

# Hazard and Risk

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# 17. HAZARD AND RISK

## 17.1. Introduction

The purpose of this Chapter is to assess key health and safety risks associated with the Project on the community, workforce and visitors to the site, and present specific analysis on several key risk areas required under the Environmental Impact Statement (EIS) Guidelines. Potential environmental impacts of the Project are addressed in other Chapters.

A risk assessment has been undertaken, to address the context of the assessment, relating to both the Project and to policy and legislative requirements. Potential impacts are identified as they relate to the key risk areas, and preventative and mitigation measures are identified to reduce the impact to acceptable levels. Potential residual impacts are then reviewed.

The study addresses the following specific risk areas:

- » Bunding of hazardous materials storage areas
- » Management of hazardous flammable or explosive materials
- » Site contamination
- » Emergency response plan
- » Public safety during construction
- » Mosquito breeding habitats
- » Exclusion zones
- » Transport and storage of construction materials
- » Fire prevention and mitigation
- » Unexploded ordnances.

This assessment deals with health and safety impacts of the Bulk Commodities Export Facility (BCEF).

The key Project activities or locations considered in this risk assessment were defined as:

- » Iron ore storage
- » Iron ore unloading
- » Rail spur
- » Ancillary amenities and infrastructure
- » Jetty
- » Ship loading wharves
- » Conveying and ship loading equipment
- » Shipping route in the Gulf.

Key risks are identified and dealt with differently in each Project stage. This assessment addressed the following stages:

- » Design
- » Construction
- » Operations and maintenance
- » Decommissioning.

Identified critical health and safety risk receptors are:

- » Local population (i.e. coastal homes at Point Lowly and False Bay)
- » Recreational boats that utilise the Upper Spencer Gulf, particularly those that launch from the Port Bonython boat ramp
- » Santos Shipping activities
- » Construction workers and contractors
- » BCEF Workers and contractors.

Through a risk assessment of the combination of all key Project activities and locations, Project stages and risk receptors provides confidence that no credible critical risks are overlooked.

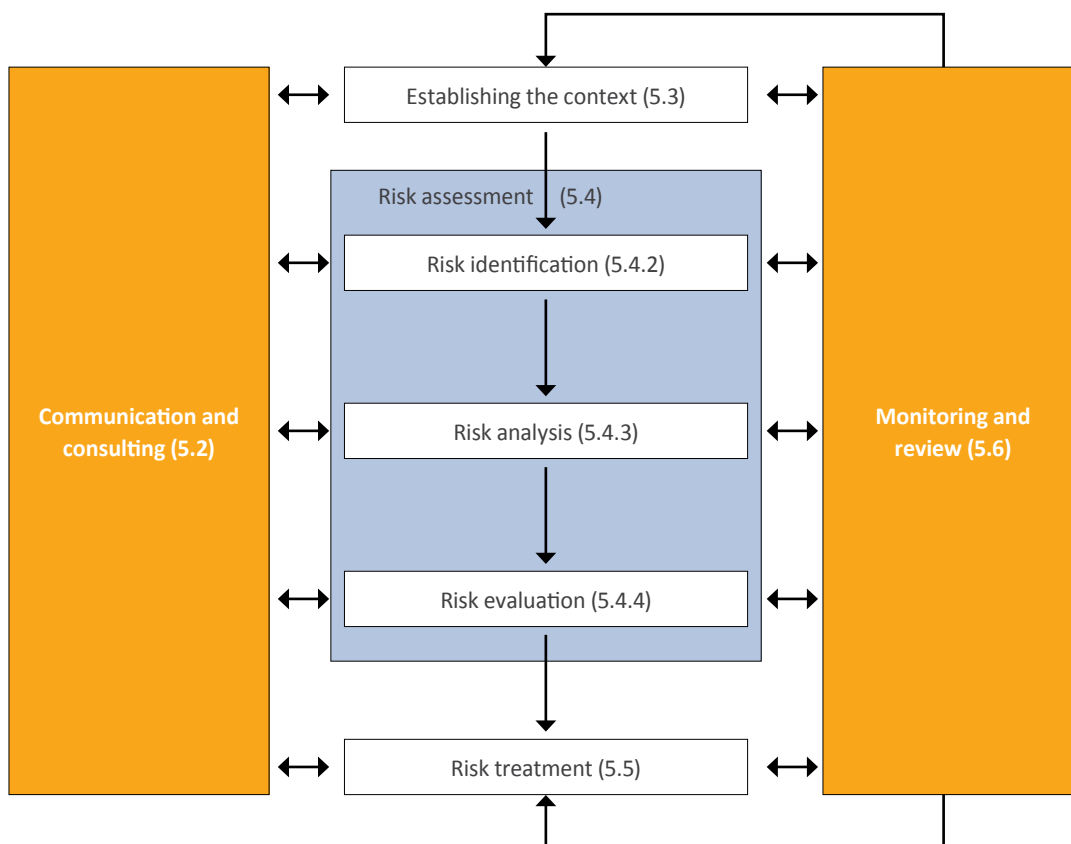
## 17.2. Methodology

The EIS risk management approach is consistent with that set out in AS/ISO 31000: 2009 Risk management principles and guidelines. This describes a methodology comprising:

1. Establishing the context
2. Risk identification
3. Risk analysis (determining likelihood and impact)
4. Risk evaluation (identifying the extent of action required)
5. Risk treatment (determining appropriate prevention and mitigation measures)
6. Communication and consultation
7. Monitoring and review.

This process is shown in **Figure 17.2a**.

Figure 17.2a: Risk management process (AS/ISO 31000:2009)



The general EIS methodology comprises:

1. Identifying the EIS context (Project, policy and legislative)
2. Identifying key risks for key Project activities or locations
3. Identifying the impact and likelihood of the risks
4. Reviewing the policy context and legislative requirements
5. Identifying appropriate preventative and mitigation measures.

This approach includes planning and implementing appropriate consultation, communication, monitoring and review with regard to all identified issues.

A sense of risk identification and assessment workshops were held with key technical disciplines and SGPL representatives to identify and manage risks associated with each phase of the Project. Findings of these workshops have been incorporated into this assessment.

The concept design has considered safety issues such as safe building techniques, operations, maintenance and decommissioning. A full Safety in Design review will be undertaken in the detailed design phase.

### 17.2.1. Significance Criteria

Significance criteria have been determined in the context of public safety and safety to personnel onsite both construction workers and operational staff. These criteria are shown in **Table 17.2a**.

**Table 17.2a: Hazard and Risk Significance Criteria**

Impact Significance	Description of Criteria
Very High	Death or serious injury to the public or site workers
High	Member of the public or site workers suffers irreversible disability or serious injuries requiring long term hospitalisation
Moderate	Injury requiring hospitalisation or resulting in a temporary disability
Minor	Moderate level of injury requiring offsite medical treatment
Negligible	No injury to the public Minor injury to workers that requires on-site treatment that does not result in lost time.
Beneficial	Results in a positive health benefit for the public or workers

### 17.3. Policy and Legislative Context

The policy context for each major risk is shown in **Table 17.3a**.

