Cruise Passenger Terminal

Location Options Report for west of Sydney Harbour Bridge

Commissioned by Sydney Harbour Foreshore Authority on behalf of the Passenger Cruise Terminal Steering Committee

CROWN PROJECT SERVICES
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**Attachment 1** – Forecast Arrivals Data
PART 1 INTRODUCTION

The Passenger Cruise Terminal (PCT) Darling Harbour, Wharf 8 needs to be relocated. The imminent commencement of works on Sydney Metro and the pending announcement of the preferred developer for Barangaroo will necessitate the establishment of a new terminal in the western harbour.

A Steering Committee was formed to examine the long term options for the establishment and operation of Cruise Passenger Terminals in Sydney, both in the western and eastern harbour.

This report examines the options for the new terminal facility in the western harbour.

Crown Project Services was retained by the PCT Steering Committee to examine six identified options, as follows:

Option 1 – White Bay 4 & 5 (adaptive re-use of existing industrial building)

Option 1A - White Bay 4 & 5 (construction of a new purpose built terminal facility)

Option 2 – Glebe Island 5 & 6 (construction of a new purpose built terminal facility)

Option 3 – Glebe Island 2 & 5 (construction of a new purpose built terminal facility)

Option 4 – Glebe Island 1 & 2 (construction of a new purpose built terminal facility)

Option 5 – Glebe Island 1 / White Bay 4 (construction of a new purpose built terminal facility with overflow capacity at White Bay 4)

The objectives of this report are to confirm the needs of the new facility, assess the options against these needs and to rank the options for submission to Government for consideration. Specifically, the task encompasses a review of each option in terms of the following:

- Cost benefit analysis
- Land transport
- Amenity
- Impact on other harbour users
- Shoreside and harbourside security
- Impact on existing land ownership/occupants;
- High level financial costing analysis

The examination of these options also needs to consider the broader market dynamic supporting the establishment of a new western harbour terminal facility and its long term ability to service the cruise industry.

The preparation of this report was guided by the PCT Steering Committee and follows an interim presentation and findings to prioritise the scope for review. Crown Project Services acknowledges the input of the Steering Committee in preparing this report, represented by the following:

Sydney Harbour Foreshore Authority
- Mike Collins (Steering Committee Chairman)
  Chairman, Sydney Harbour Foreshore Authority

Carnival Australia
- Ann Sherry AO, Chief Executive Officer
- John Nell, Director Shore Operations

Tourism and Transport Forum (TTF)
- Christopher Brown, Managing Director

Royal Australian Navy
- Andrew Mackinnon, Director General, Navy Capability Plans & Engagement, Navy Strategic Command
- Gerry Savvakis, Port Services Manager

NSW Maritime
- Tony Middleton, Deputy Chief Executive
- Geraldine Andrews

Sydney Ports Corporation
- Grant Gillilan, Chief Executive Officer
- Annette Woods, Executive General Manager

Tourism NSW
- Lyndel Gray, Executive Director & General Manager
- Alan McGuigan

Shipping Australia Limited
- Llew Russell, Chief Executive Officer

Royal Caribbean Cruises Australia
- Gavin Smith, Managing Director
In developing the concepts for alternate options and corresponding cost implications of the alternatives, specialist expert advice was provided by the following:

- Cox Richardson – Architectural and space allocation
- Rider Levett Bucknall – Cost Planning
- MWT Halcrow – Traffic
PART 2 CRUISE INDUSTRY DYNAMICS

A number of reports have been prepared over the last five years which support the need to expand and enhance passenger cruise terminal facilities in Sydney. These reports have been commissioned by various government/statutory authorities and private organisations to support the case for the development of new passenger cruise facilities.

A Steering Committee has been established to:

- Review existing information
  - Existing and future cruise number forecasts
  - Adequacy of existing data/requirement for additional data
- Assess infrastructure requirements to support future cruise projections
- Identify the nature, location and enhancements required to existing and/or new infrastructure
- Develop needs brief for future PCT facilities and assess alternative locations against the agreed brief
- Establish a consultation program with relevant stakeholders
- Prepare a report to the Minister for Planning incorporating the Terms of Reference suitable for Ministerial/Cabinet consideration
- Prioritise and develop a Part A report incorporating a detailed implementation plan for the establishment of a permanent PCT west of Sydney Harbour Bridge
- Develop a Part B report for the development of options in the eastern harbour.

To realise the above it is necessary to understand the key drivers for the industry, both now and moving forward, to ensure that facilities are available in line with industry needs.

INDUSTRY DYNAMICS

The Australian cruise industry is characterised by the following:

- Australia and the South Pacific market represents just under 4% of the global cruise market
- The cruise industry in Australia is highly seasonal with the peak season occurring between November and April
- The market is characterised by three different segments, as follows
  1. Round the world cruises that transit Australia in Northern Hemisphere winter
  2. Seasonally based regional cruises (typically October to April)
  3. Year round home based vessels
- In 2008/2009 season home based vessels represented over 47% of all visits, with 29% being seasonally deployed visits and the balance, 24% coming from round the world visits
- The market grew at over 18% per annum in the period from 2002 to 2008
- Carnival represents 70-80% of Sydney’s annual revenue from cruise ships
PART 3 OPTIONS ANALYSIS

Functional Brief

A functional brief was developed for the new Cruise Passenger Terminal and was used by the Committee as the basis for reviewing each of the identified options. The functional design brief was largely based on the existing terminal at Darling Harbour, Wharf 8. The performance of the new terminal was set to at least match the existing terminal in terms of operation and efficiency.

