12. Heritage

The DGRs list heritage as a key issue for the EIS. This chapter addresses the DGRs for the assessment of Indigenous and non-Indigenous heritage.

Table 12-1 summarises the DGRs for the Heritage component of the EIS. The Heritage Assessment Report is located in Appendix F.

Table 12-1 Heritage DGRs

Environmental Impact Statement Requirements	Where Addressed
Identify heritage items and values of the site and surrounding area.	Section 12.1.7 (Potential Impacts on Indigenous Heritage), Section 12.2.6 (Summary of cultural activities in the study area), Section 12.2.7 (Summary of recorded heritage items in the study area), Section 12.2.9 (Significance Assessment for Heritage) and Section 12.3 (Potential Impacts for Heritage)
Consider the *NSW Heritage Manual* (NSW Heritage Office), *Assessing Heritage Significance Guidelines* (NSW Heritage Office) and *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC)	Section 12.2.4 (Methodology)

12.1 Introduction

The Awabakal and Worimi Aboriginal people traditionally occupied the Newcastle and Hunter area. Traditional resources in the Project area were abundant and exploited by Aboriginal people. The British discovered the area in 1797 and European settlement began at the turn of the 19th century. After European settlement, industrial and port related land uses have been intensive in the Project area.

The DGRs require that Indigenous and non-Indigenous heritage items and values in the surrounding area be assessed. The assessment of the Project's potential impacts on heritage issues has been undertaken in two stages. The first examines the potential impacts on Indigenous heritage, and the second identifies potential impacts on non-Indigenous heritage.

A Preliminary Environmental Assessment (PEA) was prepared to accompany the Project's application to the NSW Department of Planning and Infrastructure (Worley Parsons 2011). This PEA concluded that due to the extensive disturbance and alteration of the environment surrounding the Project, it was unlikely that any relics, items or places of Aboriginal significance would remain within the locality.

The level of disturbance from industrial and land reclamation activities is outlined in Section 12.2.5 of this chapter, and in detail in the non-Indigenous heritage assessment contained within Appendix F (Heritage Assessment Report). The dredging works would be below the low tide level and the foreshore treatment works undertaken on reclaimed land. Based on the concept design, the findings of the PEA, and the low probability of items of Aboriginal significance being disturbed, NPC determined that an archaeological field survey was not required. The assessment of Aboriginal cultural heritage has been undertaken as part of the Aboriginal Community consultation program.

12.1.1 Existing Environment

A search of the NSW Office of Environment and Heritage (OEH) Aboriginal Heritage Information System (AHIMS) was conducted on 1 September 2011 using a 5 kilometre radius of the Project site. The search of the AHIMS database (search 50468) determined there are no known Aboriginal archaeological sites within the Project area.

Archaeological traces of Aboriginal occupation could occur in association with the original pre-European, and nineteenth century shoreline of the Hunter River estuary. Site types that may be associated with the shoreline include stone artefact distributions (indicating transit and campsites), and shell middens (meal remains of predominantly shell material).

As a result of the urban and maritime development of the lower Hunter River estuary, primarily landfilling for reclamation, the location of the original, pre-European shoreline is now mostly situated some distance inland from the current estuary edge. The extent to which Aboriginal sites may still be present along the former shoreline remains largely unknown and would be dependent on the type and degree of disturbance which has occurred on the old land surface.

The greatest potential for Aboriginal sites to be impacted by the Project would be associated with pre-European dry-land contexts that were subsequently developed through the importation and levelling of fill. However, as no areas of pre-European or nineteenth century dry-land or shoreline would be impacted by the Project, this greatly reduces the potential to disturb Aboriginal sites.

Figure 12.1 shows historical mapping of the former shoreline and tidal flat areas associated with the lower Hunter River Estuary (Top: 1865 Plan of Allotments on Bullock Island; Bottom: Extract from 1912 Parish map of Newcastle, County of Northumberland, Second Edition by NSW Lands Department).

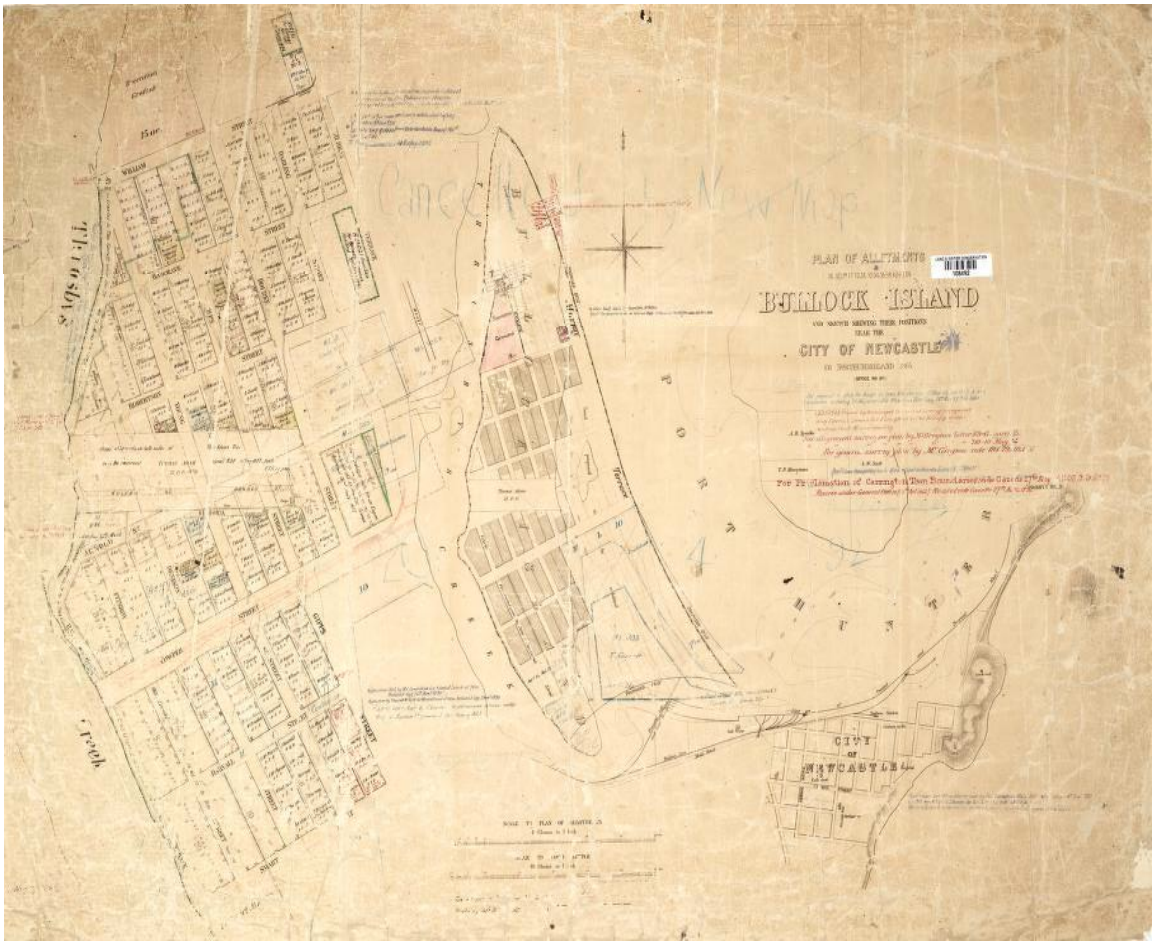
Figure 12.2 shows the outlines of these former estuary features overlaid onto a modern aerial photo and compared with the proposed dredge locations. It shows the proposed dredging location (blue outlines) relative to the former shorelines and tidal flats of the Hunter River estuary (red = 1865, yellow = 1912). Note that all proposed dredging areas are situated in areas of former riverbed or tidal flat. All adjacent dry land margins have been constructed post 1912, as part of port developments.

This comparison reveals that all of the dredging and construction activities would be situated on the existing bed of the estuary, or on reclaimed land which post-dates 1912. This land was formerly estuary bed or tidal mud flats. Neither of these contexts is associated with significant Aboriginal archaeological potential for the following reasons:

- Their permanent or tidal inundation made them unsuitable for Aboriginal camping activities.
- Scouring from flood events and normal tidal flows will have removed any former dry-land deposits that may have been present prior to the development of the estuary and riverbed in this location.

There is potential for Aboriginal cultural values to be associated with the intangible heritage of the Hunter River estuary. This arises from the area's likely importance and role in past Aboriginal habitation and tradition. This potential has been further assessed in the Aboriginal community consultation program (refer Section 12.1.5).

Figure 12.1 Historical Mapping of the Hunter Estuary Shoreline



LEGEND

Historical Shorelines

- Shoreline, 1912
- Shoreline, 1865
- Tidal Flats, 1912
- Tidal Flats, 1865
- Extent of Proposed Dredging
- Port Detail NPC

1865 Shorelines and Tidal Flats - 1865 Plan of Allotments on Bullock Island, City of Newcastle
1912 Shorelines and Tidal Flats - 1912 (2nd Edition) Parish Map of Newcastle

1:30,000 Paper Size A4

0 125 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA94 MGA zone 56

N

CLIENTS | PEOPLE | PERFORMANCE

Newcastle Port Corporation
Capital Strategic Dredging Project

Job Number 22-15683
Revision 0
Date 10 Sep 2012

Historical Shorelines and Extent of Proposed Dredging

Figure 12.2

Level 3, 24 Honeysuckle Drive, Newcastle NSW 2300 Australia T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com W www.ghd.com

G:\22\15683\GIS\Maps\Deliverables\Environmental Assessment\Heritage\22_15683_H001_HistoricalShorelines_Rev_0.mxd

Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by:fmackay

12.1.2 Literature Review

The following historical mapping was reviewed as part of the assessment of nineteenth and twentieth century shoreline positions across the lower Hunter River estuary near the Project area:

- Allan, D.T. (1869) *Chart of Newcastle Harbour and Port Waratah,* 1:10,000, Drawn and Lithographed with the sanction of the Pilot Board of N.S.W., R.C. Knaggs & Co 1869, [National Library of Australia, internet version http://nla.gov.au/nla.map-f52-v].
- Lands Department NSW (1865) *Plan of Allotments in Scns 17-24, 30-34, 36-39, 42-50 on Bullock Island and Sketch Showing their positions near the City of Newcastle, Co. Northumberland 1865*, Office no.511.[Land and Water Conservation no. 108492, Internet version: http://parishmaps.lands.nsw.gov.au/pmap.html, CD: PMapMD07, Image no. 10849201].
- Lands Department NSW (1912) *Parish map of Newcastle, County of Northumberland*, Second Edition [Land and Water Conservation no. 108492, Internet version: http://parishmaps.lands.nsw.gov.au/pmap.html, CD: PMapMD07, Image no. 13914602].
- Lands Department NSW (1889 – 1959) *Parish maps of Newcastle, County of Northumberland,* Editions 1 to 8 [Internet versions: http://parishmaps.lands.nsw.gov.au/pmap.html, CD: PMapMD07, various image nos].

12.1.3 Legislation and Guidelines

Appropriate guidelines and legislation considered in the assessment of Aboriginal heritage included, but were not limited to:

- *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (Department of Environment and Conservation, July 2005).
- *Interim Guidelines for Aboriginal Community Consultation – Requirements for Applicants* (Department of Environment and Conservation, January 2005).
- *Environmental Planning and Assessment Act 1979.*
- *National Parks and Wildlife Act 1974.*
- *National Parks and Wildlife Amendment Bill 2010.*

12.1.4 Methodology

The Aboriginal cultural heritage assessment was conducted according to the following methodology:

Review of Archaeological Potential

The review included:

- Searching the NSW OEH AHIMS database.
- Reviewing historical mapping.
- Identifying pre-European landforms impacted by the Project.

Aboriginal Community Consultation Program

The DGRs for the assessment of Aboriginal heritage specified that consideration must be given to the Department of Environment and Conservation (now OEH) 2005 policy document: *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*. For guidance on consultation with Aboriginal people and communities, this document is related to the 2005 DEC (now OEH) policy document *Interim Community Consultation Requirements for Applicants*.

Accordingly, the Aboriginal consultation program conducted for the Project has followed the steps and protocols defined in this 2005 Interim Community Consultation policy document.

The following is an outline of those steps:

- Notification of the assessment, and consultation with various government organisations requesting information on potential Aboriginal stakeholders, as defined in the *Interim Guidelines.*
- Publication of a public notice in *The Newcastle Herald* on 28 May 2011 outlining the Project, its assessment and inviting registration from Aboriginal organisations and individuals who wish to participate in the consultation program.
- Letters of notification and/or seeking registration were sent to twenty organisations, including seventeen Aboriginal organisations.
- Following a closing date for expressions of interest on the 9 June 2011, ten responses to the public notice and letters were received, including the following seven Aboriginal organisations:
  - Awabakal Descendants Traditional Owners Aboriginal Corporation.
  - Awabakal Local Aboriginal Land Council.
  - Awabakal Traditional Owners Aboriginal Corporation (ATOAC).
  - Cacatua Culture Consultants.
  - Gidawaa Walang Cultural Heritage Consultancy.
  - Mur-roo-ma Inc.
  - Nur-Run-Gee Pty Ltd.
- Each of these respondents was duly recognised as Aboriginal stakeholders in the consultation program. The interest of the City of Newcastle was also recognised in the program.
- A copy of a proposed assessment methodology was drafted and sent to all registered parties on the 1 July 2011, with an invitation to comment within a 21 day period.
- The draft methodology outlined an Aboriginal program limited to the conduct of the 2005 DEC *Interim Guidelines* consultation program. In addition, the methodology outlined the case for low Aboriginal archaeological potential based on historical mapping data, and outlined the non-Indigenous maritime assessment methodology.
- Three Aboriginal stakeholder responses to the methodology were received (refer Section 12.1.5).

- Following consideration of the responses received, the methodology was amended to include a field inspection of the Project area for registered Aboriginal stakeholders guided by NPC.
- The guided field inspection for registered Aboriginal stakeholders was conducted by NPC on 2 September 2011. The following stakeholders attended the inspection:
  - Awabakal Descendants Traditional Owners Aboriginal Corporation.
  - Awabakal Traditional Owners Aboriginal Corporation (ATOAC).
- Written responses regarding the management of the potential impact of the Project on Aboriginal cultural values were invited from each attendee group.
- On 10 November 2011, NPC wrote to registered Aboriginal stakeholders to inform them of the inclusion of proposed berths at Mayfield 3 and 4.
- The stakeholder's comments are included and addressed in the specialist Indigenous Heritage report contained within Appendix F (Heritage Assessment Report).
- Registered Aboriginal stakeholders were sent a copy of the draft EIS on 21 August 2012, and given 28 days to comment. Copies of these outgoing letters are provided in Appendix F. No responses had been received from the stakeholders by the closing date or by the time of writing of this EIS

12.1.5 Results of Aboriginal Consultation Program

The following is a summary of the issues raised by the three respondents to the draft assessment methodology:

Awabakal Traditional Owners Aboriginal Corporation

- Concerned that the methodology is based only on historical mapping from 1865 and that no other Aboriginal cultural heritage aspects have been included and/or considered.
- Do not agree that an Aboriginal cultural heritage assessment is not required.
- Believe that further information be provided on the environment, known Aboriginal sites and impact of the proposed dredging.
- Concerned that the Aboriginal cultural heritage of the South Arm of the Hunter River is being overlooked.

Awabakal Descendants Traditional Owners Aboriginal Corporation

- Believe that the proposed methodology requires major changes before they could agree to it.
- No information has been included regarding the number of Aboriginal cultural heritage sites registered on the OEH AHIMS database or mentioned in historical documents.
- Do not agree that there is no potential for Aboriginal archaeological sites in the Project area.
- Suggest that a revised methodology is developed and distributed to Aboriginal Stakeholders for their comment.
- Request an opportunity to conduct a walk over/assessment of the Project area and its surrounds.

Nur-Run-Gee Pty Ltd

- Agree with and understand the proposed methodology.