**Table 17.3a: Policy and legislative context for key risks**

Risk	Policy Context and Legislative Framework
Bundling of Hazardous Material Storage Areas	<ul style="list-style-type: none"> <li>» Australian Code for the Transport of Dangerous Goods by Road and Rail 7th Ed (ADG Code)</li> <li>» Australian Standard 1940:2004 The storage and handling of flammable and combustible liquids</li> <li>» Australian Standard 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers</li> </ul>
Storage of Hazardous, flammable and Explosive materials	<ul style="list-style-type: none"> <li>» Australian Code for the Transport of Dangerous Goods by Road and Rail 7th Ed (ADG Code)</li> <li>» Australian Standard 1940:2004 The storage and handling of flammable and combustible liquids</li> <li>» Australian Standard 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers</li> <li>» Concrete batching Industry Guideline, EPA South Australia, September (2009b)</li> </ul>
Site Contamination	<p>The state legislation that has been accounted for in this plan is the <i>South Australian Environment Protection Act 1993</i> and associated the regulations, <i>State Environment Protection Policies and Waste Management Policies</i></p> <p>Further state legislation that covers this is the <i>South Australia Dangerous Substances Regulations 2002</i>, under the <i>Dangerous Substances Act 1979</i></p> <p>The following relevant standards and guidelines were referred to:</p> <ul style="list-style-type: none"> <li>» Australian Code for the Transport of Dangerous Goods by Road and Rail 7th Ed (ADG Code)</li> <li>» Australian Standard 1940:2004 The storage and handling of flammable and combustible liquids</li> <li>» Australian Standard 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers</li> </ul>
Public safety during construction	<p>The federal legislation that defines the requirements for ensuring the health and safety of public falls under the <i>Work, Health and Safety Act and Regulations 2011</i>.</p> <p>This work also falls under the <i>Maritime Transport Security Act 2003</i>.</p> <p>The <i>Work Health and Safety Act and Regulations 2012 South Australia</i> was passed to bring the South Australian work health and safety legislation into harmonisation with the Federal legislation.</p>

Risk	Policy Context and Legislative Framework
Emergency Response Plan	<p>The plan has been developed in accordance with the following Federal and State regulatory conditions:</p> <ul style="list-style-type: none"> <li>» <i>Work, Health Safety Act and Regulations 2011</i> Specifically Division 4 Emergency Plans</li> <li>» <i>South Australian Emergency Management Act 2004</i></li> <li>» <i>South Australian Emergency Regulations Act 2009</i></li> <li>» <i>Environmental Protection Act 2004</i></li> </ul> <p>The Australian standard for creating emergency plans is <i>AS 3745:2010 Planning for emergencies in facilities</i>.</p> <p>Other documentation consulted in the development of this plan is the <i>Mid-west Zone Emergency Management Plan (ZEMP), November 2007</i>. The BCEF is based in the South Australian Mid-west zone and falls under the management plan for this Zone Emergency Management Committee</p> <p>The <i>Mid-West ZEMP</i> outlines the responsibilities, authorities and mechanisms to prevent and manage, recover from incidents and disasters within South Australia.</p>
Mosquito breeding habitats	<p>References that were used in the development of this assessment are the following from the South Australian and Queensland health departments.</p> <ul style="list-style-type: none"> <li>» <i>South Australian Integrated Mosquito Management Strategy SAIMMS, Government of South Australia Department of Health, January 2007</i></li> <li>» <i>Queensland Health Guidelines for controlling public health risks relating to mosquitoes, flies and black flies in a flood event (01 February 2011)</i></li> </ul>
Exclusion zones	<p>The documentation used in the development of this section includes:</p> <ul style="list-style-type: none"> <li>» <i>Harbours and Navigation Regulations, 2009 (SA)</i></li> <li>» <i>Australian Maritime Safety Authority Act 1990</i> sets out the functions of the Australian Maritime Safety Authority (AMSA)</li> <li>» <i>Marine Safety (Domestic Commercial vessels) National Law Act 2012</i>.</li> <li>» <i>AS3846-2005 The handling and transport of dangerous cargoes in port areas</i></li> </ul>
Transport and storage of construction materials	<p>The following relevant standards and guidelines were referred to:</p> <ul style="list-style-type: none"> <li>» <i>Australian Code for the Transport of Dangerous Goods by Road and Rail 7th Ed (ADG Code)</i></li> <li>» <i>Australian Standard 1940:2004 The storage and handling of flammable and combustible liquids</i>.</li> <li>» <i>Australian Standard 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers</i></li> </ul>
Fire prevention and mitigation	<ul style="list-style-type: none"> <li>» <i>CFS Fact Sheet Bushfire Safety For Organisations and Business, CFS, October 2011 (CFS, 2011a)</i></li> <li>» <i>Bushfire Safety Survival for business organisations, CFS, 2011(CFS, 2011b)</i></li> <li>» <i>Upper Eyre Peninsula Interim Bushfire Management Area Plan, Upper Eyre Peninsula Bushfire Management Committee, September 2012 (UEPBMC, 2012)</i></li> <li>» <i>Overall Fuel Hazard Guide for South Australia, Department of Environment and Natural Resources, 2nd Edition Amendment February 2012 (DENR, 2012a)</i></li> <li>» <i>Ecological fire Management Guidelines for Native Vegetation in South Australia, Department of Environment and Natural Resources, 1st Edition April 2012. (DENR, 2012b)</i></li> </ul>
Unexploded ordnance	<p>The Department of Defence (DoD) website (nd) defines unexploded ordnance as:</p> <p>“...any sort of military ammunition or explosive which has failed to explode as intended. It includes sea mines or shells used by the Navy, mortar bombs, mines, artillery shells or hand grenades used by the Army; bombs, rockets or missiles used by the Air Force; and many other types of ammunition and explosives including training munitions.”</p> <p>The website describes four types of UXO that may be encountered:</p> <ul style="list-style-type: none"> <li>» Artillery ammunition,</li> <li>» Mortar ammunition,</li> <li>» Grenades, and</li> <li>» Aircraft.</li> </ul> <p>The DoD website lists a set of Categorisation Criteria to describe the residual UXO potential at a range of sites throughout Australia. The categories are listed as substantial, slight or other, later discussed in Section 17.4.7</p>

## 17.4. Potential Impacts

### 17.4.1. Bunding of Hazardous Materials Storage Areas

A hazardous material is one that poses a hazard to human health when improperly handled, stored or disposed of. The hazard may arise from acute or chronic toxicity or carcinogenicity of the substance or its corrosive or flammable nature.

Hazardous or flammable materials identified that may be generated by either the construction or operation of the BCEF include:

- » Sewage from both temporary facilities during construction and the permanent sewage treatment plant
- » Oils
- » Construction materials and wastes
- » Operations materials and wastes
- » Iron ore and iron oxides
- » Unexploded ordnances
- » Lubricants and paints
- » Delivery of diesel fuel to the site during both construction and operation for refuelling tugs and construction machinery/boats
- » Construction wastes such as cement and slurries, caulking, welding and grinding offcuts
- » Concrete particles from the potential concrete batching plant.

The potential mechanisms for these materials to be lost to the surrounding environment include loss from the train track, loss during refuelling activities, general spills during transportation or use on site or dust release from plant failure.

### 17.4.2. Moving Vehicles and Machinery

There is a risk that the public or on-site workers may be adversely impacted by construction vehicles and/or moving equipment during either construction or operation of the BCEF. This includes road-based traffic generated by the Project on public roads or within the work site as well as marine traffic and rail movements.

#### 17.4.2.1. Vehicle Movements on Haul Routes

The main roads affected by the Project are:

- » Port Bonython road
- » Lincoln Highway
- » Norrie Avenue Extension.

These routes are designated B-Double, B-Triple and Road Train routes.

These are public roads, there is potential for risk to public road users through the increased traffic movement and numbers of large vehicles sharing the road and also at rail crossings. For information on how this risk will be managed, refer to **Chapter 8, Transport**.

