PORT KEMBLA LAND USE SAFETY STUDY

Overview Report

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Notation

Abbreviation	Description
A/G	Above Ground
ADG Code	Australian Dangerous Goods Code
Arriscar	Arriscar Pty Ltd
ARTC	Australian Rail Track Corporation
AST	Aboveground Storage Tank
BLB	Bulk Liquids Berth
CD	Complying Development
CH_4	Methane
DG/s	Dangerous Good/s
DP&E	NSW Department of Planning and Environment
EGP	Eastern Gas Pipeline
ERC	Emergency Release Coupling
ESD	Emergency Shutdown
FHA	Final Hazard Analysis
FN	Cumulative frequency vs. Number of fatalities
FSRU	Floating Storage Regasification and Unloading
HAZID	Hazard Identification
HIPAP	Hazardous Industry Planning Advisory Paper
HP	High Pressure
kg	Kilograms
LFL	Lower Flammability Limit
LNG	Liquefied Natural Gas
LNGC	Liquefied Natural Gas Carrier
LOA	Length overall
LPG	Liquefied Petroleum Gas

Abbreviation	Description
LSIR	Location-Specific Individual Risk
LUSS	Land Use Safety Study
m	Metres
m/s	Metres / second
m^2	Square metres
mg/m^3	Milligrams per cubic metre
MHF	Major Hazard Facility
MLA	Marine Loading Arm
mm	millimetres
NH_3	Ammonia
p.a.	Per Annum
PANSW	Port Authority of NSW
PHA	Preliminary Hazard Analysis
PKGT	Port Kembla Gas Terminal
pmpy	Per million per year
QRA	Quantitative Risk Assessment
SEPP	State Environmental Planning Policy
Study Area	Area within the 'Port Kembla Lease Area', as defined by the T&I SEPP, and the area within the site boundary of the IXOM facility (refer to Figure 3)
T&I SEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
TEU	Twenty-foot equivalent unit A unit of measurement equal to the space occupied by a standard twenty-foot container One 40-foot container is equal to two TEU
TTLR	Tank Truck Loading Rack
U/G	Under Ground
UN	United Nations
VCE	Vapour Cloud Explosion

1 INTRODUCTION

1.1 Background

Port Kembla is managed by NSW Ports under a 99-year lease arrangement from the Government of NSW. Port Kembla is an international trade gateway for bulk agricultural, construction and mining industries. It is the largest motor vehicle import hub in New South Wales and the State's largest grain export terminal and second largest coal export port.

Risk assessments for individual facilities in the port area have been undertaken as part of some development applications; however, a Land Use Safety Study (LUSS) incorporating a cumulative risk assessment for all the industrial facilities has not previously been undertaken.

In 2022, the NSW Department of Planning & Environment (DP&E) engaged Arriscar Pty Ltd (Arriscar) to undertake an LUSS to estimate the cumulative risk from the industrial facilities and operations (existing, approved or under consideration by the DP&E) to determine the appropriateness of bulk liquid storage tank development being enabled by the complying development framework under the State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) at Port Kembla.

1.2 Objectives

The objectives of the Port Kembla LUSS were to:

(a) Estimate the cumulative risks from facilities within the Study Area on the surrounding land uses for the current situation including any development applications being considered by the DP&E at the time of preparing the LUSS.

(b) Identify the significant risk contributors and their causes and assess the magnitude of their impact in relation to relevant NSW risk criteria for land use safety planning.

(c) Develop a strategic land use safety framework for future developments at the port, including any opportunities to simplify planning controls in the Lease Area. This included identifying whether complying development provisions in clauses 11, 12/12A and 13 in Schedule 11 of the 'State Environmental Planning Policy (Transport and Infrastructure) 2021' (T&I SEPP) [1] are suitable for the Lease Area.

(d) Identify options to minimise risk and provide a regime for ongoing risk management.

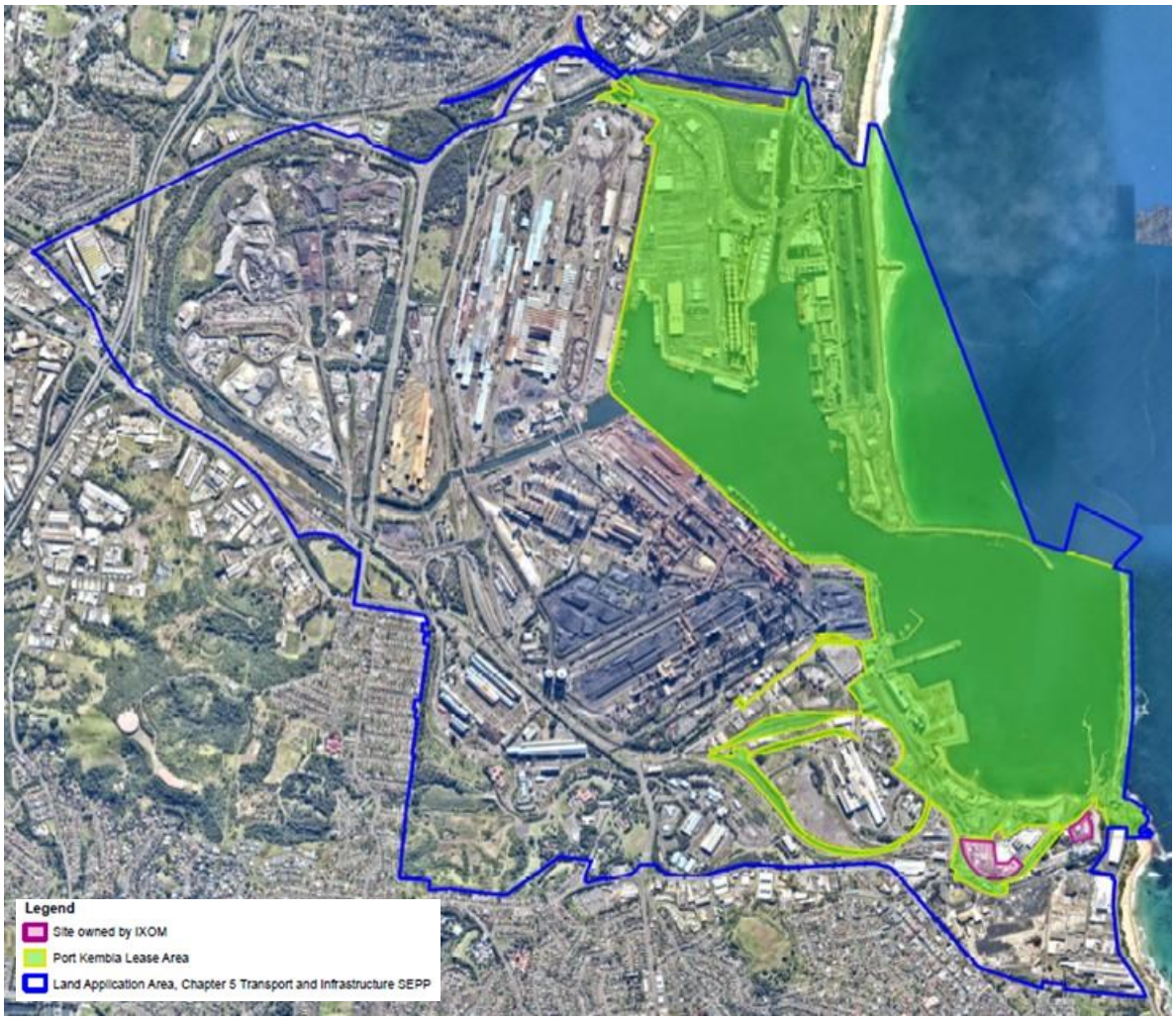
1.3 Scope

1.3.1 Study Area

The LUSS and the cumulative risk assessment included the facilities and operations located within the Port Kembla Lease Area, as shown in Figure 1 (marked in green) from the T&I SEPP [2]. The Study Area also included the two sites operated by IXOM Operations Pty Ltd, which are located on Foreshore Road adjacent to the Port Kembla Lease Area (marked in pink in Figure 1).