While the functional brief is to accommodate one ship there is a need for a secondary/overflow berthing facility so that two ships can be accommodated simultaneously west of the Harbour Bridge.

The terminal is sized to efficiently process up to 4,800 passengers and crew through immigration, customs, check-in, quarantine and port security (i.e. a ship arrival and a ship departure). The facility is not designed to handle two arrivals at the one time.

The key elements of the brief are:

Terminal Building:
- Arrivals Hall - Area: 1,000 square metres
- Customs Hall - Area: 1,750 square metres
- Providing/Cargo Hall - Area: 1,500 square metres (to include 280 sqm Bond Store)
- Customs / AQIS offices
- Covered set down/pick up point and external coach queuing area – 2350sqm
- Embarkation balcony approximately 80m long x 5m wide, set back around 15m from the wharf face, subject to final gangway specifications.
- Elevator, stairs and escalator from Customs Hall level to embarkation balcony level.

Berthing Facilities (minimum):
- Minimum quay length required - 305m (including moorings for one vessel).
- Max vessel - LOA 265 metres
- Water depth required - 11m
- Stringer Height: 3.1 m

Gangways:
- Two self supporting passenger gangways required with an operating range along the balcony of at least 60m.

Parking:
- Car parking for 200 vehicles required inside the boundary of the terminal precinct.
- Ability to add 200 vehicle parking for long term “Park & Cruise”
- Number of Bus/Coach spaces required: maximum of 20 spaces
- A minimum of 20 taxi queuing bays and at least 10 drop-off and pick-up spaces
- At least 8 parking spaces for trucks providing Providing / ship services

Security:
- Fencing to Australian Customs requirements
- Secure access control
- Waterside / landside security in accordance with the Maritime Transport and Offshore Securities Act

A copy of the functional brief is provided in Attachment 6 of the Steering Committee’s Part A Report.

The Steering Committee has reviewed the functional brief and a workshop was held with Sydney Ports to review the brief in detail.
Overview of Options

The six options identified for review are as follows:

**Option 1** – White Bay 4 & 5 (adaptive re-use of existing industrial building – Cargo Hall)

**Option 1A** - White Bay 4 & 5 (construction of a new purpose built terminal facility)

**Option 2** – Glebe Island 5 & 6 (construction of a new purpose built terminal facility)

**Option 3** – Glebe Island 2 & 5 (construction of a new purpose built terminal facility)

**Option 4** – Glebe Island 1 & 2 (construction of a new purpose built terminal facility)

**Option 5** – Glebe Island 2 / White Bay 4 (construction of a new purpose built terminal facility at GI 2 with overflow capacity at White Bay 4)

*Option1 - White Bay Berths 4&5 (adaptive re-use)*

The White Bay option benefits from established wharf facilities and infrastructure.

Advantages
- Wharf structure established
- Minimal impact on Harbour users
- Ability for building reuse
- Compatible future adjoining use
- Landside utilities in place
- Currently active part of port infrastructure

Disadvantages
- Proximity to residents with potential noise / air quality issues
- Existing traffic congestion on Robert St / Mullins St
- Restricted Logistics access
- Potential conflict with other wharf users

*Note: Marquee required at Berth 4 for secondary berthing*

*Option1A - White Bay Berths 4&5 (new terminal)*

The White Bay option benefits from established wharf facilities and infrastructure.

Advantages
- Wharf structure established
- Custom built facility means a smaller building footprint
- Minimal impact on Harbour users
- Compatible future adjoining use
- Landside utilities in place
- Currently active part of port infrastructure

Disadvantages
- Proximity to residents with potential noise / air quality issues
- Existing traffic congestion on Robert St / Mullins St
- Restricted Logistics access
- Potential conflict with other wharf users
Option 2 - Glebe Island Berths 5 & 6

Glebe Island Berths 5 & 6 do not have an established wharf facility and would require significant marine works to meet the requirements of the functional brief new infrastructure.

Advantages
- Landside utilities in place
- Good access to the site from James Craig Drive
- Good access for logistics

Disadvantages
- Wharf structure not established
- Insufficient berth length for two ships
- Insufficient depth
- Potential impact on other port users (bulk material berths and turning basin)
- Cost and time impact of developing new wharf structure and associated infrastructure

Proximity to residents with potential noise / air quality issues

Option 3 - Glebe Island Berths 2 & 5

Glebe Island Berth 2 has an established wharf – Berth 5 does not have a wharf and requires significant investment in port infrastructure.

Advantages
- Minimal impact on port users
- Infrastructure in place to service terminal
- Further away from residents

Disadvantages
- Wharf 5 structure not established
- Insufficient depth at Glebe Island 5
- Time and cost to develop Wharf 5
- Some dredging required

Option 4 - Glebe Island Berths 1 & 2

Glebe Island Berths 1 & 2 have an existing continuous wharf and are well serviced from a utilities / access to the site.

Advantages
- Currently active port use
- Wharf structure established
- Infrastructure in place to service the terminal
- Good access to the site from James Craig Road
- Good access for logistics
- Further away from residents

Disadvantages
- Insufficient berth length for two ships (468m)
- Maneuvering width of bay is tight
- Second wharf is close to residents
Option 5 - Glebe Island Berth 2 / White Bay Berth 4

Glebe Island Berth 2 & White Bay 4 have an existing wharf structure and Glebe Island is well serviced by utilities / access.

