



**Planning &  
Environment**

***ASSESSMENT REPORT:  
Remediation and Associated Works,  
Hickson Road, Barangaroo (SSD 6617)***



Environmental Assessment Report  
Section 89E of the  
*Environmental Planning and Assessment Act 1979*

August 2016

## ABBREVIATIONS

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|                 |                                                                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant       | Lend Lease (Millers Point) Pty Ltd (Lend Lease), or any other person or persons who rely on this consent to carry out the development that is subject to this consent                                                  |
| CIV             | Capital Investment Value                                                                                                                                                                                               |
| Council         | The City of Sydney Council                                                                                                                                                                                             |
| Department      | Department of Planning and Environment                                                                                                                                                                                 |
| EIS             | Environmental Impact Statement entitled ' <i>Hickson Road Remediation Works (SSD 6617) Environmental Impact Statement</i> ' prepared by JBA Urban Planning Consultants Pty Ltd and dated August 2015                   |
| EP&A Act        | <i>Environmental Planning and Assessment Act 1979</i>                                                                                                                                                                  |
| EP&A Regulation | <i>Environmental Planning and Assessment Regulation 2000</i>                                                                                                                                                           |
| EPA             | Environment Protection Authority                                                                                                                                                                                       |
| EPI             | Environmental Planning Instrument                                                                                                                                                                                      |
| Minister        | Minister for Planning                                                                                                                                                                                                  |
| OEH             | Office of Environment and Heritage                                                                                                                                                                                     |
| RTS             | Response to Submissions Report<br><i>State Significant Development Report (SSD 6617-2014) Remediation of part Hickson Road (Remediation Site 21122)</i> prepared by JBA Urban Planning Consultants Pty Ltd March 2016. |
| Secretary       | Secretary of the Department                                                                                                                                                                                            |
| SRD SEPP        | <i>State Environmental Planning Policy (State and Regional Development) 2011</i>                                                                                                                                       |
| SSD             | State significant development                                                                                                                                                                                          |
| SWC             | Sydney Water Corporation                                                                                                                                                                                               |
| TNSW            | Transport for NSW                                                                                                                                                                                                      |

Cover Photograph: Approximate location of the proposed remediation works  
(Source: EIS)

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**Note: Images are not to scale unless otherwise noted.**

## EXECUTIVE SUMMARY

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This report provides an assessment of a State significant development lodged by Lend Lease (Millers Point) Pty Ltd (the Applicant) to remediate part of Hickson Road within the EPA Declaration Area (no. 21122) and adjacent areas at Barangaroo. The remediation works are proposed to be undertaken either via onsite in-situ treatment (the preferred method) or excavation for off-site treatment and disposal.

The project has a maximum capital investment value (CIV) of approximately \$32.1 million and will generate 71 jobs.

The development is State significant development under clause 3 of Schedule 2 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP), as it is a development at Barangaroo that has a CIV of more than \$10 million. Therefore, the Minister for Planning is the consent authority.

The Department exhibited the Development Application (DA) and Environmental Impact Statement (EIS) from 24 September 2015 until Friday 6 November 2015. The Department received 13 submissions, including nine from government agencies and four public submissions. None of the government authorities objected to the proposal but issues of concern were raised in relation to the control and management of air and noise emissions, chemical and waste handling and impacts on surface and groundwater quality. One public submission objected to the proposal raising concerns that flawed assumptions were driving the need to remediate the site, the work has limited potential to improve aquatic ecosystems in Darling Harbour and the proposed remediation method may cause significant impacts to human health and the environment when there are lower impact remediation methods available.

The proponent submitted a Response to Submissions (RTS) and second Response to Submission to address issues raised by the government agencies and the public.

The Department has assessed the merits of both remediation methodologies and has found the key issues include contamination and waste management, construction impacts (air quality, noise and vibration, water quality, traffic and chemical handling) and health impacts.

In its assessment of the proposal, the Department has fully considered all relevant matters under section 79C of the EP&A Act, the objectives of the EP&A Act and the principles of ecologically sustainable development. This assessment has concluded that with the implementation of the recommended conditions of consent, the impacts of the development can be mitigated and/or managed to ensure that relevant environmental, health and amenity standards can be met.

The Department's assessment notes that the development would address the significant risk of harm to human health and the environment identified by the EPA's Declaration (no. 21122) within part of Hickson Road and bring forward the development of Barangaroo at significant benefit to the NSW economy. Further, the proposal is generally consistent with the approved Barangaroo Concept Plan (as modified), the strategic objectives for the area as identified in *A Plan for Growing Sydney* and the requirements of relevant environmental planning instruments and policies.

Consequently, the Department considers the development is in the public interest and should be approved, subject to conditions.

## 1. BACKGROUND

### 1.1 Introduction

Lend Lease (Millers Point) Pty Ltd (the Applicant) has lodged a State significant development approval to remediate contaminated land within part of Hickson Road and adjacent areas at Barangaroo.

### 1.2 The Site

Barangaroo is located on the north-western edge of the Sydney CBD. The site is bounded by the Sydney Harbour foreshore to the north and west, Hickson Road and Millers Point to the east, and Kings Street Wharf/Cockle Bay/Darling Harbour to the south. The Barangaroo precinct is divided into three redevelopment areas (from north to south): Headland Park; Barangaroo Central; and Barangaroo South. A Location Plan is provided at **Figure 1** below.



