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# Contaminated Land Management Plan

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Proposed Fence and  
Road Widening,  
Mayfield 4 Berth,  
Mayfield North, NSW

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## Executive Summary

Port of Newcastle (PON) propose to install a fence and carry out road widening to the north west of the existing Mayfield 4 Berth, located at 109 Selwyn Street, Mayfield North NSW (the site). This Contaminated Land Management Plan (CLMP) has been prepared to guide and manage the handling of soils during the proposed works.

The site is located within the larger BHP remediated site, or Closure Area (approximately 155 hectares) at Mayfield NSW.

The BHP Closure Area is currently subject to a Maintenance of Remediation Notice (MRN Notice No. 20142802, 20 March 2014) and Voluntary Management Proposal (VMP) under the Contaminated Land Act 1997. As part of the MRN and VMP, a Contaminated Site Management Plan (CSMP) was prepared by Hunter Development Corporation (HDC) for the Closure Area in December 2016 (ref: 203188503, December 2016). The site is also subject to a NSW EPA Statutory Site Audit under Part 4 of the *Contaminated Land Management Act 1997* (CLM, 1997). Ms Fiona Robinson is the appointed Contaminated Land Site Auditor. The CLMP will require formal approval by the Site Auditor, Fiona Robinson of Ramboll Australia Pty Ltd, prior to implementation.

A Materials Management Plan (MMP) was also developed by Maunsell Australia Pty Ltd for the Closure Area in 2005. The MMP (2005) provided a decision matrix to assess the appropriate onsite material categorisation, reuse, storage, treatment and management of onsite soils.

The objective of the CLMP is to describe the works proposed and the measures, with respect to contamination, that will be implemented in order to manage excavated and re-instated material during the proposed works.

The CLMP has been prepared in accordance with requirements outlined in the CSMP (HDC, 2016).

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## 1.0 Introduction

### 1.1 General

Port of Newcastle (PON) propose to install a fence and carry out road widening to the north west of the existing Mayfield 4 Berth, located at 109 Selwyn Street, Mayfield North NSW (the site). This Contaminated Land Management Plan (CLMP) has been prepared to guide and manage the handling of soils during the proposed works. The location of the site is shown on Figure 1, Appendix A.

The site is located within the larger BHP remediated site, or Closure Area (approximately 155 hectares) at Mayfield NSW. The location of the Site (in relation to the Closure Area) is shown on Figure 1, Appendix A.

The BHP Closure Area is currently subject to a Maintenance of Remediation Notice (MRN Notice No. 20142802, 20 March 2014) and Voluntary Management Proposal (VMP) under the Contaminated Land Act 1997. As part of the MRN and VMP, a Contaminated Site Management Plan (CSMP) was prepared by Hunter Development Corporation (HDC) for the Closure Area in December 2016 (ref: 203188503, December 2016). The site is also subject to a NSW EPA Statutory Site Audit under Part 4 of the *Contaminated Land Management Act 1997* (CLM, 1997). Ms Fiona Robinson is the appointed Contaminated Land Site Auditor. The CLMP will require formal approval by the Site Auditor, Fiona Robinson of Ramboll Australia Pty Ltd, prior to implementation.

A Materials Management Plan (MMP) was also developed by Maunsell Australia Pty Ltd for the Closure Area in 2005. The MMP (2005) provided a decision matrix to assess the appropriate onsite material categorisation, reuse, storage, treatment and management of onsite soils.

### 1.2 Objectives

The objective of the CLMP is to describe the works proposed and the measures, with respect to contamination, that will be implemented in order to manage excavated and re-instated material during the proposed works.

The CLMP has been prepared in accordance with requirements outlined in the CSMP (HDC, 2016).

### 1.3 Scope

This CLMP is to be provided to the Contractor to specify the management requirements for contaminated land and materials management at this site. The CLMP has been designed to guide the Contractor on how excavation and backfilling works will be managed to meet the relevant regulatory requirements and approvals associated with the site. The CLMP will also provide procedures to prevent normal human physical contact and reduce the risks to the environment associated with the material.

## 2.0 Roles and Responsibilities

Table 2.1.1 summarises the roles and responsibilities for the project.

**Table 2.1.1: Role and Responsibilities**

<b>Role</b>	<b>Responsibilities</b>
Site Owner – Port of Newcastle	<ul style="list-style-type: none"> <li>- To ensure the remediation work is undertaken in accordance with the CLMP.</li> </ul>
Site Auditor – Fiona Robinson	<ul style="list-style-type: none"> <li>- To provide independent audit of the implementation of this CLMP.</li> <li>- To provide a Site Audit Statement and Site Audit Report at the completion of the works.</li> </ul>
Principal Contractor – TBC	<ul style="list-style-type: none"> <li>- Only engaging suitably qualified and competent staff and subcontractors.</li> <li>- Enforcing the implementation of this plan on the site by staff, subcontractors and visitors.</li> <li>- Authorised to stop work as deemed necessary where unsafe activities are being carried out or where management plans are not being followed.</li> <li>- Overseeing the proper use and maintenance of site safety equipment, including staff Personal Protective Equipment (PPE) and first aid equipment.</li> <li>- Training and Induction to make staff and subcontractors aware of their responsibilities and the contents of this CLMP.</li> </ul>
Environmental Consultant – TBC	<ul style="list-style-type: none"> <li>- Appropriately experienced and qualified environmental scientist suitably experience in contaminated land management.</li> <li>- To provide advice regarding the management of onsite materials.</li> <li>- Carry out tracking, observations, sampling and reporting.</li> <li>- To provide air monitoring for odours or asbestos, if required.</li> <li>- To notify PON as soon as practical of any unexpected finds, or non-compliances.</li> <li>- Authorised to stop work as deemed necessary where unsafe activities are being carried out or where this CLMP is not being followed.</li> </ul>
Site Workers	<ul style="list-style-type: none"> <li>- Taking reasonable care for their own safety and the safety of others.</li> <li>- Following site rules and work instructions.</li> <li>- Taking immediate action to rectify hazards that may arise during the course of the work.</li> <li>- Complying with management plans, relevant OHS legislation and industry standards.</li> <li>- Establish and maintain a positive safety climate on the project.</li> </ul>

## 3.0 Site Description

### 3.1 Site Identification

General site information is provided below in Table 3.1. The site location is shown in Figure 1, Appendix A.

**Table 3.1: Summary of Site Details**

<b>Site location:</b>	109 Selwyn Street, Mayfield North
<b>Approximate site area:</b>	Fence – Approx. 485 linear meters. Road Widening – Approx. 420m <sup>2</sup> .
<b>Title Identification Details:</b>	Part Lot 54 DP1229869 and part Lot 42 DP1191982 within the Newcastle local government area
<b>Current Ownership:</b>	Port of Newcastle
<b>Previous Landuse:</b>	Part of BHP Newcastle Steelworks
<b>Current Landuse:</b>	Vacant land and storage of materials
<b>Proposed Landuse:</b>	Storage of materials and road
<b>Adjoining Site Uses:</b>	Mayfield 4 Berth to the south east; Hunter River to the north and north east of the site; and Vacant remediated former BHP land to the north west, west and south of the site.
<b>Site Coordinates:</b>	32°53'31 S 151°45'52 E in the centre of the site

## 4.0 Previous Remediation Works

The proposed works area located in areas of the former BHP Steel works site that has previously been remediated, as summarised below. Table 6.5, below outlines the classification of materials (Level 1, 2 and 3) based on the Materials Management Plan (Maunsell 2005).

### Western Portion of the site:

Stage 1/Area 1 remediation works previously completed by Coffey Environments Pty Ltd (Coffey) in 2008 (Coffey, *Closure Area, Former BHP Steelworks, Mayfield Remediation and Validation Report*, June 2008).