The Study Area included the Outer and Inner Harbours and excluded BlueScope's Port Kembla Steel Works (PKSW).

Figure 1 Study Area



1.3.2 Facilities and Operations

The following facilities and operations were included in the scope of the LUSS:

1. Existing facilities and operations in the Study Area.
2. Future facilities if these may be operational in the Study Area within the next c. 5 years.
3. Example representative bulk liquid storage tank facilities to maximise the potential application of the relevant CD provisions in the Lease Area under the T&I SEPP [1].

Any potentially hazardous facilities or operations located outside the Study Area were excluded from the scope of the LUSS. Similarly, the transport of Dangerous Goods (DGs) by pipeline, road, rail or sea was only included within the boundary of Study Area.

1.3.3 Risk Assessment

A Quantitative Risk Assessment (QRA) was undertaken to meet the principal objectives of the study.

The scope of the QRA included a quantitative analysis and assessment of the fatality, injury and property damage risks for which the DP&E has specified risk criteria in Hazardous Industry Planning Advisory Paper (HIPAP) No. 4 [3] and HIPAP No. 10 [4].

2 METHODOLOGY

2.1 Introduction

The LUSS included four main activities:

1. Consultation with stakeholders, including facility Operators and relevant Regulatory Authorities.
2. Gathering of all data required for the risk assessment. This data was obtained from the stakeholders and other publicly available sources.
3. Completion of the QRA.
4. Development of a land use safety plan and risk management options based on the findings of the QRA.

2.2 Stakeholder Consultation

The stakeholders relating to Port Kembla operations were divided into the following groups:

- Tenant and Ports Users. This group included Operators of industrial facilities in the Study Area (Port tenants).
- Regulatory Authorities. This group included regulatory authorities that have role in land use safety planning at Port Kembla (e.g. DP&E and Port Authority of NSW).

Presentations for the stakeholders were held on the following dates:

- Tenant and Ports Users – 25 August 2022.
- Regulatory Authorities – 26 and 29 August 2022 (via Microsoft Teams).

The consultation meetings included a presentation of the objectives of the study and identified the issues and components of the Study relevant to each stakeholder.

2.3 Data Gathering

Tenants and ports users were sent a questionnaire to collect information on their operations. This information included site layout maps, dangerous goods inventories, operations and installed safety systems for hazard control. Most of this information was provided as 'commercial-in-confidence' and is not included in this report.

Data was gathered on current and potential future developments based on the following information:

- Data provided by tenants and ports users on the current and likely future handling of DGs.
- Trade statistics [5].
- NSW Ports' 30 Year Master Plan [6].
- NSW Ports' Port Development Plan 2019-2023 [7].
- Hazard analyses and transport risk studies available in the public domain.

A site visit was also undertaken.

No significant planned future expansion projects were reported by the Operators of the facilities and operations included in the risk analysis.

2.4 Risk Assessment

A QRA was undertaken in accordance with the NSW HIPAP guidelines [8]. This included:

- Identification of the hazards for the potentially hazardous facilities and operations in the Study Area (with reference to existing risk related studies, where available, and a focus on those events that may contribute to off-site impacts);
- Identification of a range of potentially hazardous incidents resulting in loss of containment of dangerous goods, fire, explosion and/or toxic releases, and the appropriate and relevant representative scenarios for each incident;
- Quantification of the consequences of potential harmful effects for each representative hazardous incident, including the potential for impact on surrounding land uses;
- Quantification of the likelihood of occurrence (frequency) of each representative hazardous incident;
- Using assumptions that are appropriate and justified, with a focus on minimising uncertainty and obtaining a 'cautious best estimate' of risk;
- Generation of Location-Specific Individual Risk (LSIR) contours or risk transects for comparison with the DP&E's risk criteria for land use safety planning, as outlined in HIPAP No. 4 [3] and HIPAP No. 10 [4];
- Estimation of societal risk for comparison with the DP&E's indicative risk criteria for land use safety planning, as outlined in HIPAP No. 4 [3] and HIPAP No. 10 [4]; and
- Estimation of the risk to the biophysical environment from accidental release of potentially toxic materials for comparison with the DP&E's risk criteria for land use safety planning, as outlined in HIPAP No. 4 [3] and HIPAP No. 10 [4].

2.5 Land Use Safety Strategy and Risk Management

Based on the findings of the risk assessment, a strategic land use safety framework has been proposed for future developments at the port (refer to Section 5), including any opportunities to simplify planning controls in the Lease Area (i.e. whether additional complying development is suitable for the Lease Area). Options to minimise risk and provide a regime for ongoing risk management are also included in Section 5.

3 OVERVIEW OF STUDY AREA

3.1 Introduction

Port Kembla is located to the south of Wollongong and is approximately 70 km from Sydney's Central Business District. The Port was in use as early as 1883 for the export of coal, with the Port Kembla Harbour Act commencing in 1889 and construction of the breakwaters commencing in 1900 [9].

The port includes an Inner and Outer Harbour, with multiple berths and a diverse range of operating facilities. It includes NSW's largest motor vehicle import hub and grain export terminal.