#### 17.4.2.2. Unauthorised Public Access

##### Landside Works

The current site is heavily crossed with unauthorised access tracks which are used by recreational vehicles. Without prevention measures being put in place, this activity is likely to continue. Access to construction areas will be controlled through signage and fencing of high risk areas. A permanent fence will be constructed around the perimeter of the site rail loop to restrict access to operational work areas.

##### Maritime Works

During operations, it will be necessary to define an exclusion zone around the jetty (50m) to ensure the safety of other marine vessels, and prevent incidents including collisions causing loss of product or oil spill.

Recreational boating and diving is popular in the Port Bonython area, and it is possible that vessels may enter the Project exclusion zone or shipping channel and collide with a vessel.

The Santos Jetty has been in operation for a significant period of time however without incident. Normal maritime safety procedures will be put in place such as signage to notify recreational boaters of the exclusion zone.

### 17.4.3. Mosquito Breeding

The mosquito population is to be managed during the construction and operation of the Project. Mosquitos are vectors for the transmission of a number of serious viruses in South Australia such as the Ross River Virus (RRV), Barmah Forest virus (BFV) and to a lesser extent Murray Valley encephalitis virus (MVEV). A large mosquito population can also be a nuisance to workers and the local population.

The most important method of controlling the mosquito population is an effective plan for managing mosquito breeding habitats. Mosquitos lay their eggs in still, standing or stagnant water, making essential that any storage of water is kept from stagnating or is completely covered. Given the low rainfall and lack of standing water, it is unlikely that stagnant water will collect on site for any significant period of time naturally.

### 17.4.4. Interface with Santos Facility

There will be no change for vessel approach or departure for the Santos Facility.

The Admiralty Chart shows a restricted area within 1500 metres of the Santos berth and jetty. Flinders Ports have advised that vessels departing the BCEF are allowed to manoeuvre through this area. **Figure 17.4a** shows the current exclusion zone for the Santos Facility. Flinders Ports will jointly manage both ports (refer **Appendix J.2** Port Operations)

Flinders Ports-managed communications protocols will be put in place with Santos for coordinating shipping for the two jetties.

### 17.4.5. Air Quality

If not appropriately managed, a deterioration in air quality can cause nuisance or health issues for nearby residents. An assessment of the potential impacts of a change in air quality has been undertaken (refer to **Chapter 6, Air Quality**). There is considered to a negligible risk of any health impacts occurring with the following control measures being put in place:

- » Cover access tracks with crushed rock or other material in required areas. This will reduce mud collection on vehicle wheels and dust generation
- » Implement low speed limits on haul roads/access tracks
- » Cover vehicle loads while transporting loose, dry or dusty material
- » Containing iron ore in enclosed sheds and conveyor systems

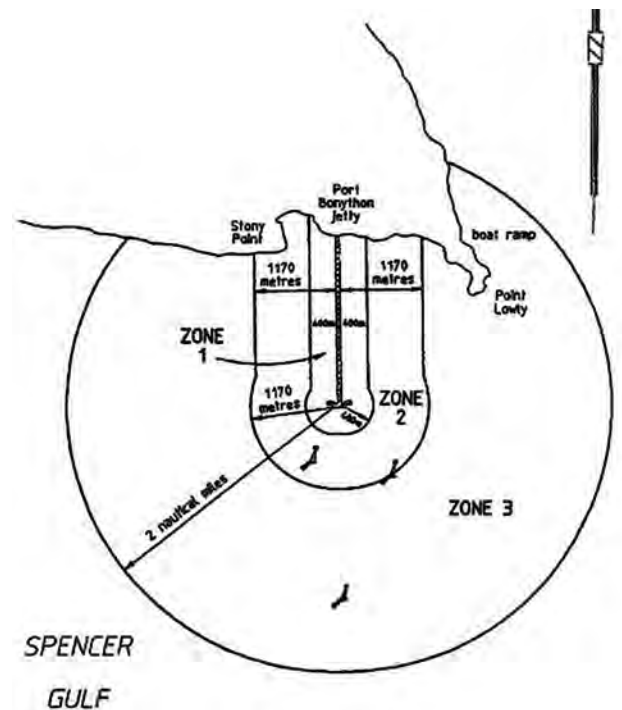
### 17.4.6. Bushfire Hazard

This Section outlines analysis of the impact of bushfire during construction and operation of the Project. The local environmental conditions including the climate, local natural fuel hazards and topography of the land are first considered as contributors to a fire event, followed by analysis of potential initiating events.

#### 17.4.6.1. Climate

The *Upper Eyre Peninsula Interim Bushfire Management Area Plan* (UEPBMC, 2012) describes the regional climate as semi-arid. Temperatures during summer range between 25-30°C, but extended periods of extreme weather over 40°C can occur. The average winter maximums range between 16-18°C and the winter minimums fall between 5-8°C. The most frequent winds are from the south-east in summer and south-west in winter. Occasionally in summer, strong hot winds blow from the north, increasing the bushfire risk to the region. Thunderstorms associated with lightning usually occur during November to December and March to April each year. The Bureau of Meteorology reports that between 1990 and 1999 the region experienced 10-15 thunder-days annually. The majority of the year's rainfall occurs between April and October, varying between 300-450mm; however the region is frequently subject to droughts.

Figure 17.4a: Port Exclusion Zone, (Harbours and Navigation Regulations, 2009 (SA)) for SANTOS



#### 17.4.6.2. Local Natural Fuel Hazard Types

The vegetation types present within the study area are described in detail in **Chapter 7, Terrestrial Ecology**. Vegetation in the immediate site area is predominantly Association four: Chenopod Shrubland. This type of vegetation is considered a moderate near-surface fuel hazard (DENR, 2012a).

Vegetation Association three, Mallee woodland, further north and in patches to the east and west of the Project area will be classified as a moderate elevated fuel hazard.

The overall fuel hazard is considered Moderate.

#### 17.4.6.3. Topography

As a general rule, fires burn faster uphill because flames can reach more unburnt fuel in front of the fire (CFS, 2010). This is because the heat radiating from the fire pre-heats fuel on the slope ahead of the fire. As a general rule, the fire will increase its spread as it travels uphill by four times for a 20° slope. The opposite applied to a fire travelling downhill.

The topography of the Project area is generally flat, though there is a significant drop off from the top of the Project area to sea level. This will be taken into account as part of the bushfire planning.

#### 17.4.6.4. Potential Initiating Events

There are two distinct phases with different fire initiating events: construction and operations. During these periods there are two situations to consider: fires started offsite, and those started on site.

During construction fuel hazards will include storage of flammable materials including fuel oils.

Potential ignition sources include:

- » Welding and grinding works
- » Spark originating from electrical equipment
- » Heat generating machinery, including vehicles
- » Staff use of lighters/matches.

During the operational period fuel hazards will include storage of flammable materials including fuel oils.

Potential ignition sources during the operational period include:

- » Welding and grinding works
- » Spark originating from electrical equipment
- » Heat generating machinery, including vehicles
- » Staff use of personal lighters/matches, incorrect disposal of cigarettes.

#### 17.4.7. Unexploded Ordnance

It is known that during the period between 1961 to 1973 parts of the Port Bonython region were used by the Department of the Army (now the Department of Defence (DoD)) as a training area. As a result there is the potential that unexploded ordnance (UXO) remains in the area.

The DoD website lists a set of Categorisation Criteria to describe the residual UXO potential at a range of sites throughout Australia. The categories are listed as substantial, slight or other, as shown in **Table 17.4b**.