The remediation works carried out in Stage 1/Area 1 included:

- Demolition of the blast furnaces, tar making facilities, benzol plant and site buildings to ground level.
- Installation of a metre wide, 40m deep sub-surface contamination (bentonite) Barrier Wall which runs through the centre of the site and to the south west of the site. The Barrier Wall terminates approximately 15-20m prior to (south of) the existing sheet piled wall on the Hunter River. The bentonite Barrier Wall was constructed to surround approximately 30 ha of heavily contaminated land. The general purpose of the wall was to control the flow of contaminants in groundwater to other areas of the site, and/or into the Hunter River. Figure 1, Appendix A has been taken from the CSMP for the site and shows the location of the Barrier Wall and Barrier Wall restriction areas for the Mayfield Closure Area. Further information on the Barrier Wall is provided below in Section 4.1.



- Contouring to the underside of the capping layer and removal of material deemed unsuitable for burial e.g. large reinforced concrete footings and slabs, reinforcing steel rods, geotechnical unsuitable material.
- Capping of the existing site soils, with either:
  - An engineered pavement cap. The pavement design consisted of a 300mm subgrade layer, a 100mm thick crushed concrete layer and a two coat bitumen seal designed to achieve a permeability of  $1 \times 10^{-9}$  m/s. The 300mm thick subgrade layer was comprised of slag won from the site and placed in two 150mm layers; or
  - A 500mm imported VENM cap layer. The purpose of the VENM capping was to prevent the ingress of water to any part of the site that may be contaminated and prevent the mobilisation and migration of contaminants in surface water or groundwater. The VENM capping was required to have a minimum permeability of  $K=1 \times 10^{-7}$  m/s and a minimum slope of 1% to prevent excessive ponding of water. The VENM capping was not suitable for structural loading.

#### Eastern Portion of the site:

Stage 2 remediation works completed by EnviroPacific Services (EnviroPacific) in 2011/2012 (*EnviroPacific, Daracon, Stage 2 Mainworks, Mayfield Former Steelworks Site, Validation Report – Area 2, undated*).

The remediation works carried out in Stage2/Area 2 (main works) included:

- Delineation of Level 2 and Level 3 hotspots previously identified by RCA Australia Pty Ltd (RCA) during Pre-remediation Investigation in June 2011;
- Preparation of 40m X 40m Grid reference;
- Excavation and placement of Level 1, Level 2 and Level 3 material in accordance with the Materials Management Plan (Maunsell, 2005);
- Level 2 material consisted of hotspot contamination (type unknown), coal tar pavements, oil-stained soil and asbestos (including friable asbestos). The Level 2 material was generally placed in designated containment areas, covered with black plastic and capped within a minimum of 0.5m of Level 1 Fill material. At some locations where Level 2 material was encountered at more than 0.5m below sub-grade level, the material was left insitu. As this was not delineated to full extent, the volume left insitu cannot be ascertained. It is noted that the area of insitu Level 2 (asbestos) and placed Level 2 locations, is not located on the current site. Refer to Figure 4, Appendix A for Level 2 placement locations.
- Level 3 material identified was generally stored in temporary storage bunds and lined skip bins prior to being placed within a permanent Level 3 Containment Cell located offsite to the north west. Refer to Figure 4, Appendix A for Level 3 placement locations.
- Capping of the existing site soils. Based on the CSMP (2016), as part of the previous remediation works, the majority of the site was capped with a 500mm Virgin Excavated Natural Material (VENM) clay cap with aggregate scour protection. The VENM capping was required to have a minimum permeability of  $K=1 \times 10^{-7}$  m/s and a minimum slope of 1% to prevent excessive ponding of water. The VENM capping was not designed for structural loading. Refer to Figure 3, Appendix A for summary of capping works.

Figure 3, Appendix A has been taken from the CSMP (2016) for the site and provides a summary of the previous capping works carried out for the BHP Closure Area between 2008 and 2016. The site is located within the engineered pavement cap area of Stage 1 and clay cap area of Stage 2.

## 4.1 Barrier Wall Cap Requirements – CSMP (2016)

A deep subsurface low permeability Barrier Wall was constructed as part of the Stage 1 Remediation Works, extending from the ground surface to the bottom of the natural sand and alluvial deposits of the Hunter River (30 metres to 49 metres).

The Barrier Wall was constructed using soil-bentonite techniques which use bentonite slurry for trench support, with the Barrier Wall then formed by backfilling the trench with a high slump mixture of soil and bentonite slurry and clay additives.

The Barrier Wall construction includes a "surface completion beam" to distribute surface loadings across the wall. The completed wall has been designed to accommodate a sustained traffic load equivalent to SM1600 (as outlined in AS 5100) applied at any location(s) on the existing ground surface, including asymmetrical loadings. The SM1600 design loading is equivalent to a 3.2 metre wide sustained loading of 36kPa. Due to the lower strength and consolidation properties of the completed soil-bentonite Barrier Wall structure, there is a risk of surface and subsurface displacement resulting from sustained future loadings of the site, both laterally and vertically.

As the proposed works in the vicinity of the Barrier Wall will include a fence, no excess of the design load will occur as part of the works.

The CSMP (2016) also outlines development restrictions which apply to works or land-uses in the vicinity of the Barrier Wall. Requirements relevant to the proposed works are reproduced below:

- Requirement 15.1.4 – Control of Works affecting Capping beam

*"Works that involve trenching or excavation through the Capping beam must include:*

*(a) appropriate controls and work methods to minimise damage to the beam; and*

*(b) appropriate design to replace or reinstate the beam to ensure that the functionality of the beam, Barrier Wall and Cap is not adversely effected.*

*(c) controls to ensure that capping beam excavations result in nil excavations into the underlying barrier wall. Excavations in capping beam are to be no deeper than 1m below "surface completion levels" in Barrier Wall..., noting that the barrier wall sits 1.2m below the surface completion level."*

The area of Nil excavation below 1.0m depth is shown as Area M in Figure 5, Appendix A.

It is noted that proposed excavations in the area of the barrier wall are not proposed to extend past 0.5m bgs.

- CSMP (2016) Requirement 15.1.5 – Geotechnical Engineer Certificate

*"A Geotechnical Engineers certificate must be obtained:*

*(a) certifying that the design of the Works comply with the requirements of this Part 15; and*

*(b) upon completion of the Works, certifying that the beam has been reinstated properly. The people to whom each certificate is addressed must include the State and the Site Auditor."*

## 5.0 Proposed Fence and Road Widening Works

### 5.1 Excavation Works

Approximately 10 end/corner posts, 77 fence posts and 2 gate posts are proposed to be installed to a maximum depth of between 0.5m and 0.9m below ground surface (bgs). The

fence post holes are proposed to be excavated using a 300mm diameter auger. The fence holes will be excavated within the existing engineered pavement cap area and in areas of former clay capping.

Area of proposed road widening is approximately 420m<sup>2</sup>. The proposed excavation depth is 0.525m bgs. The proposed road widening works will involve excavation in areas of former clay capping.

## 5.2 Management of Excavated Materials

Based on previous remediation works it is assumed the following subsurface conditions will be encountered:

- Engineered pavement area - two-coat bitumen seal, 100mm thick crushed concrete layer, a 300mm subgrade (slag) layer OR Clay capping – 500mm thick clay cap; and
- Underlying Level 1 material (refer to section 6.5, below for onsite designated classification system).

With the exception of the existing clay cap material, excavated materials are not proposed to be segregated between material types.

The spoil material is proposed to be placed in the designated stockpiling area, shown on Figure 6, Appendix A.

The clay capping material is proposed to remain on PON land, adjacent to the current site area. The remaining material will be classified in accordance with the NSW EPA (2014) Waste Classification Guidelines.

Following the preparation of a waste classification letter, the stockpiled material is to be disposed offsite to an appropriately licensed waste facility.

Following offsite disposal of the stockpiled material the designated stockpiling and laydown areas will require a visual assessment to assess if the stockpiled materials and/or machinery have impacted the underlying two coat seal . Following removal of the stockpile/machinery the two-coat seal is to be assessed as being free from staining and the two-coat seal intact.

To minimise risk of damage to the two-coat seal (bitumen seal/cap), it is recommended that the designated stockpiling/laydown areas be lined with steel plates/bog mats and all vehicles (including excavator) to have rubber tyres.