3.2 Land Uses

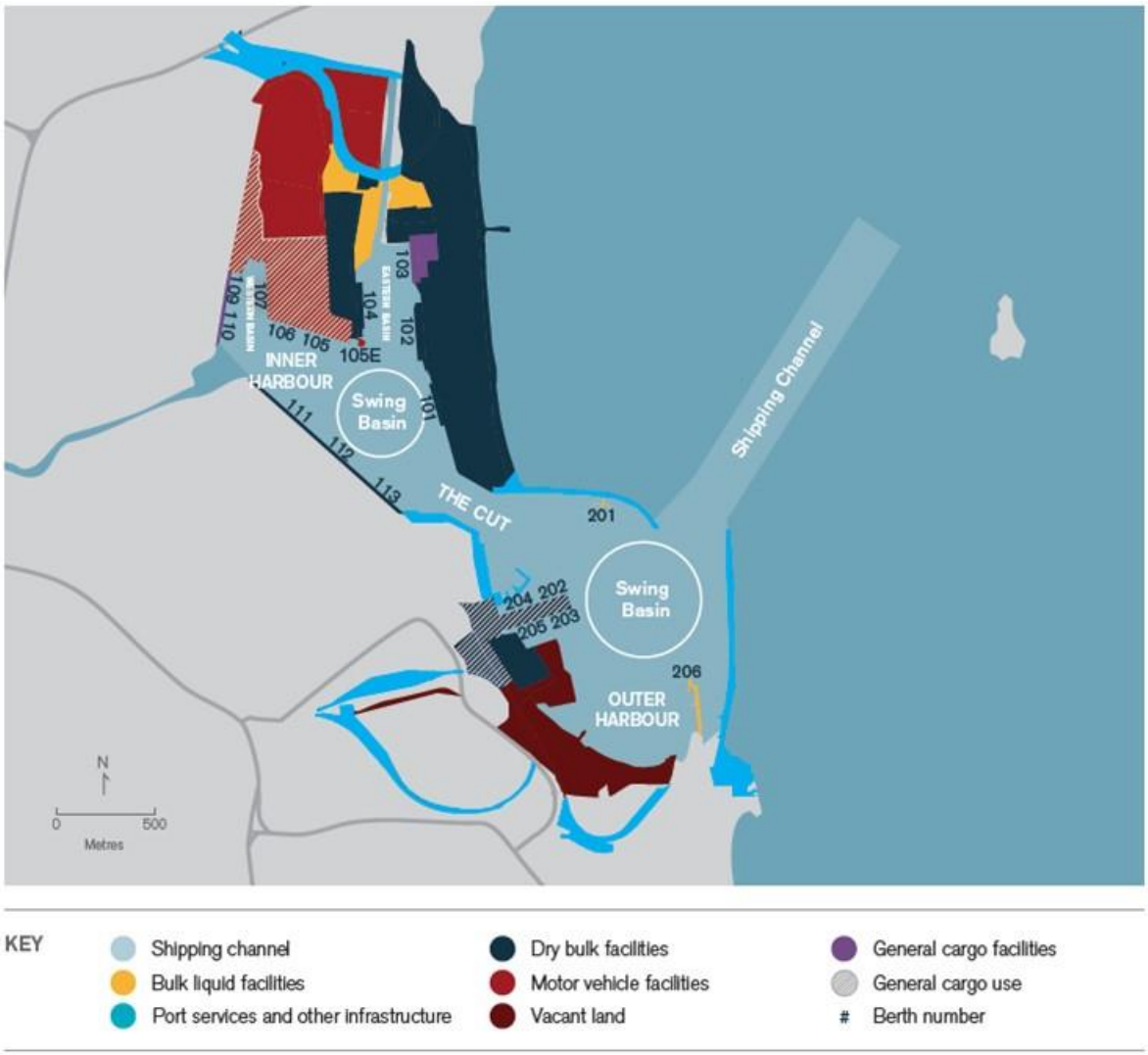
3.2.1 Port Lease Area

Land within the Port Kembla precinct is leased from NSW Ports. The usage of land within the Port Lease Area is shown on Figure 2 [6] and includes:

- Bulk liquids berths and storage facilities;
- Containerised and general cargo berths and storage facilities;
- Dry bulk berths and storage facilities;
- Motor vehicle berths and open yard storage;
- Supporting road and rail infrastructure; and
- Port services and other infrastructure.

Most NSW Ports land at the Inner Harbour is in use or under development. There is more vacant NSW Ports land at the Outer Harbour, which will be incorporated into an Outer Harbour Development for future container and bulk product handling [6].

Figure 2 Shipping Access and Land Utilisation (2019) [6]



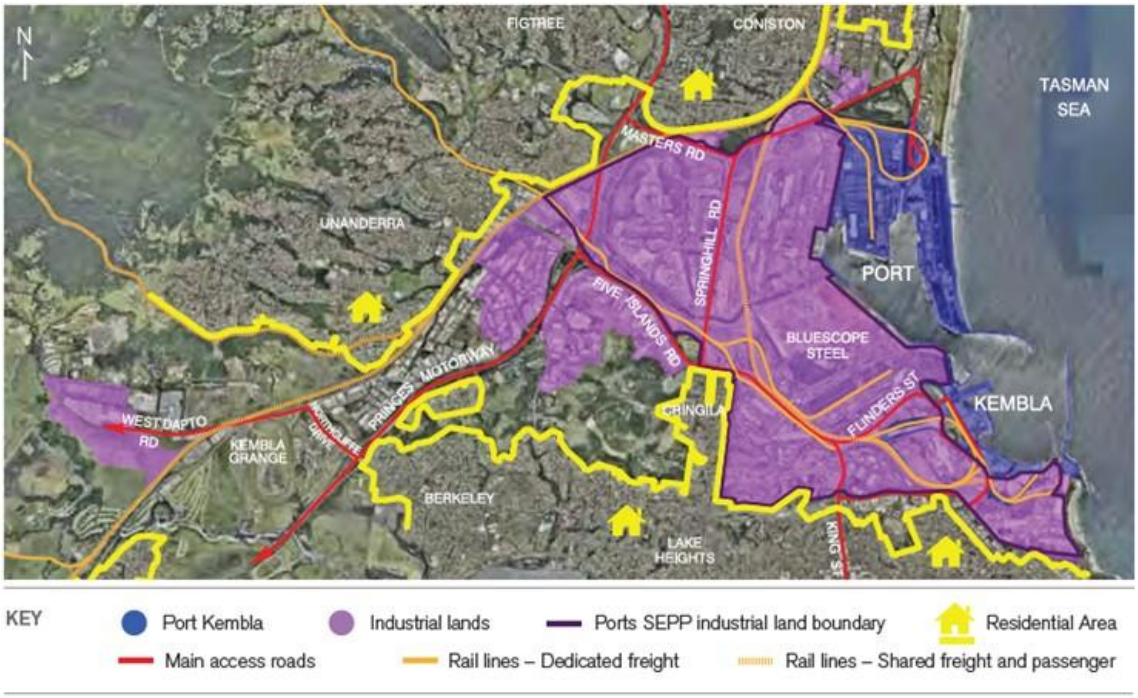
3.2.2 Surrounding Land Uses

Land uses surrounding the Study Area are predominantly industrial and residential, as shown in Figure 3 [6]. BlueScope's PKSW is the predominant use adjoining the Study Area.

Industrial lands adjoining the Lease Area are surrounded by residential, businesses uses and open spaces.

The closest residential house is approximately 110 metres from the boundary of the Lease Area and more than 1 km from the closest berth. The closest residential areas are zoned R2 Low Density Residential [10].

Figure 3 Surrounding Land Uses [6]



3.3 Overview of Facilities and Operations

3.3.1 Bulk Liquids and Liquefied Gases

The Port handles a range of bulk liquid products, including coal tar; ethanol; diesel and lube oils for vehicles; machinery and equipment; marine fuel oil for refuelling ships; and sulphuric acid [6].

The volume of bulk liquid handled through Port Kembla is expected to increase and diversify with the development of new bulk liquid storage facilities [6], such as those approved for TQ Holdings and Manildra.

Three common user berths are used for bulk liquid transfers (Berths 104, 201 and 206). Two of these berths are in the Outer Harbour and are dedicated to liquid bulk trades only (Berths 201 and 206). The bulk liquid facility located in the Inner Harbour (Berth 104) commenced operations in 2015 and this berth is also used for dry bulk and general cargo.

The bulk liquids are transferred from the berths to on shore storage tanks by pipeline (refer to Section 3.4.4).

Only relatively small quantities of liquefied gases are currently present at Port Kembla.

Australian Industrial Energy (AIE), which is an entity of Squadron Energy, is constructing a gas terminal at Port Kembla. This includes a Liquefied Natural Gas (LNG) Floating Storage Regasification and Unloading (FSRU) vessel and high-pressure natural gas pipeline.

A proposed potential bitumen facility on Foreshore Road was excluded as the development is not expected to proceed and due to its low off-site hazard potential.

3.3.2 Containerised Goods

Port Kembla has been identified as the location for development of a future container terminal to augment capacity of Port Botany when required [7]. This future development would require significant land reclamation and is not included in the scope of the current LUSS.

Whilst there is no dedicated container terminal at Port Kembla, some containerised goods are still handled. For example, the Australian Amalgamated Terminals (AAT) facility can cater for containers [9]; however, most containerised goods are only present as transit cargoes. Furthermore, most transit containers are essentially empty and only a small fraction contain dangerous goods.

3.3.3 Dry Bulk

Port Kembla includes NSW's largest grain handling facility and is the second largest coal export port in NSW [6]. The Port's dry bulk trades include [6]:

- Cement clinker, which is imported by ship via two berths. Clinker received via Berth 203 is conveyed directly into the grinding mill operated by Cement Australia and material received via Berth 103 is trucked to a grinding mill operated by Morgan Cement located on land adjacent to the port at Foreshore Road. A significant proportion of the Cement Australia product is distributed by rail. Ground cement product is imported via Berth 104 and stored in silos for distribution by road.
- Coal and coke, which are primarily exported by ship and are transported by road and rail to the port from coalfields in the Illawarra and at Lithgow. Coke is also exported by ship directly from BlueScope's PKSW (Note: excluded from scope of LUSS).
- Fertilisers, which are imported by ship and despatched by road.
- Grain, which is primarily exported by ship and is transported by road / rail to the port from regional NSW.
- Steel making raw material imports (e.g. iron ore, limestone) and finished product exports associated with BlueScope's PKSW (Note: excluded from scope of LUSS).

Other dry bulk products include metal concentrate exports (zinc, copper) and soda ash imports [6].

Cement Australia (Port Kembla Milling) was excluded from the risk analysis due to its low off-site hazard potential.