In order to address the concerns expressed in these responses, a guided field inspection for Aboriginal stakeholders was introduced into the assessment methodology. Aboriginal stakeholders from Awabakal Traditional Owners Aboriginal Corporation and the Awabakal Descendants Traditional Owners Aboriginal Corporation were taken by NPC vessel to each of the proposed berths.

In addition, the concept design was refined and the extent of landside excavation was limited. Submerged estuary bed deposits would be impacted, but no areas of pre-1912 shorelines would be impacted. This design amendment reduced the potential for remnant and now over-filled former land surfaces being impacted. All dredging would occur in the current bed of the estuary, and therefore in contexts with low or no archaeological potential. Since the nineteenth century, these areas have been either part of the active and submerged estuary floor, or tidal flats.

12.1.6 Field Inspection

The registered stakeholders were invited to attend a guided field inspection of the Project area on 2 September 2011. The aims of the inspection were:

- To provide an opportunity for stakeholders to seek more information about the nature of the Project.
- To provide an opportunity for stakeholders to inspect the Project area first hand and understand the nature of the Project.
- To explain the reasoning behind the assessment of low archaeological potential within the Project area.
- To provide an opportunity for stakeholders to assess and report on the potential of the Project to impact upon Aboriginal cultural values.

The stakeholders were given the opportunity to identify any potential impacts on Aboriginal cultural values, and possible strategies for managing any identified impacts. NPC requested the Aboriginal stakeholders in attendance provide a written response to NPC after the field inspection.

Written Responses

Written responses were received from the Awabakal Descendants Traditional Owners Aboriginal Corporation and the Awabakal Traditional Owners Aboriginal Corporation following the field inspection. The following is a summary of the issues raised by the respondents:

- Awabakal Descendants Traditional Owners Aboriginal Corporation:

On 28 September 2011, the Managing Director of the Awabakal Descendants Traditional Owners Aboriginal Corporation (ADTOAC) emailed a response to NPC. The email stated:

> "*This tour gave us new insight into the project and subsequently we now have no objections to the project. We still reinforce the fact that if any Aboriginal Cultural Heritage is discovered during the course of this project, then all works should cease in the area of concern and all the Aboriginal Stakeholders to be notified immediately. We would also like to be informed periodically on the project's progress*".

- Awabakal Traditional Owners Aboriginal Corporation:

The Awabakal Traditional Owners Aboriginal Corporation (ATOAC) provided a letter to NPC on 14 September 2011. The ATOAC letter stated the

> *"proposed sites for the berths are being positioned and located appropriately. We also believe that the proposed new berths are being built on reclaimed land and therefore may not impact on visible Awabakal Cultural Heritage*". The ATOAC recommended that "*NPC consider the value of 'place' within the Heritage and Cultural weighting for the South Arm Hunter River Project as this consideration is to insure the protection and conservation of Place & Objects which impact significantly on the spirituality, cultural, historic and general legacy needs of Aboriginal people to address inequalities in social and community wellbeing*".

Copies of the ADTOAC and ATOAC responses are provided in the Heritage Assessment Report in Appendix F.

12.1.7 Potential Impacts

No potential for direct impacts on archaeological sites or deposits have been identified. The greatest potential is associated with pre-European dry-land contexts that were subsequently developed through the importation and levelling of fill. There are no areas of pre-European or nineteenth century dry-land or shoreline that would be impacted.

All dredging for the Project would take place within the existing bed of the Hunter River estuary. Other construction activities would occur on adjoining reclaimed land associated with the modern port. Both of these contexts preclude the potential for Aboriginal archaeological deposits for the following reasons:

- Their permanent or tidal inundation made them unsuitable for Aboriginal camping activities.
- Scouring from flood events and normal tidal flows will have removed any former dry-land deposits that may have been present prior to the development of the estuary and river bed in this location.

In contrast to the low potential for archaeological sites, which is a measure of the low potential for the survival of material evidence, there remains potential for Aboriginal cultural values to be associated with the intangible heritage of the Hunter River estuary. This arises from the area's likely importance and role in past Aboriginal habitation and tradition. This potential has been further assessed in the Aboriginal community consultation program.

The estuary of the lower Hunter River is an important place in local Aboriginal tradition due to its remembered and assumed importance in local Aboriginal tradition. This importance is a consequence of both its past function as a place for Aboriginal hunting, food gathering, camping, and early interchange with Europeans; and its current form as an estuary, a fishing place, and as the modified remnant of that original estuary environment. As such these cultural values are largely intangible, though grounded in the loci of place and the on-going ecological health of the estuary.

12.2 Non-Indigenous Heritage

12.2.1 Introduction

The British discovered the Hunter River and estuary in 1797. European settlement began shortly afterward with the establishment of a penal colony and the exploitation of timber and coal resources. Timber and coal were shipped south to the Sydney colony, and Australia's first export was coal shipped from the port to England.

12.2.2 Literature Review

An extensive body of information details the history of portside developments in the Port of Newcastle. The following heritage lists and registers were searched as part of this assessment:

- National Heritage List (Department of Sustainability, Environment, Water, Population and Communities).
- State Heritage Register (NSW Heritage Office).
- Newcastle Port Corporation Section 170 Heritage and Conservation Register.
- State Environment Policy (Major Projects) Amendment (Three Ports) 2009.

The following previous studies, texts and image collections were significant sources of background and review information:

- Allan, D.T. 1869 *Chart of Newcastle Harbour and Port Waratah*, 1:10,000, Drawn and Lithographed with the sanction of the Pilot Board of N.S.W., R.C. Knaggs & Co 1869, [National Library of Australia, internet version http://nla.gov.au/nla.map-f52-v].
- EJE Heritage. 2007. Newcastle Port Corporation S170 Heritage and Conservation Register.
- Lands Department NSW, Parish map of Newcastle, various dates and editions, [Online] Available Parish Map Preservation Project http://parishmaps.lands.nsw.gov.au/pmap.html.
- Newcastle City Council - Cultural Collections. various images [Online] Available http://collections.ncc.nsw.gov.au.

- Newcastle Industrial Heritage Association Inc. 2009. Steel - early years. [Online] Available http://www.niha.org.au.
- Newcastle Industrial Heritage Association Online Collection http://www.niha.org.au/mediagallery.
- Parrott, T. 1893. *Map of the country around Newcastle*, NSW. [Online] Available http://www.nla.gov.au.
- *Plan of the Port of Newcastle. 1875, 1887*. National Library of Australia, [Online] Available http://nla.gov.au/nla.map-rm1525, 1588.
- Stewart, I. 1983. *Taming the River and the Sea: The Port of Newcastle*, pp 11-27, In Armstrong, J., (Ed) Shaping the Hunter, Newcastle Division of the Institution of Engineers, Newcastle.
- Suters Architects. 1997a. *Newcastle City Wide Heritage Study 1996-97*, Prepared on behalf of Newcastle City Council.
- Suters Architects. 1997b. *Newcastle Archaeological Management Plan*, Prepared on behalf of Newcastle City Council.
- Toward, M. 1950-1959. Skeleton map of Newcastle and suburbs showing main routes to BHP Co properties and allied industries. [Online] Available http://nla.gov.au/nla.map-vn4585362.
- Umwelt (Australia) Pty Limited. May 2002. *Assessment of the historical archaeology and Research Design: Newcastle Steelworks Closure Area*. Report prepared for AECOM.

12.2.3 Legislation and Guidelines

Cultural heritage in New South Wales is protected and managed under a hierarchy of legislation. Appropriate guidelines and legislation considered in the assessment of non-Indigenous heritage included, but were not limited to:

- *Environmental Planning and Assessment Act 1979.*
- The *NSW Heritage Act 1977.*
- *State Environmental Planning Policy (Major Projects) 2005 as amendment (Three Ports) 2009.*
- *Newcastle Local Environmental Plan (Draft 2011).*
- Newcastle Ports Corporation Section 170 Heritage and Conservation Register.

12.2.4 Methodology

The key objectives of the non-Indigenous heritage assessment were to:

- Identify the location and extent of all registered heritage items that are located within or immediately adjacent to the Project area.
- Carry out additional primary and secondary historical research to identify earlier maritime infrastructure that may be present within the Project area.
- Outline the heritage significance for all known heritage items, as well as undertake a statement of significance of any newly identified items identified within or immediately adjacent to the Project area.
- Assess the impact that the construction works would have on any heritage items that are within the impact area.
- Provide mitigation options and recommendations for the identified potential impacts.

The assessment used the following methodology:

1. Review of background information.

   Including:

   - A review of primary and secondary historical sources, including mapping, and photographs.
   - A review of previous heritage studies.
   - A search all relevant heritage registers and schedules, and a review of all relevant citations.

2. Field Inspection and survey.

   A field inspection of landside areas adjacent to the proposed berths was conducted. The inspection did not include any subsurface excavations, or underwater investigations.

3. Identify known heritage items and the potential archaeological resource.
4. Outline heritage significance of all known heritage items.
5. Assess potential for development impact to heritage values.
6. Prepare draft impact mitigation strategies.

12.2.5 Existing Environment

Historical Summary

A detailed historical outline of the Project area is provided in the specialist non-Indigenous heritage assessment report. Refer to Appendix F (Heritage Assessment Report). This outline, and its associated review of historical information sources, was used to guide the identification of archaeological potential, and to place known heritage items within an historical context.

The following description is not a detailed history of Newcastle, but focuses on known cultural activity that has taken place in the South Arm of the Hunter River specifically near Carrington (Bullock Island), Mayfield and Walsh Island. This background has been compiled using primary sources (maps, plans, newspapers and others) and secondary sources (heritage studies, archaeological reports and others).

Newcastle was originally known as Kings Town and Coal Harbour before it was named Newcastle in 1804. In 1823, military rule ended and Newcastle was declared an open port. Free settlers established settlements across the region. During this time, the harbour was characterised by a series of mud flats and sand pits separated by channels.

Mining in the area increased rapidly when the A.A. Company's coal monopoly agreement was broken in 1847, and Newcastle was secured as a major trading port. Despite this, trade growth was hindered as the harbour was not considered navigable, and did not possess adequate wharfage and loading facilities.

In the 1850s a series of harbour improvement projects were undertaken to reduce sand and silt in the harbour. These works, including major land reclamations, significantly altered the shape of the harbour over time.

Figure 12.3 shows the South Arm of the Hunter River in 1871. Land reclamation activities altered this shoreline. Figure 12.4 compares the 1851 shoreline with the 1950 shoreline. The broken lines show the 1950 shoreline.

Figure 12.3 View of the South Arm of the Hunter River in 1871

Source: Gowlland, J. 1871. *Australia East Coast New South Wales*. [Online] Available http://nla.gov.au

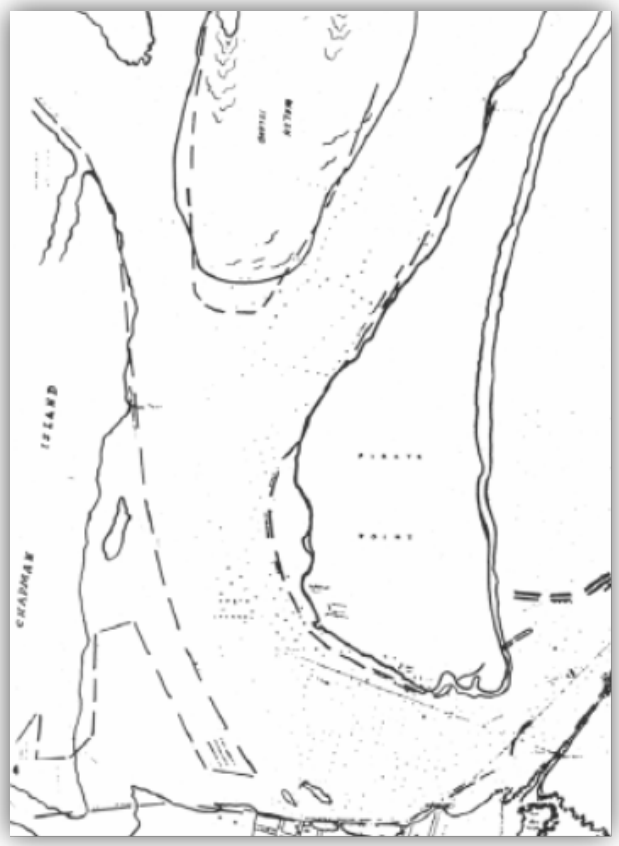


Figure 12.4 Comparison of the 1851 and 1950 Shorelines

Source: Stewart, I. 1983. *Taming the River and the Sea: The Port of Newcastle*, 14.

Carrington

As part of the improvement works to port and harbour facilities, a dyke was constructed along a sand bank on the east side of Bullock Island (now Carrington). In 1862, two ballast jetties were built and ships began depositing ballast heaps on the bank, while sand dredged from the harbour was pumped behind the newly created wall.

The stone bank was completed by 1874 and subsequently lined with wharves equipped with coal loading facilities. Seventeen wharves were built in 1875. In 1877 the first 10 wharves were connected to form a continuous timber wharf 838 metre long. A northern extension was added to the Dyke and by 1886 it was almost three kilometres long. Historical photographs of the Carrington Dyke are displayed in Figure 12.5 and Figure 12.6.

Figure 12.5 Looking South Along the Dyke in 1906

Source: State Library of Victoria. c1906. *Newcastle from the Dyke, NSW*. [Online] Available http://www.slv.vic.gov.au/pictoria/gid/slv-pic-aab50433/1/a11835

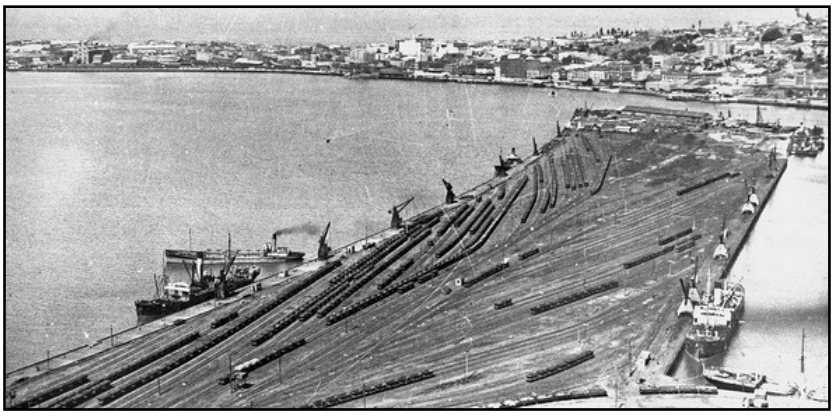


Figure 12.6 Carrington Dyke in 1940

Source: University of Newcastle - Cultural Collections. 1940. *Carrington Dyke, NSW*. [Online] Available http://www.flickr.com/photos/uon/5202823111/

Mayfield

In 1866, the Wallaroo Mining and Smelting company secured a lease on property owned by Waratah Coal and opened a smelting works which became known as the Hunter River Copper Company Works. Copper was smelted at Port Waratah until the early 1890s, when the works closed. The Waratah Coal Company subsequently sold their land to the Broken Hill Proprietary Company (BHP) in 1896.

BHP decided to establish a steelworks in Newcastle, transforming the city into the industrial capital of Australia. The State Government removed silt from the harbour to a depth of 25 feet (approximately 8 metres) to provide access to the shipping channels for the import and export of raw materials and finished product. The steelworks site was very low lying and often flooded, leading to it being reclaimed with sand dredged from the harbour.

Construction of a 600 foot (approximately 200 metre) timber wharf for the delivery of raw materials and shipping of the finished product began on the site as early as 1912. The plant officially opened in 1915 and expanded rapidly. By 1918 a second blast furnace was constructed. The wharf facilities were expanded in 1916-17, to a total of 1,300 feet in length (approximately 430 metres); able to accommodate four steamers simultaneously. Rail tracks ran along the length of the wharf to carry wagons to receive cargo. Figure 12.7 shows the BHP wharf being constructed in 1912.