**Figure 1:** Site context and project location (Source: EIS)

The subject land sought to be remediated is a rectangular area approximately 1,800 m<sup>2</sup> in size and located within the Hickson Road reserve (see 'remediation area' coloured in yellow in **Figure 2**). The site is generally adjacent to parts of Barangaroo South and Barangaroo Central to the west and 30-34, 36 and 38 Hickson Road to the east. The subject land forms part of the EPA Declaration Area 21122 and is herein referred to in this report as the 'remediation area' (**Figure 2**).

The remediation area is generally flat and consists of a two-lane road, footpaths, parking bays and is covered with asphalt and concrete surfaces. Street trees are located within the road reserve along the western side (15 trees) and eastern side (10 trees). A large number of underground infrastructure services are also located within the road reserve.

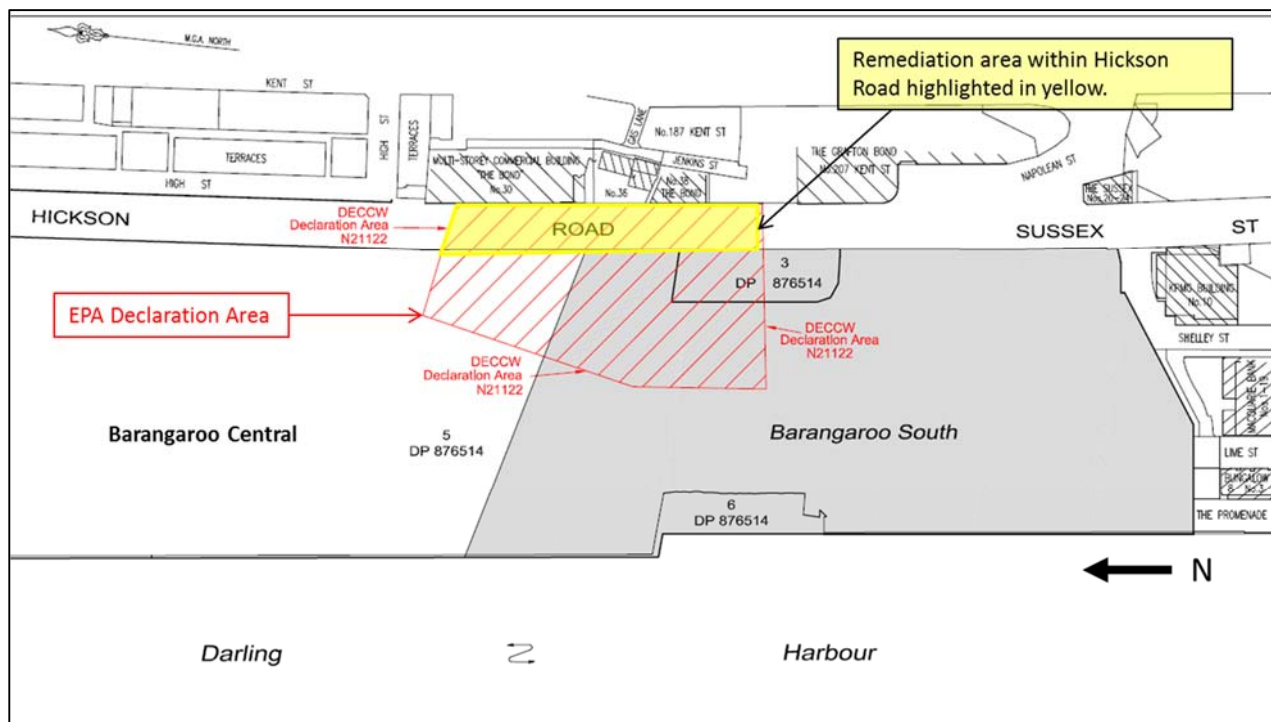


Figure 2: Remediation Area (Source: EIS)

Remediation-related logistics, including equipment, temporary construction facilities and associated storage areas would be located on land immediately to the north and west of the remediation area within Barangaroo Central (**Figure 4** illustrates the development application boundary in blue and includes the area to be utilised for remediation-related logistics).



Figure 3: View to the North across the site on Hickson Road (Source: Google Maps 2016)

