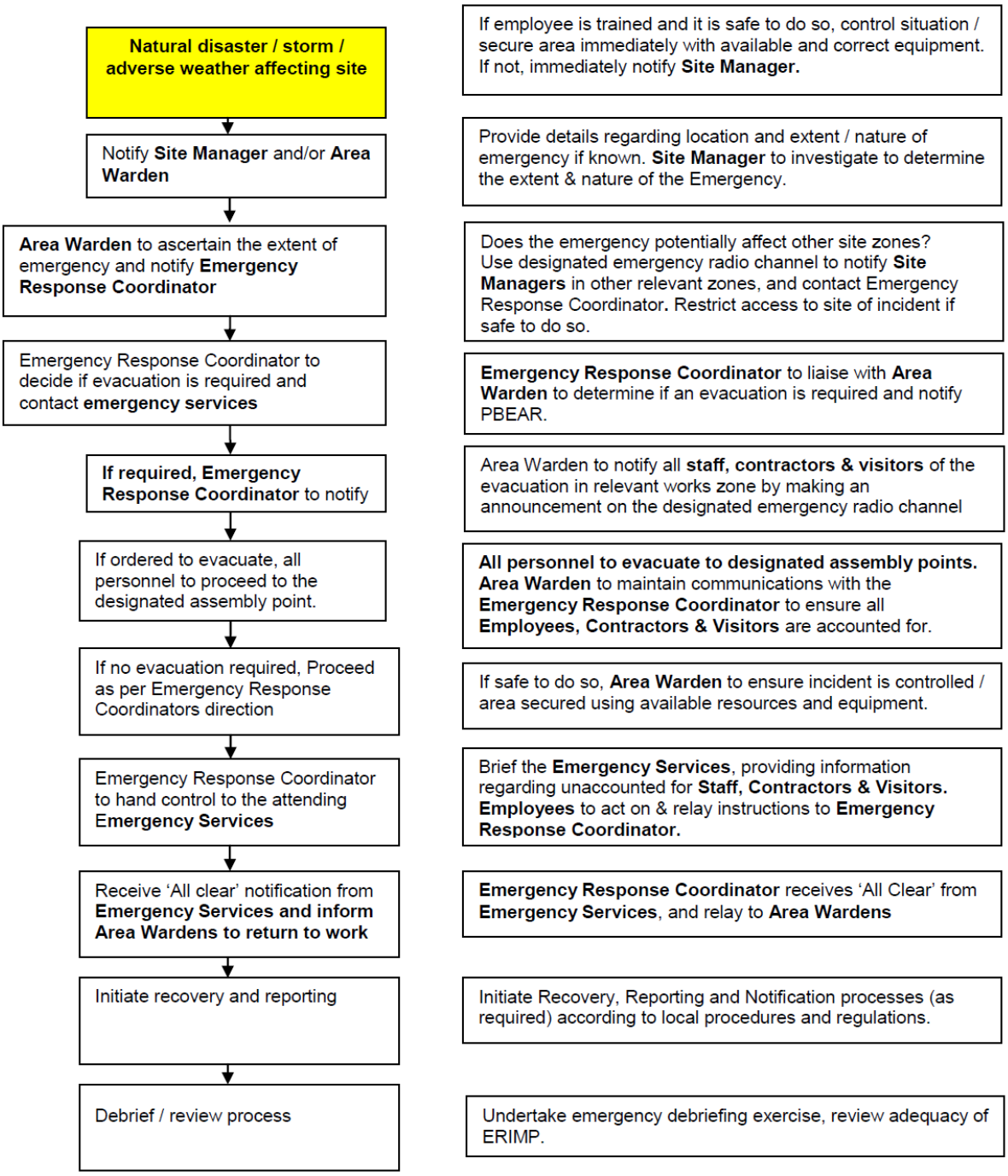
Response Procedure - Public Safety

This procedure details the actions to be followed in the event that a member of the public gains unauthorised access or an incident occurs in a project work zone. Possible scenarios include:

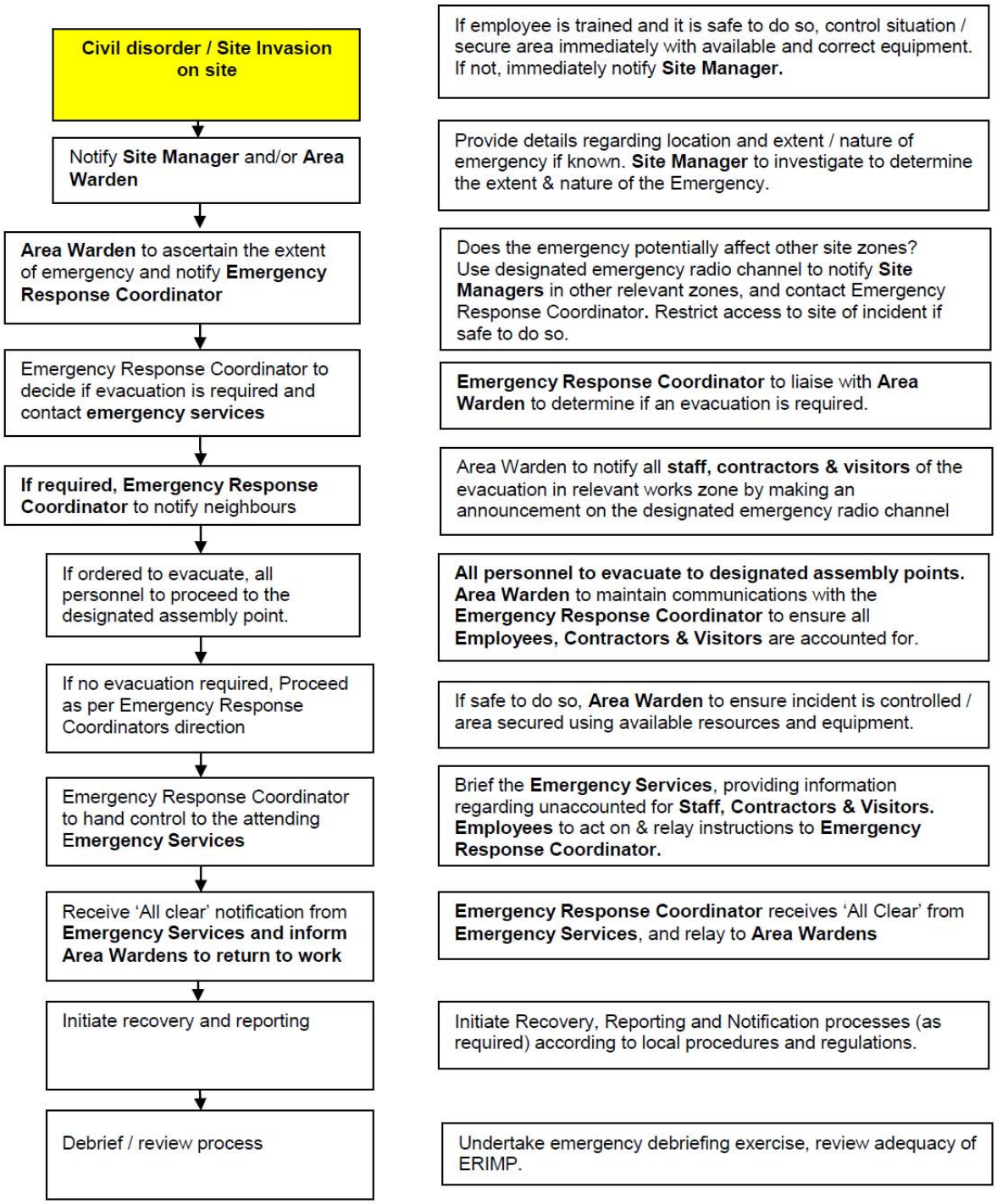
- Unintended or unauthorised access to project work zones
- Interaction with mobile plant
- Incident involving public amenities
- Breach of perimeter fence or physical barriers
- Motor vehicle/recreational craft incident