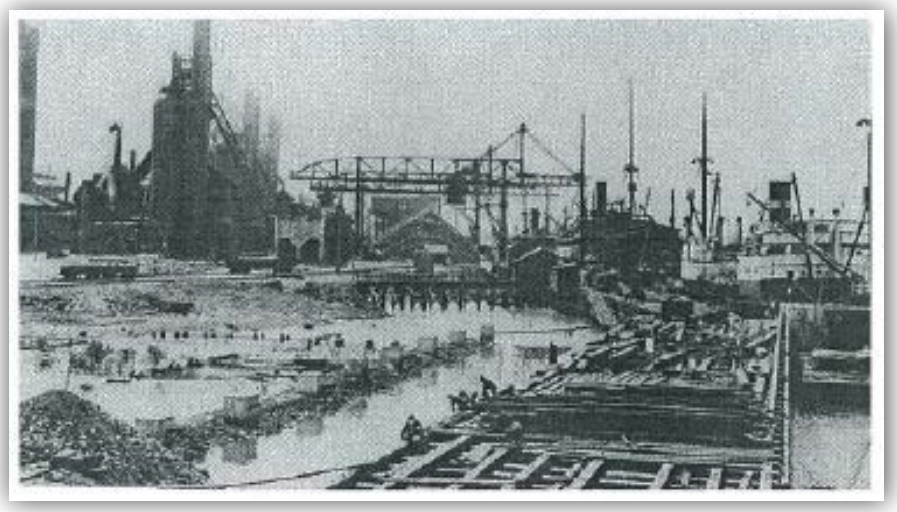


Figure 12.7 Construction of the BHP Steelworks Wharf in 1912

Source: NSW Heritage Branch. 2008. NSW Heritage Database - Original Timber Wharves. [Online] Available http://www.heritage.nsw.gov.au

Extensions and maintenance to the wharf were undertaken throughout the 1920s and 1930s to cater for an increase in trade. In 1925, the wharf was extended by a further 225 feet (approximately 75 metres) and a section of wharfage was reinforced with concrete. Figure 12.8 shows the BHP site and wharves in 1932.

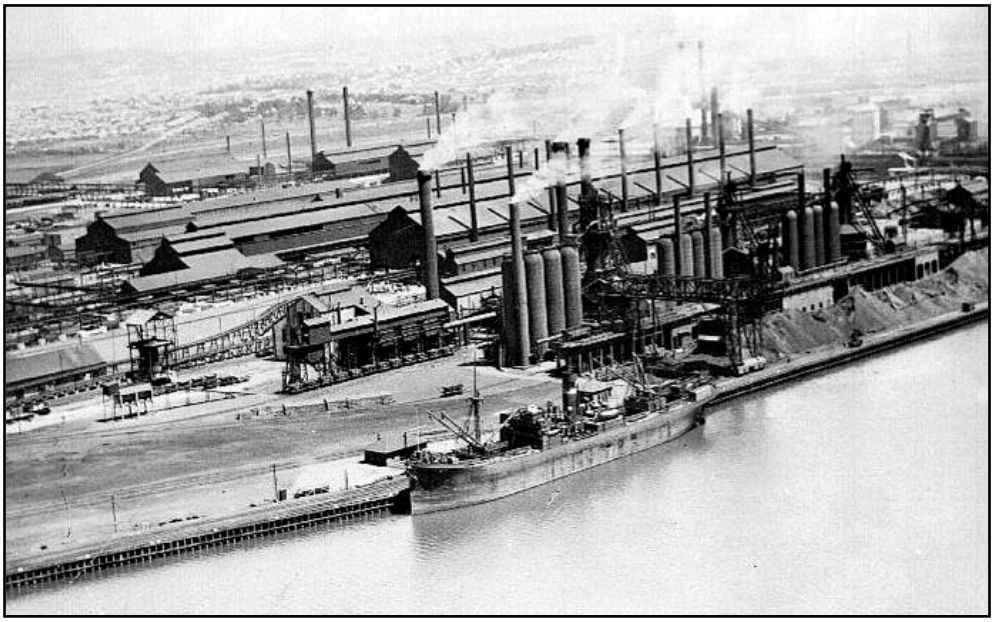


Figure 12.8 BHP Steelworks and Wharves in 1932

Source: NSW Heritage Branch. 2008. NSW Heritage Database - Original Timber Wharves. [Online] Available http://www.heritage.nsw.gov.au

During the 1950s the size of bulk carrier vessels increased dramatically and the wharves underwent further extensions in 1959 and again in 1964 in order to accommodate the larger vessels.

Walsh Point

As an economical method of disposing of the silt removed from the harbour, an area between Carrington and Stockton was reclaimed. This area included three small islands (including Goat and Spectacle Islands) and a large mud flat.

Figure 12.9 shows Newcastle Harbour in 1893 prior to land reclamations to form Walsh Island.

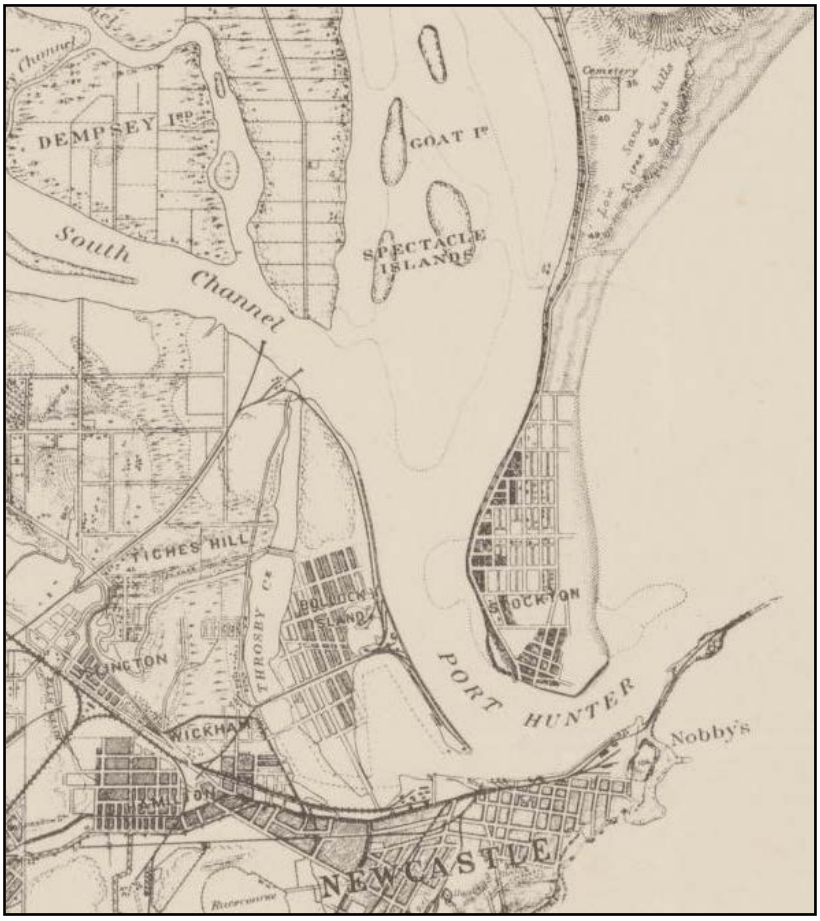


Figure 12.9 View of Newcastle Harbour in 1893 Prior to Land Reclamations to Form Walsh Island

Source: Parrott, T. 1893. *Map of the country around Newcastle, NSW*. [Online] Available http://www.nla.gov.au

The NSW Government established a dockyard at Walsh Island, directly opposite the BHP Steelworks, to provide shipbuilding, ship repair, bridge building and general engineering services. The Walsh Island Dockyard and Engineering Works officially opened in November 1914 and was one of the largest workshops in Australia at the time. There were three slipways or building berths in the shipyard.

A floating dock 630 feet in length (approximately 210 metres) with a lifting capacity of 15,000 tonnes was built in 1930. Despite this, the Walsh Island Dockyard and Engineering Works subsequently closed in February 1933. The floating dock and many of the buildings and plant were sold and moved and the site was abandoned. Much of this equipment was subsequently moved to the State Dockyard which was established on Dyke Point in 1942. Figure 12.10 shows boat slips at the Walsh Point Dockyards.

Figure 12.10 Boat Slips at the Northern End of Walsh Point Dockyards

Source: Newcastle Industrial Heritage Association Online Collection (http://www.niha.org.au/mediagallery/media.php?f=0&sort=0&s=20090326204022710)

A substantial reclamation scheme began in 1951 and saw the creation of a large industrial estate and adjacent wetlands reserve (now Kooragang Island) between the north and south arms of the Hunter River. The Project involved reclaiming the tidal flats between a number of low-lying islands in the Hunter River estuary, using silt and other materials dredged from the bed of the river. Greenleaf Fertilisers Pty Ltd was the first industry to establish on this newly reclaimed land when it purchased 80 acres on Walsh Point in 1964. Coal loading operations expanded to Kooragang Island in the early 1980s.

12.2.6 Summary of the Cultural Activities within the Study Area

From the above historical background of the South Arm of the Hunter River, Newcastle, the following cultural activities are identified:

Mayfield 1 to 7

- Early settlement.
- Smelting and manufacturing (tin, coal, steel).
- Import/export of materials.

Walsh Point (Walsh Point berth pocket and K1)

- Land reclamation.
- Shipbuilding (Walsh Island Dockyard).

Dyke Point (D3)

- Land reclamation.
- Import / export (coal).

12.2.7 Summary of Recorded Heritage Items in the Study Area

There are six registered heritage items listed on the Newcastle Ports Corporation Section 170 Heritage and Conservation Register and under SEPP (Major Projects) Three Ports 2009. Five of the items are covered by both heritage listings. The registered heritage items are:

- The Bullock Island Crane Bases under the SEPP (Major Projects - Three Ports) includes the Crane Base 14 and 15 listed under the s.170 heritage register.
- The Former McMyler Hoist as listed under the SEPP (Major Projects) Three Ports 2009 is the same item known as Dyke 3 Coal Loader under the s.170 heritage register listing.
- The Original Timber Wharves at 99 Selwyn Street, Mayfield North are listed under the relevant SEPP (Major Projects) Three Ports 2009.

Table 12-2 summarises the heritage items recorded in the Project area.

Table 12-2 Summary of Recorded Heritage Items in the Study Area

	Crane Base 15	Crane Base 14	Dyke 3 Coal Loader	Bullock Island Crane Bases	Former McMyler Hoist	Original Timber Wharves
Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*						
NSW *Heritage Act 1976*						
NSW S170 Heritage and Conservation Register (Newcastle Port Corporation)	✓	✓	✓			
State Environmental Planning Policy (Major Project) as amended (Three Ports) 2009				✓	✓	✓

12.2.8 Archaeological Potential

Based on the archaeological potential that has been identified, the Project will impact known heritage items at Dyke 3 and Mayfield 3 and 4. The Project has the potential to affect archaeological relics at the Walsh Point berth pocket and Kooragang Berth 1.

Dyke 3

The archaeological potential of the Dyke 3 dredging area is considered to be limited. The earliest items built on the site were the temporary ballast wharves for unloading the ballast and other fill material used in the reclamation works for the dyke construction. These items were likely to have been lightweight constructions. It was intended that these wharves would be removed and replaced with larger timber wharves. In the 1870s new wharves were constructed out of timber with ballast deposited between the piles. The removal of the dyke's wharves included dredging over the area in 1966 which would have removed any construction and fallen cargo material (coal) from the seabed.

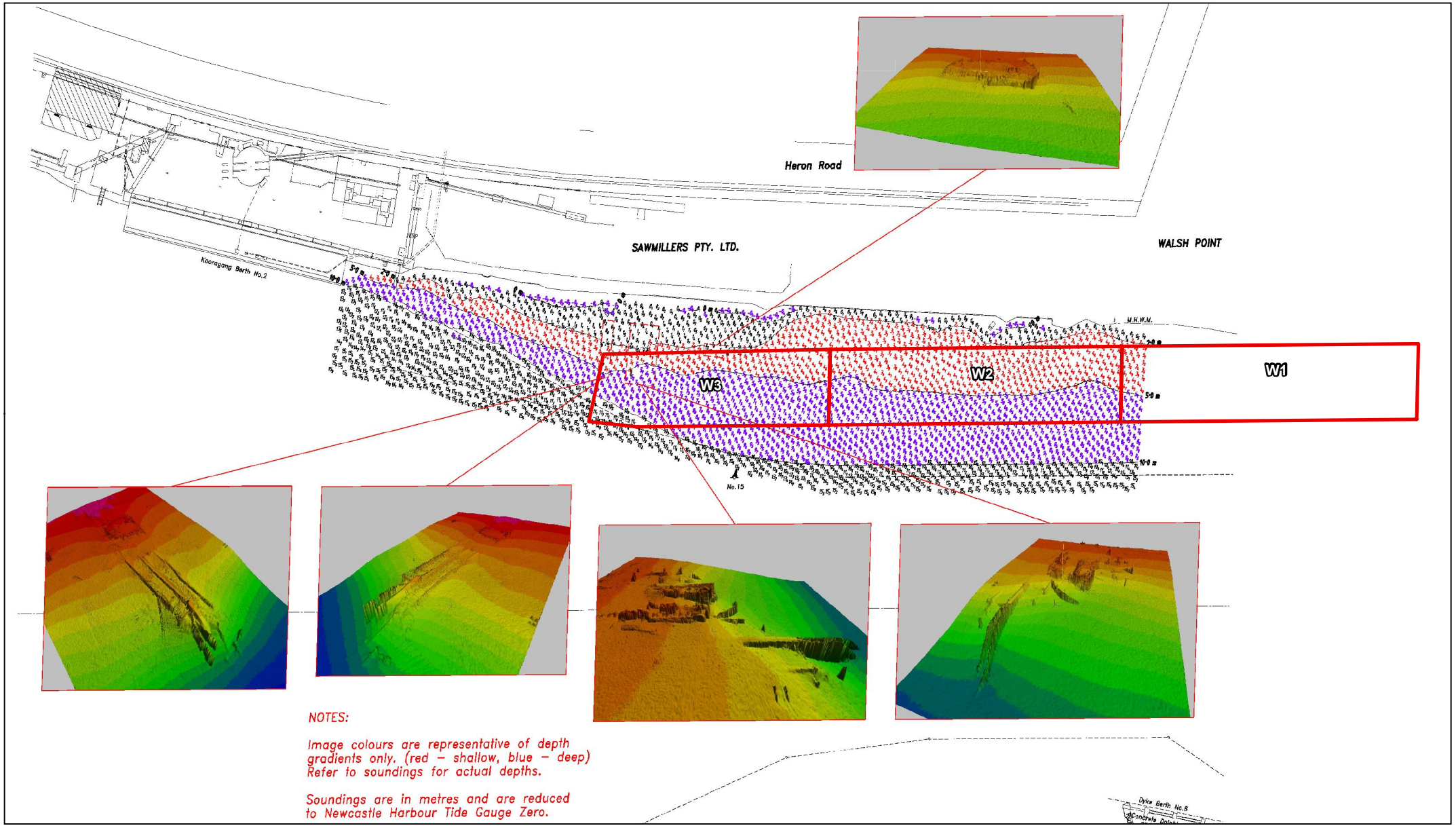
The remains of two crane bases and a former McMyler hoist foundation are still present on the site today. Their physical remains are likely to be the only remaining components of the cranes that existed on the site.

The works at Dyke 3 will require the removal of Crane Bases 14 and 15 from the site, as well as the remains of McMyler Hoist base. Each of these items has been assessed as locally significant.

Walsh Point

The archaeological potential that exists within the proposed berth boxes of Kooragang 1 and the Walsh Point berth pocket relate to the early 20th century ship building industry. There is potential for archaeological remains associated with a former jetty, potential remains associated with the repair pontoons, and material dropped into the water during the repairs undertaken on vessels that were moored to the pontoons or Jetty. "Obstacles" have been identified in the vicinity of Walsh Point 3 and Kooragang 1 that may relate to the dockyard.

The proposed Walsh Point berth pocket and Kooragang 1 berth are located immediately adjacent to the location of the former ship building yard. Relics from the ship building yard include the remains of a slipway, and a platform. Figure 12.11 shows underwater sonar imagery of the slipway and platform remains.