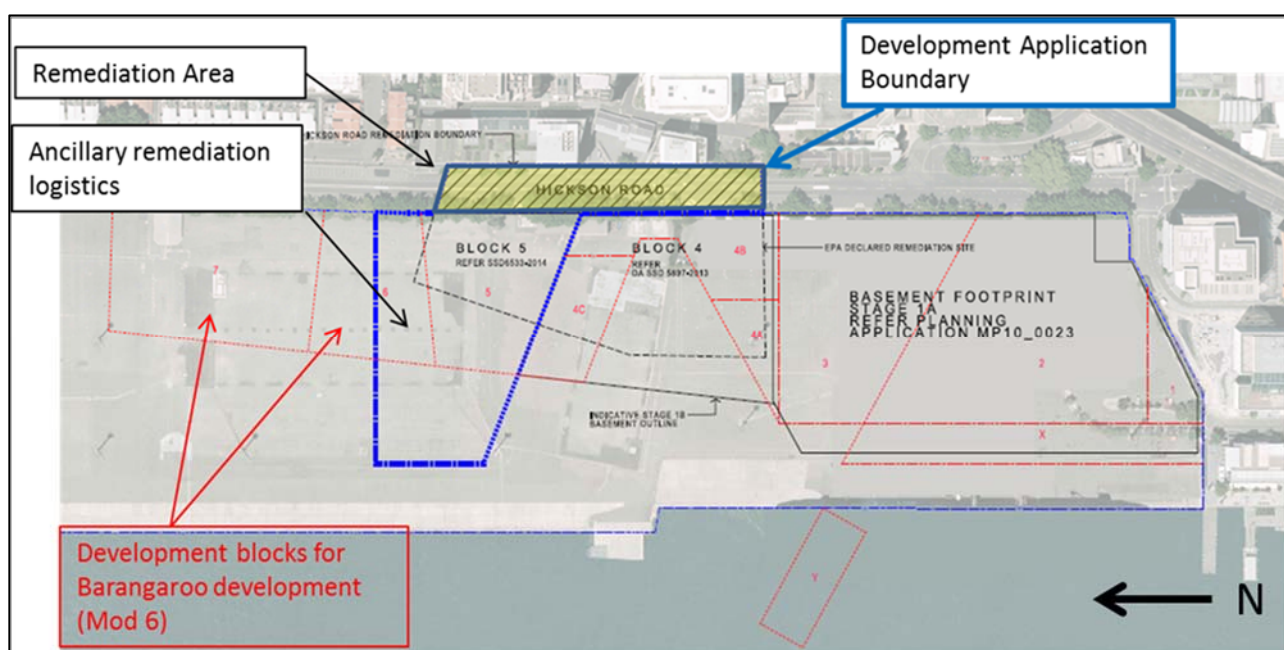
Hickson Road currently connects Sussex Street to the south and extends to Millers point to the north (**Figure 3**).

## 1.3 Approval History

### 1.3.1 Barangaroo Concept Plan

On 9 February 2007, the then Minister for Planning approved the Barangaroo Concept Plan (MP 06\_0162). The Concept Plan approved a set of built form principles to guide development within the mixed use zone.

The detailed planning history of modifications to the Concept Plan for Barangaroo is provided at **Appendix B**. In summary, eight (8) modifications have been approved since the Concept Plan was originally approved. Consistency of the proposed development with the Concept Plan as modified is discussed in **Section 3.6**, however it is noted the original environmental assessment for the approved Barangaroo Concept Plan identified that parts of the site (particularly those within the known footprint of the former gasworks) were contaminated and would need to be remediated. The location of the proposed remediation works relative to the approved configuration of development blocks at Barangaroo Central is depicted in **Figure 4**.



**Figure 4:** Development Application Area (development blocks are shown as approved under MOD 6. Changes to the development blocks as approved by MOD 8 do no impact on the remediation area as illustrated) (Source: EIS)

### 1.3.2 Staged Remediation of the EPA Declaration Area

The primary objective of the remediation work is to enable the NSW EPA's declaration (Declaration No. 21122) of the remediation area as 'significantly contaminated land' to be revoked. The intent of the proposed remediation works is to address the significant risk of harm to human health and the environment identified through the EPA Declaration under the current land use.

The Department has previously approved remediation for other parts of the EPA Declaration Area on November 2014 (Block 4) and 18 December 2015 (Block 5) (**Figure 5**).

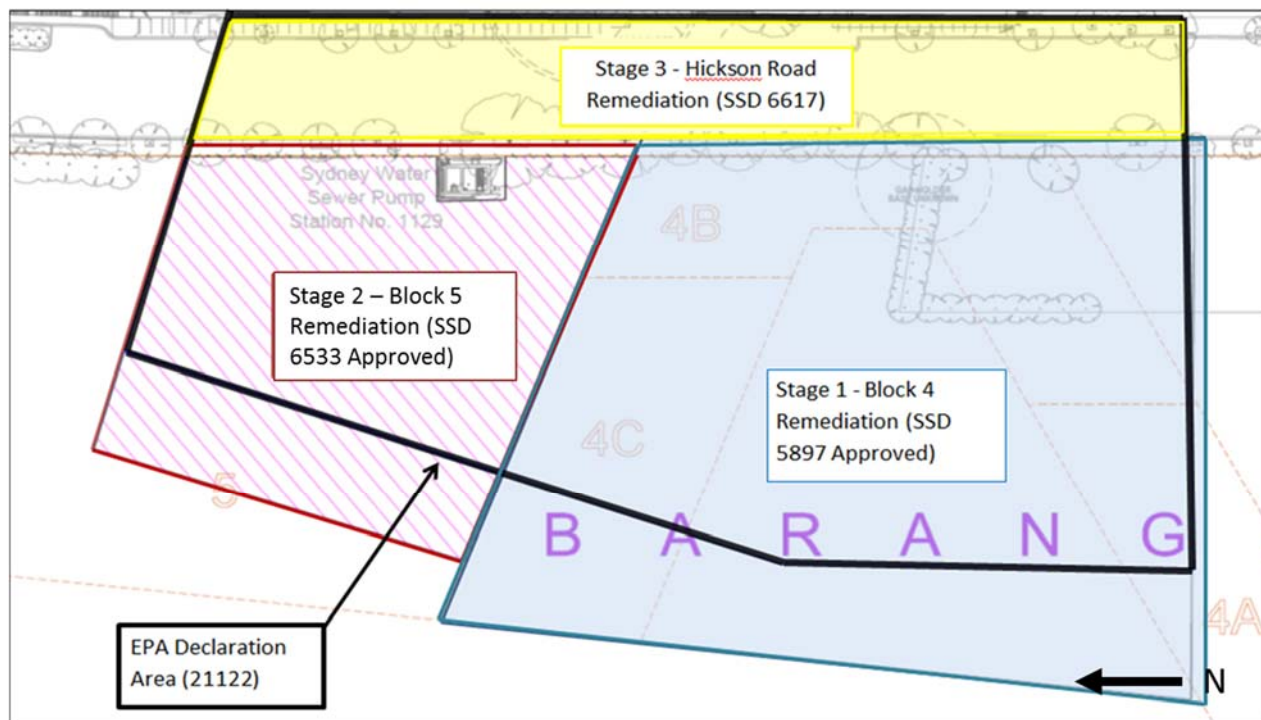
The EPA has indicated the Declaration (no. 21122) will not be lifted until the entire area (i.e. Block 4, Block 5 and Hickson Road) has been successfully remediated