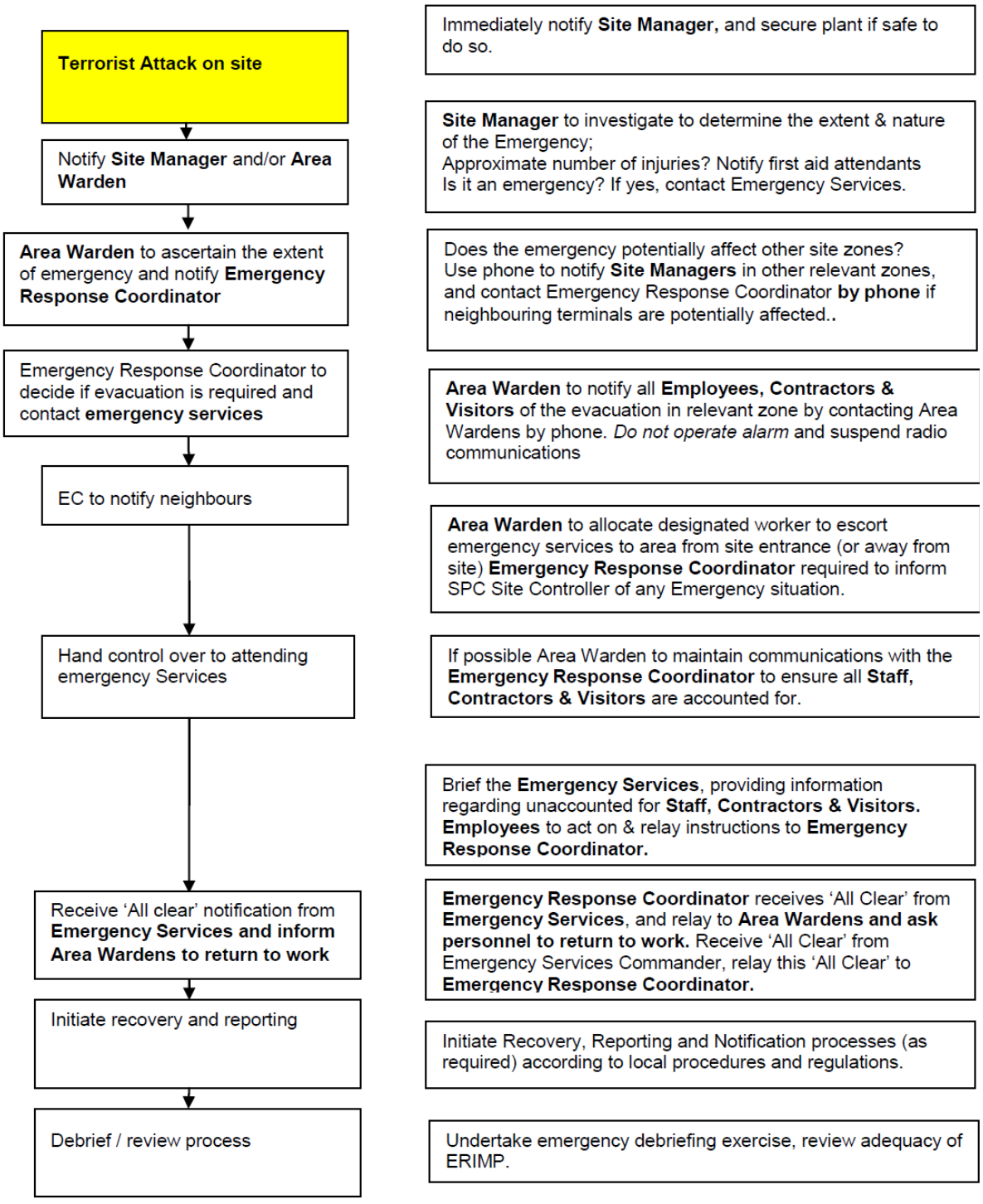
Response Procedure - Natural Disaster / Storm / Adverse Weather



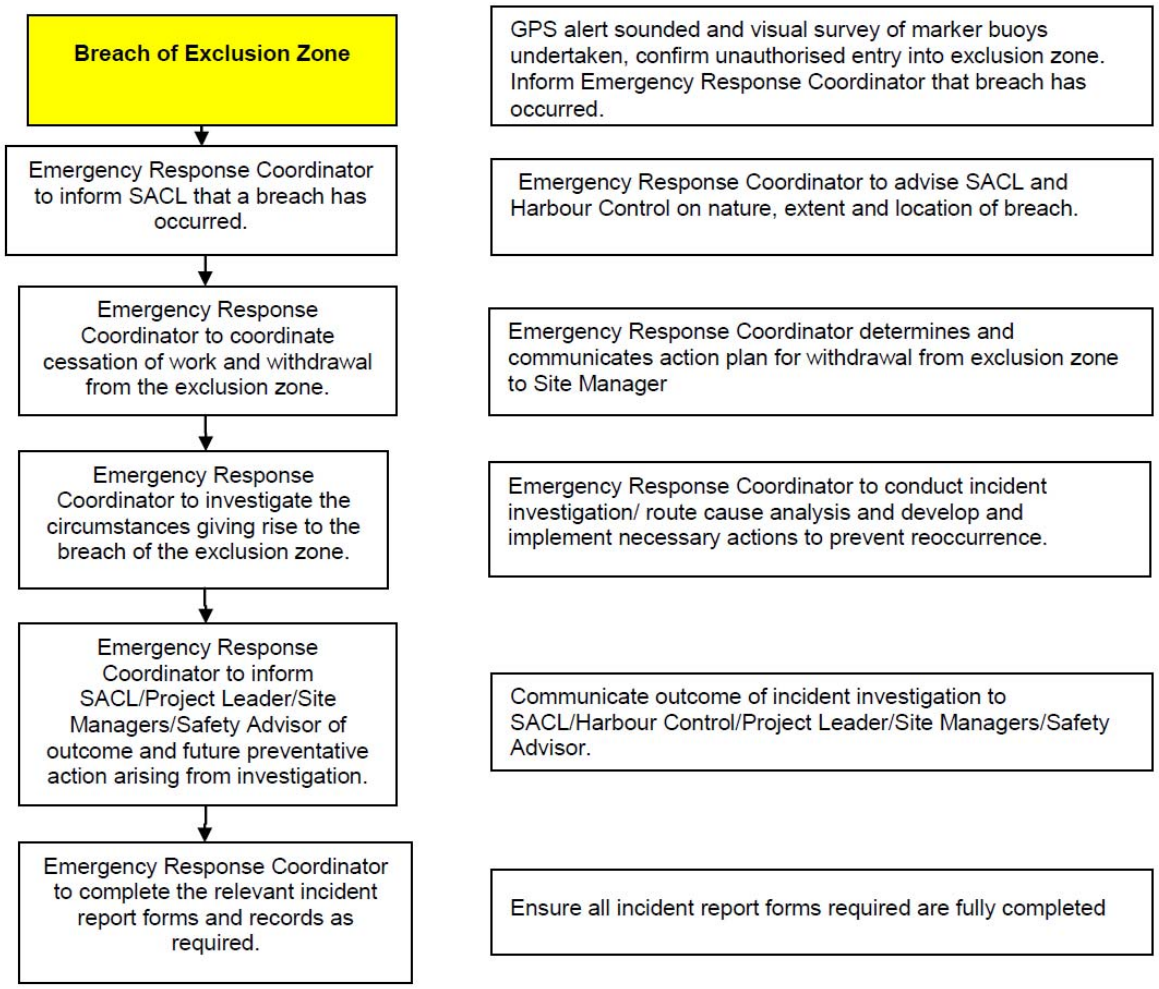
Response Procedure - Civil Disorder and Site Invasion