## 5.3 Backfilling Works

The fence/gate posts will be backfilled with concrete between 0.5m and 0.9m thick.

The proposed road widening construction is expected to consist of:

- 150mm thick Cement Modified DGB20;
- 325mm thick Heavily Bound Stabilised Granular Base (TfNSWR73); and
- 50mm AC pavement using AC14.

As outlined in the CSMP (2016) the site surface is required to meet a permeability of  $K \leq 10^{-9}$  m/sec. The proposed backfill material will require geotechnical testing for permeability and/or the AC pavement will be required to be placed in accordance with previous methodologies/material types which have previously been assessed to meet the permeability of  $K \leq 10^{-9}$  m/sec.

The 0.5m to 0.9m thick concrete backfilled post holes are expected to meet the permeability requirement of  $K \leq 10^{-9}$  m/sec.

Following backfilling works, the proposed road and fence/gate posts are required to be tied into the surrounding area, with no joints which could allow for water ponding or infiltration.

Following placement of the road and fence/gate posts, a visual assessment will be required to assess that there are no cracks or ponding around the road/post holes.

## 6.0 Materials Management Plan

### 6.1 Introduction

This section provides a step by step procedure for management of excavated material during proposed works.

It is noted that the proposed scope of works (discussed in Section 5.0 above) is anticipated to include segregation of the clay capping from 0.0 to 0.4m bgs. No other segregation of material types is proposed.

### 6.2 Regulatory Requirements

The BHP Closure Area is currently subject to a Maintenance of Remediation Notice (MRN Notice No. 20142802, 20 March 2014) and Voluntary Management Proposal (VMP) under the Contaminated Land Act 1997. As part of the MRN and VMP a Contaminated Site Management Plan (CSMP) was prepared by Hunter Development Corporation (HDC) for the Closure Area in December 2016 (ref: 203188503, December 2016).

As Stage 1/Area 1 and Stage 2 (location of proposed works) of the Closure Lands has been remediated and validated, further development on these lands is now controlled by the PON approvals process including consent from Newcastle City Council. Future development, where the existing cap is disturbed, must be carried out in accordance with the CSMP and include approval from the Site Auditor.

The proposed works will include earthworks that will interfere with the existing engineered pavement cap and clay capping, therefore the requirements of the CSMP must be implemented. This includes the management of waste (soils) materials, as identified in the MMP (Maunsell 2005). Contaminants of concern associated with the proposed earthworks excavated material include Heavy metals, Petroleum Hydrocarbons (TRH, BTEX, PAH, VOCs), Ammonia/Cyanide and PCBs.

This CLMP has been prepared in general accordance with, or with reference to, the following legislation, guidelines, policies and standards:

- Environmental Planning & Assessment Act 1979 (EP&A Act).
- Contaminated Land Management (CLM) Act 1997 (CLM Act).
- Protection of the Environment Operations Act 1997 (POEO Act).
- Protection of the Environment Operations (Waste) Regulation 2014 (POEO Regulation).
- State Environmental Planning Policy (Resilience and Hazards), Chapter 4.
- Guidelines for Consultants Reporting on Contaminated Land (NSW EPA, 2020).
- Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA, 2014).
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (Amended April 2013) NEPC 2013 (ASC NEPM 2013).

- AS/NZS 4482.1 – 2005, Guide to the Sampling and Investigation of potentially contaminated soil – Non-volatile and semi-volatile compounds.
- AS/NZS 4482.2 – 1999, Guide to the Sampling and Investigation of potentially contaminated soil – Volatile compounds.
- NSW EPA (2017) Guidelines for the NSW Site Auditor Scheme (3<sup>rd</sup> edition).

### 6.3 Site Supervision

A qualified Environmental Scientist (herein referred to as the Environmental Consultant (EC)), shall attend site at all times during excavation of the existing cap and underlying contaminated soils. The EC shall undertake the following tasks:

- Assessment and field classification of excavated material;
- Screening of excavated soils using a Photoionization Detector (PID) and Multigas Analyser;
- Maintaining a record of excavated soils, classification and volume excavated (refer to Section 6.7); and,
- Monitor compliance with this CLMP.

Site observation, field classification and photographic evidence will be used for validation of the works. The validation report will be prepared by the EC. Validation sampling is not anticipated to be carried out due to the size of the excavation works and as the area has previously been subject to remediation/validation.

### 6.4 Site Establishment

Site enabling works shall be undertaken to prepare the site for commencement of earthworks and to manage potential risk associated with excavation and transportation of contaminated soil. This shall include the following:

- The site will be isolated from the general public and workers carrying out other activities on the Port Lands. Site Inductions, including familiarity with this CLMP, will be required prior to commencing work on the site;
- Amenities shall be established to allow the implementation of recommended site procedures detailed in Section 6.1;
- A designated stockpiling/laydown area is to be established; and
- Environmental monitoring equipment shall be established at the work area and site boundary (refer to Section 7.2).

### 6.5 Field Classification of Material

The material excavated during the works is proposed to be stockpiled on the site prior to being assessed. Materials which form the existing caps shall be classified as follows:

- Clay capping material that has been excavated from the surface (to about 0.4m bgs) and not mixed with any other materials, will be classified as clay capping for onsite reuse. The lower 0.1m of the clay cap, which has been in contact with underlying Level 1 material, shall be considered cross-contaminated, and therefore, will be classified and handled as Level 1 material. The clay cap is proposed to remain stockpiled on PON lands. The underlying clay cap from 0.4m bgs is proposed to be disposed offsite in accordance NSW (2014) Waste Classification Guidelines.
- The existing pavement cap is proposed to be disposed offsite in accordance NSW (2014) Waste Classification Guidelines.

Classification of the material (in accordance with the designated soil classification system for the site) will be required during excavation. The designated soil classification system for the site, underneath existing capping is:

- Level 1, including the existing engineered pavement cap (EPC);
- Level 2; and
- Level 3.

The field classification shall be based on visual and olfactory evidence of contamination and field measurements collected, as detailed in Table 6.5, below.

**Table 6.5 - Contaminant characteristics**

<b>Criteria/ Classification</b>	<b>Chemical group</b>	<b>Distinguishing Features</b>	<b>Field sensory screening method</b>
<b>Level 1</b>	Heavy metals	Iron staining Light grey/green/black Granular appearance Possibly associated with ash, coke or clinker in soil	Visual assessment
	Average PAH <2000 mg/kg VOC <300 ppm	Dark brown to black in colour Mild phenolic odour	Visual assessment Olfactory assessment Instrumentation assessment (PID and Multigas Analyser)
<b>Level 2</b>	Average PAH >2000 mg/kg	Dark brown to black in colour Mild phenolic odour	Visual assessment Olfactory assessment Instrumentation assessment (PID and Multigas Analyser)
	VOCs >300 ppm	Strong hydrocarbon smell	Visual assessment Olfactory assessment Instrumentation assessment (PID and Multigas Analyser)
	Ammonia/ Cyanide	Ammoniacal odours	Visual assessment Olfactory assessment Instrumentation assessment (Multigas Analyser)
	Asbestos	Fibrous texture Grey/white/blue/greenish	Visual assessment <i>Presence of bonded sheeting</i>
	PCBs	Dark brown to black in colour Mild phenolic odour	Visual assessment Olfactory assessment Instrumentation assessment (PID and Multigas Analyser)
<b>Level 3</b>	SPH	Immiscible liquid phase hydrocarbons (free diesel, oil, tar or other hydrocarbon)	Visual assessment Olfactory assessment

Criteria/ Classification	Chemical group	Distinguishing Features	Field sensory screening method
		product) existing in soil that can flow	Instrumentation assessment (PID and Multigas Analyser)

**Notes:**

PAHs – Polycyclic aromatic hydrocarbons; VOC – Volatile Organic; Compounds;

PCB – Polychlorinated Biphenyl; SPH – Separate Phase Hydrocarbon

In the event that Level 2 or Level 3 contaminated material is encountered, excavation of the material shall cease and the client notified. The site auditor shall also be notified via email.