The remediation process is to be undertaken in stages, as follows:

- Stage 1 incorporating the remediation of Block 4 and the adjacent public domain areas;
- Stage 2 involves the remediation of Block 5; and

- Stage 3 relates to the remediation of part of Hickson Road and is the subject of this application (SSD 6617).

No stages of remediation have been completed on site to date.



**Figure 5:** Staged remediation process across development blocks at Barangaroo (Source: EIS)

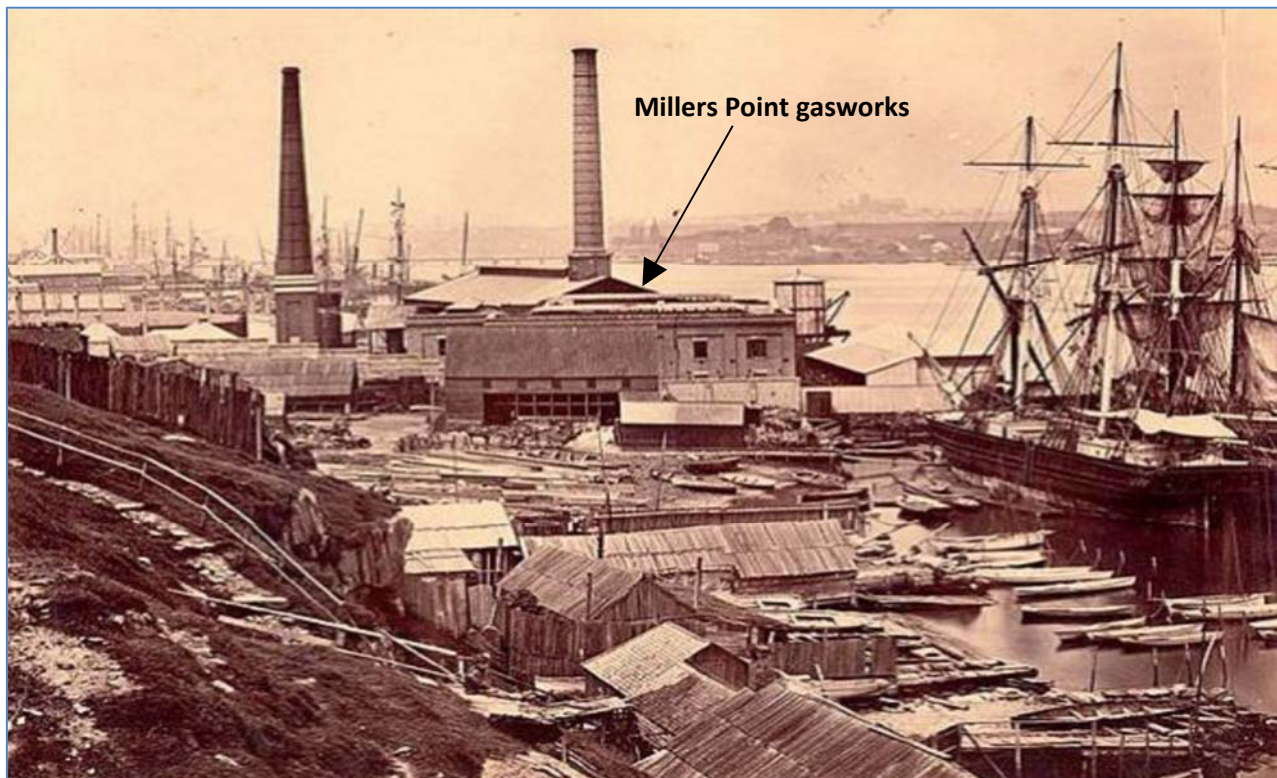
## 1.4 Contamination History

Barangaroo has been used for wharf/port related activities since the 1800s. From 1839 to 1921, the former Australian Gas Light Company (now Jemena) gasworks operated at Millers Point on parts of Blocks 4 and 5 and the area now occupied by Hickson Road before being demolished in 1922 (**Figure 6**). Gasworks were used to produce town gas by heating coal for lighting, cooking and heating. The remainder of the site largely consisted of finger wharfs which were used for ship berthing and associated activities.