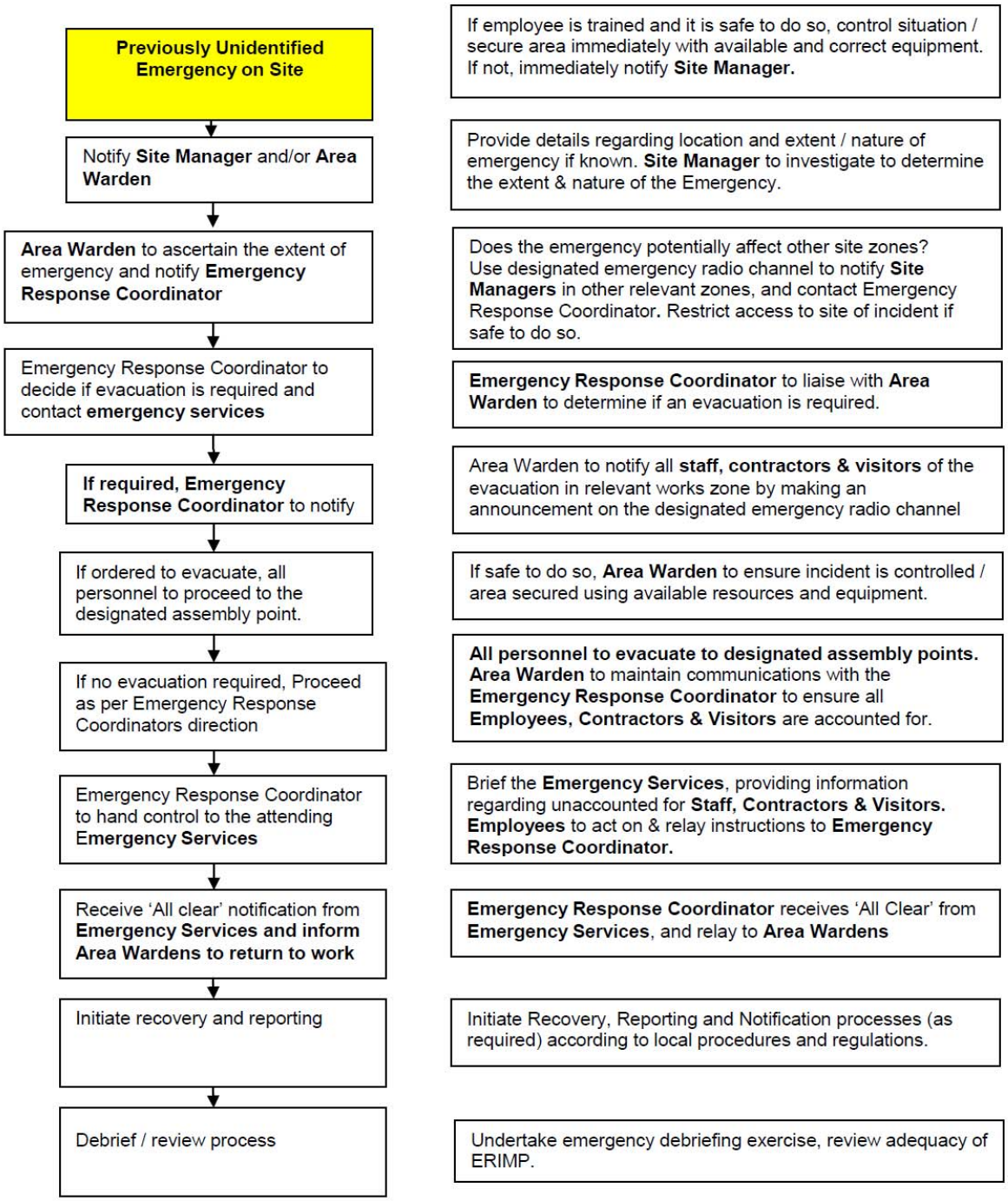
Response Procedure - Terrorism



Response Procedure - SACL Exclusion Zone Breach



Response Procedure - 'Previously Unidentified' Emergency



Appendix 6 – MCoA.

MCOA Number	Description	CEMP Reference
B1.3	Construction Environmental Management Plan (CEMP)	This Document
B2.4	Dust Management Plan	Section 1.25
B2.5	Soil and Water Management Plan	Section 1.24
B2.6	Acid Sulphate Soils Management Plan	Refer to Appendix 6 Acid Sulphate Soils Management Plan
B2.13	Section 73 Compliance Certificate	N/A
B2.14	Construction Traffic Management Plan	Section 1.23 and Appendix 1
B2.15	Safety audit in accordance with RTA guidelines	N/A
B2.19A	Seek approval for conducting construction activities audible at residential premises outside the hours specified.	NA – refer section 1.22

MCOA Number	Description	CEMP Reference
B2.20	Construction Noise Management Plan	Section 1.22
B2.22A	Night-Time Works Noise Management Protocol	NA – refer section 1.22
B2.33	Construction Waste Management Plan	Section 1.26 and Appendix 2
B2.43	Emergency Response and Incident Management Plan in consultation with DEC, DOP, Council and the Community Consultative Committee.	Appendix 5
B2.48	Construction may not commence until details regarding the steps and timeframes for resolution of aviation issues, including certification, has been endorsed by Air Services Australia and by the Minister for Planning.	Section 1.29
B3.1	Community consultation and complaints management	Section 1.29
B4.2	Annual Environmental Management Report	Downer can provide input into the report.
Protection of the Environment Operations Act 1997	Environment Protection Licence	N/A

Appendix 7 – Acid Sulphate Soils Management Plan

Environmental "Aspect" Procedure

Acid Sulphate Soil Management

Prepared By:

DEE Environmental Officer	Troy Cowcher	7 / 04 / 10
	Name	Date

Reviewed & Approved By:

DEE Systems Manager	Tim McCullough	7 / 04 / 10
	Name	Date

TABLE OF CONTENTS

1.0 INTRODUCTION

Acid Sulphate Soils (ASS) or Potential Acid Sulphate Soils (PASS), are a naturally occurring soil profile phenomena found throughout most coastal low-lying areas in Australia, usually below 5 metres Australian Height Datum (AHD).