It is noted that excavated materials from under the cap are proposed to be disposed offsite after classification in accordance with the NSW EPA (2014) Waste Classification Guidelines.

## 6.6 Material Classification, Notification and Reuse

Table 6.6 summarises the material classification assessment criteria, stockpiling restrictions and reuse restrictions for each of the material classifications if contaminated soils are encountered.

It is noted that the current scope of works does not include segregation (with the exception of the clay cap) and/or reuse of material. Reuse options have been included in Table 6.7 in the event that the scope of work changes and onsite reuse of material is required.

Should Level 2 or Level 3 material be encountered then the stockpiling requirements (outlined below) for Level 2 and/or Level 3 will be required.

**Table 6.6 – Material Classification, Notification and Reuse**

Criteria/ Classification	Level 1	Level 2	Level 3
<b>Potential Onsite Use</b>	Reuse on site below the pavement cap (>0.4m bgs)  <i>Example: General fill and/or backfill below the cap</i>	Auditor notification required Restricted reuse on site. Must be placed 0.5m below the finished sub grade surface.  <i>Example: Fill at depth where appropriate</i>	EPA and Auditor Notification required  <i>Placement to be determined on a case by case basis.</i>
<b>Stockpiling</b>	<b>Short Term:</b> Temporary stockpile to be placed in a practical location in relation to the works	Stockpile in bunded area and impermeable ground surface (e.g. hardstanding) with visible Level 2 signage.	Stockpile in bunded, fenced area with visible Level 3 signage and Personal Protective Equipment (PPE) requirements. Ensure odour and environmental

Criteria/ Classification	Level 1	Level 2	Level 3
	<b>Long Term:</b> Level 1 Signage		conditions are monitored. If practical cover material with tarp or tent
<b>PAH threshold</b>	<2000 mg/kg (average after placement), and no individual result >2,500 mg/kg	>2000 mg/kg (average after placement), and no visible free phase compounds.	Free diesel, oil tar or other hydrocarbons freely flowing in pore spaces.
<b>Metals</b>	Visual assessment	N/A	N/A
<b>VOC threshold</b>	<300 ppm	>300 ppm Strong hydrocarbon odour	N/A
<b>Ammonia/cyanide</b>	No ammoniacal odours	Ammoniacal odours	N/A
<b>PCB</b>	No mild phenolic odour	Mild phenolic odour	N/A
<b>SPH</b>	None observed	None observed	Visually detected
<b>Asbestos</b>	None observed	Visually detected	N/A

## 6.7 Materials Tracking Including Waste Disposal

During excavation a material tracking system shall be implemented to monitor the movement of excavated materials on site.

The system shall indicate the following information:

- Date and time;
- Area of excavation;
- Field classification;
- Notable contaminants: VOC's etc.
- Destination; and
- Volume of material.

Example materials tracking forms are provided in Appendix B.

With the exception of the existing clay capping, material excavated during works is proposed to be disposed offsite to an appropriately licensed waste facility. Copies of the waste disposal tickets provided by the waste contractor, identifying soil volumes and dates, shall be retained for site validation purposes. All disposal tickets are to be included in the Site Validation Report. The requirements of the Site Validation Report are detailed in Section 7.5.

## 6.8 Validation Sampling

Validation sampling is not anticipated to be carried out due to the small size of the excavation works and as the area has previously been subject to remediation/validation.



The requirements of the Site Validation Report are detailed in Section 7.5.

## 7.0 Site Management Plan

### 7.1 General

The following measures should be implemented to mitigate any potential contamination risk to site users, visitors and construction related personnel.

- All site personnel shall have undertaken the Contractor's standard site induction prior to entering the site. The site induction shall include safe working practices drawn from this materials management plan and associated with working on a contaminated site and with potentially contaminated material;
- Amenities must be available for personal hygiene. As a minimum, hand washing facilities must be available;
- Hands must always be washed before eating, drinking or smoking and these activities must be carried out away from the work area;
- Smoking must be prohibited at the site;
- Workers directly in contact with soil or potentially contaminated material from the site shall wear appropriate Personal Protective Equipment (PPE) such as gloves, long pants/sleeves and eye protection. Additional PPE requirements for contact with contaminated soil is provided in Table 7.2.2 below;
- During earthworks activities at the site, the work area shall be cordoned-off/controlled to prevent entry of unauthorised persons and ensure that workers use appropriate PPE;
- Appropriate erosion and sediment controls shall be implemented, including:
  - Control of run-on water by constructing earth bunds or similar;
  - Separation of "clean" and "dirty" water;
  - Prevention of 'ponding';
  - Protecting the land surface from erosion; and
  - Preventing sediment from leaving the site.
- Use of dust suppression techniques, including; wetting of roads, reduction of works during windy periods, minimising areas of disturbed soil, covering/stabilisation of soil stockpiles using an impermeable membrane, such as plastic sheeting;
- As far as practicable, workers will stand upwind of the work area;
- Excavated material shall not be placed in direct contact with the ground (unless on an impermeable surface). To minimise risk of damage to the two-coat seal (bitumen seal/cap), it is recommended that the designated stockpiling/laydown areas be lined with steel plates/bog mats and all vehicles (including excavator) to have rubber tyres;
- Stockpiled soils will be placed on an impermeable ground cover, covered, and surrounded with appropriate erosion and sediment controls to protect the soils from storm water run-on and run-off;
- Odour control is to take the form of minimising open excavation areas where odour is a problem, covering soil with sand/clean site-soils/shotcrete so that odour is released more gradually;
- Exported soils must be covered during transport;
- To prevent stormwater or rainfall run-off entering the earthworks or excavations the following measures shall be implemented:

- Appropriate bunding shall be constructed around excavated areas to prevent run-off water entering the excavations;
- If works cease for extended periods of time, measures will be implemented to protect the earthworks and excavations;
- Works shall be planned around forecast weather conditions and excavations protected as far as reasonably practical to prevent ingress from heavy rainfall; and
- Any waste water collected during excavation, including water ponding in excavations from runoff or groundwater, will be treated as liquid waste, sampled for laboratory analysis and irrigated on the site (if suitable) and/or transported by a licensed liquid waste transporter to a liquid waste facility for classification, treatment and disposal as relevant.

## 7.2 Occupational Health and Safety Monitoring

Monitoring for dust, odours, VOCs and gases within ambient air at the site and at the site boundaries shall be undertaken for occupational health and safety purposes and to inform suitable health and safety procedures. Monitoring shall be carried out continuously by the EC during excavation below the existing cap.

Monitoring will consist of recording general observations, and by using monitoring equipment such as a PID (for vapour detection) and a multigas analyser located downwind of excavations.

Odour monitoring will be conducted in accordance with the ratings and descriptions provided in 7.2.1. Contaminant trigger levels and management measures are detailed in Table 7.2.2 and 7.2.3.