Paper Size A4

0 30 60 90 120

Meters

Horizontal Datum: GDA 1994
Grid: GCS GDA 1994

N

LEGEND

Berth Locations

GHD

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Newcastle Port Corporation
Capital Strategic Dredging Project

Job Number 22-15683
Revision 0
Date 10 Sep 2012

Sonar Images for
Non- Indigenous Heritage

Figure12.11

G:\22\15683\GIS\Maps\Deliverables\Environmental Assessment\Heritage\22_15683_H002_NonIndig_Heritage_Rev_0.mxd

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 Australia T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com W www.ghd.com

Data source: Commonwealth of Australia (Geoscience Australia): 250K Topographic Data Series 3 - 2007, DECCW: CMA BDY - 2006. Created by:fmackay

Mayfield

The archaeological potential at the Mayfield site is limited to the Old Timber Wharves associated with the former BHP Steelworks site at Mayfield 3 and 4. Construction of a timber wharf for the delivery of raw materials and shipping of the finished product began on the site in as early 1912. The first section of the Original Wharf structure was 600 feet long and supported on turpentine piles. The wharf facilities were expanded in 1916-17, to a total of 1,300 feet in length; able to accommodate four steamers simultaneously. Extensions and maintenance to the wharf was undertaken throughout the 1920s and 1930s to cater for an increase in trade. In 1925 the wharf was extended by a further 225 feet and a section of wharf under the ore bridges was double reinforced and concreted. Piles and beams were also repaired or replaced during the late 1920s and throughout the 1930s, including the replacement of 22 single piles in 1928.

Approximately 17 headstocks were renewed and structural timbers were replaced with 40 long, 14” x 12” steel “l” beams, 23 in total. Repairs to Berth No. 3 were undertaken in 1937 and faulty decking was also replaced as well as timber on the wharf face. In the following year wharf maintenance was continued with 49 piles being replaced throughout the full length of the wharf. During the 1950s the size of bulk carrier vessels increased dramatically and the wharves underwent further extensions in 1959 and again in 1964 in order to accommodate the larger vessels. The wharves continued to be an essential part of the steelworks up until September 1999, when the BHP steelworks closed.

Although very little, if any, of the original timber construction remains, these early wharves are a reminder of the importance of the harbour in BHP’s decision to build the steelworks at Newcastle. Although the earliest fabric has been concealed or lost, subsequent wharf fabric elements remain and remain capable of interpreting the evolution of the structure over at least the last three quarters of a century.

The current condition of the wharf is poor with sections of the wharf already collapsed and removed. As such, the current structure cannot be reused. The condition of the wharf is such that repairs to the structure are unlikely to be possible without removing all of the existing structure and rebuilding a new, similar, timber wharf. This is not a viable option as the significance of the heritage item would be lost through the removal of all of the existing original fabric. Stabilisation of the current structure through minimal repair has not been considered. A ‘do nothing’ approach is also not considered to be appropriate as the wharf is likely to continue to degrade and collapse, thereby becoming a navigation hazard to shipping and small craft in the harbour.

Newcastle City Council Consent

Newcastle Port Corporation has since received consent by Newcastle City Council to remove the timber wharves at Mayfield 3 and 4. These timber wharves have been removed as the structure was degraded and had the potential to collapse and become a navigation hazard.

12.2.9 Significance Assessment

The NSW Heritage Office has defined a methodology and set of criteria for the assessment of cultural heritage significance for items and places, where these do not include Aboriginal heritage from the pre-contact period (NSW Heritage Office & DUAP 1996, NSW Heritage Office 2000). The assessments provided in this report follow the Heritage Office methodology.

The following heritage assessment criteria are those set out for Listing on the State Heritage Register. In many cases items will be significant under only one or two criteria. The State Heritage Register was established under Part 3A of the *Heritage Act* (as amended in 1999) for listing of items of environmental heritage that are of state heritage significance. Environmental heritage means those places, buildings, works, relics, moveable objects, and precincts, of state or local heritage significance (section 4, *Heritage Act 1977*).

An item will be considered to be of State (or local) heritage significance if, in the opinion of the Heritage Council of NSW, it meets one or more of the following criteria:

Criterion (a) an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (b) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).

Criterion (d) an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.

Criterion (e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (g) an item is important in demonstrating the principal characteristics of a class of NSW's:

- cultural or natural places; or
- cultural or natural environments.

(or a class of the local area's

- cultural or natural places; or
- cultural or natural environments.)

All of the non-Indigenous archaeological sites and features known to occur within or near the Project area are assessed as having heritage significance within a local context. Table 12-3 summarises these assessments.

Table 12-3 Summary of Known Heritage Items in the Study Area

Site/feature	Proposed Berth	Significance Assessment	Notes
Crane Base 14	Dyke 3	Local	As stated in the S170 Heritage Register
Crane Base 15	Dyke 3	Local	As stated in the S170 Heritage Register
McMyler Hoist Base	Dyke 3	Local	As stated in the S170 Heritage Register
Archaeological remains associated with the Walsh Point Dockyard and Engineering Works on Walsh Point	Walsh Point berth pocket and Kooragang Berth No. 1	Local	
Old timber wharves	Mayfield 3 and 4	State	

12.3 Potential Impacts

The Project would involve dredging twelve berth boxes on the South Arm of the Hunter River. These areas are adjacent to historical port related activities at Mayfield, Carrington and Walsh Point.

12.3.1 Mayfield

The current condition of the wharves at Mayfield 3 and 4 is poor, with sections of the wharf already collapsed and removed. As such, the current structure cannot be reused. The condition of the wharf is such that repairs to the structure are unlikely to be possible without removing all of the existing structure and rebuilding a new, similar, timber wharf. This is also not an option as the significance of the heritage item would be lost through the removal of all of the existing original fabric.

The Project would result in the removal of the remains of the Old Timber Wharves. The existing wharves cannot be reinstalled or reused as the structure is not considered to be structurally sound. Repair of the item is also not an option, as the timber structure would have to be replaced almost in its entirety, thereby removing the original fabric and significance of the heritage item. As such, the Old Timber Wharves have now been removed by NPC (via consent with Newcastle City Council).

12.3.2 Kooragang and Walsh Point

There are known seabed obstructions present in the vicinity of the Walsh Point berth pocket and Kooragang Berth 1 that would require removal as part of the dredging works. These items are believed to be associated with the in-water infrastructure associated with the boat building and engineering yard present at Walsh Point from 1914.

At Walsh Point Berth 3, anomalies within the proposed berth box area are thought to be associated with the engineering gas works former located adjacent to the site.

12.3.3 Dyke 3

At Dyke 3 the proposed works would remove existing structures, including the heritage listed Crane Bases 14 and 15, and the former McMyler Hoist base, as well as a modern timber wharf at the northern end.

Based on this heritage assessment, there is potential for direct impact to known cultural heritage items at Dyke 3, and to potentially occurring archaeological relics at the Walsh Point berth pocket and Kooragang 1.

12.4 Recommended Mitigation Measures

This section details the mitigation measures to minimise the Project's potential impacts on Indigenous and non-Indigenous heritage values.

The adequacy review comments provided by the Office of Environment & Heritage (Heritage Branch) were considered when formalising the mitigation measures for this Chapter. NPC has had multiple meetings and correspondence with the Heritage Branch to identify the most appropriate mitigation measures, and to confirm an agreed approach. The following mitigation measures incorporate the agreed recommendations, and form part of the Statement of Commitments for the Project.

12.4.1 Indigenous Heritage

In order to address the potential for impact to Aboriginal cultural values (such as the significance of the lower Hunter River estuary in Aboriginal lore and tradition) it is recommended that consultation with Aboriginal stakeholders be systematic and on-going. The program would address and discuss potential management strategies where necessary, and seek a practical input into the development of the management strategy. Possible management strategies include:

- Establishing public interpretation of Aboriginal cultural values associated with the estuary (this may be achieved through on-site signage, pamphlet production, event sponsorship, and nomenclature).
- Commemoration of traditional Aboriginal themes through appropriate naming of port facilities and features.

12.4.2 Non-Indigenous Heritage

No further maritime archaeological assessment is required for Mayfield berths 1 to 7. In order to mitigate the impact of the proposed capital dredging works on the South Arm of the Hunter River on historical/maritime items it is recommended that:

- Archival recording of the maritime archaeological remains associated with the former engineering works present along Walsh Point. The remains will be recorded following the guidelines stated in “Photographic Recording of Heritage Items Using Film or Digital Capture” and will be undertaken under the direction of a maritime archaeologist. This work will include both video and still photograph.
- Prior to the demolition and removal of the underwater remnant structures at Walsh Point an archaeological and engineering review, to archival standards, is to be conducted. The review will continue during the demolition of the structures and provide a photographic and engineering record of the structures. Copies of the records are to be submitted to the OEH Heritage Branch and to Newcastle City Council libraries for their records after the demolition of the structures.
- Prior to any works associated with the removal of Crane Bases 14 and 15, and of the former McMyler Hoist and Coal Loader, notification to the Heritage Council, Heritage Branch, Office of Environment and Heritage is required regarding the demolition and removal of these items from the Section 170 Heritage and Conservation Register.
- As stated in the *Heritage Act* 1977, under Section 170A(1) notification has to be made in writing to the Heritage Council no less than 14 days before the item is removed from the Section 170 Register or demolition works commence.
- An archival recording (and engineering review to archival standards) will be undertaken for both Crane Base 14 and 15, and the McMyler Hoist prior to their demolition at Dyke Point. The review will continue during the demolition of the structures and provide photographic and engineering record of the structures. The remains will be recorded following the guidelines stated in “Photographic Recording of Heritage Items Using Film or Digital Capture” and will be undertaken under the direction of a maritime archaeologist. The recording will include the above and below water remains of all three items, and will include both video and still photography. Copies of the records are to be submitted to the OEH Heritage Branch and to Newcastle City Council libraries for their records after the demolition of the structures.
- The former BHP steel wharf in the location of Mayfield 3 and 4 have previously been assessed and archival recording of the wharves has been completed. No further maritime archaeological or heritage work is required for the proposed Mayfield 3 and 4 berths. The archival recording completed in 2000 for the proposed decommissioning of the wharf site is considered to be adequate, and no further archival recording work is required.
- Record all archaeological artefacts that are discovered during the works. In the event that an archaeological artefact is found, a heritage expert is to be consulted about appropriate archival recording and if possible preservation.
- If beach renourishment is found to be a suitable option for Stockton Beach, this will be achieved through bottom dumping (or bow casting) of sands from the dredge (subject to the *Commonwealth Historic Shipwrecks Act 1976* being considered).

13. Spoil Handling and Disposal

The DGRs list spoil handling and disposal as a key issue for the EIS. This chapter describes the Project's requirements for spoil handling and disposal, together with potential reuse options. Other chapters within the EIS such as Chapter 9 (Contamination), Chapter 11 (Noise and Vibration), Chapter 14 (Traffic and Transport) and Section 16.2 (Air quality) address potential impacts from the handling and disposal of spoil. Appendix E contains a copy of the Spoil Handling and Disposal Strategy.

The DGRs for the Spoil Handling and Disposal component of the EIS are provided in Table 13-1.

Table 13-1 Spoil Handling and Disposal DGRs

Environmental Impact Statement Requirements	Where Addressed
Assess spoil and reuse options and identify potential disposal locations.	Section 13.3 (Potential Impacts for Spoil Handling and Disposal) and Section 13.4 (Recommended Mitigation Measures for Spoil Handling and Disposal)
Assess air quality and odour impacts associated with dredging, handling, stockpiling and disposal of dredged material in accordance with *Approved Methods for Modelling and Assessment of Air Pollutants in NSW* (DEC).	Section 16.2 (Air Quality)
Assess traffic impacts associated with the hauling of dredged material to disposal locations in accordance with the RTA (now RMS) *Guide to Traffic Generating Developments*.	Chapter 14 (Traffic and Transport)

13.1 Introduction

Dredging in the South Arm of the Hunter River takes place on a regular basis. Maintenance dredging keeps shipping lanes navigable. NPC has approval under the *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) to dispose of maintenance dredging material at the current Newcastle Offshore Spoil Ground (Sea Dumping Permit SD2011/1942) to the volume of 6,450,000 cubic metres over a ten year period. The current Newcastle Offshore Spoil Ground is located offshore, approximately 2.0 kilometres south-east of Nobby's Head. Figure 13.1 shows the location of the Newcastle Offshore Spoil Ground.

NPC also holds an Environment Protection Licence (EPL 3373) issued by OEH. EPL 3373 approves the removal of between 500,000 and 2,000,000 cubic metres of sediment annually.The preferred method of disposal for the Project's dredged sediment is via sea dumping, with alternate disposal strategies dependant on material type and potential use of the material. NPC would apply for approval from the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) for a Sea Dumping Permit for Capital Dredging under the Sea Dumping Act and EPBC Act. Impacts associated ocean disposal would be assessed under the EPBC Act, and approval from SEWPaC would be required before any sea dumping can occur.

The proposed offshore disposal site is known as the former Newcastle Offshore Spoil Ground and was used as a disposal site by NPC between 1989 and February 1997. The site is also currently used by Port Waratah Coal Services (PWCS), BHP Billiton and Newcastle Coal Infrastructure Group (NCIG) for disposal of sediment dredged from the Hunter River. The proposed spoil ground is located approximately 3.8 – 5.8 kilometres southeast of Nobby's Head. The disposal ground falls just inside the 3 nautical mile State / Commonwealth waters boundary, and has an area of approximately 2 kilometres by 2 kilometres (or 4 square kilometres).

NPC has an existing licence from Crown Lands in relation to the dumping of material at sea. When NPC receives approval from SEWPaC for the new sea dumping permit for capital dredging, NPC will apply for a new Crown Lands licence. This is expected in early 2012. The licence will be subject to approval of a Sea Dumping Permit by SEWPaC. The licence also has provision permitting the placement of material on Stockton Beach. A copy of the Crown Lands licence is located in Appendix I.

Other potential uses for the dredged material would be investigated as each berth is dredged. The Spoil Handling and Disposal Strategy ("the Strategy") developed for the Project provides details on these options. Appendix E contains a copy of the Spoil Handling and Disposal Strategy.

Dredging and disposal of the sediments has the potential to create environmental impacts that require assessment under Part 5.1 of the EP&A Act. These potential impacts are the subject of other chapters within this EIS. This chapter concentrates on the potential impacts from the spoil handling and disposal methods that are contained within the Strategy.

In total, the Project would involve dredging in the order of 1,870,000 cubic metres of material from the twelve proposed berths. At Walsh Point an estimated 30,000 cubic metres of dredged material has the potential to contain contaminants with levels higher than the allowable limits for sea dumping under the SEWPaC *National Assessment Guidelines for Dredging 2009* (NAGD). If validation testing confirms that contamination levels are above NAGD Guidelines, and therefore not suitable for sea dumping or other beneficial uses, this material would be disposed of to landfill.