**Table 17.4b: DoD UXO categorisation criteria**

Categorisation Criteria	Description
Substantial	<p>A history of numerous UXO finds or heavy residual fragmentation. Areas likely to be assessed as substantial include impact areas, demolition sites and areas of heavy explosive ordnance dumping.</p> <p>Advice: All land usage may continue without specific UXO search or remediation. Development and/or land usage re-zoning proposals for land parcels considered to be subject to a substantial UXO should only proceed following the conduct of UXO investigation and remediation. Refer to our UXO Warning and Advice and Site Information pages.</p>
Slight	<p>Areas with a confirmed history of military activities that have resulted in residual UXO but Defence considers it inappropriate to assess as substantial.</p> <p>Advice: All land usage and development, within these areas, should continue without further UXO investigation or remediation. Refer to our UXO Warning and Advice and Site Information pages.</p>
Other	<p>Defence records do not confirm that the site was used for live firing. UXO or explosive ordnance fragments components have not been recovered from that site. Defence opinion is that it will be inappropriate to assess as either slight or substantial.</p> <p>Advice: These sites have been included for general information purposes only. Defence makes no recommendations in regards to this category. Refer to our UXO Warning and Advice and Site Information pages.</p>

#### 17.4.7.1. G-tek Investigation (2008)

G-tek Pty Ltd, a DUXOP contractor, was engaged in 2008 by Port Bonython Fuels to conduct a UXO Field Validation Survey (FVS) of an adjacent site north east of the area of interest to the current study. As part of this FVS, G-tek reviewed available documentation on the history of the area and undertook UXO detection activities. The FVS is shown in **Figure 17.4b**.

The G-tek survey found small arms ammunition (SAA) cartridge cases. The majority of ammunition types were civilian and included .22 and shotgun cases. While military design .303 cartridges cases were also identified, these were widely circulated to the public after surplus war stock was sold. G-tek was unable to confirm if these items suggest military or civilian activities, but determined that the presence of these cases will not interfere with planned construction of the surveyed site.

Military style ration packs, empty metal "hot box meal" trays and empty tubes of condensed milk were found during the FVS. This suggested that military personnel have taken meals on the site, but G-tek was unable to confirm what kind of associated activity was undertaken.



Regarding the potential for UXO on that site, the G-tek report (2008) noted the following:

- » There is a clear history of military training on the site of the G-tek FVS
- » Generally a five percent sample rate (area) for an UXO FVS is considered adequate potential for UXO on a site of that nature. A FVS with a 20 percent sample area was conducted in the 2008 study
- » No UXO or related material was found during the FVS. Small arms ammunition cartridge cases were found
- » Extensive soil disturbance has occurred at G-tek FVS site over a number of years and no UXO have been reported
- » Due to site characteristics it is considered unlikely that UXO will be found at depth
- » The site subjected to the G-tek UXO works is fit for its intended purpose (in the case of the G-tek report, the development of a fuel import/distribution terminal and diesel refinery), and no further UXO work is recommended for the site.

G-tek was contacted as part of our review to discuss if any conclusions regarding UXOs at the BCEF site could be drawn from their 2008 study of the adjacent site. G-tek's opinion was that no firm conclusions could be drawn, and that, while G-tek's investigation did not reveal any UXO, the previously surveyed land is unlikely to be representative of the area of interest for the current study.

However, there is information from the G-tek study which is relevant to the area in question. In 1961 the Department of the Army (now DOD) requested and acquired land sections located between Whyalla and Port Augusta with an area of approximately 90,530 acres for training purposes. The area is known today as the Cultana Training Area.

As noted in G-tek's 2008 report, in 1961 and 1962 representations were made to the Federal Government for the exclusion of the Point Lowly Peninsula for the Gazetted training area. The principle reason for exclusion was the proposed coastal township to be developed by the city of Whyalla and the development of a State road to the proposed township. Delegate approval to dispose of the southern portion of the training area was eventually given on 31 January 1974. As a result the current Cultana Training Area boundary excludes the area of interest (**Figure 17.4c**).

The DoD website currently provides a UXO categorisation of "Other" for the Whyalla region, including the BCEF. It also notes that "there was anti-aircraft battery of four 3.7" guns in this area during WWII". However, the description provided for the "Other" categorisation in Table 1 notes that "Defence records do not confirm that the site was used for live firing."

Overall, findings for the site of the proposed BCEF are:

- » The site is known, in the past, to have been a military training area
- » Previous UXO surveys in the vicinity of the site cannot be considered reflective of the conditions that may be found on site
- » The DoD UXO categorisation of the site as "Other" indicates that insufficient evidence is available to DoD to certify that no UXO are present. This is further emphasised by the note that anti-aircraft guns were in the area during WWII.

Based on these points, the potential presence of UXO at the site of the proposed BCEF is considered credible, and cannot be discounted. Risk is generally characterised as a combination of likelihood and consequence. However in the case of UXO, there is no information on the likelihood of the presence of UXO, other than that it is considered credible.

Precautions to address the safety of users of the BCEF are listed.

#### Workers during site investigations and construction

Site investigations and construction work will each likely include invasive work (e.g. geotechnical test-pitting, excavations) and non-invasive work (e.g. flora surveys). It is expected that these vulnerabilities will be addressed in the first instance through worker training and safe work method statements

#### Public during site investigations and construction

It is expected that site access by the public will be prevented by good practice procedures (fencing etc.)

#### Operations

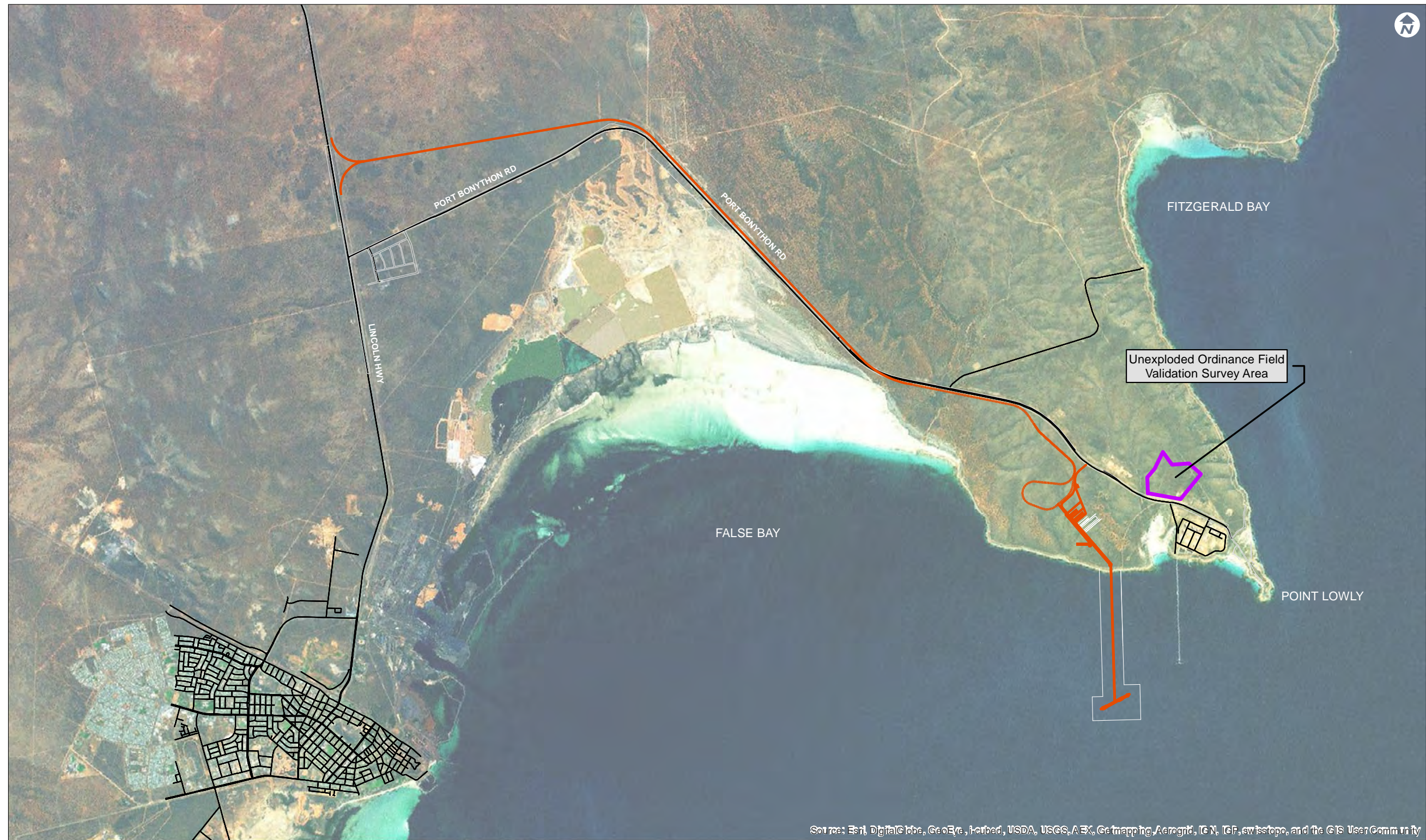
This study and any other relevant information obtained pertaining to potential UXO threats on site will be passed on to inform stakeholders' risk management activities.