**Table 7.2.1 Odour Assessment**

Rating	Description
0	No odour above background
1	Faint odour
2	Noticeable
3	Strong
4	Offensive
5	PPE Required or being worn

**Table 7.2.2 Contaminant trigger level and associated PPE Requirements**

Exposure category	Contaminant Trigger level	PPE Requirements	
		Operators	Ground Personnel
Green (No respiratory protection required)	<ul style="list-style-type: none"> <li>● PID readings &lt;10ppm within workers breathing zone</li> <li>● No significant or constant visible airborne dust is present</li> </ul>	<ul style="list-style-type: none"> <li>● Where no direct contact with contaminated soil, groundwater or other contaminated material occurs, standard site PPE is adequate.</li> </ul>	<ul style="list-style-type: none"> <li>● Where no direct contact with contaminated soil, groundwater or other contaminated materials occurs, standard site PPE is adequate.</li> </ul>

Exposure category	Contaminant Trigger level	PPE Requirements	
		Operators	Ground Personnel
	<ul style="list-style-type: none"> <li>No significant or constant odours are present</li> </ul>		
<b>Amber</b> (respiratory protection required)	<ul style="list-style-type: none"> <li>PID readings &gt;10ppm within workers breathing zone</li> <li>Significant or constant visible airborne dust clouds are present</li> <li>Explosive gas action limit of 5% LEL</li> <li>Works around free phase coal tar</li> </ul>	<ul style="list-style-type: none"> <li>Half face combined particulate/organic vapour respirator</li> <li>Carbon filters fitted to machine to reduce nuisance odour</li> <li>PID monitor in cabin</li> <li>Protective footwear (gumboots) or disposable boot covers if traversing level 3 material before entering and exiting machine</li> <li>Coveralls</li> <li>Gloves available in cab</li> </ul>	<ul style="list-style-type: none"> <li>Half face combined particulate/organic vapour respirator</li> <li>Protective footwear (i.e. gumboots/boot covers)</li> <li>Gloves</li> <li>PID monitor within work zone</li> <li>Protective footwear (gumboots), boot covers are not sufficient</li> <li>Coveralls</li> </ul>

**Table notes:**

PID - Photoionisation detector

H<sub>2</sub>S – Hydrogen sulphide

LEL – Lower explosive level

**Table 7.2.3 - Occupational Atmospheric Contaminant Action Levels**

Contaminant	Action level	Monitoring device	PPE requirements (respiratory)
Total Volatile Organic Compounds (hydrocarbons)	10ppm	PID	Respirator
Hydrogen sulfide	15ppm	GasAlert Quattro/MX6 IBird	Respirator
Ammonia	35ppm	GasAlert Quattro/MX6 IBird	Respirator
LEL	5% LEL	GasAlert Quattro//MX6 IBird	Respirator
Oxygen	<19.5 % v/v	GasAlert Quattro//MX6 IBird	Respirator
	>23.5% v/v	GasAlert Quattro//MX6 IBird	Respirator

In the event that contaminant trigger levels are detected (as detailed in Table 7.2.2 and Table 7.2.3), works shall be stopped and management measures specified in Section 7.1 be implemented to alleviate the issue. Should any odour complaints be received during the works action shall be taken to alleviate the issue.

### 7.3 Level 3 Contamination Discovery

If, during site earthworks or excavation, offensive or noxious odours and/or evidence of free phase contamination are observed, site works will cease in that area and action will be taken to immediately abate the potential for environmental harm. Sand, clean site-soils or shotcrete can be used to cover materials generating noxious odours so that odour is released more gradually.

The EC and Principal Contractor will consult with the Site Auditor to evaluate the material and determine the appropriate course of action. The requirement for EPA notification of Level 3 material is detailed in Section 7.5.

### 7.4 Calibration of Monitoring Equipment

The PID shall be calibrated via manufacturer's instructions and calibration certificates retained for future reference in accordance with all statutory and relevant authority requirements. Daily checks for accuracy of the instrument shall be carried out by exposing it to a known concentration calibration gas before each day's use (i.e. isobutylene at 100 ppm). If the accuracy is out by more than 5 ppm, the PID shall be calibrated using the standard two-point calibration method (zero (fresh air) and span calibration (isobutylene)).

Due to the number of sensors on the Multigas monitor it is considered impractical to carry out the two-point calibration method. The Multigas monitor is to be calibrated in accordance with manufacturer's instructions and calibration certificates retained for future reference in accordance with all statutory and relevant authority requirements. The Multigas monitor is to be fresh air calibrated (zero) daily.

### 7.5 Notification and Reporting Requirements

The principal contractors representative and the Site Auditor shall be notified via email should any Level 2 or Level 3 material be identified on site. Additionally, the NSW Environment Protection Agency (EPA) shall be notified in the event that Level 3 classified material is encountered. Details including the volume of Level 3 contamination encountered and remediation undertaken shall be submitted to the EPA through submission of a Free Phase Incident Form and Site Validation Report on completion of the site works.

A Site Validation Report/Summary of Works Report is also required to be submitted to the Site Auditor for approval at the completion of works. The report will include evidence (photographs, field observations and/or laboratory results) to show that the site has been managed in accordance with the CLMP, including:

- A description of the work carried out;
- Summary of field monitoring and classification by the EC, and field monitoring/tracking sheets;
- Comparison of contamination laboratory results, if any, to the material classification criteria (if required);
- Provision of material tracking information, including material re-used on site (if any) and material disposed off-site; and
- That the completed works meet the requirements of the key performance specifications for the cap(s):
  - The extent of the cap (proposed road/concrete backfilled post holes);
  - Pavement cap minimum 400mm thick (comprising various materials to construct pavements);
  - The works areas are regarded to be draining and free of ponded areas; and
  - The surface of the site has a permeability of less than or equal to  $K \leq 10^{-9}$  m/sec.

The format of these reports will meet the requirements of the NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Land and the *National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013)*, NEPC 2013, Canberra (referred to as ASC NEPM 2013).

## 8.0 References

**AS/NZS 4482.1 (2005)**, *Guide to the Sampling and Investigation of potentially contaminated soil – Non-volatile and semi-volatile compounds*

**AS/NZS 4482.2 (1999)**, *Guide to the Sampling and Investigation of potentially contaminated soil – Volatile compounds*

**Coffey (2008)** *Closure Area, Former BHP Steelworks, Mayfield Remediation and Validation Report*, June 2008)

**Enviropacific (Undated)**, *Daracon, Stage 2 Mainworks, Mayfield Former Steelworks Site, Validation Report – Area 2, undated*

**HDC (2016)** *Contaminated Site Management Plan, Closure Area, Former BHP Steelworks Mayfield, Newcastle*, February 2016

**NEPC (2013)** *National Environmental Protection (Assessment of Site Contamination) Measure 1999*, as amended in 2013, National Environment Protection Council (ASC NEPM, 2013).

**Maunsell (2005)** *Mayfield Site Solid Waste (Soils) Materials Management Plan*

**SKM (2004)** *Remedial Action Plan Former BHP Mayfield Closure Site, final for VRP*






## **APPENDIX A:**

### **Figures**





**Legend**

-  CSMP Application of Plan / Closure Area
-  Subterranean Barrier Wall
-  Area 2B Remediation Site
-  Area 1 Pavement Capping  $K=1 \times 10^{-9} \text{ms}^{-1}$  Plus Barrier Wall
-  Area 2A Port Lands Recontouring and Capping Exceeding  $K=1 \times 10^{-7} \text{ms}^{-1}$

Approximate

Source: Google Earth 2016 and CSMP (2014)



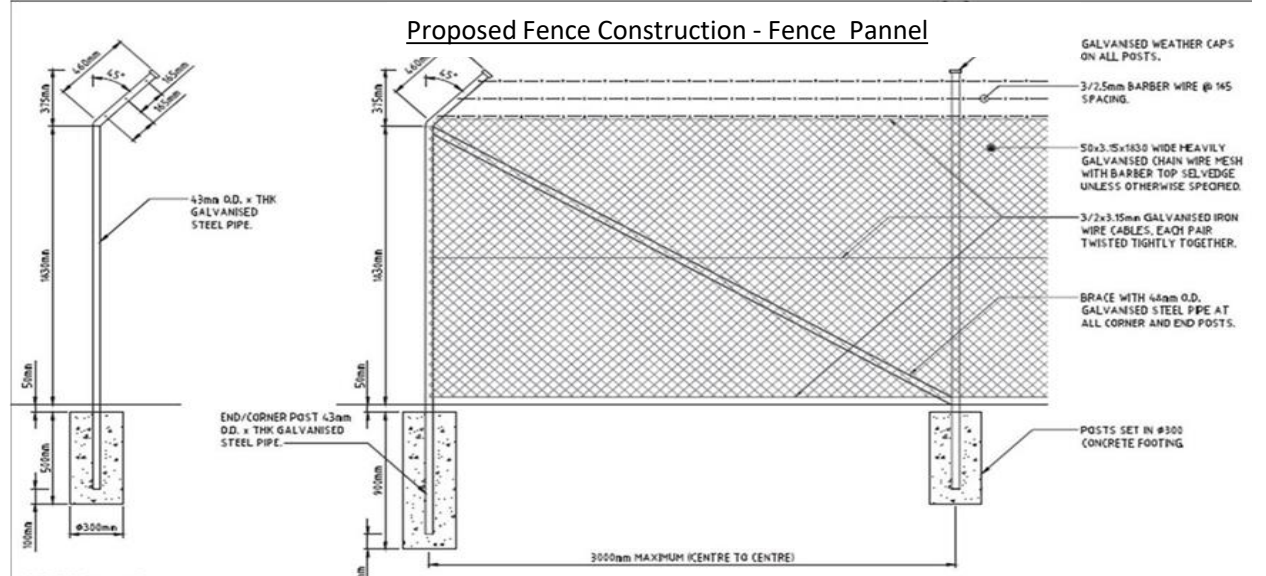
Client:	PORT OF NEWCASTLE	Drawing No:	FIGURE 1
Project:	PROPOSED FENCE AND ROAD WIDENING	Project No:	NEW22P-0190-AA
Location:	FORMER BHP MAYFIELD, NSW	Scale:	NTS
Title:	SITE LOCATION PLAN	Date:	14/09/2023