Due to past land use the land is contaminated with gasworks waste, particularly waste tar, and a range of other chemicals likely to be associated with uncontrolled fill used in various stages of site reclamation. The key chemical contaminants identified at the site include, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs) and heavy metals, some of which are classified as human carcinogens and substances toxic to aquatic ecosystems.

Investigations have also revealed that remnant subsurface infrastructure from the Millers Point gasworks remain on site, including part of the annulus of the former main gasholder, a smaller secondary gasholder, tar tanks, purifying beds, condensers and the engine house.

In May 2009, the EPA considered that the area was contaminated in such a way as to present a significant risk of harm to human health and the environment and as such declared part of Millers Point to be a remediation site (no. 21122) under the *Contaminated Land Management Act 1997* (CLM Act). The site to which the declaration relates (the 'EPA Declaration Area') coincides with the known footprint of the former Millers Point gasworks and is located within Block 4, a portion of Block 5 and a portion of Hickson Road.



**Figure 6:** View of the Millers Point gasworks from the north in 1880 (Source: State Library of NSW via [www.abc.net.au](http://www.abc.net.au))

On 23 July 2010, the EPA approved a Voluntary Management Proposal (VMP) application (no. 20101719) by the Barangaroo Delivery Authority (BDA) under section 17 of the CLM Act to remediate the site to enable the EPA Declaration (no. 21122) to be revoked.

In 2011, Lend Lease (on behalf of the BDA) commissioned AECOM to quantify the nature and the extent of the contamination by conducting Human Health and Ecological Risk Assessments (HHERAs), develop remediation goals and provide a subsequent Remedial Action Plan (RAP).

On 16 December 2015, the EPA issued a Management Order (no. 20151402) to the BDA under section 14 of the *Contaminated Land Management Act 1997* and effectively withdrew approval of the VMP (20101719). The EPA noted that although they are satisfied with the remediation strategy provided in the Remedial Action Plan, they are concerned with the delayed progress of the work. The Management Order enables the EPA to schedule remediation tasks and apply penalties in the event of non-compliance.

Accordingly, the remediation works proposed by Lend Lease are being undertaken pursuant to the Management Order issued by the EPA to the BDA, to enable the EPA Declaration to be revoked.

## **2. PROPOSED DEVELOPMENT**

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### **2.1 Development Summary**

The SSD application seeks approval for remediation of part of Hickson Road and associated works via either one of two methods; onsite in-situ treatment (the preferred method) or excavation for off-site treatment and disposal.

To enable the revocation of the EPA Declaration, both remediation methodologies are required to demonstrate the contamination has been reduced to levels which will not impact on human health or the environment and are not significant enough to warrant regulation under the current land use scenario.

### 2.1.1 In-situ Remediation

The preferred remediation method is in-situ chemical oxidation (ISCO) and product extraction (Figures 7 and 8). The preferred remediation methodology was selected as it will result in reduced impacts on adjacent buildings and road users, by minimising ground disturbance and the potential for exposure of contaminants. The ISCO process involves the installation of subsurface wells and underground piping to facilitate controlled injection of chemical mixtures (oxides such as hydrogen peroxide, sodium/potassium permanganate) to chemically break down contaminants in-situ (both within the soil and groundwater) into less harmful chemicals. In addition, soil and vapour wells are required to extract chemicals to control the build-up of injected chemicals and vapours. Some localised excavation, off-site treatment and disposal may supplement the ISCO remediation method. The remediation works are to be carried out in a staged process, firstly on the western side and then switching to the eastern side to retain vehicle access along Hickson Road. See Table 2 for an outline of the timing of the Stages of the remediation process.

Prior to undertaking full scale ISCO remediation, a pilot trial is currently being progressed in Hickson Road to evaluate the effectiveness of the technology. If the pilot trial indicates that the preferred remediation technology is not feasible or viable the alternative remediation method will be implemented.

In summary the onsite in-situ treatment includes:

- installation of perimeter retention walls,
- temporary treatment compound(s) for chemical storage, pumps, waste water storage and safety wash systems,
- installation of up to 90 wells for chemical injection, extraction and monitoring;
- localised excavation works to extract contaminated materials around remnant subsurface infrastructure associated with the Gasworks, where required;
- remnant infrastructure will only be excavated if it is found to contain contaminated materials that cannot be treated;
- any excavated contaminated soil material will be covered and transported for off-site treatment and disposal; and
- reinstatement of the road surface.