Advantages

- Wharf structures are established in both locations
- Currently active port use
- Infrastructure in place
- Primary wharf (Glebe Island 2) further away from residents
- Minimal impact on harbour and port users
- Good access to the site from James Craig Road
- Good access for logistics

Disadvantages

- Two berths are not co-located
- Bus shuttle from White Bay to terminal on Glebe Island 2 not feasible

*Note: Marquee required at Berth 4 for secondary berthing

NB. A more detailed examination of the options follows.
OPTION 1 - White Bay Berths 4 & 5

Adaptive Reuse of Existing Industrial Building – Cargo Hall

Zoning: Port & Employment

Permitted uses: Uses that facilitate the continuation of the commercial port uses, employment uses, port and maritime uses.

Area: 12.9 hectares (refer Attachment 2 – Site Area)

Terminal Area: 6.1 hectares

Wharf / Quay Length: berth 4 - 264 metres, berth 5 - 233 metres, berth 6 - 179 metres (Baileys) and berth 3 – 278m

Water Depth: 10.9 / 11 metres

Stringer Height: 3 metres

Comments:

White Bay is the most operationally ready facility in terms of accommodating two ships. It has relatively secure and dedicated access with complete wharf structures that have been used as an overflow berth when DH8 was occupied.

To achieve the required quay length, this option needs to use parts of berths 3 & 6.

The original concept developed utilizes a portion of land in front of the escarpment which is not considered essential and cashflows will be adjusted to reflect this.

The condition and extent of infrastructure at White Bay would enable the works to be staged in line with the requirements to exit Barangaroo and have a new facility operational by June 2012.

Shoreside security is maintained by a substantial escarpment that is topped by a full height fence. Shoreside security can be maintained at 30 metres out from the water side of the vessel. As the terminal is designed for only one arrival at a time, either a temporary marquee is required or staggered arrivals on the same day be planned to minimize processing delays. Option 1 best satisfies the functional brief except for stringer height (-100mm) and the requirement to occupy waterside lease area from the Baileys site for the bow overhang (incorporated in negotiations with Baileys).
The key amenity issues are:

- Noise arising from:
  - Shipping activities
  - Traffic
  - Functions that might be associated with non-ship day usage
- Increased local traffic and the impact on the already congested Robert Street, particularly at the Robert Street / Mullen Street intersection and the Victoria Road intersection.

Established communities in Balmain and Balmain East will require extensive consultation during the planning and concept design stage to ensure that all stakeholders are actively engaged.

In terms of separation distances for noise transmission, White Bay 5 is 18 metres closer to impacted residences than White Bay 4.
Access would need to be provided from the terminal from Victoria Road and Robert Street. Improved controls at the intersection of Robert Street and Mullens Street would partly mitigate the impact of the terminal on the road network.

The proximity of residential to White Bay berths 4 & 5 needs to be considered in detail.

As an alternative to the adaptive re-use of the existing structure a revised option, Option 1A, has been developed on the basis that existing structure is demolished and a new terminal is built on the site.

Major traffic congestion at Mullens Street / Robert Street intersection and at Victoria Road
Option 1A – White Bay 4&5

Construction of a new terminal building

Zoning: Port & Employment
Permitted uses: Uses that facilitate the continuation of the commercial port uses, employment uses, port and maritime uses.
Area: 12.9 hectares
Terminal Area: 4.5 hectares
Wharf / Quay Length: berth 4 - 264 metres, berth 5 - 233 metres, berth 6 - 179 metres (Baileys) and berth 3 - 278 m
Water Depth: 10.9 / 11 metres
Stringer Height: 3 metres
Comments:
Comments for Option 1A are the same as those for Option 1.
Access and views for this option remain the same as Option 1.
OPTION 2 - Glebe Island Berths 5 & 6
Construction of a new terminal building

Zoning: Port & Employment
Area: 12.3 hectares
Terminal Area: 4.8 hectares

Wharf / Quay Length: – approximately 435 metres available, but unformed wharf and insufficient length to berth two ships at 5 & 6. Delivery of bulk materials at Berths 7 & 8 would not be possible in the event that two cruise ships were berthed as there would be an encroachment on berth 7 by 170 metres. The overflow position is shown at berths 7 & 8.

Depth - limited depth at berths 5 & 6 (<11m).

Stringer height – unstable rock face with no wharf structure built.

Major wharf development and dredging required.

Comments:
This option would severely restrict the operation of the bulk material berths. Because of need to build a new wharf and dredge the bay, it would be costly and could not meet the timetable for the transition program from Barangaroo.

As with White Bay, the key amenity issues for the local residents include noise arising from shipping activities and any functions that might occur on non-ship days.

Shoreside security is maintained through secure access to the facility by a fenced road. Water side security can be maintained at 30 metres out from water side of vessel.

As the terminal is designed for only one arrival at a time, either a temporary marquee is required or staggered arrivals on the same day be planned to minimize processing delays.

Option 2 satisfies the functional brief but would be highly disruptive to the bulk material receival facility.
Established communities in Balmain are further away from Glebe Island berths. The distance from the terminal position to the nearest residential is in excess of 250 metres and considerably better than at White Bay & 5.