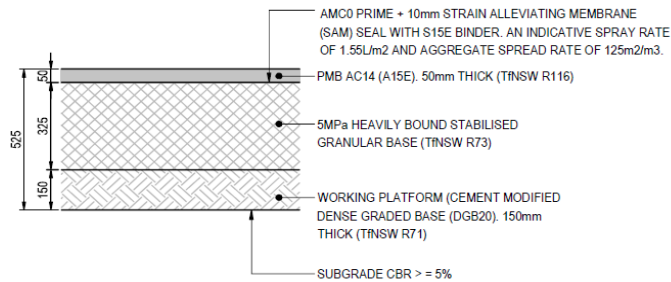
Proposed Fence Alignment

Proposed Road

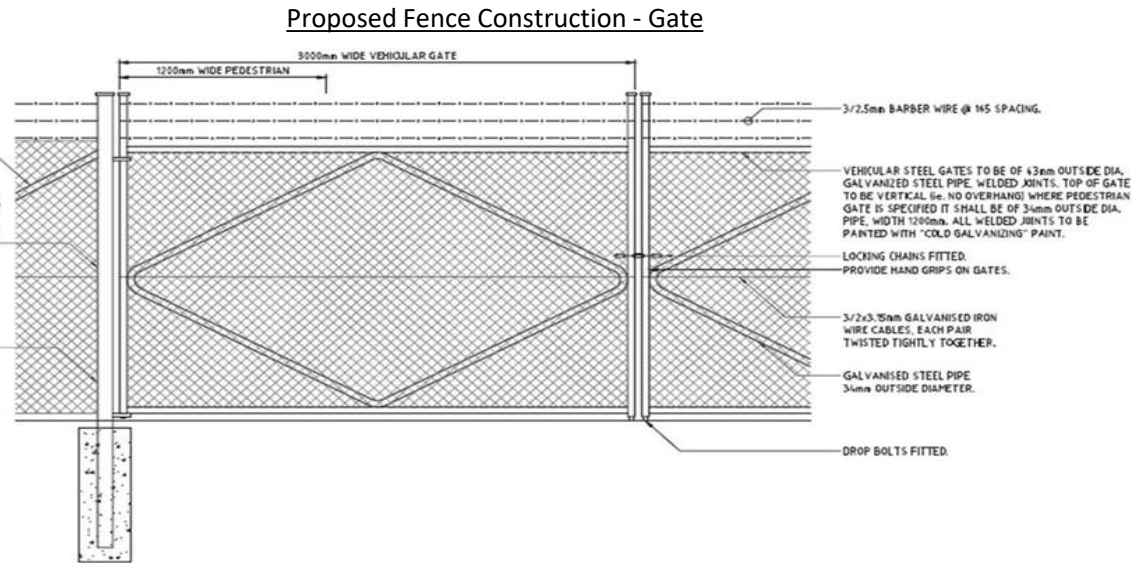


Proposed Fence Construction - Fence Panel

Proposed Road Widening



OVERSIZE VEHICLE ACCESS ROUTE  
(THIN ASPHALT SURFACING)



Proposed Fence Construction - Gate

PEDESTRIAN/VEHICULAR GATE

Source: PON email, dated 7 September 2023



Client:	PORT OF NEWCASTLE	Drawing No:	FIGURE 2
Project:	PROPOSED FENCE AND ROAD WIDENING	Project No:	NEW22P-0190-AA
Location:	FORMER BHP MAYFIELD, NSW	Scale:	NTS
Title:	SITE AREA AND PROPOSED WORKS	Date:	14/09/2023



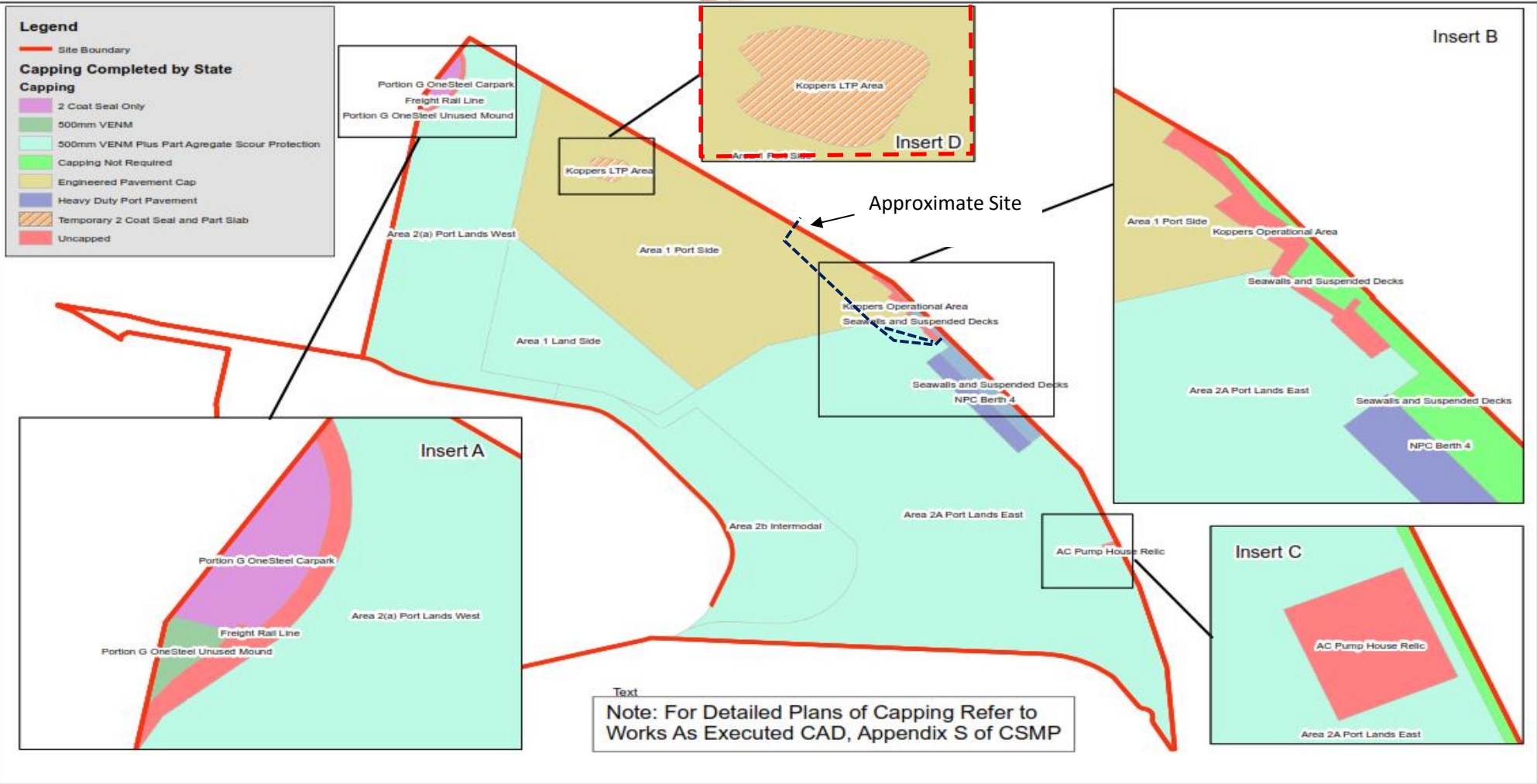
**Legend**

— Site Boundary

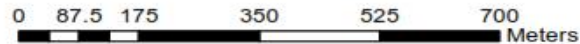
**Capping Completed by State**

**Capping**

- 2 Coat Seal Only
- 500mm VENM
- 500mm VENM Plus Part Aggregate Scour Protection
- Capping Not Required
- Engineered Pavement Cap
- Heavy Duty Port Pavement
- Temporary 2 Coat Seal and Part Slab
- Uncapped