An estimated quantity of 2,500 cubic metres of contaminated landside material would be excavated from shore at the Mayfield 1 and 2 berths. This material would require disposal to landfill in accordance with the NSW *Waste Classification Guideline, Part 1: Classifying Waste.*

LEGEND

- Berth Locations
- Offshore Spoil Ground

1:40,000 (at A4)

0 150 300 600 900 1,200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

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Newcastle Port Corporation
Capital Strategic Dredging Project

Job Number 22-15683
Revision 0
Date 10 SEP 2012

Newcastle Offshore Spoil Ground

Figure 13.1

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

G:\22\15683\GIS\Maps\Deliverables\Environmental Assessment\Spoil handling & disposal\2215683_SHD001_NewcastleOffshoreSpoilGround_0.mxd

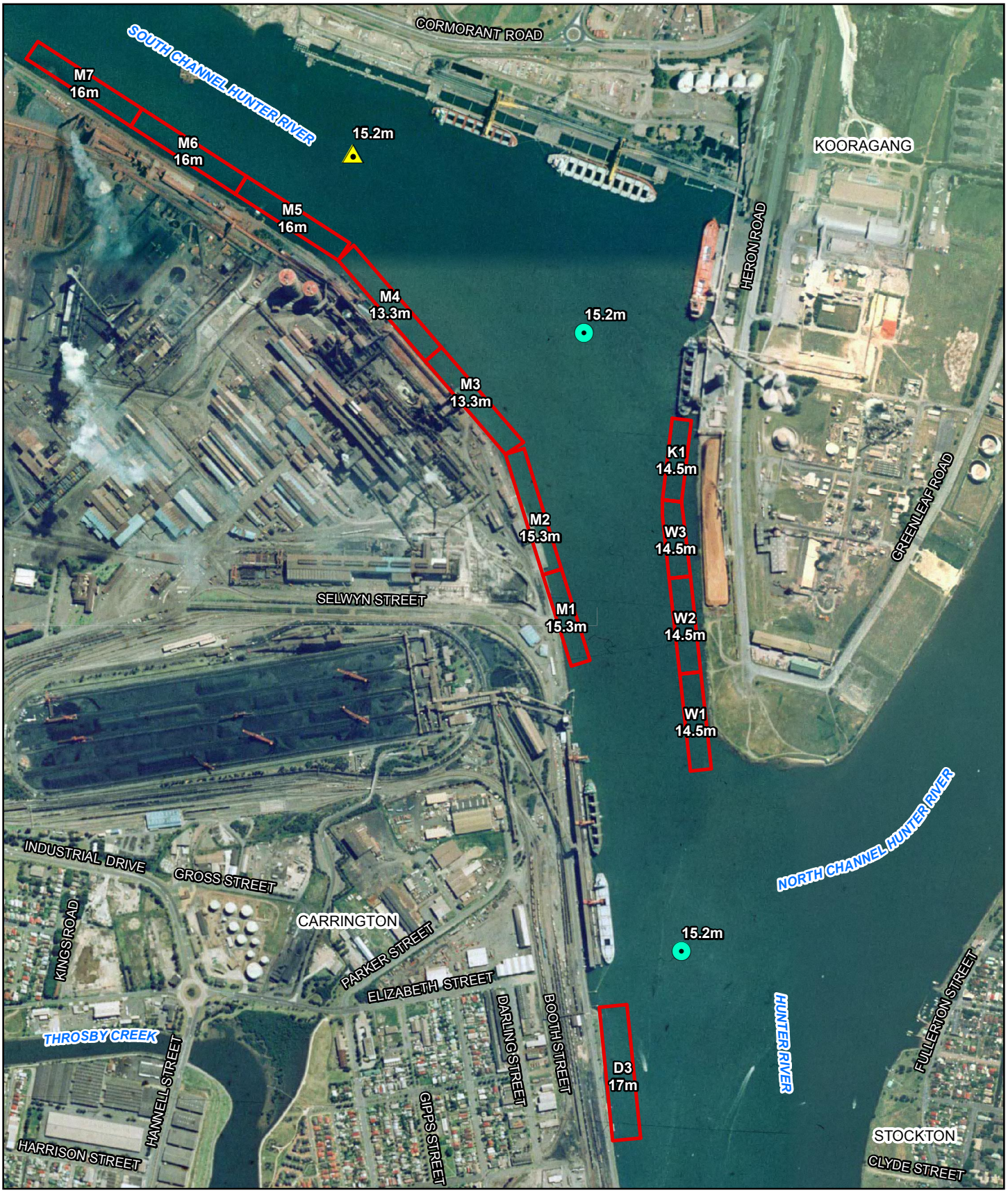
Data Source: LPMA: DTDB - 2007; ESRI: I3 Imagery - 2010. Created by: gmcdiarmid, fmackay, mbarnier

13.2 Existing Environment

The South Arm of the Hunter River is a highly modified environment. Port side developments have modified the riverbanks and adjoining land. Portside land at Mayfield, Carrington and Kooragang Island has all been created through land reclamation. Chapter 12 (Heritage) provides a detailed description of the historical modifications to the Hunter River estuary.

Kooragang Island was created by filling channels and connecting numerous small islands. Industrial and port infrastructure dominates the southern and eastern sides of Kooragang Island. The southern bank of the river's South Arm has supported a range of industrial land uses incorporating port infrastructure such as wharves, railways and berths. Foreshore treatments such as piled walls and rock revetments stabilise the foreshore in these areas.

Channel dredging has been a feature of the existing environment. Maintenance dredging is undertaken daily to maintain navigable depths for vessels servicing industrial and export activities located on port side land. Figure 13.2 shows the existing river and channel depths, together with depths for existing dredged berths and the proposed berths.



LEGEND

- Berth Locations
- Existing Channel 15.2m (NHTG)
- Approved Channel Depth 15.2m to be dredged by others

1:13,000 (at A4)

0 50 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

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Capital Strategic Dredging Project

Existing Channel and Berth Depths

Job Number 22-15683
Revision 0
Date 10 SEP 2012

Figure 13.2

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com.au W www.ghd.com.au

G:\22\15683\GIS\Maps\Deliverables\Environmental Assessment\Spoil handling & disposal\2215683_SHD002_ExistingRiverBerthSites_0.mxd

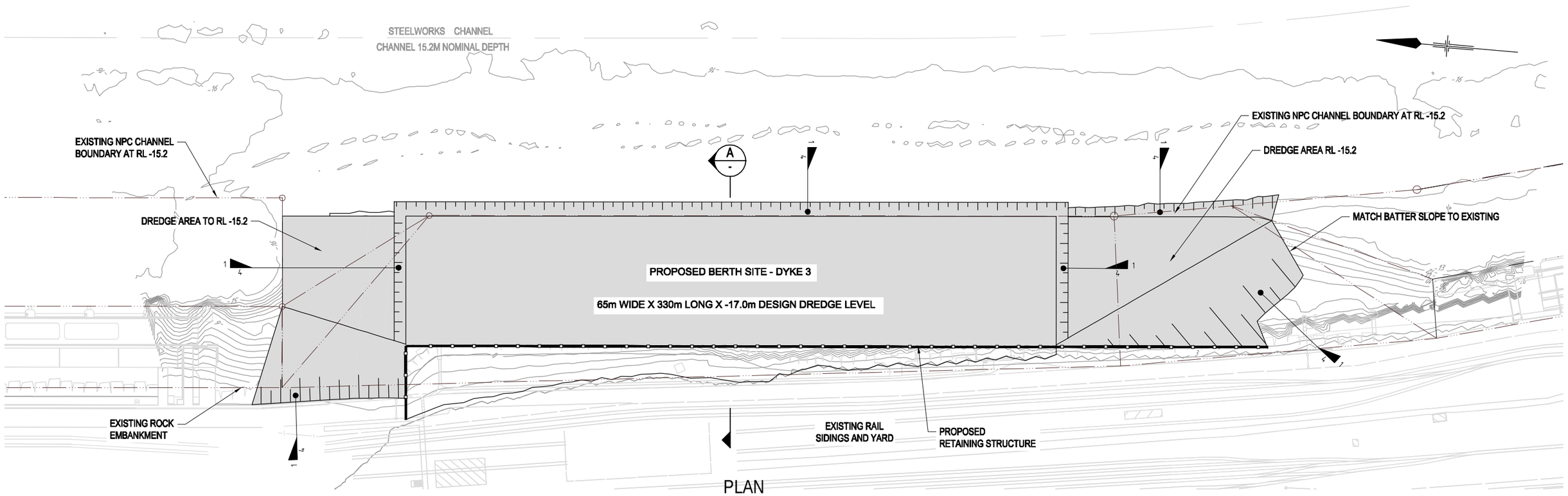
Data Source: LPMA: DTDB - 2007, Imagery - 2007. Created by: gmcdiarmid, fmackay, mbarnier

13.2.1 River Sediment Profile

Typically, the riverbed consists of fine grained, soft silty clay sediments overlying sand. The sand contains some lenses of clay and overlies deeper layers of clay, soft rock and hard rock. Figure 13.3 to Figure 13.7 show a typical long section and cross-section profiles of the river with material layering.

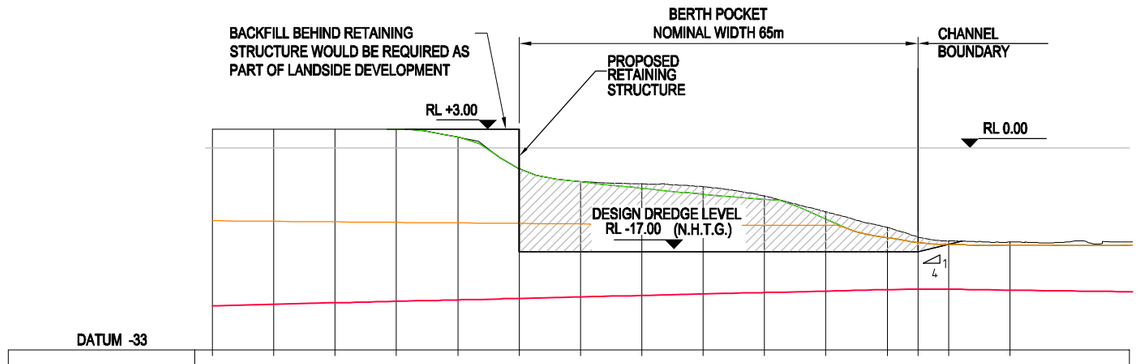
The soft, silty clay sediment contains varying levels of contaminants that have washed into the sediment layers over an extended period of time. These sediments have primarily originated from the adjoining industrial developments. Historical geochemical and ecotoxicity testing of the sediments show that the majority of these sediments are suitable for disposal at sea. However, some of the sediment may require treatment before it is suitable for disposal or reuse. Chapter 9 (Contamination) describes the relevant characteristics of the contaminated sediment chemistry and recommended treatment processes.

Historical testing has shown that the sand, clay, soft rock and rock found in the South arm are generally not contaminated and do not require treatment before reuse or disposal. The physical property of each of these materials considerably influences the method of dredging/excavation and reuse/disposal. Figure 13.3 to Figure 13.7 also show the depths and design profiles of the proposed berths.



PLAN

SCALE 1:2000



DESIGN SURFACE						-17.00	-17.00	-17.00	-17.00	-17.00	-17.00	-17.00	-17.00	-15.60					
EXISTING SURFACE LEVEL	3.01	3.01	3.01	3.01	1.72	-3.45	-5.53	-5.91	-6.38	-7.87	-10.46	-13.00	-14.56	-15.18	-15.37				
CHAINAGE	-50.00	-40.00	-30.00	-20.00	-10.00	-0.00	10.00	20.00	30.00	40.00	50.00	60.00	65.00	70.00	80.00				

LEGEND

- CHANNEL BOUNDARY
- EMBANKMENT (ROCK)
- EMBANKMENT (OTHER)
- ROCK SURFACE
- STIFF CLAY SURFACE
- SAND SURFACE
- PROPOSED RETAINING STRUCTURE
- PROPOSED BATTER SLOPE (VARIES) REFER PLAN
- EXTENT OF PROPOSED DREDGING (PLAN)
- EXTENT OF PROPOSED DREDGING (SECTION)

DREDGING VOLUMES TABLE DYKE 3 BERTH

MATERIAL TYPE	VOLUME (m3)
MUD	30,000
SAND	160,000
CLAY	110,000
GENERAL FILL	0
TOTAL	300,000

A / - SECTION (TYP.)

SCALE 1: 1000

Figure 13.3 **FOR INFORMATION**

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
1	REVISED ISSUE FOR ENVIRONMENTAL ASSESSMENT		AS	CC	MAW	07.09.12
0	ISSUED FOR ENVIRONMENTAL ASSESSMENT		VW	JS	MAW	21.11.11

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

NEWCASTLE PORT CORPORATION

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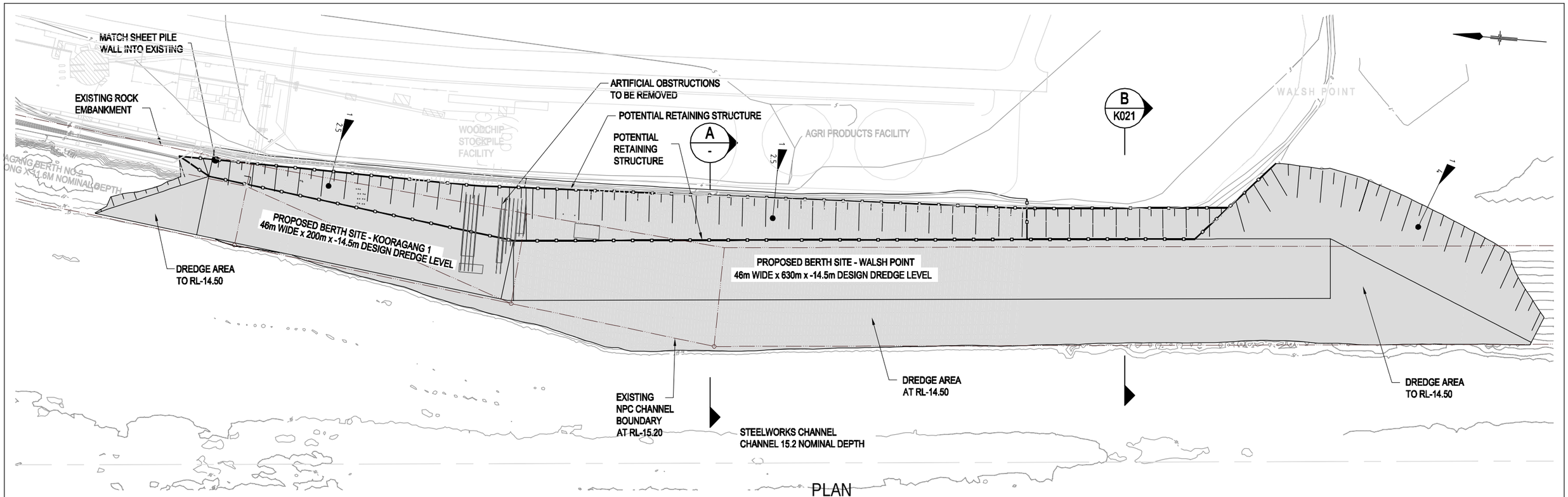
Drawn	L. TORRES	Designer	C. DENGATE
Drafting Check	A. MACLEAN	Design Check	M. WRIGHT
Approved (Project Director)	M. WRIGHT		
Date	21.11.11		
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client NEWCASTLE PORT CORPORATION
Project CAPITAL DREDGING ENVIRONMENTAL ASSESSMENT
Title DYKE 3 - PROPOSED BERTH SITE PLAN AND SECTION

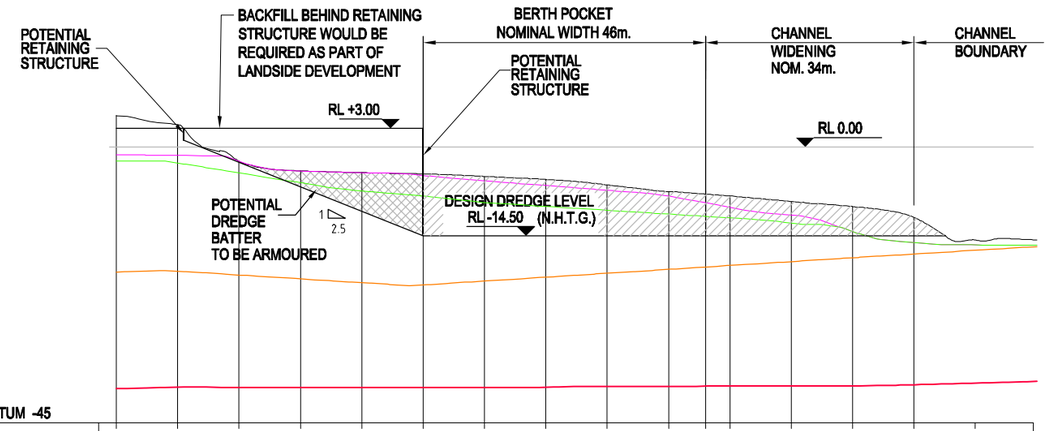
Original Size A3 **Drawing No: 22-15683-K010** **Rev: 1**

Plot Date: 6 September 2012 - 11:58 AM Plotted By: Andrew Shaw Cad File No: G:\22\15683\CADD\Drawings\22-15683-K010.dwg



PLAN

SCALE 1:3000



DATUM -45

DESIGN SURFACE	3.00	3.00	-2.50	-6.50	-10.50	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50
EXISTING SURFACE LEVEL	5.03	3.58	-2.64	-3.92	-4.21	-4.41	-4.84	-5.31	-6.21	-7.28	-7.71	-8.01	-8.20	-9.73	-11.52	-15.21
CHAINAGE	-50.00	-40.00	-30.00	-20.00	-10.00	-0.00	10.00	20.00	30.00	40.00	46.00	50.00	60.00	70.00	80.00	90.00

A - SECTION (TYP.)