At Glebe Island 5 & 5, the distance from the nearest impacted residences is approximately 196 metres which is some 45 metres further away than White Bay 4 and 64 metres further away than White Bay 5.

Tug and bunkering activities on the northern side of Glebe Island will impact Balmain residents. Current port use would indicate that there should be minimal objection to this site on the basis of loss of amenity.
Access is from Victoria Road / City West Link Road onto James Craig Road and into the site.

At this stage the implications of the access to Glebe Island facilities have not been investigated in detail. Preliminary investigations indicate that traffic generated from the PCT would not conflict with other port functions.

Access to the terminal will require some changes to the road network on Glebe Island. Once completed, access to the site will be available via James Craig Drive from the City West Link Road / Victoria Road.
OPTION 3 - Glebe Island Berth 2 & 5

Construction of a new terminal building

Zoning: Port & Employment
Area: 12.3 hectares
Terminal area required: 5.0 ha
Wharf / Quay Length: ~ potential 320 metres each side using GI 1 & 2 (467m) and GI 5 & 6 (435m)
Depth: - 11.9 metres at Glebe Island 2 – limited depth at Glebe Island 5 (<11m)
Stringer height: 2.9 metres at wharf 5 – unstable rock face with no wharf structure built.
Comments:
Glebe Island has a distinct advantage over White Bay as it will not be necessary to access Victoria Road using already congested urban streets.
Shoreside security is maintained through secure access to the facility by a fenced and isolated road.
Water side security can be maintained at 30 metres out from water side of vessel.
The condition of Glebe Island Berth 2 would allow immediate use and the terminal building could be completed in line with the requirements to exit Barangaroo and have a new facility operational by June 2012.
A new wharf structure for berth 5 would require considerable waterside works, including dredging, wall stabilisation and wharf construction and would not be completed in line with new terminal building.

As the terminal is designed for only one arrival at a time, either a temporary marquee is required or staggered arrivals on the same day be planned to minimize processing delays.
As with White Bay, amenity issues for the local residents include noise arising from shipping activities. However, with the terminal being located on the Pyrmont side, the distance to the nearest residences is nearly 200 metres. The developed estate at Pyrmont has required extensive noise abatement measures as part of the developments approval as a result of its proximity to Glebe Island and Anzac bridge.
The site has good road access to the city. Access is from Anzac Bridge/City West Link Rd from the east and Victoria Road / City West Link Road from the west onto James Craig Road and into the site.

Access to the terminal will require some changes to the road network on Glebe Island. Once completed, good access to the site will be available via James Craig Drive from the City West Link Road / Victoria Road.
OPTION 4 - Glebe Island Berths 1 & 2

Construction of a new terminal building

Zoning: Port & Employment
Area: 12.3 hectares
Terminal area required: 4.4ha
Wharf / Quay Length: 468 metres
Depth: 11.9 metres
Stringer height: 2.9 metres
Comments:
As a result of limited quay length, Berths 1 & 2 do not satisfy the functional brief without adding a mooring buoy to the existing structure for the primary berth. Such a structure would significantly impact the turning basin to the east and would therefore impact on the use of the other berths.
It should be noted that during the use of Glebe Island 1 for Port operations, vessels have not been permitted to use the western portal of the old Glebe Island Bridge.
As the terminal is designed for only one arrival at a time, either a temporary marquee is required or staggered arrivals on the same day be planned to minimize processing delays. As with White Bay, amenity issues for the local residents include noise arising from shipping activities. However, with the terminal being located on the Pyrmont side, the distance to the nearest residences is nearly 200 metres. The developed estate at Pyrmont has required extensive noise abatement measures as part of the developments approval as a result of its proximity to Glebe Island and Anzac bridge. Shoreside security and water side security can be maintained. Some restrictions may be placed on vessels leaving Blackwattle Bay when two ships are berthed.

The condition of Glebe Island Berth 2 would allow immediate use and the terminal building could be completed in line with the requirements to exit Barangaroo and have a new facility operational by June 2012.
OPTION 5 - Glebe Island Berth 2 / White Bay Berth 4

Construction of a new terminal building at GI 2 with overflow capacity provided at WB4

Zoning: Port & Employment

Permitted uses: Uses that facilitate the continuation of the commercial port uses, employment uses, port and maritime uses.

Area: 12.3 hectares (Glebe Island)

Terminal area: 3.8 hectares GI / 1.1 ha White Bay

Wharf / Quay Length: GI 1&2 468 metres/WB4 264m / WB5 233m

Depth: 11.9 metres

Stringer height: 2.9 metres

Quay length: White Bay and Glebe Island combined satisfy the Needs Brief (305m).

Comments:

The key elements of Option 5 are:

- Primary berth and terminal located at berth 2, Glebe island
- Secondary or overflow berth located at White Bay, berth 4 or 5

Initially, it was thought cruise passengers using White Bay 4 or 5 as a secondary berth could be bussed to the terminal building on Glebe Island 2 for Customs clearance. In terms of capacity this could only work if the arrival of ships was staggered as the Glebe Island terminal could not accommodate 2 ship loads of passengers simultaneously.

In addition, Sydney Ports Corporation do not believe that the customs operation will allow a shuttle on portside land and mixing port traffic with shuttle buses would create significant operational problems.

In the event that the shuttle cannot be accommodated, a marquee would need to be provided at WB4 or the existing shed at WBS used for overflow.