3.3.4 General Cargo

Approximately 1.5 million tonnes of general cargo is handled at the port, such as: steel exports, containers, mining equipment, construction materials and special project cargo like power generation transformers, wind turbines and yachts [6].

All general cargo facilities and operations were excluded from the risk analysis due to their low off-site hazard potential.

3.3.5 Motor Vehicles

Port Kembla has NSW's largest motor vehicle import facility, handling 390,000 vehicles and machinery each year, with volumes forecast to grow to between 540,000 and 850,000 vehicles per year by 2045 [6].

3.3.6 Power Generation

Australian Industrial Power (AIP), which is an entity of Squadron Energy, is proposing to develop a dual-fuel (gas and green hydrogen) Power Station at Port Kembla.

3.4 Overview of Transport Infrastructure and Operations

3.4.1 Berths

The berth operators, and the typical usage of each berth, is summarised in the following table.

Table 1 Berths at Port Kembla [11]

Berth Number	Berth Operator	Example Goods	Comments
101	AIE	LNG	AIE is currently redeveloping Berth 101 for future use as part of the Port Kembla Gas Terminal.
102	Port Kembla Coal Terminal	Coal	
103	AAT & Quattro Ports	Grain, fertilisers, cement clinker	
104	Multi-User	Grain, fertilisers, cement, bulk liquids, general cargo	Multi-purpose common-user berth (including bulk liquids), owned by NSW Ports. Main operator is GrainCorp.
105	AAT	Motor vehicles, general and containerised cargo	
106			
107			
109	BlueScope Steel	Steel making raw materials (e.g. iron ore, limestone) and finished products	Excluded from scope of LUSS.
110			
111			
112			
113			
201	NSW Ports	Diesel, ethanol	Common-user bulk liquids berth owned by NSW Ports. Main operator is Park Fuels.
202	Port Kembla Gateway	Bulk and break-bulk cargoes (e.g. cement clinker, gypsum, soda ash, metal concentrates), coal tar	
203			
204			
205			
206	NSW Ports	Sulphuric acid, ethanol	Common-user bulk liquids berth owned by NSW Ports. Main operator is Ixom with approved use by Manildra.

3.4.2 Road Transport

Truck volumes at Port Kembla are forecast to increase to between 1,100 and 1,200 trucks per day in 2025 [6].

Masters Road, Springhill Road, Five Islands Road, Mount Ousley Road, Picton Road and the Princes Motorway are the main access roads used to transport products to and from the Port.

There are no multi-user truck marshalling areas (TMAs) in the Study Area.

3.4.3 Rail Transport

Port Kembla's coal, grain, copper concentrate and steel are the main products handled by rail. The number of trains arriving and departing from the Port is forecast to grow to about 17 trains a day by 2045 based on the forecast trade growth of existing commodities [6].

NSW Ports manages the freight rail network within the Inner and Outer Harbour, including the rail lines, sidings and loops. The Illawarra Line and the Moss Vale-Unanderra Line provide rail connections to Port Kembla from markets in regional NSW. The Moss Vale-Unanderra Line is a dedicated freight line.

3.4.4 Pipelines

There are multiple pipelines in the Study Area for bulk liquids (e.g. fuels, sulphuric acid) and gases (e.g. natural gas). These include:

- Liquid lines to/from Berths 104, 201 and 206 from/to the respective storage facilities.
- Natural gas pipeline connecting the AIE PKGT to the Eastern Gas Pipeline (EGP).
- Pipeline from BlueScope PKSW to Port Kembla Gateway for export of coal tar (DG class 9 marine pollutant).

Additional pipelines connected to bulk liquid storage tanks may also be present in the future (e.g. Hydrogen to AIP power station), including pipelines currently permitted as Complying Development under the State Environmental Planning Policy (Transport and Infrastructure) 2021.

Bunker fuel is also supplied by pipeline to Berths 101, 102, 111 -113 (BlueScope) and 201 [12].

4 FINDINGS OF RISK ASSESSMENT

4.1 Introduction

All of the DP&E's quantitative and qualitative risk criteria for land use safety planning were considered in the LUSS. A quantitative analysis was undertaken for the cumulative individual fatality risk and societal risk and a quantitative or semi-quantitative analysis was undertaken to assess the other risk criteria.

The cumulative individual and societal risks for all of the facilities and operations included in the QRA comply with all of the DP&E's corresponding quantitative risk criteria for land use safety planning outlined in HIPAP No. 4. The risk profile for the Study Area is also considered to generally comply with the qualitative risk criteria outlined in HIPAP No. 4.

The potential for accidental emissions to threaten the long-term viability of the harbour environment was evaluated semi-quantitatively and assessed to be compliant.

4.2 Individual Fatality Risk

The cumulative individual fatality risk contours for all existing and proposed facilities and operations included in the QRA are shown on Figure 4 to Figure 7.

The main contributors to the cumulative individual fatality risk include the: AIE LNG facility (approved and under construction); AIP facility (proposed and subject to approval); GrainCorp facility (existing); TQ Holdings facility (approved, construction not commenced); and Manildra facility (approved, construction not commenced).

Figure 4 Cumulative Individual Fatality Risk

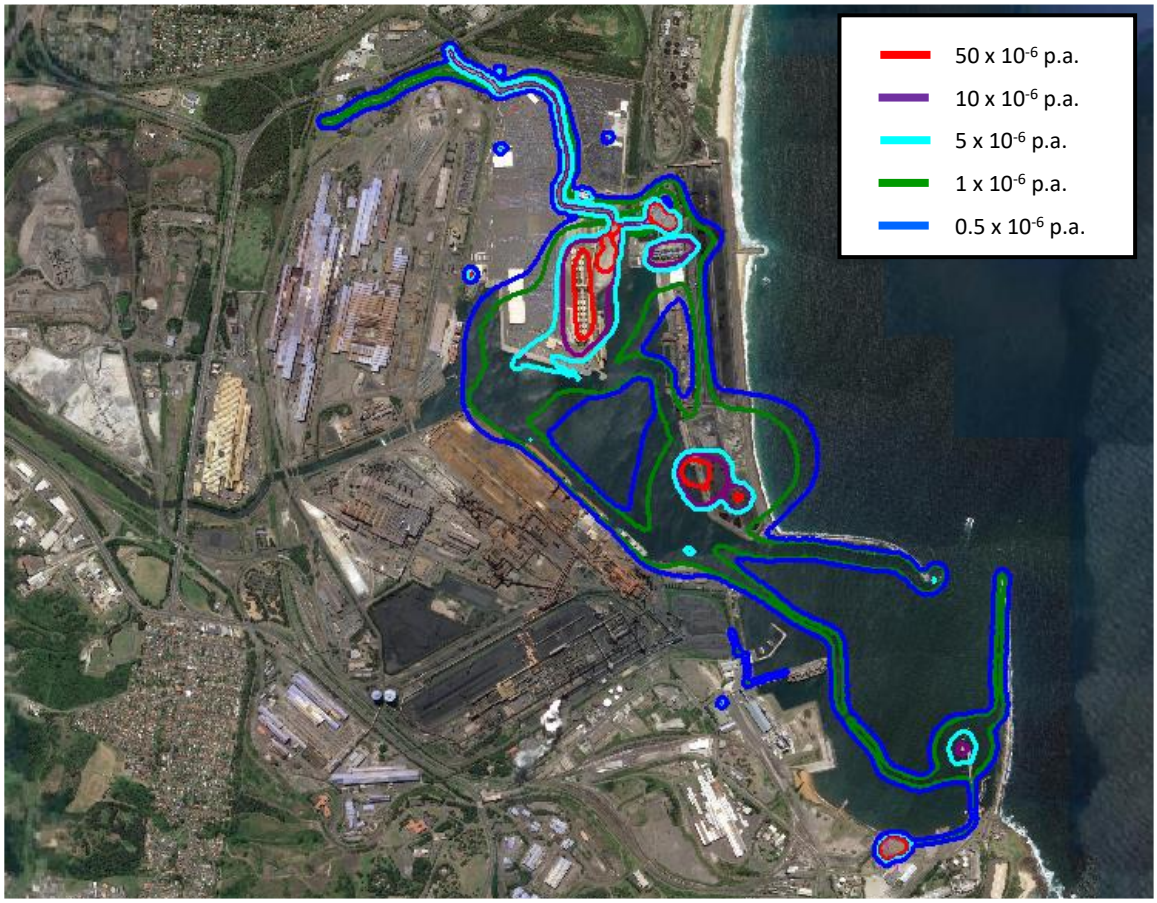


Figure 5 Cumulative Individual Fatality Risk (North)