Disturbance of these soils through construction activities and allowing oxygen exposure into the profile can lead to toxic quantities of Sulfuric Acid (H_2S0_4), aluminium, iron, and other heavy metals being released into surrounding soil and adjacent watercourses. This leaching is further exacerbated following rainfall events and prolonged dry periods. As the acid moves through the soil profile it releases other toxins which eventually flow into surrounding waterways, causing fish kill and damaging ecosystems.

In addition to these environmental impacts, consideration also needs to be given to the potential damage these compounds may cause to construction structures including foundations, and metal support frames. This is of great importance when considering tower footing locations along the easement.

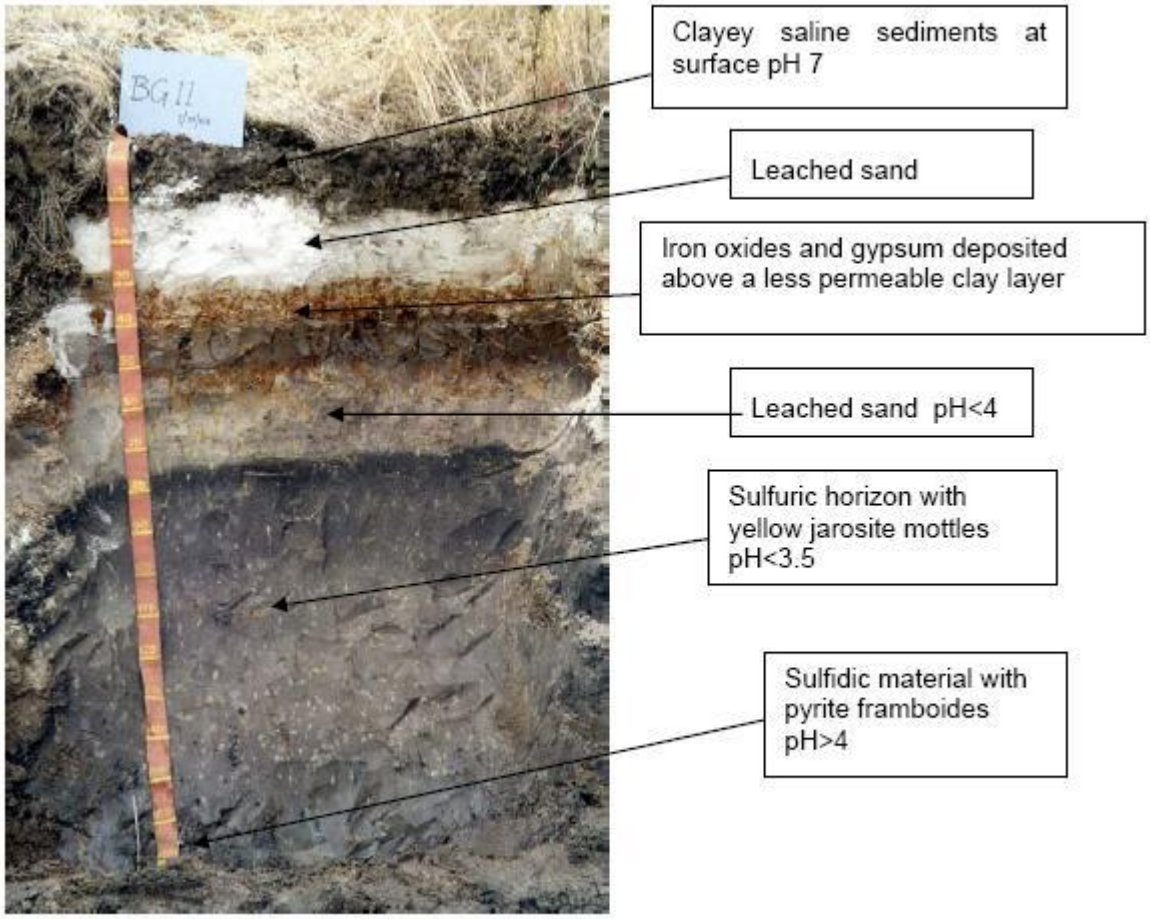


Fig 1.0 – Soil Profile view showing Actual Acid Sulphate layer and pH values*

This procedure has therefore been defined to detail the management and control processes, inclusive of:

- field and laboratory testing procedures;
- neutralisation of spoil and groundwater; and
- disposal methods.

which will be implemented on all projects which interact with Acid Sulphate soils so as to prevent and control the release of acid sulphate soils and their subsequent chemical reactions into the surrounding environment within the transmission line corridor.

It has been developed to comply with and supplement the guidelines documented in the respective client's environmental documentation (EMP and or EIA), any relevant state or local government legislation, as well as the DEE EMP.

The scope of this procedure shall apply to all Downer employees, subcontracted personnel and all construction activities related to the respective transmission line project.. Implementation shall be monitored by the DEE Environmental Officer as well as respective project supervision.

1.1 POTENTIAL ENVIRONMENTAL IMPACTS

- Escape of Acid Rich Sediments (ASS) together with other contaminants off-site into waterways, pasture and groundwater without protection or treatment as well as leading to fish kills and damaging vegetation;
- Potential for contaminated acid sulphate soil to mix with clean soil in a landfill and produce acidic leachate;
- Mixing of acid sulphate soil into ground water (upper aquifers), creating water with an acidic pH.

2.0 DEFINITIONS

DEE	-	Downer EDI Engineering
EPA	-	Environmental Protection Authority
EMP	-	Environmental Management Plan
EIA	-	Environmental Impact Assessment
PASS	-	Potential Acid Sulphate Soil
AASS	-	Actual Acid Sulphate Soil
AHD	-	Australian Height Datum

3.0 PROCEDURE

3.1 IDENTIFICATION OF ACID SULPHATE SOILS

Acid Sulphate Soil (ASS) can be identified in the field by examination of bore samples containing a mixture of grey with mottled yellow/reddish brown (jarosite) stains (see Figs 1.0 – 4.0). These may have a sulphurous odour and the area where it is present is poorly vegetated. Reasonable ASS maps are available from the respective state body, such as the QLD Department of Natural Resources, Mines and Water to determine the presence of ASS in a proposed transmission area/route.

A few simple field indicators can help in the identification of both potential and actual ASS:

- Soils with pH < 4;
- Unusually clear or milky green drainage water with a pH of less than 5.5;
- Extensive rust coloured iron stains on any metal drain surfaces;
- Iron stained drain water or ochre deposits;
- Butter coloured jarosite present in surface spoil;
- Iron oxide mottling or corrosion of concrete and steel structures.