However, due to the inherently uncertain nature of the potential UXO threat on site, it is also considered reasonable that an investigation by a DUXOP contractor be commissioned for the site to provide confidence that UXO do not pose a threat within the site boundaries; this will be undertaken prior to the commencement of construction.

It is expected that such a study will involve a detailed review of the site history and records (military use etc.) as well as physical UXO detection activities. The outcomes of this will, it is assumed, include either a certification that the site is suitable for its intended purpose, or recommended steps for UXO remediation to allow development to proceed.

It is noted that even if a UXO study by a DUXOP contractor indicates that no UXO are present on site, all precautions listed above will be considered reasonable due to the minimal effort they will require and the severity of the potential consequences against which they protect.

Figure 17.4b: G-tek FVS area (reproduced from G-tek report, 2008)



Port Bonython EIS  
Spencer Gulf Port Link

Figure 17.4b -  
G-tek Unexploded Ordnance Field  
Validation Survey



1:75,000 (at A3)  
0 1 2 4  
Kilometers

Map Projection: Transverse Mercator  
Horizontal Datum: Geographic Datum of Australia  
Grid: Map Grid of Australia 1994, Zone 53



Figure 17.4c: Current Cultana Training Area, reproduced from Cultana Training Area Expansion Draft Public Environment Report (AECOM, 2012)



Port Bonython EIS  
Spencer Gulf Port Link

**Legend**  
 Current Cultana Army Training Area

Figure 17.4c -  
Current Cultana Army Training Area



1:250,000 (at A3)  
 0 2.5 5 10  
 Kilometers

Map Projection: Transverse Mercator  
 Horizontal Datum: Geographic Datum of Australia  
 Grid: Map Grid of Australia 1994, Zone 53

#### 17.4.8. Oil Spills

An oil or product spill may be considered a significant risk to the environment. The Port will develop an Oil Spill Plan to address this risk, and plans for Vessel Navigation and Operations will be implemented. The plan will comprise preventative measures (e.g. Port Operating Rules, a Pilot Plan) and mitigation measures (e.g. clean up procedures).

During operations, credible potential causes of oil spills include ship-to-ship collisions, ship-to-structure collisions and ship grounding. It is anticipated that the increased port movements will contribute to an increased risk of ship to ship collisions.

#### 17.4.9. On-Site Irrigation

Treated wastewater will be generated from an on-site plant proposed for the treatment of sewage from an ablution block containing showers and toilets to accommodate up to 12 people per shift. The treated water is intended to be used for local irrigation of landscaping which could pose a risk to workers if inhaled untreated.

##### 17.4.9.1. Contaminated Material

The site is not listed on any contaminated land register; however detailed investigations have not been undertaken. Given the minimal previous use of the area however, it is not considered likely that contaminated material will be found on site, unless illegal dumping of material has occurred. Geotechnical investigations will be undertaken during detailed design that will consider requirements for the detection of contaminated materials.

#### 17.4.10. Offloading/Loading of Wharf Materials

There are significant risks to workers during the offloading and loading wharf materials, which include:

- » Person struck by crane or falling object
- » Falling from heights
- » Structural failure or overloading of machinery.

These risks will be managed by the development of appropriate procedural controls for the operation of the crane. Staff will be appropriately licensed and trained before use of cranes and equipment for wharf loading operations.

#### 17.4.11. Services

The construction of railway near road will pass close to Port Bonython Road. Currently, the planned construction corridor will be typically 50m wide, but will extend beyond this to the extent necessary to complete the cut or embankment construction.

Both overhead and underground essential services will be taken into account during construction of the 17.5km line with 6.1km rail loop railway. A water pipeline and electricity transmission line are located close to Port Bonython Road.

#### 17.5. Mitigation Measures

The following mitigation measures are proposed to minimise the health and safety impacts for construction/operation workers and the general public.

##### 17.5.1. Bunding of Hazardous Materials Storage Areas

Once operational, a hazardous goods store will be located in storage sheds that will be constructed on a slab on ground with bunding to the perimeter. Building cladding will be either pre-cast or masonry and fire protection will be installed in the building as required by Section 11 of AS1940-2004. Temporary bunding will be provided for any hazardous substances required for use during construction.

Bund design will comply with the following requirements of AS 1940-2004:

- » The bund will be impervious to retain spillage and enable recovery of any spillage
- » The bund will retain structural integrity
- » Any bund or compound floor will be designed to withstand the hydrostatic head when full
- » Any pipe that passes through a bund shall be designed to prevent excessive stresses as a result of settlement or expansion resulting from fire exposure. The joint between the pipe and bund shall be sealed to prevent leakage
- » Where flammable liquids are stored, the distance from the top inside perimeter of the bund to protected places or on-site protected places shall be at least one half of the specified separation distances given in the table below or 15m, whichever is less, as specified in the Standard.

During construction and operations of the BCEF, general procedures for the maintenance of bunds will include:

- » All bunds being routinely inspected to ensure integrity
- » Ensuring no liquid (including storm water or spilled liquid) have accumulated within the bund
- » Chemical resistant linings on bunds being maintained to an undamaged state

- » Any flexible joints between concreted section not having shrunk, with no resulting gaps in the bund
- » Concreted section having been poured without any jointing material between them, resulting in gaps in the bund
- » Concrete bunds having no cracking due to movement or damage from mobile plant.

Operations processes addressing these requirements will be developed, implemented and documented for the Project.

### 17.5.2. Management of Hazardous, Flammable or Explosive Materials

#### 17.5.2.1. During Construction

For the management of hazardous and flammable materials, the following mitigation measures will be applied:

- » A current Material Data Safety Sheet (MSDS) will be made available for any hazardous substances or dangerous goods stored and handled at the premises
- » All licenses, permits and approvals will be retained on site as required by the statutory obligations, for each type of hazardous material
- » Controls detailed in the MSDS will be recorded in the Safety, Health and Environment Work Method Statement) relating to the activity that involves the use of the substance.
- » A Hazardous Substance Register will be maintained for all hazardous substances used on the Project (usually generated by the Project Safety team):
  - A hard file copy will be kept at the substances storage area and copy kept with all first aid equipment and facilities
  - The Hazardous Substances Register will be reviewed annually to ensure all MSDSs are current
  - Quantities of materials will be tracked when they are decanted and taken to another area for use. The containers will be labelled and an MSDS made available at the location.
- » Prior to bringing any hazardous material on site, the licensing requirements to store the material will be determined from the:
  - Australian Standard for storage and handling of Hazardous Substances (AS 1940-2004)
  - Australian Dangerous Goods Code
  - Material Safety Data Sheets (MSDS)
- » A risk assessment will be performed on the use and disposal of the material, and the appropriate controls implemented
- » Quantities of hazardous substances stored on site will be kept to a minimum.