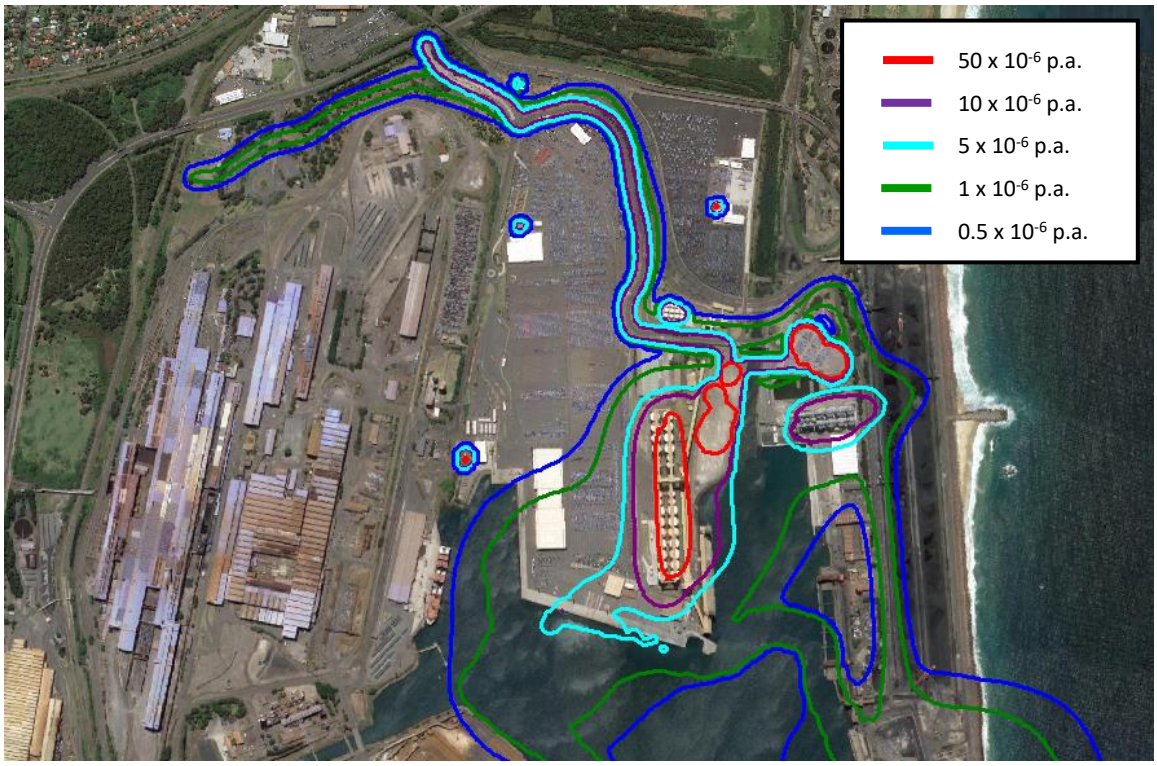


Figure 6 Cumulative Individual Fatality Risk (Central)

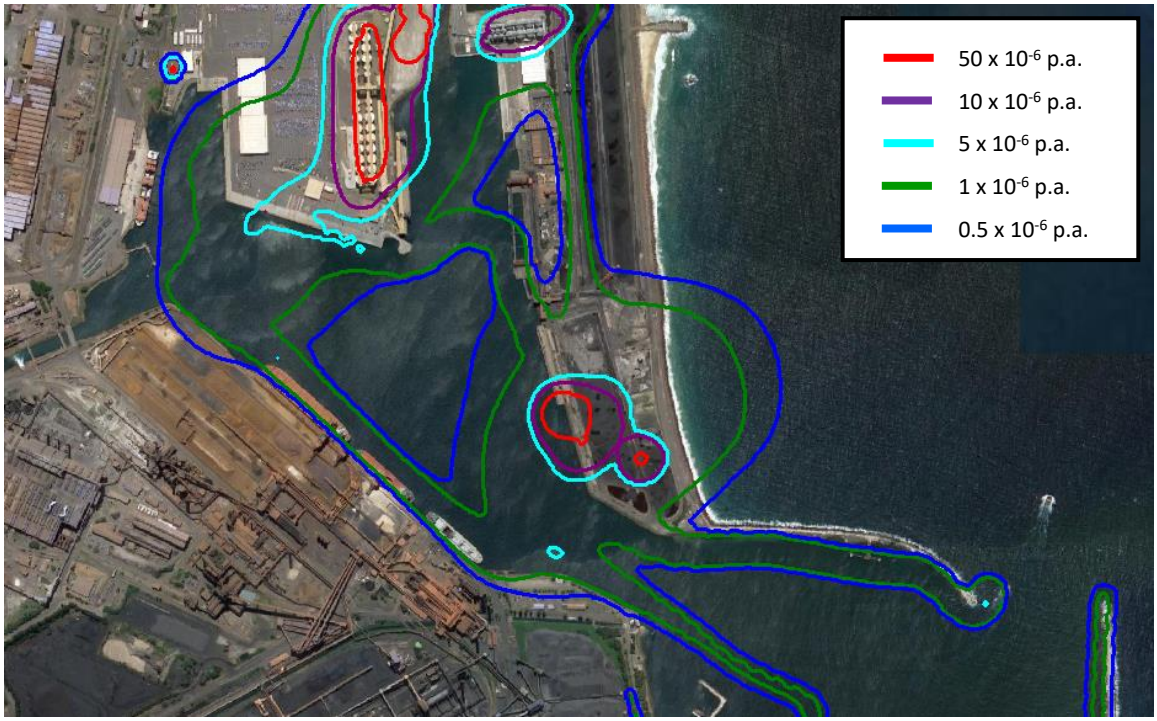
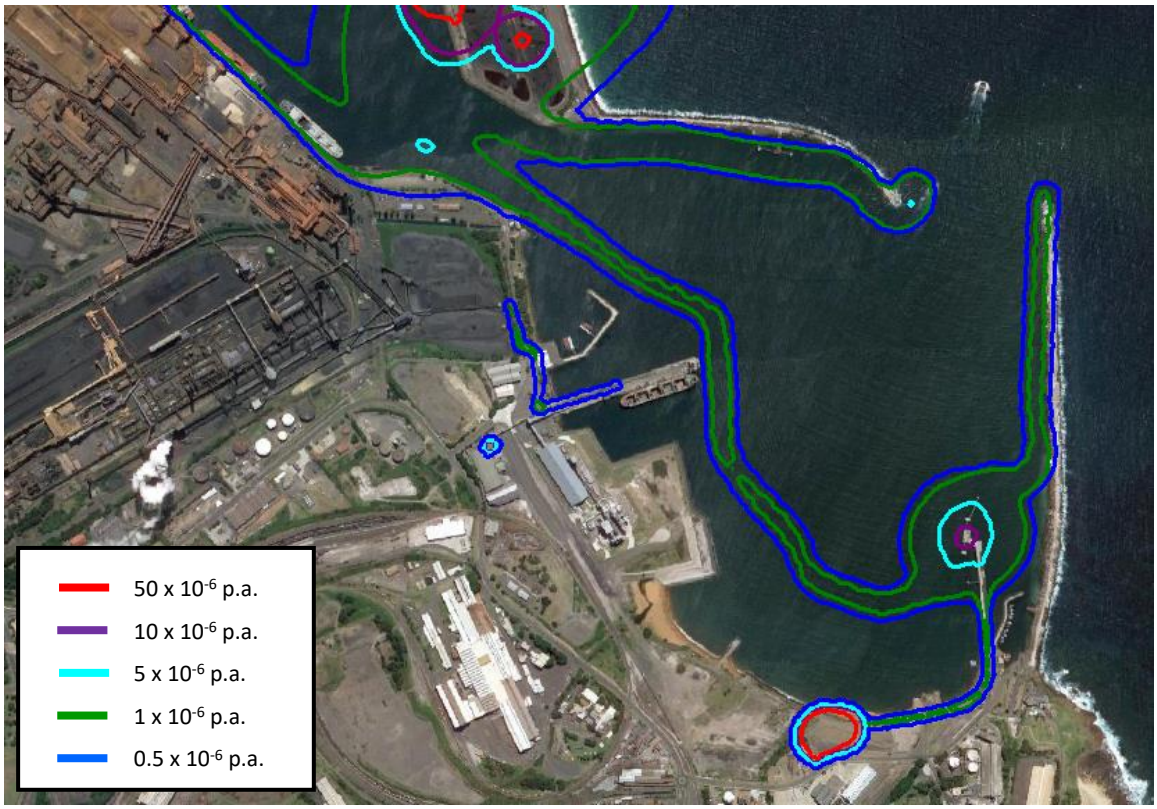