Access is via Victoria Road / City West Link Road onto James Craig Road and into the site.

The impact and frequency of activities at White Bay would be minimal on Balmain residents.
The establishment of a permanent terminal at the end of Glebe Island to primarily service berth 2, will locate the facility as far as possible from the residential communities of both Balmain and Pyrmont.

As with White Bay, amenity issues for the local residents include noise arising from shipping activities. However, with the terminal being located on the Pyrmont side, the distance to the nearest residences is nearly 200 metres. The developed estate at Pyrmont has required extensive noise abatement measures as part of the developments approval as a result of its proximity to Glebe Island and Anzac bridge.

Both White Bay 4 and Glebe Island 2 are operational berths currently used for major shipping activities.

Shoreside security is maintained through secure access to the facility by a fenced and isolated road.

Water side security can be maintained at 30 metres out from water side of vessel. It is unlikely that restrictions would be placed on vessels leaving Blackwattle Bay when a ship is berthed at Glebe Island Berth 2.

The condition of Glebe Island Berth 2 would allow immediate use and the terminal building could be completed in line with the requirements to exit Barangaroo and have a new facility operational by June 2012.

Access to the site is similar to Option 4, outlined previously.
PART 4 COMMERCIAL ANALYSIS

The Steering Committee requested that all options initially be commercially assessed ahead of discounting particular options as a result of other qualitative and/or operational considerations.

For timing purposes, two options for a temporary facility were considered, as follows:

1. DH 8 vacated by September 2010 – a more permanent temporary facility is established at White Bay for use over two seasons.
2. DH 8 to be occupied until April 2011 – a temporary marquee established at DH 4/5 for a single season.

On the basis of a smooth planning process, the earliest that a new terminal could be developed at White Bay or Glebe Island is June 2012.

The assumptions behind each of the options are summarised below.

Option 1 - White Bay Berths 4 & 5 with adaptive re-use of the existing structure

- Scheme generally in accordance with the detailed concepts prepared by Jackson Teece for Sydney Ports Corporation.
- Total developed area = 6.1 ha

Option 1A - White Bay Berths 4 & 5

- Scheme assumes existing structures removed and new purpose designed structure is built.
- Total developed area = 4.2 ha

Option 2 - Glebe Island Berths 5 & 6

- The terminal is assumed the same as that shown adjacent to Wharf 2 Glebe Island.
- 500 metres of new wharf structure required.
- Additional time for Part 3A application for new wharf structure and dredging will be required.
- Total developed area = 4.8 ha (similar to GI2)

Option 3 - Glebe Island Berth 2 & 5

- The terminal is assumed the same as that shown adjacent to Wharf 2 Glebe Island.
- 300 metres of new wharf structure required.
- Additional time for Part 3A application for new wharf structure and dredging will be required.
- Total developed area = 4.4 ha

Option 4 - Glebe Island Berths 1 & 2

- Scheme generally in accordance with the concepts prepared Cox Richardson for a single terminal at Glebe Island Berth 1.
- Total developed area = 4.4 ha

Option 5 - Glebe Island Berth 2 / White Bay Berth 4 (the terminal being located at Glebe Island)

- Scheme in accordance with the concepts prepared Cox Richardson for a single terminal at Glebe Island Berth 1.
- Total developed area = 4.9 ha

In considering the options, it should be noted that the space required for constructing a temporary marquee at the secondary berthing/overflow location has not been allowed for in the comparative analysis as it is considered the same across all options.
CASHFLOWS

The table opposite shows the comparative cost differences of the options.

In preparing the comparative cost, it should be noted that they are indicative at this stage and will require further detailed engineering to confirm project budgets. The key differences of each of the options has been used as the basis for cashflow analysis.

The following assumptions underly the cashflows assumed for the discounted cashflow analysis:

- All costs exclude GST
- Rider Levett Bucknell have estimated the comparative cost based on the following:
  - Costs are based on preliminary sketches produced by Cox Architects and are current at September, 2009
  - Option 1, adaptive re-use, is based on the scheme produced last year by Jackson Teece
  - Services estimates have been extrapolated from concepts prepared as part of the BCA submission prepared last year
  - Fitout of specialist areas has not been included
  - No allowance has been made for site decontamination and/or geotechnical investigation or bores
  - Utilities in the area are assumed as sufficient and no upgrades of local infrastructure are allowed in the cashflow
  - Relocation cost from DH8 to the temporary marquee and the construction of the temporary marquee have not been included in the comparative analysis
  - Part 3A costs do not provide for an environmental assessment
  - SPC advised that new wharf construction for Glebe Island 5&6 would cost $50m. A reduced cost of $30m is assumed for berth 5, only
  - A 20% design and construction contingency has been allowed
  - An allowance has been made for the differences in roadwork cost between the options in particular there is a costing in Option 1 and 1A of $2.45m for James Craig Drive roadworks and $2.1m for Robert Street upgrade works