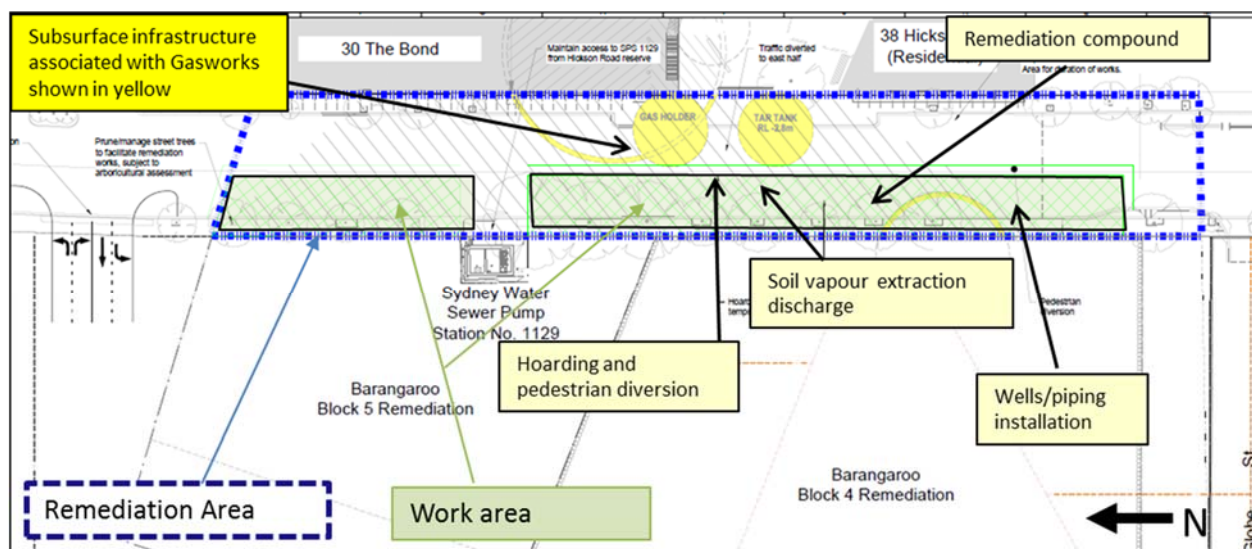


Figure 7: In-situ works on the western side of Hickson Road (Source: EIS)

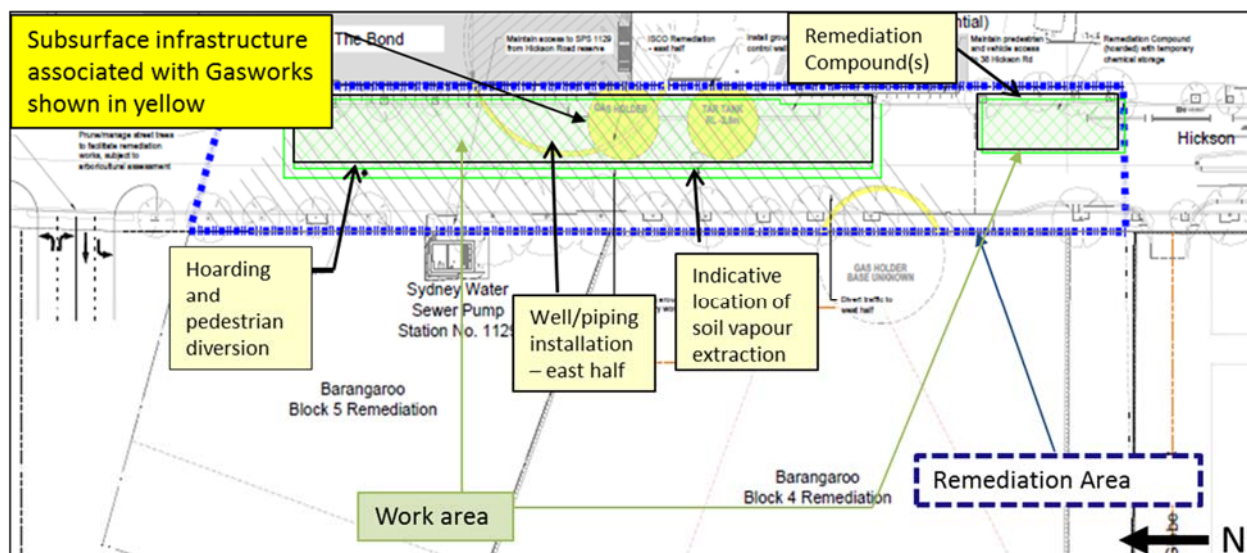


Figure 8: In-situ works on eastern side of Hickson Road (Source: EIS)

### 2.1.2 Ex-situ Remediation

The alternative ex-situ remediation strategy involves the excavation of material inside tented excavation enclosure(s) with emission control systems (**Figures 8 and 9**). No on-site treatment of contaminated material is proposed. Excavated material would be classified in accordance with the EPA's *Waste Classification Guidelines (2014)* and loaded into trucks inside a tented excavation enclosure, covered, sealed (by covering the exposed soil surface with a foam agent) and transported off-site for treatment and disposal at an EPA-licensed facility.

Groundwater contamination would be addressed by dewatering/pumping contaminated groundwater below the excavated soil level and treating prior to discharge. Water would be treated in the temporary water treatment plant on site to achieve water quality criteria provided in the environmental protection license or trade waste agreement or alternatively the water will be tankered off site to a liquid waste facility. In summary the ex-situ remediation consists of excavation, offsite treatment and disposal of contaminated soil and includes:

- installation of perimeter retention walls, excavation and associated works, erection of temporary excavation enclosures and emissions control system(s) and removal of street trees;
- treatment of water at a waste water treatment plant and/or disposal of water off-site;
- traffic management activities for the duration of works; and
- reinstatement of Hickson Road on completion.