SCALE 1 : 1000

LEGEND

- CHANNEL BOUNDARY
- EMBANKMENT (ROCK)
- EMBANKMENT (OTHER)
- ROCK SURFACE
- STIFF CLAY SURFACE
- SAND SURFACE
- MUD SURFACE
- POTENTIAL RETAINING STRUCTURE
- PROPOSED BATTER SLOPE (VARIES) REFER PLAN
- EXTENT OF PROPOSED DREDGING (PLAN)
- EXTENT OF PROPOSED DREDGING IF VERTICAL RETAINING STRUCTURE (SECTION)
- EXTENT OF PROPOSED DREDGING IF BATTER (SECTION)

DREDGING VOLUMES TABLE
K1 AND WALSH POINT BERTHS

MATERIAL TYPE	VOLUME (m3)
MUD	290,000
SAND	310,000
CLAY	75,000
GENERAL FILL	0
TOTAL	675,000

Figure 13.4

FOR INFORMATION

No	Revision	Drawn	Job Manager	Project Director	Date
0	ISSUED FOR ENVIRONMENTAL ASSESSMENT	VW	JS	MAW	21.11.11

Note: * indicates signatures on original issue of drawing or last revision of drawing

0 30 60 90m
SCALE 1:3000 AT ORIGINAL SIZE

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

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Drafting Check	A. MACLEAN	Design Check	M. WRIGHT
Approved (Project Director)	M. WRIGHT		
Date	21.11.11		
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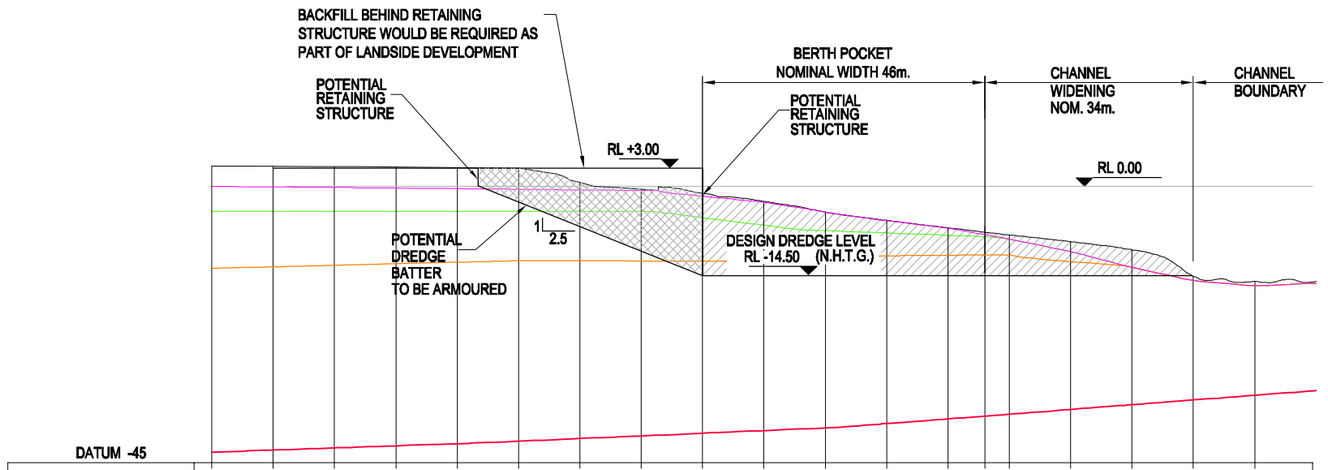
Project: CAPITAL DREDGING ENVIRONMENTAL ASSESSMENT
Title: K1 AND WALSH POINT - PROPOSED BERTH SITE PLAN AND SECTION

Original Size: A3
Drawing No: 22-15683-K020
Rev: 0

Plot Date: 24 November 2011 - 12:09 PM Plotted By: Alister R Maclean/Sydney/GHD/AU Cad File No: N:\AU\Newcastle\Projects\22\15683\CADD\Drawings\22-15683-K020.dwg



DESIGN SURFACE	3.00	3.00	0.50	-2.00	-4.50	-7.00	-9.50	-12.00	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50	-14.50	
EXISTING SURFACE LEVEL	3.353	3.297	3.239	3.164	3.084	3.002	0.674	-0.432	-1.114	-2.411	-4.142	-5.501	-6.738	-7.897	-8.970	-10.284	-14.583	-15.468	
CHAINAGE	-80.00	-70.00	-60.00	-50.00	-40.00	-30.00	-20.00	-10.00	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	

B K020 SECTION (TYP.)
SCALE 1 : 1000

LEGEND

- ROCK SURFACE
- STIFF CLAY SURFACE
- SAND SURFACE
- MUD SURFACE
- EXTENT OF PROPOSED DREDGING IF VERTICAL RETAINING STRUCTURE (SECTION)
- EXTENT OF PROPOSED DREDGING IF BATTER (SECTION)

FOR INFORMATION

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
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0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

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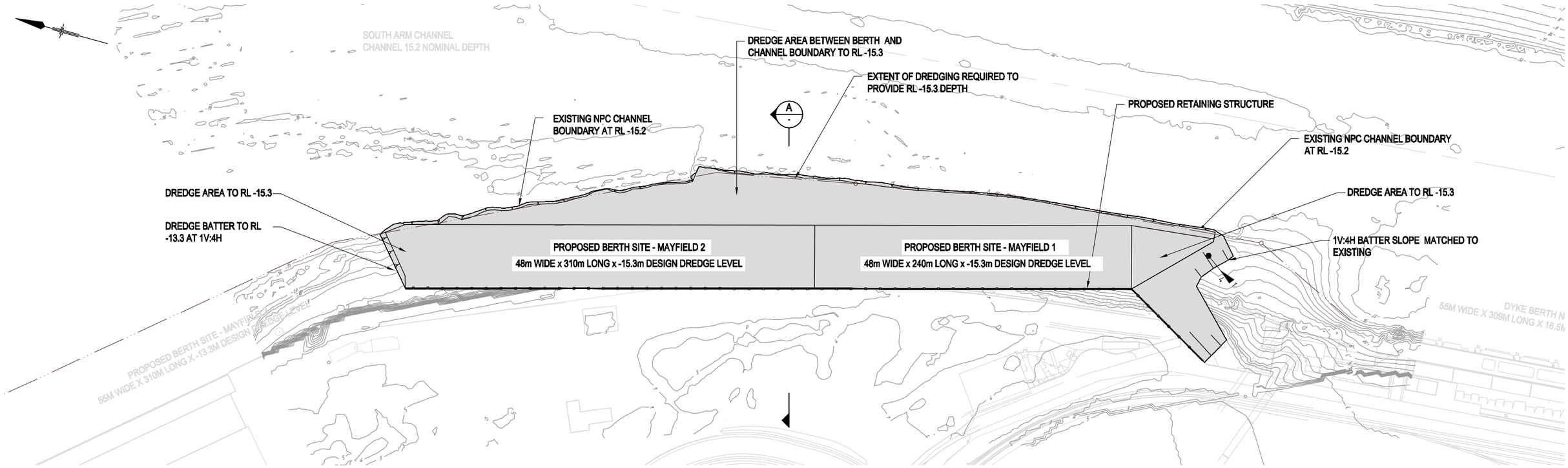
Drafting Check	A. MACLEAN	Design Check	M. WRIGHT
Approved (Project Director)	M. WRIGHT		
Date	21.11.11		
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client NEWCASTLE PORT CORPORATION
Project CAPITAL DREDGING ENVIRONMENTAL ASSESSMENT
Title K1 AND WALSH POINT - PROPOSED BERTH SITE SECTION

Original Size A3 **Drawing No:** 22-15683-K021 **Rev:** 0

Plot Date: 24 November 2011 - 11:52 AM Plotted By: Alister R Maclean/Sydney/GHD/AU Cad File No: N:\AU\Newcastle\Projects\22\15683\CADD\Drawings\22-15683-K021.dwg

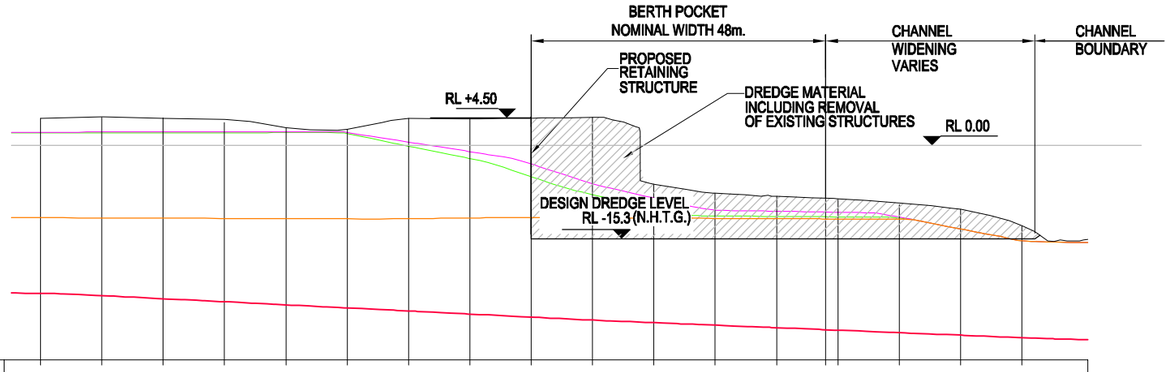


PLAN

SCALE 1:3000

LEGEND

- CHANNEL BOUNDARY
- EMBANKMENT (ROCK)
- EMBANKMENT (OTHER)
- ROCK SURFACE
- STIFF CLAY SURFACE
- SAND SURFACE
- MUD SURFACE
- PROPOSED RETAINING STRUCTURE
- PROPOSED BATTER SLOPE (VARIES) REFER PLAN
- EXTENT OF PROPOSED DREDGING (PLAN)
- EXTENT OF PROPOSED DREDGING (SECTION)



DATUM -35

DESIGN SURFACE								-15.30	-15.30	-15.30	-15.30	-15.30	-15.30 -15.30	-15.30	-15.30	-15.30		
EXISTING SURFACE LEVEL	4.591	4.670	4.436	4.184	2.730	2.914	4.445	4.417	4.538	4.604	-6.593	-7.782	-8.271	-8.739	-9.441	-10.623	-13.816	
CHAINAGE	-80.00	-70.00	-60.00	-50.00	-40.00	-30.00	-20.00	-10.00	-0.00	10.00	20.00	30.00	40.00	48.00 50.00	60.00	70.00	80.00	

A - SECTION (TYP.)

SCALE 1 : 1000

DREDGING VOLUMES TABLE MAYFIELD 1 AND 2 BERTHS	
MATERIAL TYPE	VOLUME (m3)
MUD	30,000
SAND	100,000
CLAY	93,000
GENERAL FILL	88,000
TOTAL	311,000

Figure 13.5

FOR INFORMATION

No	Revision	Drawn	Job Manager	Project Director	Date
1	REVISED ISSUE FOR ENVIRONMENTAL ASSESSMENT	AS	CC	MAW	07.09.12
0	ISSUED FOR ENVIRONMENTAL ASSESSMENT	VW	JS	MAW	21.11.11

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0 30 60 90m
SCALE 1:3000 AT ORIGINAL SIZE

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

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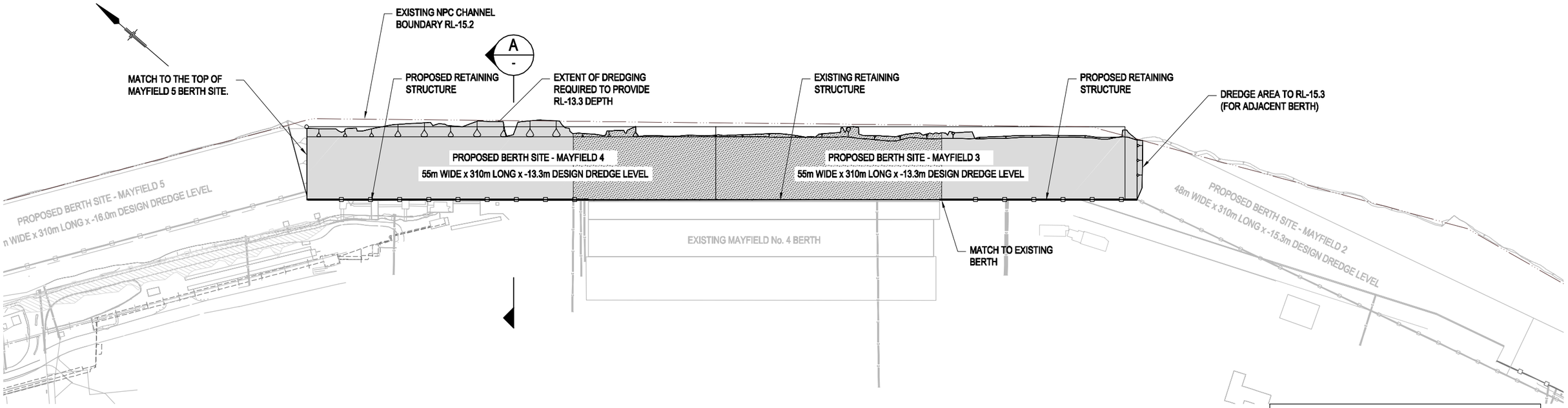
Drafting Check	A. MACLEAN	Design Check	M. WRIGHT
Approved (Project Director)	M. WRIGHT		
Date	21.11.11		
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client: NEWCASTLE PORT CORPORATION
Project: CAPITAL DREDGING ENVIRONMENTAL ASSESSMENT
Title: MAYFIELD 1 AND 2 - PROPOSED BERTH SITE PLAN AND SECTION

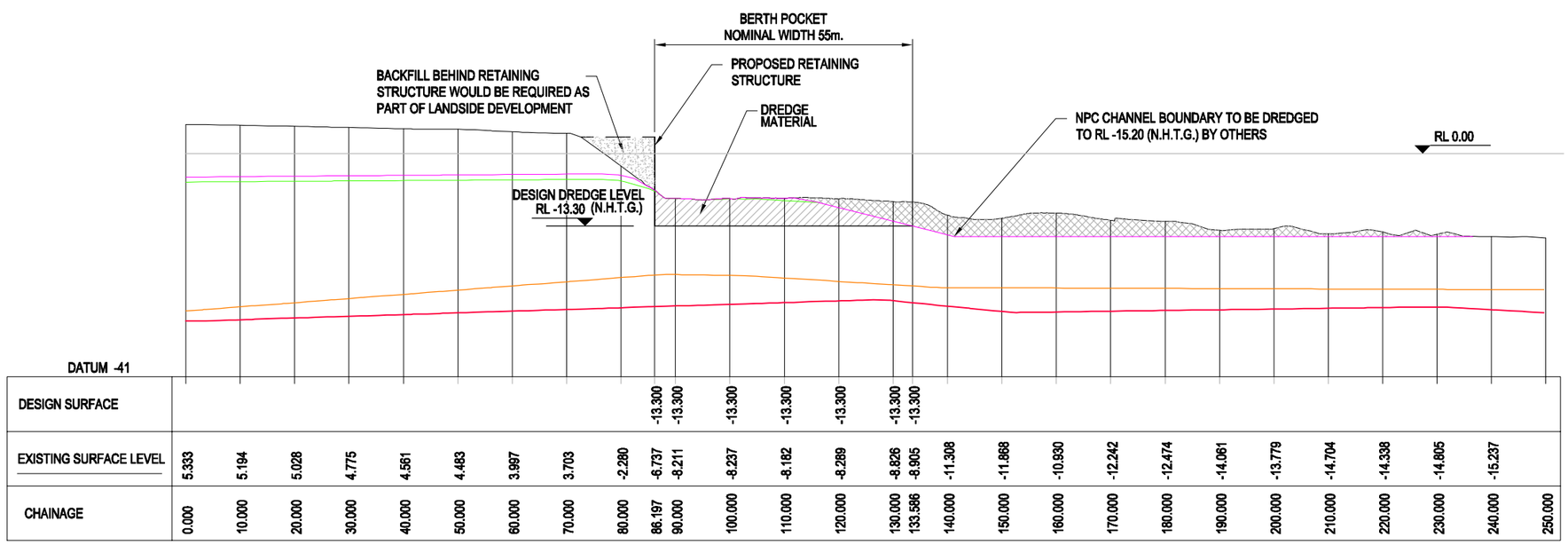
Original Size: A3
Drawing No: 22-15683-K030
Rev: 1