Figure 7 Cumulative Individual Fatality Risk (South)

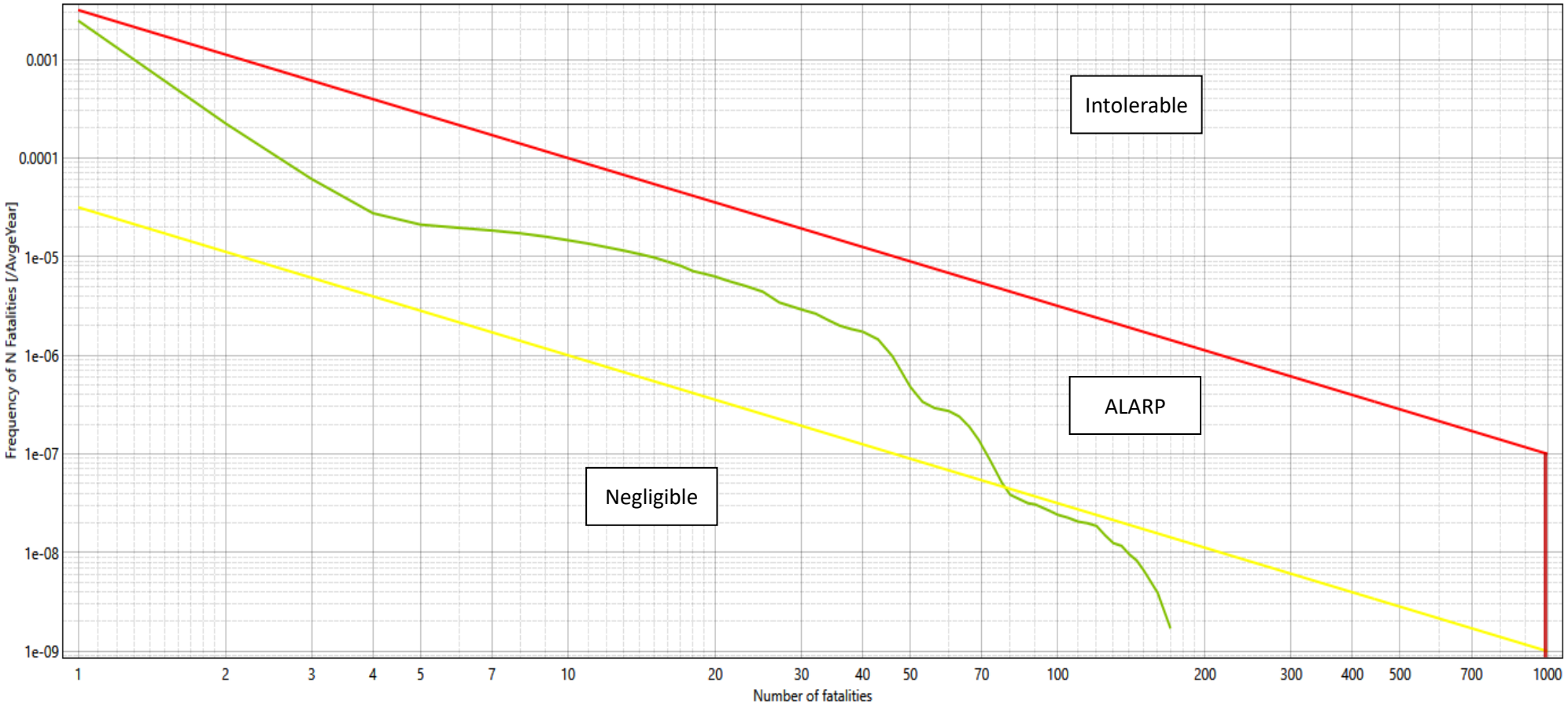


4.3 Societal Risk

The cumulative societal risk (FN curve) for all facilities and operations included in the QRA is shown on Figure 8.

The cumulative FN curve complies with the DP&E indicative criteria, with the majority of the curve in the 'ALARP' region (N < c.45) before dropping into the 'Negligible' region (N > c.45).

Figure 8 Cumulative Societal Risk



5 LAND USE SAFETY STRATEGY AND RISK MANAGEMENT

5.1 Land Use Safety Strategy

5.1.1 Existing and Proposed Facilities and Operations

The cumulative individual and societal risks for all of the existing and proposed facilities and operations included in the QRA comply with all of the DP&E's corresponding quantitative risk criteria for land use safety planning.

The following facilities or operations were not included in the QRA:

- BlueScope Steel – The Port Kembla Steelworks is a potential contributor to the cumulative risk for Port Kembla; however, it is noted that the risk contours for the facilities and operations included in the QRA do not extend significantly into the steelworks.
- Cruise ship operations – Cruise ships have occasionally used Port Kembla (commencing in 2016); however, no visits had been scheduled at the time of this study and there was no indication of these operations recommencing in the foreseeable future based on consultation with PANSW. Only a few visits per year have previously occurred prior to the COVID-19 pandemic restrictions and these occurred at Berths 105 / 106. If cruise ships were to return, then a review of the risks (particularly societal risk) would be appropriate.
- Port Kembla Outer Harbour Development – This was not included in the QRA as it is a longer-term potential future project; however, it does not appear to be significantly impacted by the cumulative risk profile for the facilities and operations included in the QRA.

5.1.2 Transportation of DGs

Risks associated with road transport of DGs do not appear to be a significant contributor to the cumulative risks with pipelines being a more significant risk contributor for DG transport. Similarly, no significant quantities of DGs were identified for rail transport.

Risks associated with LNG carriers are a notable contributor to the cumulative risks due to the large number of movements and LNG is the only liquefied gas transported in bulk in the Study Area. Other marine related events (e.g. grounding) were also included for the flammable / combustible liquids but are not as significant due to lower number of movements and generally lower hazard area.

The road through the northern part of the Study Area appears to have been selected as a DG pipeline route. Whilst this is not an issue presently, the coexistence of road transport and pipeline DG movements has the potential to increase risks in this area. It may be appropriate to control higher population density developments and commercial uses along this route and the land interfacing North Gate, as the estimated risk at this location area is not compatible with commercial uses.

There are no designated DG truck marshalling areas in the Study Area. It is expected that this will be addressed for the Outer Harbour if the Port Kembla Outer Harbour Development proceeds; however, a designated area for the Inner Harbour may be required if DGs are transported by road in increased quantities. Given that these may include toxic gases, such an area may be more suitable towards the southern end of the Study Area (Inner Harbour); however, this would need to be balanced against the possibility of Berths 105 / 106 being used for future cruise ship operations.