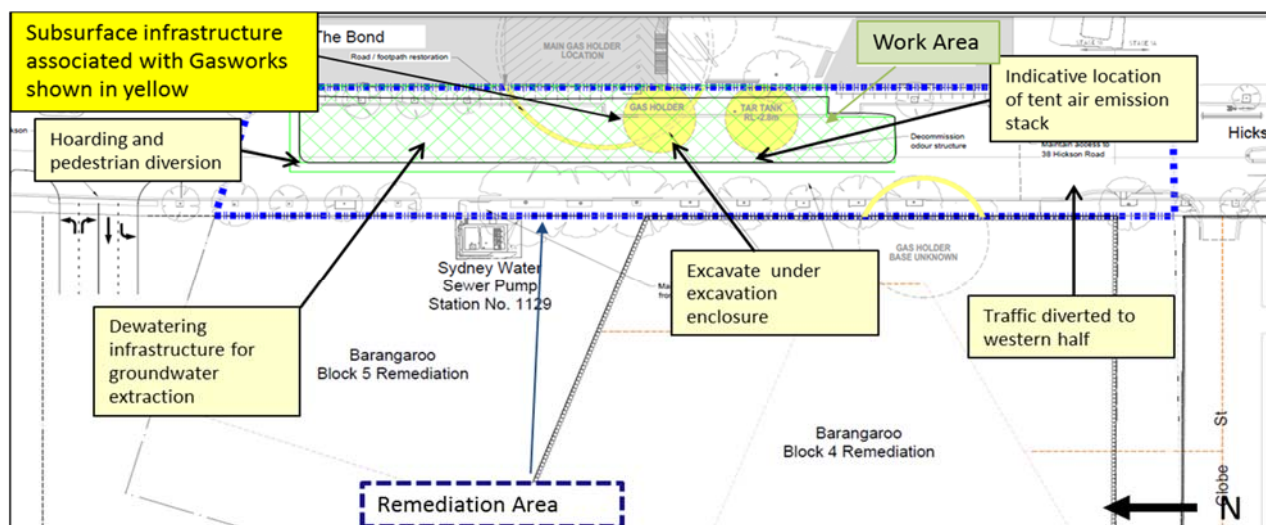


Figure 9: Ex-situ works on western side of Hickson Road (Source: EIS)

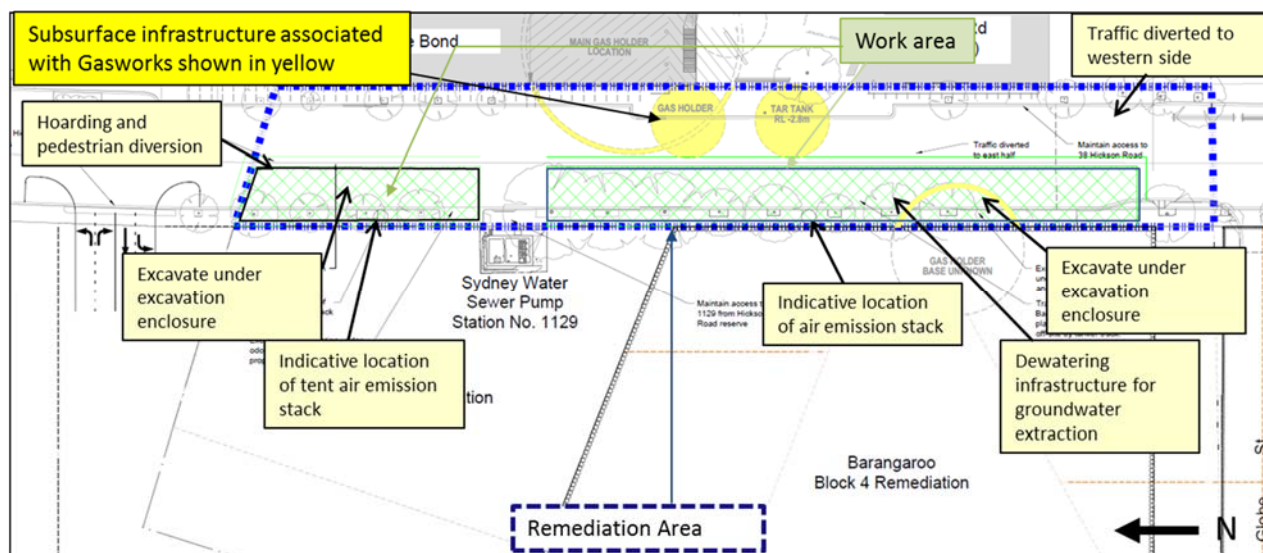


Figure 10: Ex-situ works on eastern side of Hickson Road (Source: EIS)

## 2.2 Major Components of the Development

The major components of both remediation processes are summarised in **Table 1** and depicted in **Figures 7 to 10**. The proposed development is described in full in the Environmental Impact Statement (EIS) and Response to Submissions (RTS), which are attached at **Appendix C** and **Appendix F**, respectively.