Hazardous substances will be stored using the following approach:

- » The net capacity of a bunded compound in a storage facility must be at least 120 percent of the net capacity of the largest tank
- » Where possible, the bunded area will be covered to prevent rain and water filling the area, resulting in additional treatment requirements during disposal and management of the storage areas
- » The storage area will be clearly signposted
- » Where the storage area is part of a building, ventilation will be provided at the floor and ceiling levels, of an adequate size to allow circulation of air. AS1940 has strict condition in relation to firewalls and containment when storage is within the same building as persons and other general goods
- » Where practical, fuels and chemicals will not be stored or handled in the vicinity of natural or built waterways or water storage areas such as streams, dams, lakes and canals. All storage areas will be a minimal distance of 100 metres from waterways to ensure minimal risk of contamination from run-off
- » All storage tanks containing hazardous substances will have the contents and volume clearly identified and be numbered if in a cluster
- » Storage areas will be protected against damage from impact with vehicles, mobile plant, etc
- » In each area of the premises where dangerous goods are stored or handled, provision will be made for spill containment that will:
  - Contain the spill of dangerous goods
  - Enable spilled or leaked dangerous goods and any solid or liquid effluent arising from the incident to be cleaned up and disposed of or otherwise treated
- » Appropriate work force training will be provided for spill management and the use of spill response kits and supplies
- » Incident reporting procedures will be followed in the event of a spill
- » Where sources of ionising radiation have been identified, they will be handled in accordance with the requirements of the relevant State radiation safety act and radiation safety regulations.

It is possible that concrete batching will be used during the construction period. Concrete contains particles of crystalline silica which can be small enough to result in damage to lungs with long exposure.

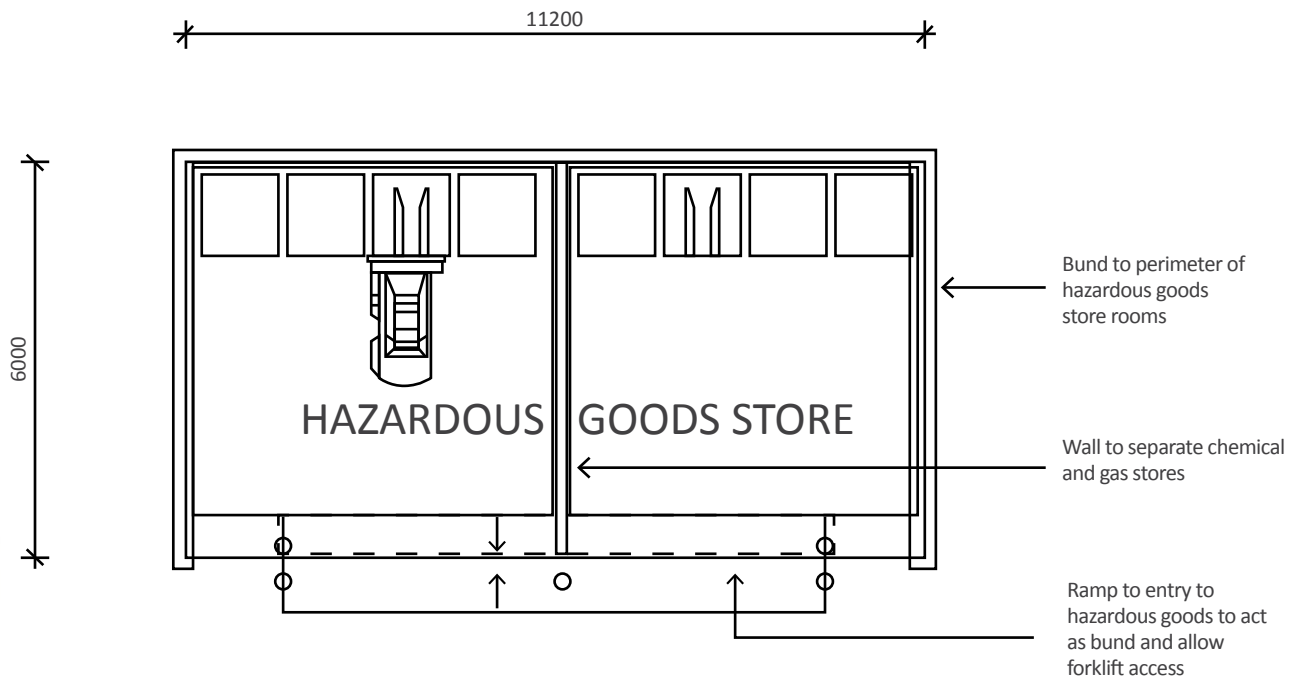
This will be managed through procedural controls, including:

- » Wet down of areas while in use
- » Provision of PPE
- » Appropriately trained staff for batching plant operation.

### 17.5.2.2. During Operations

During the operational phase, hazardous goods will be contained in a steel framed industrial building. The building will be constructed as a slab on ground with bunding to the perimeter with pre-cast or masonry cladding. The building will be installed with appropriate fire detection as required by AS 1940:2004. A typical building design is as shown in **Figure 17.5a**.

**Figure 17.5a: Design of Hazardous Goods Store**



### 17.5.3. Spillage Control

Spills of hazardous materials and wastes will be controlled by appropriate containment and procedures for immediate clean up. Any waste will be disposed of safely in accordance with South Australian regulations and spill kits will be provided in hazardous material storage areas. The BCEF will comply with the requirements of AS1940-2004: The Storage and Handling of Flammable and Combustible Liquids. The requirements for spillage containment according to AS1940-2004 include:

- » Spillage containment compound all be sufficiently impervious to retain spillage and to enable recovery of spillage. The compound will be chemically resistant and fire resistant as far is necessary to fulfil its functions
- » Construction and drainage complies with AS1940 clauses 5.8.3 and 5.8.6 (of the Standard)
- » Capacity at least 100 percent of the volume of the largest package plus 25 percent of the storage capacity up to 10,000L, together with ten percent of the storage capacity between 10,000 and 100,000L and five percent above 100,000L
- » Fire suppression equal to the output of the system over 20 minutes
- » If a water-based automatic or manual fire suppression system is installed the compound capacity shall be increased by a volume equal to the output of the system over 20 minutes
- » Any drainage shall be capable of carrying the output of the sprinkler system over the assumed area of operation at the design density of discharge
  - The drainage of any rainwater or fire water to outside the compound shall either be:
    - » Via a suitable interceptor or separator
    - » After sampling and testing of the water
      - Where more than one storage are connected to a common compound, drainage tank or pit, the capacity of the compound shall be equal to the largest compound required for any one store, plus 25 percent of the capacity of the compounds required for other stores connected to it.

Bunding requirements are further discussed in Bunding of Hazardous Materials Areas (Refer to **Section 17.5.1**).

#### 17.5.4. Temporary Storage

Where there is to be temporary storage of hazardous materials, drums will be stored on spill containment pallets. Each pallet will be capable of capturing the contents of at least one of the drums in the event of a leak.