In addition to these, Coastal Environments with water logged estuarine sands or silty sands which are:

- Mid to dark grey to dark greenish grey in colour.
- Soft and buttery with the consistency of clay.
- pH neutral to acidic

Ph of 3.5 or less

Fig 2.0 – ASS, showing bright yellow jarosite mottles

pH between 4.0 & 6.0

Fig 3.0 – Potential ASS, showing reddish/brown jarosites*

pH of 4.0 or less

Fig 4.0 – Potential ASS, showing beginning of jarosite mottles*

3.2 FIELD TESTING OF BORE HOLE SPOIL MATERIAL

In the areas identified as having potential ASS from test bores, Geotechnical testing and those unknown areas not covered by these procedures, field pH testing of the soil profile shall occur. The DEE environmental officer will be responsible for the purchase and maintenance of soil testing equipment, co-ordination of laboratory confirmation

analysis (POCAS Test) and in-field site testing of drill spoil during excavation activities. A procedural flowchart guide adapted for use by the DEE environmental officer for the testing and treatment of ASS is shown in Fig 7.0.

Soil confirmed as being actual or potential ASS shall be treated and disposed of in accordance with this DEE procedure and the respective state guidelines (e.g. *"Qld. Acid Sulphate Soil Technical Manual – Soil Management Guidelines").*

4.0 TREATMENT OF ACID SULPHATE SOIL (ASS)

During the excavation stage of construction activities for tower foundation setting, it is possible that disturbance of PASS or ASS could occur. Soil testing shall be conducted on all excavated spoil in areas identified as high risk zones according to Geotechnical test data and DEE test bores. Should ASS be determined during this stage the following procedure shall be implemented immediately:

- POCAS verification testing of soil samples to be performed at a designated laboratory facility;
- All disturbed ASS material shall be neutralised with AgLime ($CaCO_3$) at the appropriate rates as per state legislation / guidelines (e.g. "*QLD Acid Sulphate Soil Technical Manual 2002"),* being generally a minimum of 5kg/t on a 150ml to 300ml thick layer of soil;
- Mild PASS may be treated in-situ by adding lime to foundation bore holes during drilling operations. Additional lime can be added to the spoil material once released from the auger attachment. Refer Fig 8.0

Note: *A guard layer of Lime must be place on the ground in the vicinity of the drill rig prior to drilling of the foundation bore hole.*

- Re-working of the soil following drying and addition of more Aglime may be required to achieve a sufficient level of neutralisation;
- Disturbed ASS will either be neutralised on site or taken off-site by truck and stockpiled on a treatment pad at a designated location for bulk treatment. Construction a typical ASS treatment pad is detailed in Fig 5.0.;
- If no hardstand area is available, a guard layer of compacted clay will be laid down first and then covered with a fine layer of Aglime prior to any soil being deposited;
- Disturbed soil will be allowed to dry prior to neutralisation treatment;
- Trucks used to transport ASS off-site will have a fine guard layer of AgLime placed on the tray bed prior to any soil being loaded;
- Soil is to be compacted prior to the next layer being deposited for treatment;
- In-situ Soil and water pool testing shall be conducted to ensure that adequate neutralisation has occurred;
- Disposal of suitably treated ASS shall be in accordance with the respective local government (City Council) Landfill disposal guidelines and the relevant licenses and regulations under the state Environmental Protection Act.

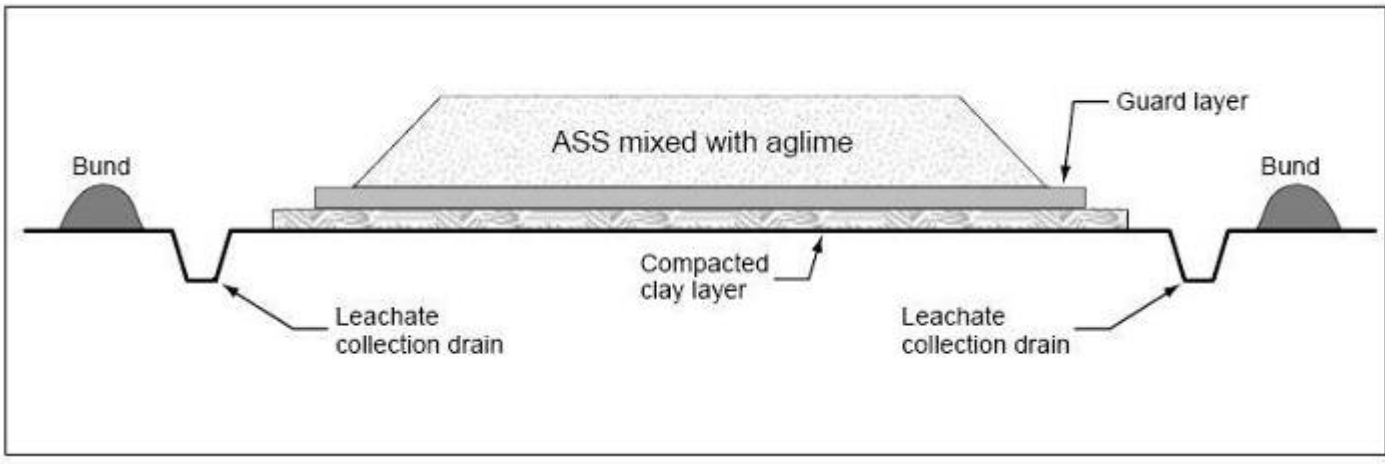


Fig 5.0 – Schematic cross section of an ASS stockpile treatment pad**

4.1 DE-WATERING OF CONTAMINATED GROUND WATER BORE HOLES

In some projects it is possible that a combination of Acid Sulphate Soils and near surface upper ground water aquifers may be encountered. Acid sulphate soils are generally waterlogged, but if groundwater levels are lowered or disturbed, oxidation of the ASS may occur. In such instances, the excavation activities for tower foundation stubs could result in the soil profile mixing of ASS with ground water, resulting in the production of acid leachate and subsequent contamination of the water. Vertical and horizontal transportation of this contaminated water can potentially affect other areas and adjacent subsoil.

It is preferable that this water is left in-situ and treated for neutralisation to an acceptable pH level (usually the optimum water pH level is 6.5 to 8.5), rather than pumping the water into a sediment pond for treatment at the surface. The following procedure shall be adopted, but may be amended as required for the treatment of ground water contaminated with sulfides:

- All ground water and upper aquifers encountered during excavation and construction activities shall be tested to determine the pH level;
- Groundwater exhibiting a pH range < 6.5, shall require further testing to investigate for the presence of dissolved calcium (shell) compounds (may give a false reading);
- Groundwater exhibiting a pH range < 5.5 will be treated with Aglime ($CaCO_3$);
- Overdosing and converting groundwater to a high alkaline pH is also an environmental risk, therefore neutralisation will be conducted at the rates indicated in the respective state guidelines. (again as an example the "*QLD State Planning Policy 2/02 Guidelines" – Planning & Managing Development Involving Acid Sulphate Soils*.");
- The assumption will be made that $1m^3$ of Acid Water is equal to 1000 litres (1 Kilolitre) and therefore $1000m^3$ is equal to (1 Megalitre);
- Progressive water testing shall be undertaken during neutralisation to ensure the optimal pH range has been achieved;
- Water will then be either left in-situ or pumped out (post treatment) into a suitable sediment pond depending on location and construction constraints at each tower site. Sediment pond shall then be buried, covered with topsoil and revegetated accordingly.