Plot Date: 6 September 2012 - 11:55 AM Plotted By: Andrew Shaw Cad File No: G:\22\15683\CADD\Drawings\22-15683-K030.dwg



PLAN

SCALE 1:3000



DESIGN SURFACE											-13.300	-13.300	-13.300	-13.300	-13.300	-13.300	-13.300													
EXISTING SURFACE LEVEL	5.333	5.194	5.028	4.775	4.561	4.483	3.997	3.703	-2.280	-6.737	-8.211	-8.237	-8.182	-8.289	-8.826	-8.905	-11.308	-11.868	-10.930	-12.242	-12.474	-14.061	-13.779	-14.704	-14.338	-14.805	-15.237			
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	86.197	90.000	100.000	110.000	120.000	130.000	133.586	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000		

A SECTION

SCALE 1 : 1000

DREDGING VOLUMES TABLE MAYFIELD 3 AND 4 BERTHS

MATERIAL TYPE	VOLUME (m3)
MUD	500
SAND	64,000
CLAY	500
GENERAL FILL	0
TOTAL	65,000

LEGEND

- CHANNEL BOUNDARY
- EMBANKMENT (ROCK)
- EMBANKMENT (OTHER)
- ROCK SURFACE
- STIFF CLAY SURFACE
- SAND SURFACE
- MUD SURFACE
- PROPOSED RETAINING STRUCTURE
- EXISTING SHEET PILE WALL
- PROPOSED BATTER SLOPE (VARIES) REFER PLAN
- EXTENT OF PROPOSED DREDGING (PLAN)
- MINIMAL DREDGING - BED PROFILING ONLY
- EXTENT OF PROPOSED DREDGING (SECTION)
- EXTENT OF DREDGING (BY OTHERS)

Figure 13.6 **FOR INFORMATION**

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
1	REVISED ISSUE FOR ENVIRONMENTAL ASSESSMENT		AS	CC	MAW	07.09.12
0	ISSUED FOR ENVIRONMENTAL ASSESSMENT		VW	JS	MAW	21.11.11

0 30 60 90m
SCALE 1:3000 AT ORIGINAL SIZE

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

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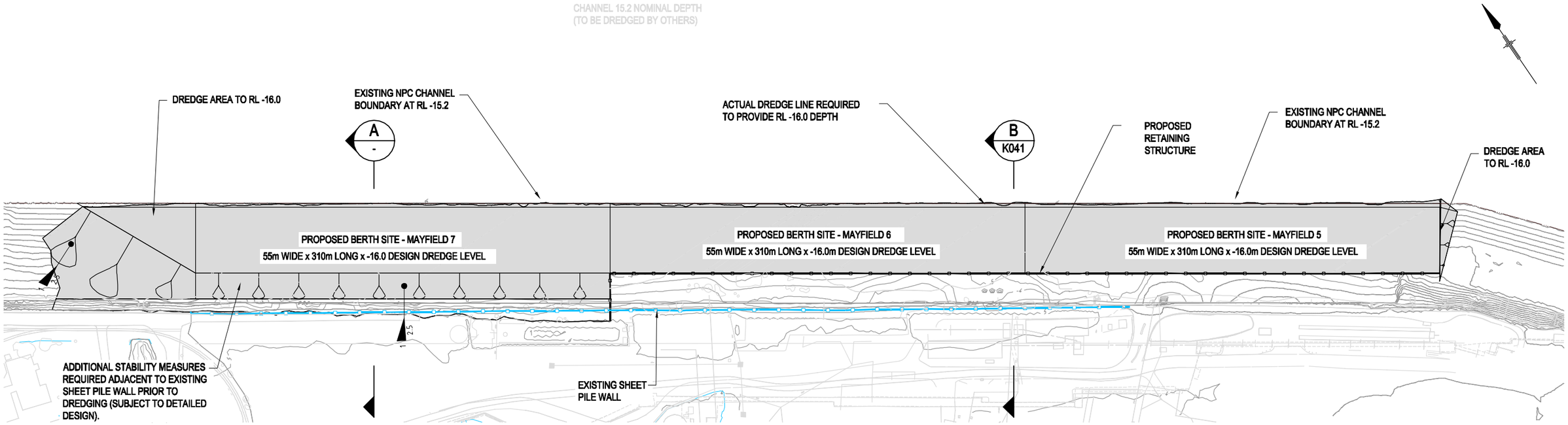
Drafting Check	A. MACLEAN	Design Check	M. WRIGHT
Approved (Project Director)	M. WRIGHT		
Date	21.11.11		
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client NEWCASTLE PORT CORPORATION
Project CAPITAL DREDGING ENVIRONMENTAL ASSESSMENT
Title MAYFIELD 3 AND 4 - PROPOSED BERTH SITE PLAN AND SECTION

Original Size A3 Drawing No: 22-15683-K050 Rev: 1

Plot Date: 6 September 2012 - 11:52 AM Plotted By: Andrew Shaw Cad File No: G:\22\15683\CADD\Drawings\22-15683-K050.dwg

SOUTH ARM CHANNEL
CHANNEL 15.2 NOMINAL DEPTH
(TO BE DREDGED BY OTHERS)

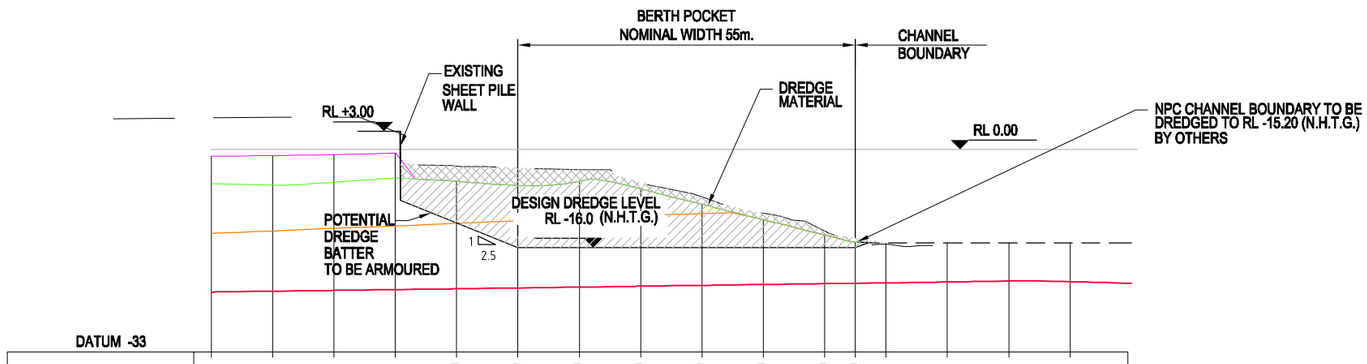


PLAN

SCALE 1:3000

LEGEND

- CHANNEL BOUNDARY
- EMBANKMENT (ROCK)
- EMBANKMENT (OTHER)
- ROCK SURFACE
- STIFF CLAY SURFACE
- SAND SURFACE
- MUD SURFACE
- PROPOSED RETAINING STRUCTURE
- EXISTING SHEET PILE WALL
- PROPOSED BATTER SLOPE (VARIES) REFER PLAN
- EXTENT OF PROPOSED DREDGING (PLAN)
- EXTENT OF PROPOSED DREDGING (SECTION)
- EXTENT OF DREDGING (BY OTHERS)



DESIGN SURFACE					-12.000	-16.000	-16.000	-16.000	-16.000	-16.000	-16.000	-16.000							
EXISTING SURFACE LEVEL	4.999	5.115	5.134	2.473	-2.918	-3.220	-3.458	-5.798	-8.115	-10.653	-13.812		-15.681						
CHAINAGE	-50.00	-40.00	-30.00	-20.00	-10.00	0.00	10.00	20.00	30.00	40.00	50.00	55.00	60.00	70.00	80.00	90.00			

A SECTION (TYP.)

SCALE 1 : 1000

DREDGING VOLUMES TABLE MAYFIELD 5, 6 and 7 BERTHS

MATERIAL TYPE	VOLUME (m3)
MUD	19,000
SAND	410,000
CLAY	75,000
GENERAL FILL	17,000
TOTAL	521,000

Figure 13.7

FOR INFORMATION

No	Revision	Drawn	Job Manager	Project Director	Date
1	REVISED ISSUE FOR ENVIRONMENTAL ASSESSMENT	AS	CC	MAW	07.09.12
0	ISSUED FOR ENVIRONMENTAL ASSESSMENT	VW	JS	MAW	21.11.11

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0 30 60 90m
SCALE 1:3000 AT ORIGINAL SIZE

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

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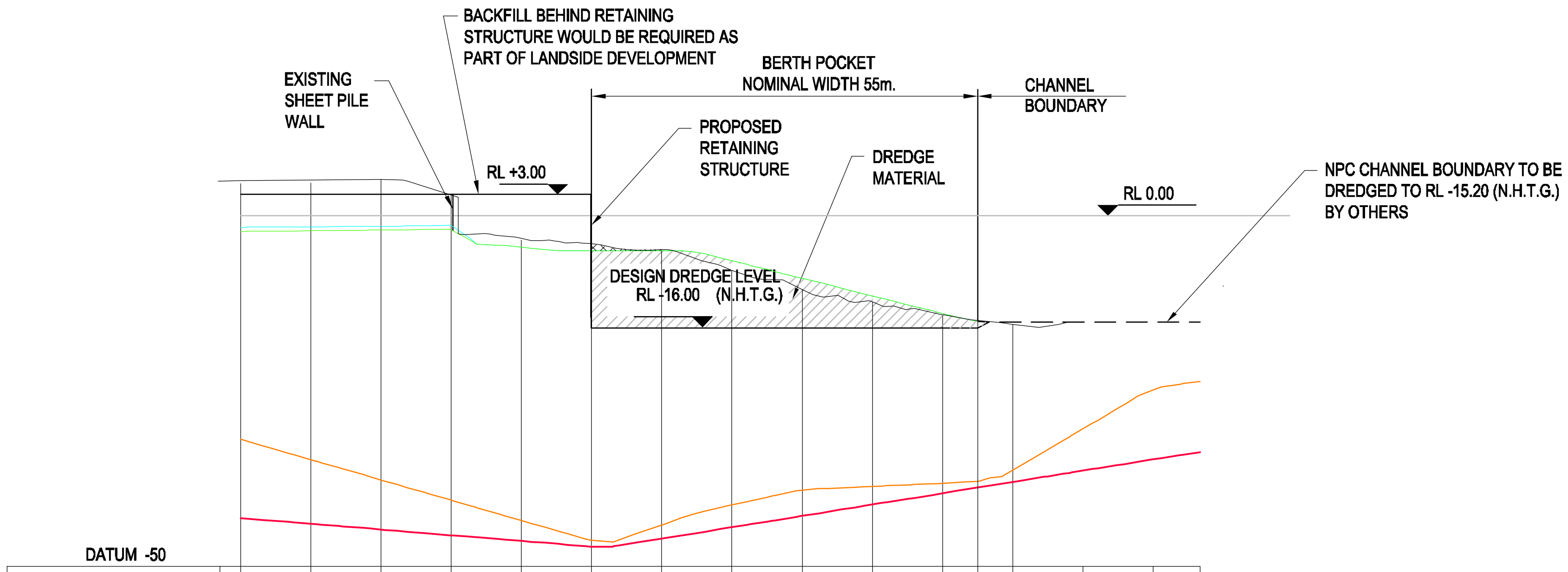
Drafting Check	A. MACLEAN	Design Check	M. WRIGHT
Approved (Project Director)	M. WRIGHT		
Date	21.11.11		
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client NEWCASTLE PORT CORPORATION
Project CAPITAL DREDGING ENVIRONMENTAL ASSESSMENT
Title MAYFIELD 5,6 AND 7 - PROPOSED BERTH PLAN AND SECTION

Original Size A3 Drawing No: 22-15683-K040 Rev: 1

Plot Date: 6 September 2012 - 11:46 AM Plotted By: Andrew Shaw Cad File No: G:\22\15683\CADD\Drawings\22-15683-K040.dwg



DESIGN SURFACE						-16.00	-16.00	-16.00	-16.00	-16.00	-16.00	-16.00	-15.20		
EXISTING SURFACE LEVEL	4.948	5.081	5.108	2.935	-3.215	-4.023	-4.852	-7.822	-10.507	-12.251	-14.146		-15.497		
CHAINAGE	-50.00	-40.00	-30.00	-20.00	-10.00	0.00	10.00	20.00	30.00	40.00	50.00	55.00	60.00	70.00	80.00

B SECTION (TYP.)
K040 SCALE 1 : 1000

LEGEND

- ROCK SURFACE
- STIFF CLAY SURFACE
- SAND SURFACE
- MUD SURFACE
- EXTENT OF PROPOSED DREDGING (SECTION)
- EXTENT OF DREDGING (BY OTHERS)

FOR INFORMATION

No	Revision	Drawn	Job Manager	Project Director	Date
1	REVISED ISSUE FOR ENVIRONMENTAL ASSESSMENT	AS	CC	MAW	07.09.12
0	ISSUED FOR ENVIRONMENTAL ASSESSMENT	VW	JS	MAW	21.11.11

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0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

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Drafting Check A. MACLEAN | Design Check M. WRIGHT
Approved (Project Director) M. WRIGHT
Date 21.11.11
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Client **NEWCASTLE PORT CORPORATION**
Project **CAPITAL DREDGING ENVIRONMENTAL ASSESSMENT**
Title **MAYFIELD 5,6 AND 7 - PROPOSED BERTH SITE SECTION**

Original Size A3 **Drawing No: 22-15683-K041** Rev: 1

Plot Date: 6 September 2012 - 11:59 AM Plotted By: Andrew Shaw Cad File No: G:\22\15683\CADD\Drawings\22-15683-K041.dwg

13.2.2 Literature Review

There is a large body of information from multiple previous studies of the Hunter River's sediments. These studies highlight the geotechnical and geochemical nature of the sediments in the South Arm of the Hunter River, as well as the previous dredging activities associated with their removal.

Together with the documents detailed in Chapter 9 (Contamination), the following documents were reviewed for the assessment of spoil handling and disposal:

- GHD 2003*, South Arm Dredging Project, Environmental Impact Statement*.
- NPC 2011*, Port Masterplan.*
- Proposed works by NCIG K8, K9 and K10.
- Proposed works at PWCS – K7 and T4.
- Hunter River Remediation Project.

13.2.3 Legislation and Guidelines

Appropriate guidelines and legislation were considered in the assessment of spoil handling and disposal. These included, but were not limited to:

- *Environment Protection and Biodiversity Conservation Act 1999.*
- *Environment Protection (Sea Dumping) Act 1981.*
- *NSW Environmental Planning and Assessment Act 1979.*
- ANZECC/ARMCANZ, 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC 2000).
- CSIRO, 2005, *Handbook for Sediment Quality Assessment.*
- Environment Australia, 2009, *The National Assessment Guidelines for Dredging*.
- NSW DECC, 2008, *Waste Classification Guidelines, Part 1: Classifying Waste.*
- Environment Australia, 2000, *Australian National Guidelines for Cetacean Observation.*

13.2.4 Methodology

A concept design was prepared to accompany the Preliminary Environmental Assessment (PEA) and application for assessment under Part 3A of the EP&A Act. This was transitioned into State Significant Infrastructure (SSI), and is now assessed under Part 5.1 of the EP&A Act. Further development and refinement of this concept design has confirmed the quantities of each material type proposed for removal and disposal. The existing geotechnical model was refined using the results of additional geotechnical and geochemical site investigations.