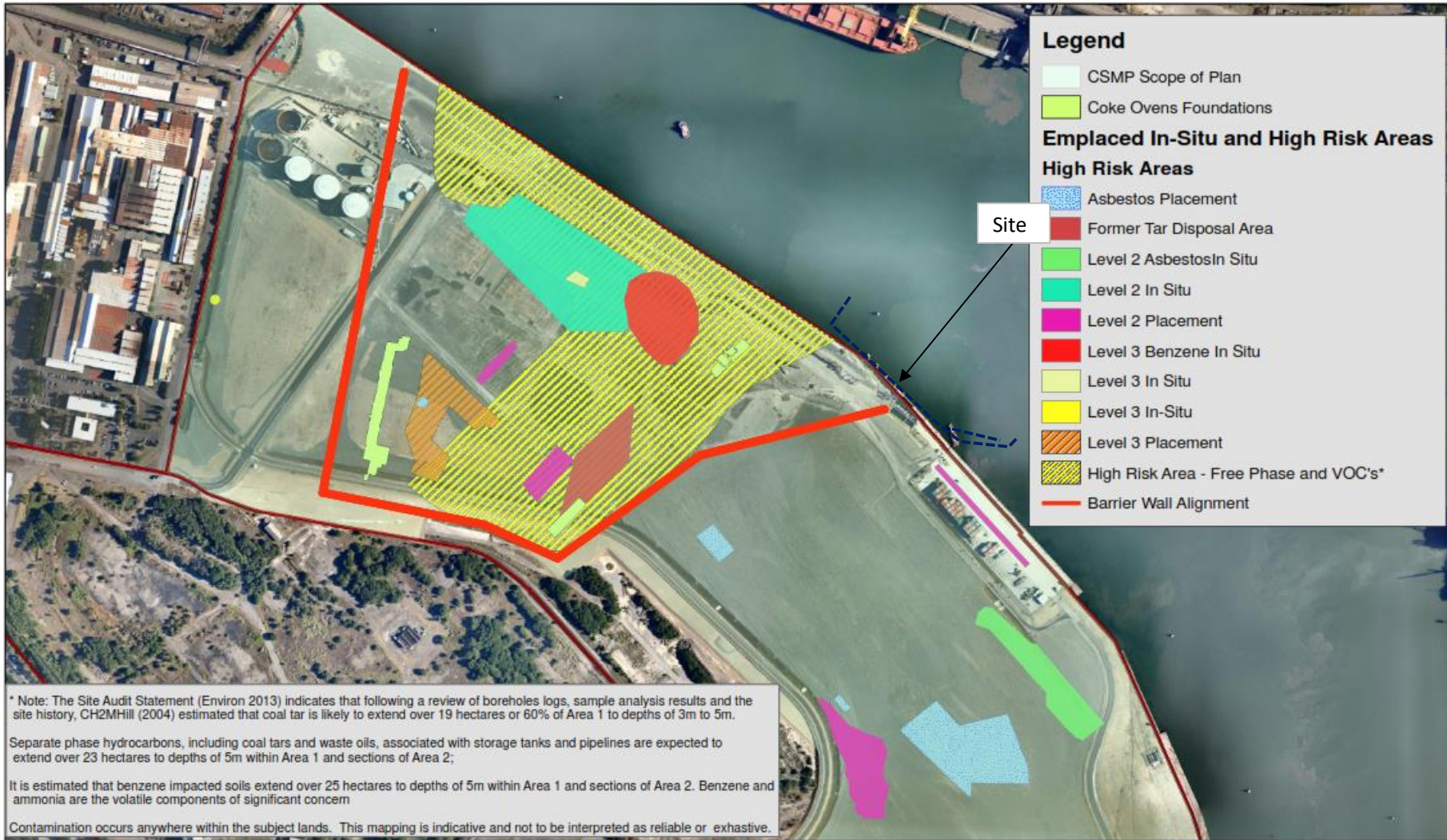
Note: For Detailed Plans of Capping Refer to Works As Executed CAD, Appendix S of CSMP



**Completed Capping  
Port Lands, Mayfield Closure Area  
December 2016**



Client:	PORT OF NEWCASTLE	Drawing No:	FIGURE 3
Project:	PROPOSED FENCE AND ROAD WIDENING	Project No:	NEW22P-0190-AA
Location:	FORMER BHP MAYFIELD, NSW	Scale:	NTS
Title:	SUMMARY OF COMPLETED CAPPING WORKS	Date:	14/09/2023



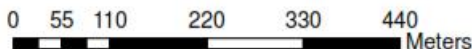
- Legend**
- CSMP Scope of Plan
  - Coke Ovens Foundations
  - Emplaced In-Situ and High Risk Areas**
  - High Risk Areas**
  - Asbestos Placement
  - Former Tar Disposal Area
  - Level 2 Asbestos In Situ
  - Level 2 In Situ
  - Level 2 Placement
  - Level 3 Benzene In Situ
  - Level 3 In Situ
  - Level 3 In-Situ
  - Level 3 Placement
  - High Risk Area - Free Phase and VOC's\*
  - Barrier Wall Alignment

\* Note: The Site Audit Statement (Environ 2013) indicates that following a review of boreholes logs, sample analysis results and the site history, CH2MHill (2004) estimated that coal tar is likely to extend over 19 hectares or 60% of Area 1 to depths of 3m to 5m.

Separate phase hydrocarbons, including coal tars and waste oils, associated with storage tanks and pipelines are expected to extend over 23 hectares to depths of 5m within Area 1 and sections of Area 2;

It is estimated that benzene impacted soils extend over 25 hectares to depths of 5m within Area 1 and sections of Area 2. Benzene and ammonia are the volatile components of significant concern

Contamination occurs anywhere within the subject lands. This mapping is indicative and not to be interpreted as reliable or exhaustive.