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<td>$0.3</td>
<td>$0.3</td>
<td>$0.3</td>
</tr>
<tr>
<td>White Bay Facilities</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Subtotal ($M)</td>
<td>$24.5</td>
<td>$25.8</td>
<td>$24.3</td>
<td>$24.3</td>
<td>$24.3</td>
<td>$24.7</td>
</tr>
<tr>
<td>Total Project On cost – percentage</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td>Project on-cost ($M)</td>
<td>$13.6</td>
<td>$14.3</td>
<td>$13.4</td>
<td>$13.4</td>
<td>$13.4</td>
<td>$13.7</td>
</tr>
<tr>
<td>Total Building Cost ($M)</td>
<td>$38.1</td>
<td>$40.0</td>
<td>$37.7</td>
<td>$37.7</td>
<td>$37.7</td>
<td>$38.4</td>
</tr>
<tr>
<td>Extra Over Cost – Specific Options</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Wharf Construction ($M)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Work $</td>
<td>$60.04</td>
<td>$60.27</td>
<td>$60.27</td>
<td>$60.27</td>
<td>$60.27</td>
<td>$60.27</td>
</tr>
<tr>
<td>Access Option 1 – James Craig Drive</td>
<td>$2.45</td>
<td>$2.45</td>
<td>$2.45</td>
<td>$2.45</td>
<td>$2.45</td>
<td>$2.45</td>
</tr>
<tr>
<td>Access Option 2 – Robert Street Upgrade</td>
<td>$2.1</td>
<td>$2.1</td>
<td>$2.1</td>
<td>$2.1</td>
<td>$2.1</td>
<td>$2.1</td>
</tr>
<tr>
<td>Marine Works – extended mooring structure</td>
<td>$4.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL COMPARATIVE COST ($M)</td>
<td>$40.55/40.2</td>
<td>$42.45/42.1</td>
<td>$46.78</td>
<td>$46.80</td>
<td>$42.0</td>
<td>$38.7</td>
</tr>
<tr>
<td>Cashflow Offsets @ $500/sqm ($M)</td>
<td>-</td>
<td>$9.5</td>
<td>$6.5</td>
<td>$5.5</td>
<td>$8.5</td>
<td>$6.0</td>
</tr>
<tr>
<td>NPV @ 4%</td>
<td>-$34.6</td>
<td>-$39.0</td>
<td>-$34.5</td>
<td>-$57.7</td>
<td>-$53.1</td>
<td>-$50.5</td>
</tr>
<tr>
<td>NPV @ 7%</td>
<td>-$32.2</td>
<td>-$37.9</td>
<td>-$59.8</td>
<td>-$54.3</td>
<td>-$30.1</td>
<td>-$28.9</td>
</tr>
<tr>
<td>NPV @ 10%</td>
<td>-$50.1</td>
<td>-$57.7</td>
<td>-$85.3</td>
<td>-$53.7</td>
<td>-$57.9</td>
<td>-$57.4</td>
</tr>
</tbody>
</table>

*Adaptive re-use

Option 4 includes an allowance of $2m for the provision of a mooring dolphin and 80 metre jetty.
Cashflow offsets are based on the value of residual land against Option 1 which utilises the most land. A rate of $500psqm and $1000psqm are assumed. The cost of Part 3A application for Options 2&3 includes a separate application for wharf and dredging works to construct new berths.

DCF ANALYSIS

On the basis of the above, the Discounted Cash Flow analysis indicates the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Option 1</th>
<th>Option 1A</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
<th>Option 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cashflow</td>
<td>-$38.1</td>
<td>-$30.5</td>
<td>-$81.2</td>
<td>-$62.5</td>
<td>-$33.5</td>
<td>-$32.7</td>
</tr>
<tr>
<td>NPV @ 4%pa</td>
<td>-$34.6</td>
<td>-$29.0</td>
<td>-$74.5</td>
<td>-$57.7</td>
<td>-$31.6</td>
<td>-$30.5</td>
</tr>
<tr>
<td>NPV @ 7%pa</td>
<td>-$32.2</td>
<td>-$27.9</td>
<td>-$69.8</td>
<td>-$54.3</td>
<td>-$30.1</td>
<td>-$28.9</td>
</tr>
<tr>
<td>NPV @ 10%pa</td>
<td>-$30.1</td>
<td>-$26.7</td>
<td>-$65.5</td>
<td>-$51.2</td>
<td>-$28.7</td>
<td>-$27.4</td>
</tr>
</tbody>
</table>

On the basis of DCF, Options 1A and 5 are ranked highest, followed by Option 1.
QUALITATIVE ANALYSIS

The analysis indicates that only Options 1, 1A & 5 are capable of satisfying the Functional Brief in terms of primary and overflow cruise terminal operations.

Option 2 is discounted on the basis that the time and cost implications of dredging White Bay at Glebe Island 5 & 6 and the construction of new wharves would not be completed in time and would be too expensive against the other options. Significant disruption would occur to the bulk materials operation during the time that two cruise ships need to be berthed at Glebe Island 5 & 6.

Option 3 incurs many of the penalties of Option 2, with a potential additional impact on the operation of the turning basin.

Option 4 cannot provide two berths of sufficient length and may restrict vessel movements through the eastern portal of Glebe Island, entering Rozelle/Blackwattle Bay when two vessels are berthed.

For financial analysis, all options are considered, with only Options 1, 1b & 5 satisfy the Functional Brief and only these options will be considered in the Cost Benefit analysis, below.