Drums will be stored on a level area and covered so that pallets do not fill with rainwater.

#### 17.5.5. Oil Spill Planning

Addressing the risk of oil spill will include providing appropriate operations procedures to prevent shipping incidents, and ensuring appropriate planning is in place for response in the event of a spill.

This process will include a good practice/benchmarking review of Port Operating Rules. Communication and consultation will be undertaken with the Australian Maritime Safety Authority on these matters. This is further discussed in **Chapter 13, Coastal Processes and Water Quality**.

The oil spill response planning will be undertaken by Flinders Port Holding with input from the Department of Planning, Transport and Infrastructure (DPTI) and from Santos, and reference to the Santos Oil Spill Contingency Plan.

**Chapter 13, Coastal Processes and Water Quality** outlines some of the mitigation measures for prevention of vessel collisions:

- » Vessel, weather and seabed monitoring
- » All Flinders Ports Pilots will be fully qualified and accredited/certified, including:
  - Undertaking of regular vessel simulation training to meet requirements as a certified pilot
  - Undertaking of hazard and risk management training
  - Licenced under the Harbours and Navigation Act managed by Department of Planning, Transport and Infrastructure (DPTI)
  - Conducting annual spill training exercises
- » Vessel Emergency Berthing abort in unladen condition
- » Vessel emergency berthing or anchoring in laden condition.
- » In the event of an oil spill:
  - » Report to appropriate authorities, as listed in the Flinders Ports oil spill management plan
  - » Evaluate size and type of spill
  - » Enact clean up in accordance with Flinders Ports oil spill management plan and as directed by the authority.

#### 17.5.6. On-Site Irrigation

On-site controls recommended by the National Guidelines for Water Recycling: Managing Health and Environmental Risks (Biotext, 2006) that will be implemented to minimise hazard include:

- » Installation of prominent signage warning workers to not enter while irrigation is in progress
- » Spray irrigation will be conducted using devices that limits airborne spray
- » Application rates will be controlled to take into account soil characteristics, water balance, nutrient balances and mechanisms
- » Application times will be controlled to minimise potential exposure, as well as maximising efficiency of watering.
- » A buffer zone will be applied to the irrigation area with access controlled through fencing or signage.

#### 17.5.7. Air Quality Dust Monitoring

Land clearance, construction materials transport operations and concrete batching operations represent the most significant potential sources of air emissions during the construction phase. **Chapter 6, Air Quality** provides details on mitigation measures that will be applied to ensure there are no health and safety issues.

#### 17.5.8. Sewage and Waste

During construction, the EPA waste Management Hierarchy (Zero Waste SA, 2012), will be adopted: avoid, reduce, reuse, recycle, recover, treat and dispose.

All unused or excess chemicals and materials will be removed and disposed of in accordance with the MSDS and waste disposal guidelines. Disposal of containers as well as any leftover contents will be tracked via the waste disposal processes outlined in the process for waste management.

All materials moving to and from site will be tracked using dockets and receipts. Only licensed transporters will be used to move and dispose of these materials.



### 17.5.9. Emergency Response Planning

In general, the response at Port Bonython will be the same during operations and construction. An Emergency Response Plan (ERP) will be developed for both phases.

#### 17.5.9.1. Emergency Services

The Port Bonython BCEF will liaise with Whyalla State Emergency Services when developing the ERP.

The Port will commit to participating in emergency response exercises as required by Whyalla State Emergency Services.

#### 17.5.9.2. Construction Specific

During construction, the Contractor will form an Emergency Management Committee (EMC), who will develop a site specific construction-based ERP. The ERP will outline specific actions for dealing with an emergency on site and outline the hierarchy of responsible persons for these situations.

The EMC will have no less than two members and be representative of the stakeholders during the Project.

#### 17.5.9.3. Operations Specific

During operations Flinders Port Holding will also form an EMC, who will develop a site specific operations-based ERP.

As recommended by AS3745:2010, the committee will consist of representatives from:

- » Senior management
- » Tenants (if any)
- » Specialist facility personnel (e.g. maintenance engineer)
- » Where reasonably available, an occupant with a disability.

External contractors, consultant or others engaged by the BCEF to provide specialist advice should not be members of the EPC, but may attend meetings.

The EPC will meet at least annually, with records kept of the meetings in accordance with legislative requirements.

#### 17.5.9.4. General

The site will be an active participant in regional emergency planning by consulting with the regional planning committee (if it exists).

Flinders Port Holdings will communicate with Santos and other nearby facilities and develop or update a final ERP in association with representatives of other regional facilities during the detailed design phase.

### 17.5.10. Public Safety During Construction

#### 17.5.10.1. Haul Routes

The potential for increased traffic movements, the use of haul roads and temporary road works have the potential to endanger the public during the construction period.

A Traffic Management Plan for the construction period will be developed by the Contractor for site traffic movements. For further information on proposed mitigation measures, refer to **Chapter 8, Transport**.

#### 17.5.10.2. Site Access

The site is in a remote location, however the Contractor will be required to undertake a risk assessment to determine the level of security required and will use this to develop a Site Security Plan.

This Plan will provide instruction for securing the site against unauthorised access, as well as prevention of theft and malicious damage.

This will include requirements for:

- » Fencing
- » Access points
- » Clear signage.

During construction, the Contractor will adhere to the requirements of the *Maritime Transport Security Act 2003*. The Contractor will advise Maritime Safety South Australia of the exclusion zone around the maritime works. A notice to mariners will be issued by Maritime Safety South Australia and printed in *The Advertiser* and the *South Australian Government Gazette*. The notice will clearly identify the exclusion zone and time table of works.

In the unlikely event that people or boats are found in the exclusion zone, Contractor transfer vessels will engage them and explain that the area is a 'no-go zone' and escort them outside of the area.

#### 17.5.11. Mosquito Breeding

The most effective method of managing the mosquito population is to minimise viable breeding grounds. Mosquitos require still, standing or stagnant water for laying eggs.

There may be a turkey's nest dam built for water storage during construction. A stand pipe will be used to pump water from the turkey's nest into water carts for application as dust suppression.

Any water storage areas will be designed with sufficient depth that it does not encourage mosquito breeding (i.e. greater than 60cm in depth). They will be regularly maintained so that plant growth which encourages mosquitos does not occur. Regular inspections will also be undertaken so that if an outbreak is identified it can be promptly treated with larvicide. Water Sensitive Design features will be designed to avoid the creation of pooling water in which mosquitos may breed.

### 17.5.12. Exclusion Zones

It is intended that a restricted area of not less than 50 metres around the proposed jetty will be defined and controls one and four from the *Harbours and Navigation Regulations, 2009 (SA)* will be applied.

This requirement is similar to those in place for the Whyalla Ore Jetty, as defined in the *Harbours and Navigation Regulations, 2009 (SA)*.

### 17.5.13. Contaminated Land

During detailed design, site inspections and geotechnical investigations will be undertaken to determine the extent of contaminated land, and soil tested in accordance with EPA requirements to determine contaminants. Should contamination be identified, detailed remediation measures will be proposed. Should no contamination be identified, construction staff will be trained in the identification and treatment of contaminated material should any material not identified in investigations be uncovered.

### 17.5.14. Bushfire

#### 17.5.14.1. Bushfire Prevention and Mitigation

Fuel load mitigation will be focused on minimising sources of fuel, or storing fuels in appropriate areas. Flammable waste and organic material fuel sources will be managed through housekeeping procedures and landscaping near buildings and operational areas.

Housekeeping procedures will generally include:

- » Removal of dead organic material in close proximity to buildings
- » Cutting any long grass within 20m of buildings, plant and equipment with ignition potential
- » Landscaping near buildings and operational areas will be minimised and/or utilise fire-retardant species.