4.2 RESOURCES REQUIRED

- Soil Test Kit (pH_f or pH_{Fox}) Refer to Fig 6.0 ;
- QLD Acid Sulphate Soil Technical Manual 2002;
- Pallet load of fine grade AgLime;
- Plastic Liner Sheets;
- Clean Soil/Clayey Loam;
- Bobcat or Backhoe;
- Landfill Disposal Regulation.

Fig 6.0 Description of Required In-Field Soil Testing Equipment

5.0 KEY PERFORMANCE INDICATORS

- Any PASS encountered through test bores or via soil field testing will be confirmed by laboratory analysis, treated and disposed of in accordance with DEE management procedures;
- Where Actual ASS material is confirmed, soil treatment has occurred within 4 hours of its identification. Where this is not possible, stockpiles are either encapsulated using a plastic sheet or secured in a lined earthen bund so as to prevent contact with air and water (eg. rain);
- Sediment bags placed on the down slope of the stockpile before the end of the next break (lunch break or end of shift);
- Where Actual ASS material requires disposal, the removal was compliant with legal requirements and disposal records have been kept.
- Run-off water and groundwater quality complies with pH range 6.5 to 8.5.

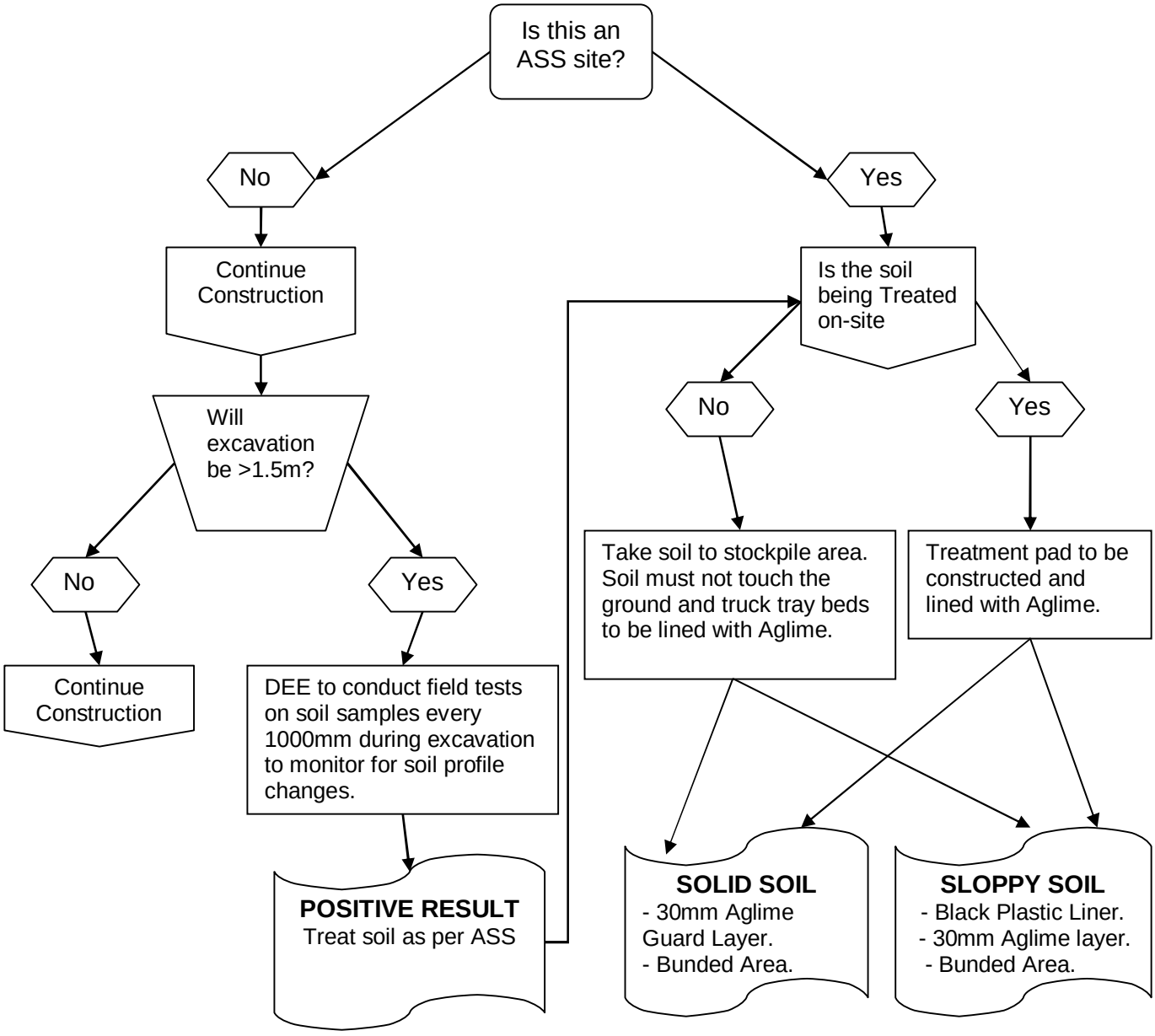


Fig 7.0 – Procedural flowchart for the identification and treatment of ASS

Fig 9.0 – In-situ nuetralisation of bore hole spoil with 'Mild PASS'

6.0 ROLES AND RESPONSIBILITIES

Project Manager (PM)	Site Supervisor/Manager (SM)	Environmental Officer (EO)
Ensure that all personnel complete an induction prior to the mobilising for work. Provide the necessary resources for managing the ASS material. Work Drawings show the presence of ASS in areas where the potential exists. Ensure that corrective actions communicated by the EO are closed out within the stipulated timeframe.	Confirm as part of pre-start prior to ground disturbance that excavation personnel are able to basically identify ASS material. Temporarily stop work in the immediate area and inform the EO and PM immediately when material that potentially could contain Acid Sulphate has been identified. Keep the soil removed to an absolute minimum. Follow instructions from EO in relation to the stockpiling, treatment and disposal of ASS.	Ensure employees are aware of the identification of acid sulphate soils, and the relevant controls and management strategies. Review Area ASS Maps and Geotechnical test data and communicate the areas where ASS may be present to the PM. Sample and test the material to confirm the presence of ASS. If ASS is present: 1) Follow the treatment management strategy (i.e treatment with lime on-site or transported to bulk treatment stockpile area). Organise the disposal of treated ASS at a landfill that can accept the material. 2) Communicate to the SM the actions that are to be completed and their timing. Submit an incident report for due diligence and communicate with the client's Environmental Representative. Carry out inspections and communicate to the PM any residual corrective actions to be implemented.