5.1.3 Complying Development

Clause 11 and 12/12A of Schedule 11 of the T&I SEPP do not currently apply to Port Kembla.

Two example representative facilities were included in the LUSS that would be consistent with the above clauses. The most potentially hazardous materials were selected as being representative for each facility.

The two representative facilities selected for the LUSS included:

- A bulk DG Class 3 flammable liquids storage terminal as being representative of a facility storing combustible liquids or DG Class 3, 8 or 9 liquids.
- A bulk DG Class 2.1 LPG storage terminal as being representative of a facility storing LPG or LNG.

Clause 13 of Schedule 11 of the T&I SEPP currently applies to Port Kembla.

Example representative bulk liquid storage tank facilities were included in the QRA. A summary of the findings from the QRA for these facilities is included in the following table.

Table 2 Summary of Findings from QRA for Complying Development

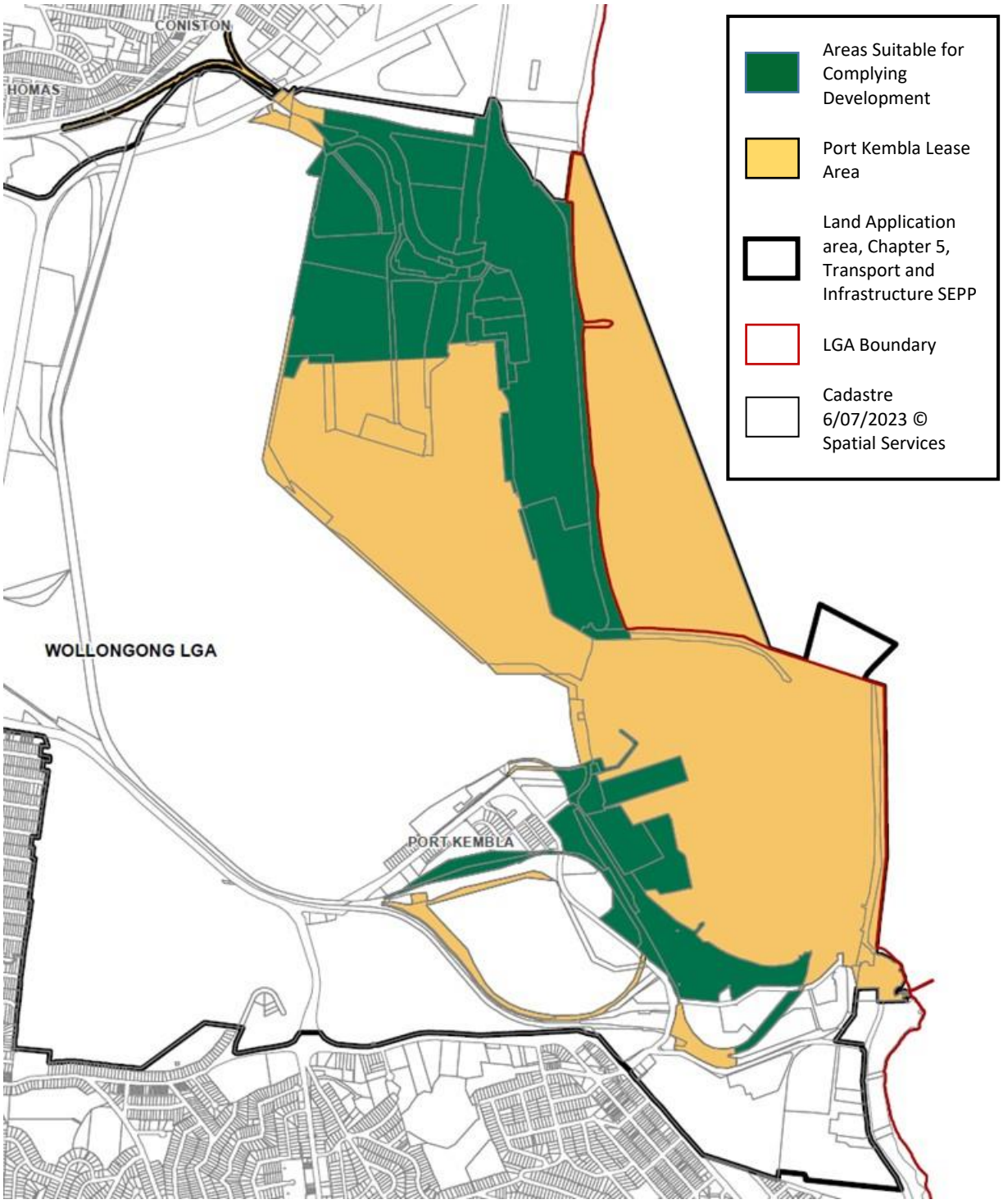
Summary of Findings from QRA	
Bulk Liquid Storage (dot point one above)	
Individual Risk	This category of CD may be appropriate at any location in the Lease Area based on the DP&E's individual fatality risk criteria. As the > 5 pmpy individual fatality risk is generally expected to fall within, or close to, the boundary of the facility, the offsite contribution to the cumulative individual risk for all facilities and operations included in the QRA is unlikely to significantly increase by this category of CD (refer to Figure 4). Some increase to the cumulative individual fatality risk would be expected if the CD is located near other higher risk locations in the Study Area, or if multiple CDs are all located in one general area in the Study Area; however, this is not expected to significantly impact upon the cumulative individual fatality risk at non-industrial uses outside the Study Area.
Societal Risk	There is potential for 'Buncefield' type VCEs to cause fatality at several hundred metres; therefore, this category of CD would not be appropriate at locations where this type of event could impact upon very large numbers of people (e.g. a cruise ship at Berths 105 / 106).
Bulk Liquid Flammable Gas Storage (dot point two above)	
Individual Risk	This category of CD may be appropriate at most locations in the Lease Area based on the DP&E's individual fatality risk criteria; however, it would be appropriate to provide a buffer of c. 100 m to any commercial uses (not associated with industrial facilities). The offsite contribution to the cumulative individual risk for all facilities and operations included in the QRA is unlikely to significantly increase by this category of CD (refer to Figure 4).

Summary of Findings from QRA	
	Some increase to the cumulative individual risk would be expected if the CD is located near other higher risk locations in the Study Area, or if multiple CDs are all located in one general area in the Study Area; however, this is not expected to significantly impact upon the cumulative individual fatality risk at non-industrial uses outside the Study Area.
Societal Risk	There is potential for Boiling Liquid Expanding Vapour (BLEVE) events to cause fatality at several hundred metres; therefore, this category of CD would not be appropriate at locations where this type of event could impact upon very large numbers of people (e.g. a cruise ship at Berths 105 / 106).

The following diagram indicates the areas within the Lease Area that may be suitable for CD (i.e., clauses 11 and 12 of Schedule 11 of the T&I SEPP) based on the findings of the QRA. This is effectively the entire lease area except for set-backs from the PANSW / NSW Ports office at the south east end of the Outer Harbour and from berths 105 / 106 for the Inner Harbour. Facilities may still be able to demonstrate that a potentially hazardous facility is suitable at locations outside the areas shown on this figure, but only through the normal (non-CD) approval pathway for potentially hazardous industry.

Clause 13 of Schedule 11 of the T&I SEPP currently applies to the entire lease area; however, it would be appropriate to also restrict the CD under this clause to the same area proposed in the following diagram. This limitation is primarily due to the intensification of the risk at North Gate (refer to Section 5.1.2) and proximity of some land (mainly rail loops) to residential areas for the outer harbour.

Figure 9 Areas for Complying Development



5.2 Risk Management

The cumulative individual and societal risks for all facilities and operations included in the QRA comply with all of the DP&E's corresponding quantitative risk criteria for land use safety planning and the existing risk management controls are generally consistent with the magnitude of this risk (see below). Consequently, the recommendations in Section 5.3 are primarily focussed on monitoring potential changes that may affect the cumulative risk profile and/or compliance with the DP&E's risk criteria for land use safety planning.