Liaison with the South Australia Country Fire Service has been undertaken. It was recommended that a 5m fire break be provided around buildings, which will be enforced.

During construction, temporary areas for flammable and hazardous material will be provided, including provisions for bunding. During operations, a dedicated hazardous materials storage area will be provided. Bunding will be provided in accordance with AS 1940:2004 The Storage and Handling of flammable and combustible liquids. This is detailed in the Sections for the management of Hazardous, Flammable or Explosive Materials Bunding of Hazardous Materials Storage Areas.

Potential ignition sources during construction and mitigation measures are provided in **Table 17.5a**.

**Table 17.5a: Mitigation Measures for Anticipated Ignition Sources**

Ignition Source	Mitigation
Welding operations	Welding and grinding will be performed by licenced operators in good practice conditions.
Electrical sparks	All electrical equipment will be checked and maintained by licenced operators
Heat-generating machinery including cars	<p>**Requirements for an engine or vehicle exhaust system:</p> <p>All engine exhaust emitted exits through the system;</p> <p>The system, or a device or devices forming part of the system, is designed to prevent the escape of burning material from the system;</p> <p>The system, or device or devices forming part of the system, is design to prevent heated parts of the system from coming into contact with flammable materials; and</p> <p>The system is in good working order.</p>
Staff using lighters and matches, incorrectly disposing cigarettes	The site will provide designated smoking areas

#### 17.5.14.2. Fire Fighting Measures

##### During Construction

The Contractor will make provisions for dedicated water arrangement/supply for fire fighting during construction:

- » Permanent water supply will be provided from the main pipeline approximately 850m from site
- » Two tanks to be used for fire fighting during construction
- » Turkey's nest dam will be available for water cart and fire fighting use
- » Monitors will be fixed to water cars for use in case of fire fighting.

The Contractor will implement an Emergency Response Plan that will have procedures that include provisions for:

- » The location of muster points
- » Alarms
- » Evacuation procedures
- » Responsibilities of staff, including appointment of wardens.

### During Operations

Potable water will be fed to site from the 200mm Whyalla to Stony Point pipeline. The water will be reticulated around site and stored for fire and spray water in onsite tanks. The current design has provision for a 500,000L Fire Tank. This tank is located in the administration area (beside the hazardous goods shed). Water is delivered from the tank to the Hydrant & Hose Reel Ring main (Refer to Drawing 60051283-SK-031 in **Appendix E.1**).

The site operator will develop an Emergency Response Plan for the site that will include directions for:

- » The location of muster points
- » Alarms
- » Evacuation procedures
- » Responsibilities of staff, including appointment of wardens.

A five metre fire break will be provided around all buildings and the rail spur.

### 17.5.15. Unexploded Ordnance

The following actions will take place prior to construction:

- » A UXO investigation at the site by a DUXOP contractor will be commissioned
- » Public access to the site will be controlled during investigations and construction works
- » Information on the potential for UXO and appropriate steps to take if encountered will be included in the induction for all current and future site personnel and visitors
- » Safe work method statements and appropriate training will be provided for all site works, both invasive and non-invasive for all Project stages
- » All information related to UXO on site will be provided to relevant stakeholders including site investigations contractors, construction companies and operators.

### 17.5.16. Services

All reasonable effort will be made to determine the location of any underground services in advance of excavation using all available information, such as contacting service owners and completing a "Dial before you dig" request.

Similarly, risks of works near the overhead transmission line are to be made clear to workers. South Australia Power networks will be contacted as the owner of the network before any work that has the potential to impact the transmission line is conducted.

Risks associated with operating a crane or item of mobile plant including:

- » Cranes
- » Concrete placing booms
- » Elevating work platforms
- » Load shifting equipment
- » Excavation and earthmoving equipment
- » High load transportation vehicles.

Engineering and procedural controls will be implemented during any works that may encounter overhead or underground electrical services, including:

- » Safe Work Methods Statement provided and followed
- » Exclusion zones clearly indicated
- » Defined areas that crane and mobile plant shall not enter with clear visual indicators
- » Proper supervision that work is done in a safe manner

Emergency planning

- » Proximity sensors and warning devices on crane and mobile plant that provide an alert if a high voltage zone has been entered
- » Personal protective equipment including insulating gloves, rubber mats or equipotential conductive mat
- » Workers are appropriately trained and informed of risks
- » Earthing systems for crane and mobile plant.

## 17.6. Residual Impact

The residual impacts following application of mitigation measures are summarised in **Table 17.6a**.

**Table 17.6a: Summary of residual impacts**

Element	Mitigation	Likelihood of Impact	Significance of Impact	Risk Rating
Spill of hazardous substances from site (including rail)	<ul style="list-style-type: none"> <li>» Storage in area designed to AS1940-2004</li> <li>» Regular inspections</li> <li>» Covering of rail loads</li> </ul>	Possible	Minor	Low
Diesel spill from refuelling of machinery and tugs	<ul style="list-style-type: none"> <li>» Procedural controls</li> <li>» Staff Training</li> </ul>	Possible	Minor	Low
Particulate matter generated from concrete batching, iron ore spillage, dust during construction	<ul style="list-style-type: none"> <li>» Refer to <b>Chapter 6, Air Quality</b></li> </ul>	Unlikely	Minor	Low
Waste generated from sewer treatment	<ul style="list-style-type: none"> <li>» Buffer zones</li> <li>» Irrigation application controls and timing</li> </ul>	Unlikely	Minor	Low
Impact to public vehicle on haul road or at rail crossing	<ul style="list-style-type: none"> <li>» Traffic management Plan</li> <li>» Traffic Controls</li> <li>» (Refer to <b>Chapter 8, Transport</b>)</li> </ul>	Unlikely	Moderate	Medium
Impact to recreation vessel	<ul style="list-style-type: none"> <li>» Maritime notices</li> <li>» Exclusion zone</li> <li>» Spotting procedures</li> </ul>	Unlikely	High	Medium
Ship to Ship impact	<ul style="list-style-type: none"> <li>» Port Rules, Harbour exclusion zone</li> <li>» Piloting of vessels by tugs within shipping channel</li> <li>» Emergency response procedures</li> </ul>	Highly unlikely	High Very High	Medium
Ship to infrastructure impact	<ul style="list-style-type: none"> <li>» Port Rules, Harbour exclusion zone,</li> <li>» Recommended Shipping channel</li> <li>» (to be finalised)</li> </ul>	Highly unlikely	High Very High	Medium
Notable increase in mosquito population causing public nuisance or spread of mosquito-borne viruses	<ul style="list-style-type: none"> <li>» Design of water storage areas and drainage to minimise water pooling</li> <li>» Monitoring</li> <li>» Use of larvicide or adulticide</li> </ul>	Unlikely	Minor	Low
Loading/Offloading	<ul style="list-style-type: none"> <li>» Procedural Controls</li> <li>» Staff Training</li> </ul>	Unlikely	High Very High	Medium
Fire	<ul style="list-style-type: none"> <li>» Water provision for fire fighting measures</li> <li>» Emergency response planning</li> <li>» Fire breaks</li> </ul>	Unlikely	High	Medium
Unexploded Ordnance (UXO)	<ul style="list-style-type: none"> <li>» UXO Study</li> <li>» Staff induction</li> </ul>	Highly Unlikely	High	Medium
Interference with Services	<ul style="list-style-type: none"> <li>» Location of underground services</li> <li>» Staff training</li> <li>» Procedural Controls</li> </ul>	Possible	High	Medium