Cost Benefit Analysis

<table>
<thead>
<tr>
<th>Item</th>
<th>Option 1</th>
<th>Option 1A</th>
<th>Option 5</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Developable Land Area - hectares</td>
<td>12.9</td>
<td>12.9</td>
<td>12.3</td>
<td>The site at White Bay is long and narrow compared to Glebe Island. Glebe Island is better shaped for alternative development.</td>
</tr>
<tr>
<td>CPT development area - hectares</td>
<td>6.1</td>
<td>4.2</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>Balance after CPT development</td>
<td>6.8</td>
<td>8.7</td>
<td>7.4</td>
<td>Development of White Bay is impacted by the escarpment and need for access to Bailey's</td>
</tr>
<tr>
<td>Total Comparative Cost</td>
<td>$38.1</td>
<td>$40.0</td>
<td>$38.7</td>
<td>Option 1A and Option 5 incur additional demolition cost</td>
</tr>
<tr>
<td>Cash offsets</td>
<td>$0m</td>
<td>-$9.50</td>
<td>-$6.00</td>
<td>A more efficient layout enables surplus land to be used for other purposes - priced at $500psqm and realised end 2015</td>
</tr>
<tr>
<td>NET COST</td>
<td>$38.1</td>
<td>$30.5</td>
<td>$32.7</td>
<td></td>
</tr>
</tbody>
</table>

QUALITATIVE

Meets the Functional Brief

Support from local community

Highest and best use as PCT

Access

Ability to meet program

Impact on Harbour Users

White Bay could be dedicated for larger ship users
From the perspective of future development options for the Bays Precinct, the longitudinal nature of White Bay and the adjacent escarpment derogate against the utility of White Bay for alternative development. White Bay also has transport/traffic constraints that will inhibit development options for high intensity uses.

As proposed in Option 1A, a new terminal at White Bay is consistent with keeping the working port operation in a defined area with minimal impact on other port users.

The removal of the existing industrial building Cargo Hall on the White Bay site will open up the area and will be positively received by the Balmain community. It will be important however to engage with the community to ensure the facility is sympathetic to concerns previously raised, particularly in regard to traffic and noise. As indicated in the previously prepared environmental assessment report, the PCT will not have a significant impact on the traffic movements and intersection performance in the area.

Option 5, the establishment of a terminal at Glebe Island 2, reduces the available berth length at Glebe Island 1. The overflow position at White Bay 5 impacts Bailey’s when the second berth is required, but this is considered less impact than White Bay 4’s impact on the bulk liquid receival.

The land at Glebe Island is more valuable than the land at White Bay for an alternative use. It should be noted, however that leases to the storage silos run through to 2020 and the further development of Glebe Island needs to master planned.

From a “highest and best use” perspective, White Bay provides a better option for development for a western harbour PCT. Its use over time may be diminished as a result of the declining number of vessels being able to pass under the Harbour Bridge and the site may be adapted for other port uses as part of a broader master plan for the area.
Summary

On the basis of the DCF, Option 1A ranks as the preferred option.

From a cost perspective, Option 1A remains preferred, with a cost benefit of $2.2 million.

Option 1A and 5 are ranked similarly from a qualitative assessment of the options. The long narrow site at White Bay would be inefficient in maximizing yield and its highest and best use is port use. In contrast to this, the expected yield for developable land at Glebe Island is considered higher than White Bay and as such will realize a higher land value in future.

The single biggest hurdle for the White Bay site is its impact on local infrastructure, particularly traffic and noise. This issue will need to be comprehensively addressed as part of any future Part 3A Planning Application and local community support would be critical to timely implementation.

On the basis of the DCF analysis and the qualitative assessment, Option 1A is ranked highest, followed by Option 5.
To better understand the demand for berthing facilities over time, growth is considered at 5% and 10% compound. As can be seen on the adjacent graph of forecast arrivals, arrivals will exceed 400 in 2021/22 at 10% and approach 250 at 5% growth.

The seasonality of arrivals also needs consideration. On the basis of the 2008/09 actual arrivals, it was evident that both terminals (DH8 and OPT) were occupied for 39% of the time. The graphic below shows the impact of arrivals on utilization over time.

The key points are:
- For 2008/09 arrivals (123 in) utilization is 75% with both terminals being occupied for 39% of the time.
- 150 annual arrivals will increase utilization to 90% in February, with a corresponding increase in the period where both terminals are occupied (>39%).
- At 200 arrivals, utilization is greater than 70% for two months and more than two berths would be required for most of February.
- With growth rate of 10% for 10 years, it is projected that month peak utilization would exceed 90% for 5 months, with two berths exceeding 100% utilization for 4 of those months.
- As the global annual passenger growth for the cruise industry is 7%, a separate forecast and analysis is included in the report.
Growth forecasts based on the 5% and 10% are compared against the following:
- 7% global growth
- Cruise industry (Carnival) forecast

The cruise industry forecast takes into consideration the changing vessel sizes over time to meet the forecast passenger demand and better reflects actual arrivals, given the anticipated change in vessels.

As shown in the cruise industry forecasts opposite, there appears to be an upswing in arrival numbers in 2012/13 which stays above the 7% global trend line out to 2017/18. There does not appear to be a significant difference in arrivals based on compounding 7% growth beyond 2017/18, although a forecast so far out is less reliable.

The distribution of vessels arriving between the western and eastern harbour is dependent on a number of factors, not just the ability of the vessel to be able to pass under the bridge and include the duration of stay, passenger types and the ability to control the timing of arrivals and departures.