5.2.1 Assessment of Potentially Hazardous Development

Any new potentially hazardous development within the port lease area is subject to the requirements of the T&I SEPP [1] and 'State Environmental Planning Policy (Resilience and Hazards) 2021' [13], which include requirements for risk assessment and compliance with the DP&E's risk criteria for land use safety planning. This will include the categories of complying development assessed in the LUSS if this provision is added to the T&I SEPP (refer to Section 5.1.3 and Recommendation No. 1).

All tenant developments require approval by NSW Ports and are assessed against the Port Kembla Development Code [14]. To comply with the Port Kembla Development Code, a new development requires, inter alia, completion of a risk assessment. All development proposals are also required to assess on and off-site traffic impacts and are to be accompanied by a Traffic Management Plan. Whilst the Port Kembla Development Code appears to be comprehensive, it may be appropriate to undertake a review to ensure any specific hazard and risk assessment requirements relating to complying development are included (refer to Recommendation No. 3).

The complying development provisions in clauses 11,12/12A and 13 of Schedule 11 of the T&I SEPP [1] do not enable any increase in the transport of DGs beyond the site boundaries; however, it would be appropriate to monitor the risks associated with road and pipeline transport of DGs in the Lease Area.

5.2.2 Emergency Management

Individual facilities in the Study Area have site specific emergency plans and the documents sighted during the Study appeared to address the potentially hazardous events identified during the QRA. However, the Illawarra Local Emergency Management Plan (EMPLAN) [15] does not include some of the potential events (see below) identified in the QRA and if an event is included, the EMPLAN generally only includes the qualitative risk rating and the response agency. More detail is reported in the EMPLAN to be available in the 'Illawarra Emergency Risk Management Study'; however, this document could not be located at the time of this Study.

It is recommended that a review of the EMPLAN (and potentially the 'Illawarra Emergency Risk Management Study' and/or other relevant emergency plans for the Study Area as a whole) be undertaken to ensure all of the potential events identified in the QRA are included (refer to Recommendation No. 5).

5.3 Recommendations

1. Based on the findings of the QRA, the complying development provisions in clause 11 (for combustible liquids, dangerous goods class 3, 8 and 9, LPG and LNG), clause 12 (for combustible liquids, dangerous goods class 3, 8 and 9) and clause 13 (for dangerous goods of class 2, including liquefied petroleum gas or liquefied natural gas, 3, 5, 6, 8 or 9) of Schedule 11 of the 'State Environmental Planning Policy (Transport and Infrastructure) 2021' [1] are appropriate for most of the lease area. The DP&E may consider enabling these provisions for the categories of complying development found in clauses 11 (as currently applied at Port Botany), 12 and 13 of Schedule 11 for the area shown as 'suitable for complying development' in Figure 9.
2. Clauses 11, 12/12A and 13 in Schedule 11 of the 'State Environmental Planning Policy (Transport and Infrastructure) 2021' [1] do not enable any increase in the transport of DGs beyond the site boundaries; however, it would be appropriate to monitor the risks associated with road and pipeline transport of DGs in the Lease Area.

3. NSW Ports should consider undertaking a review of the Port Kembla Development Code [14] to address the findings of the LUSS, particularly as they relate to specific hazard and risk assessment requirements relating to complying development (i.e. if this provision is added to the T&I SEPP [1] - refer to Recommendation No. 1). For example, this may include consideration of the risk implications of population intensification along the main road transport and pipeline corridor for the Inner Harbour facilities (refer to Section 5.1.2).

4. The DP&E should develop and implement a process to review the ongoing appropriateness of the complying development provisions (i.e. clauses 11 and 12, Schedule 11) in T&I SEPP [1] for Port Kembla, particularly where changes occur that may affect the cumulative risk profile and/or compliance with the Department's risk criteria for land use safety planning. The Secretary of the DP&E should, for example, consider a review following:

   a. Any new major potentially hazardous development/s in the Lease Area (e.g. submarine facility, Port Kembla Outer Harbour Development, MHF development, new BLB/s or high pressure pipelines, etc.).

   b. Any significant increase in the transit quantities of containerised DGs and/or import / export of containerised DGs by road / rail.

   c. Any new major potentially hazardous development/s at the adjacent Port Kembla Steelworks.

   d. Introduction of multiple complying developments in the Lease Area, particularly where these are located in close proximity (e.g. currently vacant land at Outer Harbour area).

   e. Any change that would significantly increase the population within the Study Area (e.g. reintroduction of cruise ships).

   f. Rezoning of land adjoining the Study Area that would result in a more sensitive use (e.g. residential or commercial instead of industrial) as categorised and described in HIPAP No. 10.

   g. Any other change/s that may affect the cumulative risk profile in the Study Area and/or compliance with the DP&E's risk criteria for land use safety planning.

   Note: Information from third parties may be required to facilitate this recommendation. DP&E should also develop and implement appropriate systems to periodically obtain the required information from the relevant third parties.

5. It is recommended that a review of the 'Illawarra Local Emergency Management Plan' (EMPLAN) [16], and potentially the 'Illawarra Emergency Risk Management Study' and/or other relevant emergency plans for the Study Area as a whole, be undertaken to ensure all of the potential events identified in the QRA are included. For example:

   - DG road transport incidents, including potential for disruption to port operations.
   - High-pressure DG pipeline incidents, including potential for disruption to port operations.
   - Shelter-in-place or evacuation arrangements, particularly where egress may be difficult and/or where there are large numbers of people.
   - A 'Buncefield' type scenario at a bulk liquids terminal.
   - Any other new scenarios associated with bulk storage complying developments (e.g. LPG BLEVE) and/or future development proposals.

6 REFERENCES

[1] NSW Government, “State Environmental Planning Policy (Transport and Infrastructure) 2021”.

[2] NSW Government, “State Environmental Planning Policy (Transport and Infrastructure) 2021 Three Ports Lease Area Map,” 2022.

[3] NSW Department of Urban Affairs and Planning, “Hazardous Industry Planning Advisory paper No.4 - Risk Criteria for Land Use Safety Planning,” Sydney, 2011.

[4] NSW Department of Urban Affairs and Planning, “Hazardous Industry Planning Advisory paper No.10 - Land Use Safety Planning,” Sydney, 2011.

[5] Australian Bureau of Statistics (ABS), “Port Kembla Import & Export Commodity Volumes, 2005 onwards,” 2022.

[6] NSW Ports, “NSW Ports' 30 Year Master Plan,” NSW Ports Operation Hold Co Pty Limited, Sydney, October 2015.

[7] NSW Ports, “Port Development Plan 2019-2023,” 1 January 2019.

[8] NSW Department of Urban Affairs and Planning, “Hazardous Industry Planning Advisory Paper No.6 - Hazard Analysis,” Sydney, 2011.

[9] NSW Ports, “Locations, Port Kembla,” [Online]. Available: https://www.nswports.com.au/port-kembla. [Accessed 24 November 2022].

[10] NSW Government, “Wollongong Local Environmental Plan 2009 (2010 EPI 76), Land Application Maps”.

[11] Port Authority of New South Wales, “Port Kembla Berths and Facilities,” [Online]. Available: https://www.portauthoritynsw.com.au/port-kembla/port-services-facilities/berths-facilities/. [Accessed 25 November 2022].

[12] Port Authority of NSW, “Port Kembla, Other Port Services,” [Online]. Available: https://www.portauthoritynsw.com.au/port-kembla/port-services-facilities/other-port-services/. [Accessed 30 November 2022].

[13] NSW Government, “State Environmental Planning Policy (Resilience and Hazards),” 2021.

[14] NSW Ports, “Port Kembla Development Code,” June 2016.

[15] Illawarra Local Emergency Management Committee, “Illawarra Local Emergency Management Plan (EMPLAN),” 2017.

[16] Illawarra Local Emergency Management Committee, “Illawarra Local Emergency Management Plan (EMPLAN),” January 2017.