7.0 DOCUMENTATION

Document No.	Title
OHS-03-F06 /11654	DEE *"Pre-Mobilisation Hazard & Risk Assessment".*
ENV-EMP-11654	DEE Environmental Management Plan *"Yabulu south – Ingham 132/275 KV".*
DNRM	*"Queensland Acid Sulphate Soil Technical Manual" – Soil Management Guidelines V3.8.*
QASSIT	*"Guidelines for Sampling and Analysis of Lowland Acid Sulphate Soils (ASS) in Queensland 1998".*
QLD Government	*"State Planning Policy 2/02 Guidelines" – Planning & Managing Development Involving Acid Sulphate Soils.*

*Images taken from *"CSIRO – Acid Sulphate Soil Technical Manual" (Version 1.2) 2003.*

**Diagram taken from "Queensland Acid Sulphate Soil Technical Manual – Soil Management Guidelines" (Version 3.8) 2002

***Kit Description image and Inspectors Flow Chart adapted from G:\RoadTek\Public\Environment 2004\EMS\ASS\ASS Field Test Guide Sheet.doc

APPENDIX A (Project Specific Controls)

From the geo tech laboratory results which can be found in Appendix B below the recommended liming rates have been identified as “low treatment” <0.1 tonnes when compared to the QASSIT guidelines. DEE has then compared neighbouring towers at similar Australian Height Datums to create a best practice principal for tower site treatment as not all sites had been tested. The sites in Table 1 reflect recommended liming rates based on the 2M and 20M geotech investigation.

Table 1. Recommended liming rates

Tower	Lime Amount
62	5kg/tonne
63	5kg/tonne
63A	12kg/tonne
64	5kg/tonne
76	5kg/tonne
77	5kg/tonne
108	5kg/tonne
109	5kg/tonne
111	5kg/tonne
136	5kg/tonne
138	3kg
137	5kg/tonne
150	5kg/tonne
155	5kg/tonne
156	5kg/tonne
157	5kg/tonne
158	5kg/tonne
159	5kg/tonne
160	5kg/tonne
161	5kg/tonne
162	7kg/tonne
163	5kg/tonne
164	42kg per tonne
165	42kg per tonne
166	42kg per tonne
167	42kg per tonne
168	42kg per tonne
169	42kg per tonne
170	5kg/tonne
171	5kg/tonne
174	3kg
190	5kg/tonne
191	5kg/tonne
192	5kg/tonne
193	5kg/tonne

194	5kg/tonne
195	5kg/tonne
196	5kg/tonne
197	8kg/tonne
199	5kg/tonne
202	5kg/tone
206	9kg/tonne
209	7kg/tonne

Low soil Treatment

1. Tower site plan to be completed at the tower site.

2. Lime to be added to the foundations whilst auguring at the applied rate.

3. Place lime guard layer where the soil

4. Black plastic to be placed on the ground where stock pile will be located. Area is to be bunded and have black plastic placed over the top.

5. Stock pile to sampled and laboratory tested for neutralisation.

6. If more pending results will be spread and compacted on site or taken to treatment pad for further treatment.

Water treatment

When ground water is identified in ASS areas, the PH should be measured prior to dewatering. Water can be neutralised by addition of an alkaline additive such as liquid caustic soda. See neutralising dosages below. Where the ground water pH is less than 6.5, dewatering discharges should be held in a suitably sized temporary holding tank. The water in the holding tank should be treated to bring the pH back above 6.5 (but below 8.5) prior to discharge to the ground surface. Direct discharge to water bodies is not recommended.

Neutralisation Rates For Water Bodies

pH in Water Body	Amount Liquid Caustic Required to be Added to 1000 litres of Water to Raise pH to 7 (neutral)							
	100% (Pure) Concentration				Other Concentration	50	(enter %)	
0.5	26563	g	19676	Litres	39353	Litres		
1.0	8390	g	6215	Litres	12430	Litres		
1.5	2686	g	1990	Litres	3979	Litres		
2.0	839	g	621	Litres	1243	Litres		
2.5	269	g	199	Litres	399	Litres		
3.0	84	g	62	Litres	124	Litres		
3.5	27	g	20	Litres	40	Litres		
4.0	8.4	g	6	Litres	12	Litres		
4.5	2.69	g	2	Litres	4	Litres		
5.0	0.84	g	0.6	Litres	1.2	Litres		
5.5	0.27	g	0.2	Litres	0.4	Litres		
6.0	0.08	g	0.06	Litres	0.12	Litres		
6.5	0.027	g	0.02	Litres	0.04	Litres		

Notes:

1000 litres = $1m^3$

1 The caustic should be applied into a closed system with inflow used to mix the caustic and water entering the system. Caustic should not be applied at discharge point to the environment.

2 Caustic should be applied incrementally and the pH of the water body should be monitored during the process to avoid overshooting (ie. pH exceeding 8.5)

3 Caustic is strongly alkaline and strict handling procedures are required to protect health and safety. Refer to MSDS from supplier.

APPENDIX B (Test Results for 20m GeotechTower Locations)

DETERMINATION OF ACID SULFATE SOIL PROPERTIES

CERTIFICATE OF ANALYSIS

Analysis By: Bio-Track Pty Ltd ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

Bio-Track

LAB REFERENCE LR260510.647 DATE OF REPORT 28 MAY 2010 @17:26:08
CLIENT NAME MR DARIN CAROLIN c/o ROADTEST PTY LTD 101 HIGH STREET ROCKHAMPTON QLD4701
PROJECT NAME TRANSMISSION TOWER YOUR PROJECT/JOB REFERENCE GT 0510/546
SAMPLING DATE 14/5/2010 NUMBER OF SAMPLES 10 Samples supplied by client SAMPLE TYPE:SOIL SAMPLE FOR ACID SULFATE STUDY
DATE RECEIVED 26 MAY 2010 PACKAGING SAMPLES LABELLED - INTACT - BAGGED - CHILLED IN INSULATED PACKAGING Ground Oven Dry Samples DISPOSED ON 1/2/2011

Page 1 of 1 Report Pages.

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. All reported values gravimetric, dry mass.
%eEQ (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %SAS - sANC/ 1.5 (±SAS included irrespective of pH).
LIME1 rates calculated to neutralise TPA (or TAA if >TPA)+ a5_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + a5_POS or S_Cr + a5_RAS -ANC_BT/1.5
NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m3.
Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then a-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH	pH KCl	pH ox	TAA	TPA	TSA	S KCl	S P	S POS	S Cr	a-NAS	s EQ	Ca KCl	Ca P	Mg KCl	Mg P	CBN POS	LIME1	LIME2	SANC_BT/FF	Ca NAS
	m			m/t	m/t	m/t	%	%	%	%	%	%	mg/kg	mg/kg	mg/kg	mg/kg	m/t	kg/t	kg/t	%	mg/kg
Analytical Method Codes		23A	23B	23F	23G	23H	23Ce	23Ge	23Ee	22B	s20le	s	23Vh	23Wh	23Sm	23Vm	e23uAx	s19n2			
TAR97 7	4.85	<1				<0.01			<0.01	<0.01	0.001	0.001	141		88		0	0		246	
TAR130 1	4.76	5				<0.01			<0.01	<0.01	0.007	0.007	32		264		0	0		47	
TAR142 3	6.71	0				<0.01			<0.01	<0.01	-0.013	-0.013	144		428		-1	-1	0.01	144	
TAR152 2	5.81	3				<0.01			<0.01	<0.01	0.004	0.004	37		58		0	0		57	
TAR154 3	4.69	8				<0.01			<0.01	<0.01	0.012	0.012	54		132		0	0		62	
TAR154 6	4.71	8				<0.01			<0.01	<0.01	0.013	0.013	48		150		0	0		74	
TAR156 1	4.37	11				0.03			<0.01	<0.01	0.026	0.026	137		399		1	1		121	
TAR167 3	4.18	20				0.03			0.84	<0.01	0.860	0.860	89		187		28	28		81	
TAR170 3	4.05	22				0.02			<0.01	<0.01	0.046	0.046	38		280		1	1		72	
TAR200 12	4.79	8				<0.01			<0.01	<0.01	0.012	0.012	810		691		0	0		597	