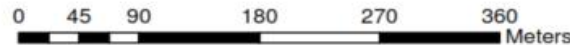
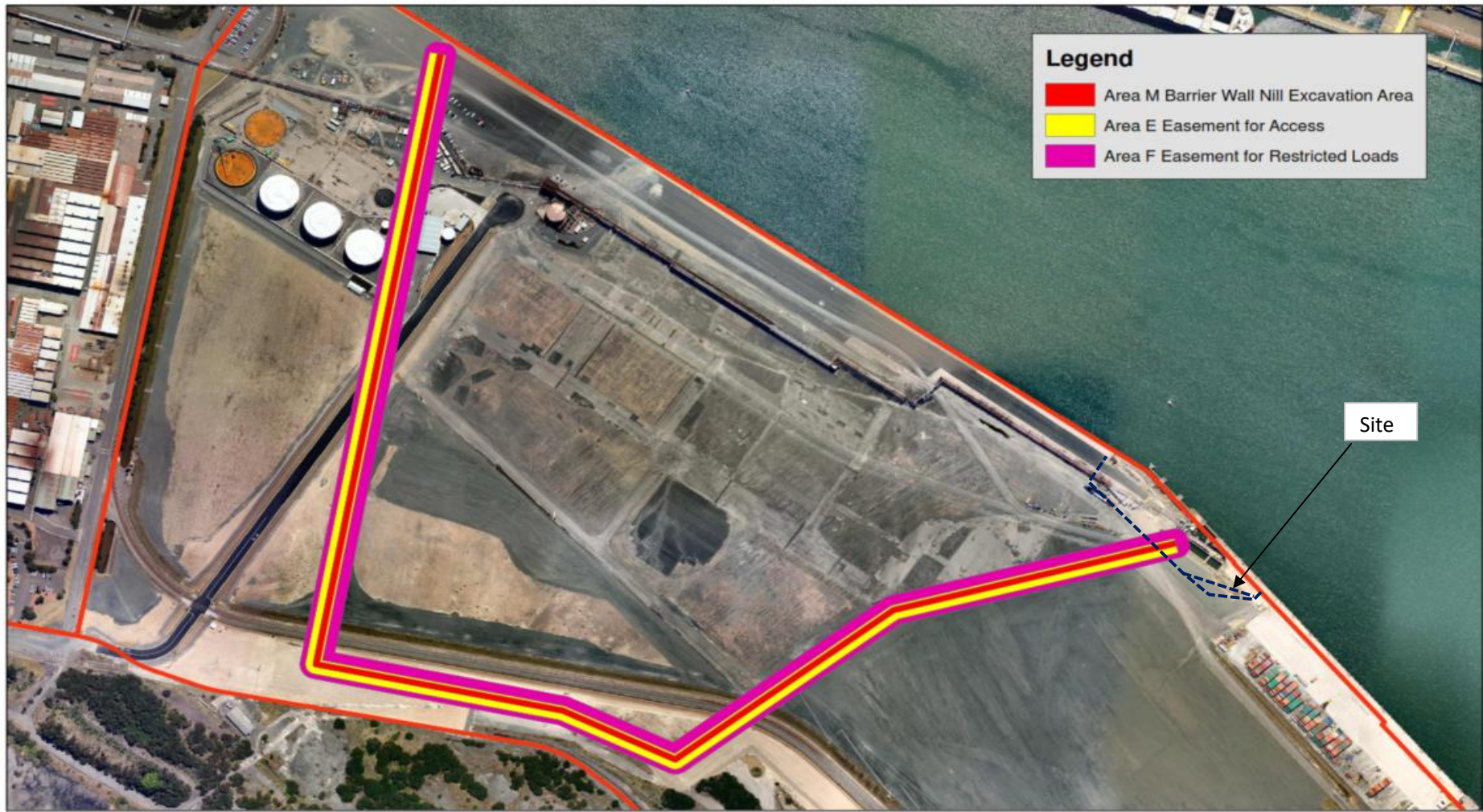
**L2 and L3 Indicative Plan  
Area 1 and 2A Mayfield Closure Area  
February 2014**

Source: CSMP (2016)



Client:	PORT OF NEWCASTLE	Drawing No:	FIGURE 4
Project:	PROPOSED FENCE AND ROAD WIDENING	Project No:	NEW22P-0190-AA
Location:	FORMER BHP MAYFIELD, NSW	Scale:	NTS
Title:	LEVEL 2 AND LEVEL 3 INDICATIVE PLAN	Date:	14/09/2023



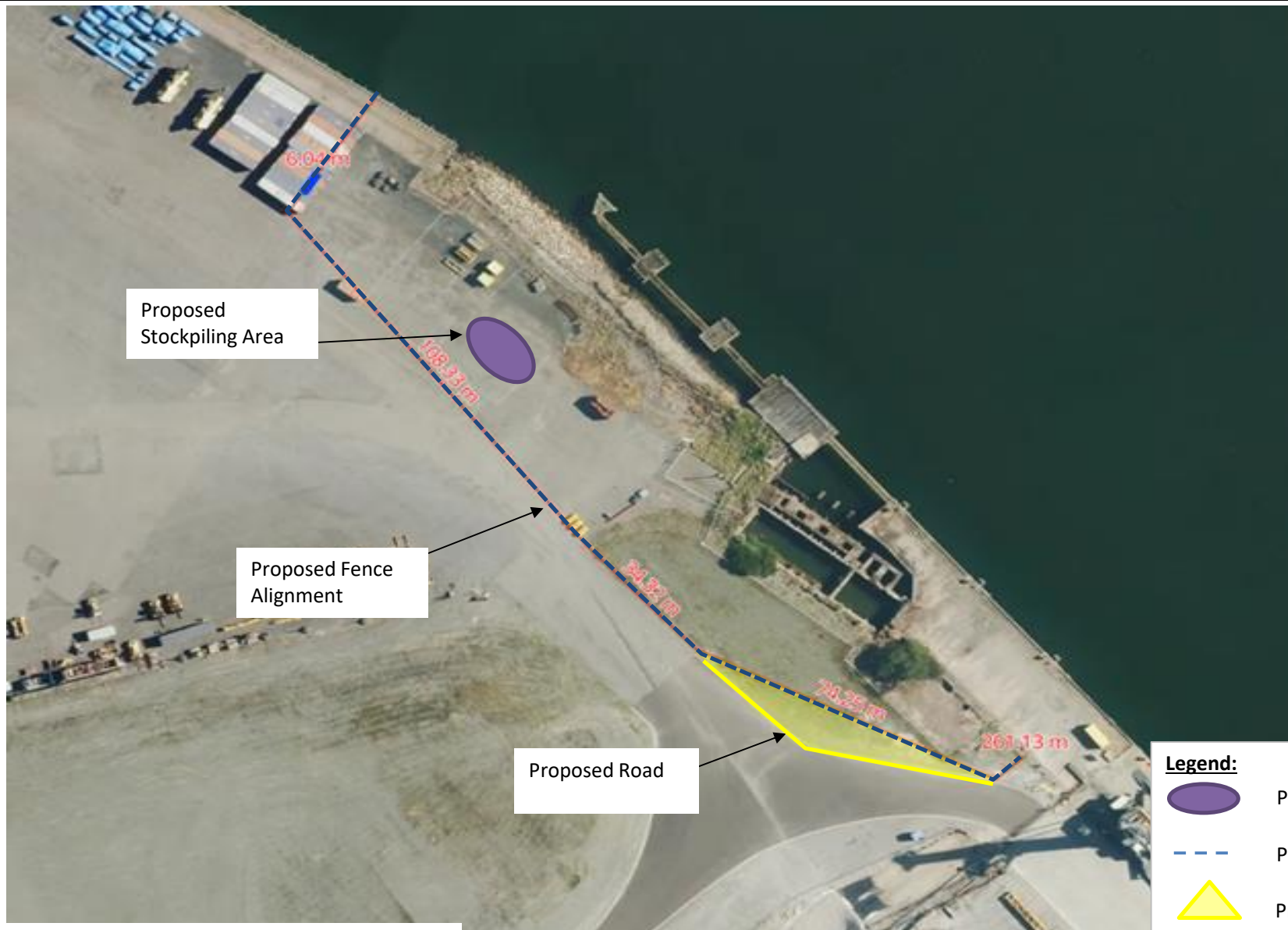


Barrier Wall Restriction Areas  
Mayfield Closure Area  
November 2013




Source: CSMP (2016)



Client:	PORT OF NEWCASTLE	Drawing No:	FIGURE 5
Project:	PROPOSED FENCE AND ROAD WIDENING	Project No:	NEW22P-0190-AA
Location:	FORMER BHP MAYFIELD, NSW	Scale:	NTS
Title:	BARRIER WALL RESTRICTION AREAS	Date:	14/09/2023



**Legend:**

-  Proposed Fence Alignment
-  Proposed Fence Alignment
-  Proposed Road Widening

Source: Provided by PON



Client:	PORT OF NEWCASTLE	Drawing No:	FIGURE 6
Project:	PROPOSED FENCE AND ROAD WIDENING	Project No:	NEW22P-0190-AA
Location:	FORMER BHP MAYFIELD, NSW	Scale:	NTS
Title:	PROPOSED TEMPORARY STOCKPILE AREA	Date:	19/09/2023

## **APPENDIX B:**

# **Material Tracking Form**