Over time however, there is an expectation that the existing fleet servicing the local market will be replaced by larger vessels. Previous analysis has indicated that existing and planned new vessels should be able to use the western harbour for the next 8-10 years, with a planned new eastern harbour berth coming on line well in advance of this.

For forecasting of western harbour arrivals and eastern harbour arrivals, it is assumed that the mix of vessels across each of the cruise sectors remains unchanged from 2008/09 and that there is constant growth across each sector. As a start point for forecasting purposes, the 2008/09, 2009/10 and 2010/11 confirmed bookings are shown on the next page.
Using the forward bookings and averaging the distribution for arrivals for the eastern and western harbour, it is possible to extrapolate the forecast arrivals on the basis of the same assumed distribution. The average distribution of arrivals over a year is depicted below.

The table below is based on extrapolating the confirmed eastern / western distribution of arrivals. The contrasting industry forecast is based on forecast vessel arrivals and changing fleet over time to satisfy 7% passenger growth.

<table>
<thead>
<tr>
<th>Year</th>
<th>Eastern Harbour @ 7%</th>
<th>Western Harbour @ 7%</th>
<th>Eastern Harbour Industry Fc</th>
<th>Western Harbour Industry Fc</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008/09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009/10</td>
<td>51</td>
<td>77</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>2010/11</td>
<td>55</td>
<td>82</td>
<td>46</td>
<td>89</td>
</tr>
<tr>
<td>2011/12</td>
<td>59</td>
<td>88</td>
<td>46</td>
<td>105</td>
</tr>
<tr>
<td>2012/13</td>
<td>63</td>
<td>94</td>
<td>39</td>
<td>140</td>
</tr>
<tr>
<td>2013/14</td>
<td>67</td>
<td>101</td>
<td>50</td>
<td>137</td>
</tr>
<tr>
<td>2014/15</td>
<td>72</td>
<td>108</td>
<td>42</td>
<td>157</td>
</tr>
<tr>
<td>2015/16</td>
<td>77</td>
<td>115</td>
<td>62</td>
<td>145</td>
</tr>
<tr>
<td>2016/17</td>
<td>82</td>
<td>124</td>
<td>90</td>
<td>128</td>
</tr>
<tr>
<td>2017/18</td>
<td>88</td>
<td>132</td>
<td>107</td>
<td>119</td>
</tr>
<tr>
<td>2018/19</td>
<td>95</td>
<td>141</td>
<td>111</td>
<td>135</td>
</tr>
<tr>
<td>2019/20</td>
<td>101</td>
<td>151</td>
<td>123</td>
<td>137</td>
</tr>
<tr>
<td>2020/21</td>
<td>108</td>
<td>162</td>
<td>138</td>
<td>137</td>
</tr>
<tr>
<td>2021/22</td>
<td>116</td>
<td>173</td>
<td>184</td>
<td>103</td>
</tr>
</tbody>
</table>

In comparing the two forecasts, the major differences are:

- Carnival has based their forecast on an assumed forward arrival schedule to satisfy passenger growth
- Home based growth higher than seasonal and world cruise based growth
- Over time, larger vessels will require an eastern harbour berth as they will be unable to pass under the bridge – resulting in higher eastern berth numbers in the Carnival forecast after 2014/15

In reviewing the growth forecasts, the industry forecast follows the 7% growth line out to 2011/12 and remains above the forecast out to 2016/17. From 2017/18, there is a strong correlation between the industry forecast and the 7% growth line.
The forecast below is based on the 7% growth and an extrapolation of arrival distribution for eastern and western arrivals. It indicates that the seasonal overflow from the eastern harbour to western harbour ramps up in 2012/13 with the western terminal reaching capacity in 2016/17.

The key assumptions behind the forecasts are as follows:

- Eastern harbour stays on average are greater than 1 day (12 vessels / 24 days February 08/09)
- Western harbour stays are based on 1 day turnaround and assume arrivals on all days of the week
- Seasonally deployed vessels using OPT have shorter turnaround than world cruise based arrivals
- Capacity of western harbour berths is assumed at 25 vessels per month
- Where possible, as growth exceeds eastern harbour berth capacity, overflow will spill to the western harbour.

![East - West Seasonal Growth @ 7%](image)

### East - West Seasonal Growth @ 7%
2009/10 to 2021/22

- **Overflow of capacity from Eastern Harbour to Western Harbour**
- **Assumes capacity of 25 vessels / month @ Western Harbour (single day visits)**
- **Assumes capacity of 15 vessels / month @ OPT**
- **Single berth at Western Harbour approaching capacity from overflow**
In determining the overall dynamics of the cruise industry and the demand on facilities in the eastern and western harbour, the following issues have been identified:

- The cruise industry is characterized by three different segments, as follows:
  - Round the world cruises
  - Seasonally based regional cruises
  - Year round home based vessels
- The global annual growth rate for cruising is about 7% - confirmed bookings over the next 2-3 years correlate strongly with this growth
- The industry in Australia is relatively immature and there is an opportunity for growth in excess of 7% - industry forecasts indicate a higher growth rate than this over the next 6 – 7 years
- The capacity of facilities and potential overflow from eastern harbour will begin in 2012/13
- As the eastern harbour reaches capacity, the overflow will increase the frequency of the need to use the secondary berth in the western harbour in 2016

In future to alleviate demand on the PCT, it may be necessary to stagger arrivals in a single day to reduce the number of days where temporary marquees are required for the overflow berth.