The PEA identified that 3,398,000 cubic metres of material would be dredged for the Project. The refinement of the concept design has reduced this volume to 1,870,000 cubic metres of material.

The concept design identified areas of potentially contaminated sediments requiring removal in order to develop the Spoil Handling and Disposal Strategy (the "Strategy"). Acid Sulfate Soil (ASS) or Potential Acid Sulfate Soil (PASS) were also investigated. The Strategy has made allowances for material that is not suitable for sea dumping or other reuses due to contamination. The Strategy also considers options for reuse of the material if sea dumping is not pursued.

It is unlikely that dredging would be undertaken at all 12 berths simultaneously, but rather in a series of smaller work packages. Reuse options would depend on other port user's requirements at the time of dredging, and the volume of material to be dredged in each work package. The Strategy provides options so that a decision can be made at the time of construction. Section 13.3 assesses the potential impacts associated with these options.

The spoil disposal and handling options detailed in the Strategy are:

- Sea dumping.
- Beach renourishment.
- Use as fill in industrial developments.
- Disposal to landfill.

13.3 Potential Impacts

The following section summarises the potential impacts from the spoil disposal options provided in the Strategy. Impacts may be produced in the immediate area of the dredged site, and in the transportation and disposal of dredged material. Other potential impacts are assessed in Chapter 9 (Contamination), Chapter 11 (Noise and Vibration), Chapter 14 (Traffic and Transport) and Section 16.2 (Air Quality).

13.3.1 Sea Dumping

Sea dumping of the sediment at the approved Newcastle Offshore Spoil Ground requires approval from SEWPaC under the Sea Dumping Act and the EPBC Act. Figure 13.1 shows the location of the Newcastle Offshore Spoil Ground.

NPC has approval from SEWPaC to deposit sediment dredged from maintenance dredging in the current Newcastle Offshore Spoil Ground. NPC will lodge a separate application with SEWPaC for a Sea Disposal Permit for Capital Dredging.

As outlined in Section 13.1, NPC holds an Environmental Protection Licence (EPL 3373) which was issued by the NSW Office of Environment and Heritage (OEH). EPL 3373 approves the removal of between 100,000 and 500,000 cubic metres of sediment annually. NPC would seek a variation to EPL 3373 to remove the additional volume of material for the Project.

An environmental assessment, including validation testing results of the sediment, would accompany the application for the sea dumping permit. Impacts associated with dumping the material at sea would be assessed under the EPBC Act, and approval from SEWPaC would be required before any sea dumping can occur.

The physical impacts from offshore disposal have been considered in the context of the relatively high natural sediment supply from the Hunter River at times of flooding, and sediment dumping from maintenance dredging activities. Estimates prepared by Patterson Britton (1989) indicate that in a major flood, for example March 1977 (50 year return period), the river can discharge approximately 25-30 times more sediment than that associated with the current average annual maintenance dredging volume (about 400,000 cubic metres). The average annual sediment discharge from the river due to flooding is some 10 times greater than the current average annual maintenance dredging. The marine ecosystem generally in Stockton Bight has adapted over time to episodes of sediment loading.

Sediment types for the Project's disposal program are similar to those disposed in the area from maintenance dredging and are therefore not expected to significantly alter the substrate to which the marine organisms have adapted. Light attenuation is not expected to occur for near shore habitats such as seagrass beds (which would only be present significantly shoreward of the disposal site).

Organisms residing in the offshore disposal area would have adapted to a certain degree of periodic disturbance from both dredge material placement and sediment loads from flooding events. Due to this expected adaptation and the limited impacts discussed above on the physical and chemical characteristics of the disposal site, it is anticipated that the Project would not significantly impact the area's biological communities.

A monitoring program would be established during the ocean disposal of the dredged materials. The nature, extent and details of this program would be agreed with all regulatory authorities prior to any disposal works being undertaken. The results of this monitoring program would be progressively re-evaluated against anticipated distribution patterns and effects. If necessary, the disposal program would be modified to minimise any adverse environmental effects.

13.3.2 Beach Renourishment

The use of dredged river sand for beach renourishment at Stockton Beach is an option considered in the Strategy. Stockton Beach is located to the immediate north of the entrance to the port. A constructed rock break wall separates the beach from the river mouth as shown in Figure 13.8.

Beach renourishment is a method of replacing sand lost from beaches due to erosion and longshore drift. Currents and wave action would disperse the sand over time thereby adding to the volume of sand along the beach. The size of the sand grains used for renourishment greatly influences its success. Where the grain size of the dredged material closely matches grain sizes at the receiving beach, renourishment is usually the most successful.

Renourishment of Stockton Beach could involve directly pumping dredged sand via flexible pipes over the Stockton breakwater from the dredge to the southern end of the beach. Alternatively the material could be "bottom dumped" in shallow waters off Stockton Beach, or "rainbowed" (cast over the bow of the dredge) into the nearshore zone to achieve nourishment of the total beach profile. The deposition of the sand has the potential to create localised and short-term impacts, but also long-term benefits.

Beach renourishment can alter the physical characteristics of the sand profiles of the receiving beach. Depending on the volumes and duration of sand deposition, changes can affect sand compaction, moisture content, grain size and potentially the slopes of the beach at the intertidal zone.

Potential impacts from the deposition of sand at the southern end of Stockton Beach include:

- Burying macrofauna and benthic organisms at the deposition area. The benthic zone is the sea floor in the area of deposition and benthic species may not have time to adapt to the sudden increase in sand volumes.
- Burying sea grasses or reefs.
- Potential for flow on effects to other species that feed on benthic organisms.
- Increasing turbidity in the receiving area due to the presence of fine-grained or silty material.
- Changes in wave patterns.

Potential long-term benefits from beach renourishment include:

- Improved habitat for aquatic species.
- Improved habitat for species in the intertidal zone.
- Enhanced protection against erosion events during storms.

The potential impacts and long-term benefits of beach renourishment would be assessed in detail at the time of construction if beach renourishment is to be undertaken by the proponent, or Newcastle City Council (currently investigating potential sand sources and funding opportunities for renourishment of Stockton Beach). Refer to Section 13.4.2 for more details regarding beach renourishment.

LEGEND

Berth Locations

1:25,000 (at A4)

0 100 200 400 600 800

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

GHD CLIENTS | PEOPLE | PERFORMANCE

NEWCASTLE PORT CORPORATION

Newcastle Port Corporation
Capital Strategic Dredging Project

Job Number 22-15683
Revision 0
Date 10 SEP 2012

Stockton Beach

Figure 13.8

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com.au W www.ghd.com.au

G:\22\15683\GIS\Maps\Deliverables\Environmental Assessment\Spoil handling & disposal\2215683_SHD005_StocktonBeach_0.mxd

Data Source: LPMA: DTDB - 2007, Imagery - 2007. Created by: gmcdiarmid, fmackay, mbarnier

13.3.3 Fill for Industrial Developments

Using the dredged material for clean fill in port side industrial developments is another option assessed in the Strategy. In this scenario, dredged material suitable for use on land would be pumped directly from the barge to the receiving site. One or more settlement ponds would be constructed at the site to allow for water to settle out from the material. The settlement ponds would collect the water and allow finer sediments to settle before the water is pumped back into the river.

Using the sediment for fill in the construction of portside industrial developments has the potential to produce environmental impacts. It also has the potential to produce positive environmental results.

Potential negative impacts include:

- Construction of settlement ponds for the separation of fine sediments requiring an area of land to be developed.
- Sedimentation from runoff if appropriate controls are not in place.
- Turbidity impacts associated with discharge of return waters.
- Air quality impacts if spoil is odorous, or from dust if it is not covered when dry.

Potential positive environmental results:

- A reduced need for imported fill. This would reduce transportation and fuel usage associated with the importation of fill.

13.3.4 Disposal to Landfill

All material suitable for sea dumping, beach renourishment or as fill for industrial development would be delivered by barge to the appropriate site. A proportion of the dredged material, in the order of 30,000 cubic metres, may be unsuitable for sea disposal or other uses due to contamination levels. Approximately 2,500 cubic metres of contaminated material would be excavated from the shoreline in the area of Mayfield 1 and 2. This would require disposal to landfill also. Chapter 9 (Contamination) describes the extent and nature of this contaminated material. This material would be taken to Kemps Creek in Sydney for disposal in landfill.

The volume of material to be transported to landfill represents approximately 1.6 percent of the total dredged volumes. The disposal of contaminated material would be undertaken in accordance with the NSW DECC, 2008, *Waste Classification Guidelines, Part 1: Classifying Waste.*

Chapter 14 (Traffic and Transport) assesses the potential impacts of transporting this material by road to landfill at Kemps Creek.

The disposal of this contaminated waste would not produce significant environmental impacts. Rather, removing contaminated sediment from the river and foreshore and disposing of it to landfill would benefit the environment.

13.4 Recommended Mitigation Measures

Mitigation measures to address specific environmental impacts associated with the Project are detailed in the relevant chapters of this EIS. The following section summarises the mitigation measures to eliminate or minimise impacts from the spoil handling and disposal options.

In the event that contaminated sediment is identified, this material will be stockpiled at Walsh Point (or other suitable location). Any proposed stockpile location will require the development of a site-specific management plan.

13.4.1 Sea Dumping

NPC would seek a separate approval for the sea dumping of material from the Project in the form of a Sea Dumping Permit Application under the *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act). This application and subsequent permit conditions would provide a detailed description of the approach to mitigating the environmental impacts associated with the transport and disposal of dredged material within the offshore disposal ground. This would generally be achieved through the implementation of a carefully planned dredging and disposal methodology, monitoring program and consultation program. Specifically, this approach would include the development and implementation of mitigation measures, including but not limited to the following:

- Geochemical validation testing prior to the commencement of dredging and disposal operations to confirm the suitability of the sediments for disposal.
- Formal waste audit, including evaluation of the types, amounts and physical impacts of wastes generated; point and diffuse sources of contaminants to which material is exposed; total quantities and cumulative impacts of each waste generated; and feasibility of waste reduction/prevention of contamination.
- Dredged Material Placement Management Plan to determine the most appropriate placement areas for the various material types and ensure individual hopper loads are distributed across the dump ground. This would minimise the localised build-up of material. The plan would include recommendations for detailed placement records and periodic bathymetric surveys during and following the completion of the disposal activities.
- Monitoring Programs both within and outside the predicted zone of impact to describe the program to determine the actual zone of impact/extent of change, especially effects on the benthic community. This would include aspects of both compliance and effects monitoring.
- In accordance with the *Australian National Guidelines for Cetacean Observation* (Environment Australia, 2000), a whale watch would be established on disposal vessels, and suspension of disposal activities would occur when marine mammals are in close proximity.

13.4.2 Beach Renourishment

The placement of dredged material at Stockton Beach would be a beneficial reuse of the material. Material with compatible physical characteristics (matching or complementing those of the existing Stockton Beach sand), would be introduced into the sub aerial and near-shore beach profile. The nourishment operations could potentially have a negative impact on the surrounding environment, unless carefully managed.

Prior to commencement of beach renourishment, additional investigations would be required in support of the approvals to be secured by others (such Newcastle City Council or the future proponents).

Development and implementation of mitigation measures would be undertaken in accordance with the approval conditions, including but not limited to the following likely measures:

- Further investigations would be undertaken in support of additional approvals in order to confirm that the material used for beach nourishment would be compatible with the native beach material. In particular, it should have a similar size (or slightly coarser) and grading; composition (quartz and shell content); angularity (angular or well rounded); and colour.
- In the event that that material is suitable for beach renourishment, it would be managed in conjunction with Newcastle City Council and relevant guidelines.
- Detailed design of the proposed nourishment area to address any site specific opportunities and constraints.
- Development of a detailed material transport and placement methodology to minimise impacts associated with the transport of the material and to ensure total nourishment of the full beach profile is achieved.
- Development of Monitoring Programs for Stockton Beach and adjacent areas to determine the actual change in beach profiles/extent of change, especially effects on the coastal processes of the area. This would include aspects of both compliance and effects monitoring.

13.4.3 Fill in Industrial Developments

As noted above, the clean sands could be pumped directly from the dredge to nearby port side industrial developments for use as fill material. The development proponent would secure additional approvals required to implement this option in the future.

Development and implementation of mitigation measures would be undertaken in accordance with the approval conditions, including but not limited to the following likely measures:

- Further investigations to support the additional approvals and confirm the onshore conditions. These investigations would confirm that the material is suitable for the intended purpose.
- Confirmation of a discharge pipeline route which minimises the impacts associated with the transport of dredged materials to the site. Consideration would be given to a number of factors including the shore connection, types of discharge pipeline required (such as land based, floating or submersible), installation methodology, routes across existing structures, vegetation, foreshores, inter-tidal and riverbed areas, installation, maintenance, operational and removal considerations and reinstatement of vegetation (where required).

- Development of a Site Reclamation Strategy, which is likely to include excavation of localised contaminated or otherwise unsuitable sediments (if required), sequential construction of bunds (both perimeter and internal) to form the settlement ponds, installation of hydraulic controls to facilitate discharge of return water through the ponds, the hydraulic placement of sand in a series of lifts, and finally, the collection and removal of the remaining fines fraction (if required).
- Development of a Water Management Strategy to manage the return waters released from the placement of dredged slurry across the reclamation site and ultimate discharge. Specifically the strategy would need to consider the following factors: existing site topography and natural features; grain size distribution of dredged sands; fines and water storage volumes required; existing drainage features; and likely requirements for discharge of return water to the Hunter River.
- Development of Monitoring Programs for the onshore and return water discharge points would be required, including aspects of both compliance and effects monitoring.

13.4.4 Disposal to Landfill

A small percentage of dredged material (in the order of 30,000 cubic metres) may be unsuitable for beneficial reuse or unconfined sea disposal due to its geochemical properties, and would require disposal (and potentially treatment) at an appropriately licenced waste facility. A further 2,500 cubic metres of contaminated material would be excavated from the shoreline at the Mayfield 1 and 2 berths. This material would require disposal to landfill.

The treatment and disposal locations for the material would be determined following the completion of additional geochemical testing to accurately define the nature and extent of the contaminated sediments. However, for the purposes of this EIS, it has been assumed that this material would be transported to Kemps Creek in Sydney.

Development and implementation of mitigation measures would be confirmed following confirmation of the nature of the material. It is envisaged these measures would include the following:

- Selection of appropriate plant and equipment, namely excavation of potentially contaminated materials using a backhoe dredge, operating in conjunction with two shallow draft flat top barges. This plant is preferred on the basis that it would minimise the potential for adverse environmental impacts such as:- the presence of artificial obstructions; odour generation; onshore dewatering; pump and pipeline blockages/breakdowns; and turbidity generation.
- Development of an appropriate construction methodology, where by the backhoe dredge would be fitted with a specially designed grab or bucket that minimises turbidity in the water column during dredging operations. The material would be raised slowly within a turbidity curtain prior to its placement in a hopper barge anchored adjacent to the backhoe dredge. The use of the specially designed grab or bucket would significantly reduce the amount of material put into suspension. This approach would minimise migration of these contaminated materials, and also has the advantage of minimising the water content of the material.

- Where materials are located high on the river bank, the removal activities would be isolated from the South Arm of the river as much as is possible, to prevent potentially contaminated groundwater flows into the excavation from reaching the river. This would be achieved by retaining the existing river banks, sea walls and revetments in the same position and level for a long as possible.
- Excavated material would be tested onsite for classification before transport and disposal using road trucks with tight fitting or sealed tailgates as previously used on similar sites on Kooragang Island and at Mayfield.
- The onsite handling and treatment of the unsuitable materials would be completed under the existing licence conditions of the potential waste facilities and is not part of this EIS.