DETERMINATION OF ACID SULFATE SOIL PROPERTIES

CERTIFICATE OF ANALYSIS

Analysis By: Bio-Track Pty Ltd ABN 94 056 257 275

781 Mt. Gravatt-Capalaba Road Highvale, Brisbane, Australia, 4520 Ph: 07 3209 7179 Fx: 07 3209 7155

Bio-Track

LAB REFERENCE LR240510.397 DATE OF REPORT 28 MAR 2010 @16:28:31 Page 1 of 1 Report Pages.
CLIENT NAME MR DWAIN CAROLAN c/o ROADTEST PTY LTD 101 HIGH STREET ROCKHAMPTON QLD4701
PROJECT NAME DONNER EDI YOUR PROJECT/JOB REFERENCE GT0410/546A
SAMPLING DATE 20/05/10 NUMBER OF SAMPLES 17 Samples supplied by client SAMPLE TYPE:SOIL SAMPLE FOR ACID SULFATE STUDY
DATE RECEIVED 24 MAY 2010 PACKAGING SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2011

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. All reported values gravimetric, dry mass.
%eEQ (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/ 1.5 (sNAS included irrespective of pH).
LIME1 rates calculated to neutralise TPA (or TAA if >TPA)+ aS_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + aS_POS or S_Cr + aS_RAS -ANC_BT/1.5
NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m3.
Fineness Factor (FF)=1.5 CRN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>6.5 then s-NAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH m	pH KCl	pH ox	TAA	TPA	TSA	S KCl	S p	S POS	S Cr	s-NAS	s EQ	Ca KCl	Ca P	Mg KCl	Mg P	CRN POS	LIME1	LIME2	sANC_BT/FF	Ca NAS
Analytical Method Codes		23A	23B	23F	23G	23E	23Ge	23De	23Ee	22B	s20Je	s	23Vh	23Wh	23Sm	23Tm	a23U6X	kg/t	kg/t	%	mg/kg
TOWER 62	7.0	4.76		10		<0.01			<0.01	<0.01	0.017	539		157			1	0		288
TOWER 85	2.0	6.28		<1		<0.01			<0.01	<0.01	0.001	527		432			0	0		300
TOWER 108	4.0	6.33		<1		<0.01			<0.01	<0.01	0.002	221		263			0	0		78
TOWER 125	7.0	6.08		<1		<0.01			<0.01	<0.01	0.001	282		233			0	0		108
TOWER 125	12.0	5.78		<1		<0.01			<0.01	<0.01	0.003	329		565			0	0		193
TOWER 149	1.0	4.93		8		<0.01			<0.01	<0.01	0.015	455		592			0	0		192
TOWER 162	10.0	5.78		4		<0.01			<0.01	<0.01	0.009	359		265			0	0		181
TOWER 174	4.0	6.11		1		<0.01			<0.01	<0.01	0.007	284		591			0	0		143
TOWER 174	9.0	5.42		3		<0.01			<0.01	<0.01	0.008	347		824			0	0		228
TOWER 178	8.0	5.86		3		<0.01			<0.01	<0.01	0.007	495		623			0	0		331
TOWER 189	3.0	4.29		4		<0.01			<0.01	<0.01	0.010	703		611			0	0		513
TOWER 189	4.0	5.19		1		<0.01			<0.01	<0.01	0.005	386		362			0	0		243
TOWER 195	3.0	4.33		9		<0.01			<0.01	<0.01	0.019	529		645			1	1		456
TOWER 195	5.0	4.66		11		<0.01			<0.01	<0.01	0.021	503		420			1	1		1109
TOWER 205	4.0	5.55		3		<0.01			<0.01	<0.01	0.008	131		74			0	0		123
TOWER 211	3.0	5.77		<1		<0.01			<0.01	<0.01	0.001	561		488			0	0		430
TOWER 211	9.0	4.98		5		<0.01			<0.01	<0.01	0.009	363		527			0	0		209

DETERMINATION OF ACID SULFATE SOIL PROPERTIES

CERTIFICATE OF ANALYSIS

Bio-Track Pty Ltd ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane. Australia, 4520 Ph 07 3289 7179 Fx. 07 3289 7155

ICE LR200510.443 DATE OF REPORT 25 MAY 2010 @19:26:13 Page 1 of 1 Report Pages.
: MR DWAIN COROLAN c/o ROADTEST PTY LTD 101 HIGH STREET ROCKHAMPTON QLD4701
IE GT 546 YOUR PROJECT/JOB REFERENCE GTO410/546
ATE MAY 2010 NUMBER OF SAMPLES 9 Samples supplied by client SAMPLE TYPE:SOIL SAMPLE FOR ACID SULFATE STUDY
/ED 20 MAY 2010 PACKAGING SAMPLES LABELLED - IN SEALED POLYTHENE SAMPLE CONTAINERS Ground Oven Dry Samples DISPOSED ON 1/2/2011

as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85'C), >1000 um shell removed, fine grind. All reported values gravimetric, dry mass.
valent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/ 1.5 (sNAS included irrespective of pH).
; calculated to neutralise TPA (or TAA if >TPA)+ aS_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + aS_POS or S_Cr + aS_RAS -ANC_BT/1.5
ates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m3.
actor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
resent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the
ive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

	pH KCL	pH ox	TAA m/t	TPA m/t	TSA m/t	S KCl %	S P %	S POS %	S Cr %	s-NAS %	s EQ %	Ca KCl mg/kg	Ca P mg/kg	Mg KCl mg/kg	Mg P mg/kg	CBN POS m/t	LIME1 kg/t	LIME2 kg/t	sANC_BT/FF %	Ca NAS mg/kg
Method Codes	23A	23B	23F	23G	23H	23Ce	23De	23Ee	22B	s20Je	s	23Vh	23Wh	23Sm	23Tm	a23U&X			s19A2	
	5.50		<1			<0.01			<0.01	<0.01	0.000	328		302			0			53
	6.27		<1			<0.01			<0.01	<0.01	0.000	152		76			0			118
	5.78		1			<0.01			<0.01	<0.01	0.002	435		361			0			100
	4.22		3			<0.01			<0.01	<0.01	0.005	352		319			0			76
	5.16		<1			<0.01			<0.01	<0.01	0.002	509		333			0			97
	6.70		0			<0.01			<0.01	<0.01	-0.004	394		226			-0	<0.01		71
	5.22		3			<0.01			<0.01	<0.01	0.004	557		358			0			129
	4.84		<1			<0.01			<0.01	<0.01	0.000	934		635			0			165
	4.95		8			<0.01			<0.01	<0.01	0.013	175		189			0			156