Table 1: Key development components

| Aspect                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        | In-situ Remediation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ex-situ Remediation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Objective                              | Remediation works to enable the EPA Declaration to be revoked.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Remediation strategy (see section 2.1) | <ul style="list-style-type: none"> <li>Remediation works utilising (ISCO) remediation technology. Estimated soil remediation volume 15,800 m<sup>3</sup>; and</li> <li>approx. 42 m<sup>3</sup> contaminated and 55 m<sup>3</sup> non-contaminated waste material (from wells and trench excavations) will be generated and treated and disposed off-site to an EPA licensed facility;</li> <li>more than 100,000 litres of contaminated groundwater will be generated from extraction. Contaminated water will either be treated on site at the temporary water treatment facility or tankered off-site to an appropriately licensed liquid waste facility.</li> </ul> | <ul style="list-style-type: none"> <li>Soil/waste classification, excavation offsite treatment and disposal;</li> <li>estimated soil remediation volume 15,800 m<sup>3</sup>;</li> <li>excavated waste materials: 16,000 m<sup>3</sup> in total consisting of 11,400 m<sup>3</sup> (contaminated soils/fill) 4,600m<sup>3</sup> (non-contaminated) to be disposed of at an appropriately EPA licensed facility; and</li> <li>less than 200,000 litres of contaminated groundwater from extraction to be treated on site at the temporary water treatment facility or tankered off-site to an appropriately licensed liquid waste facility.</li> </ul> |
| Remediation works                      | <ul style="list-style-type: none"> <li>Install approximately 60 injection, extraction and monitoring wells and approximately 30 soil vapour extraction and monitoring wells to varying depths;</li> <li>wells consist of pvc or steel pipes with slotted screen, be surrounded by sand, then sealable materials (clay and concrete);</li> <li>wells will be connected to the compound (see description below) via a pipe system that will run along trenches. The trenches will be backfilled and finished to ground level;</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>Erection of temporary excavation enclosure(s) (tent-like structure or similar) to mitigate emissions of air pollutants;</li> <li>the enclosure would operate under negative pressure with EPA-approved air extraction systems and control devices; and</li> <li>contaminated soil will be excavated and placed in trucks inside the enclosure. Trucks will be covered and sealed prior to transportation off-site.</li> </ul>                                                                                                                                                                                  |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | <ul style="list-style-type: none"> <li>upon decommissioning all wells will be capped in-situ; and</li> <li>localised excavation of material within excavation enclosures (tent like structures) to manage odours and emissions may be required.</li> </ul>                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Remediation compound                | <ul style="list-style-type: none"> <li>Temporary remediation compounds to include: <ul style="list-style-type: none"> <li>enclosed containment areas to store chemicals, equipment and waste for the chemical handling and controlled injection;</li> <li>secured shipping containers will be used for bulk storage of chemicals.</li> <li>waste water will be stored in a separate bunded area within the compound; and</li> <li>supplied with power and water and located within the Barangaroo site (ancillary remediation logistics <b>Figure 3</b>).</li> </ul> </li> </ul> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                |
| Temporary perimeter retention walls | <ul style="list-style-type: none"> <li>Construction of temporary perimeter wall in locations of existing gas work infrastructure to control groundwater flows and stabilise areas of localised excavation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Construction of temporary perimeter walls to facilitate excavation and to control groundwater on the site.</li> </ul>                                                                                                                                                                                                                                                       |
| Infrastructure                      | <ul style="list-style-type: none"> <li>Temporary diversion or protection of stormwater and other infrastructure may be required.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Diversion or protection of underground infrastructure.</li> </ul>                                                                                                                                                                                                                                                                                                           |
| Groundwater treatment               | <ul style="list-style-type: none"> <li>Extraction systems connected to wells to remove contaminated groundwater, followed by storage on site, offsite treatment and disposal.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Dewatering to be undertaken during excavation; and</li> <li>treatment of wastewater (contaminated surface and groundwater) at the existing wastewater treatment plant (WTP) prior to discharge into Sydney Harbour or sewer in accordance with EPL limits and/or Sydney Water trade waste requirements or tankered off site to a licensed liquid waste facility.</li> </ul> |
| Traffic Management                  | <ul style="list-style-type: none"> <li>Undertake temporary lane diversion as required</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Temporarily close half of Hickson Road to undertake remediation and divert traffic to the other half; and</li> <li>reinstate and re-divert traffic to alternate half of road to complete remediation.</li> </ul>                                                                                                                                                            |
| Tree Removal                        | <ul style="list-style-type: none"> <li>No removal of street trees is anticipated, however, pruning may be required to facilitate the development.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Up to a maximum of fifteen (15) street trees may need to be removed to facilitate the remediation works.</li> </ul>                                                                                                                                                                                                                                                         |
| Demolition                          | <ul style="list-style-type: none"> <li>Demolition of road pavement and footpath sections, as required.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Construction                        | <ul style="list-style-type: none"> <li>7 am to 6 pm (Monday to Friday);</li> <li>7 am to 5 pm (Saturday); and</li> <li>No work Sundays or public holidays.</li> <li>All workers entering and leaving the site would be required to pass through a clean/dirty zone and a decontamination station.</li> </ul>                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capital Investment Value            | <ul style="list-style-type: none"> <li>\$21.4 million.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>\$32.1 million.</li> </ul>                                                                                                                                                                                                                                                                                                                                                  |
| Employment                          | <ul style="list-style-type: none"> <li>Construction – 24 full-time jobs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Construction – 71 full-time jobs                                                                                                                                                                                                                                                                                                                                                                                   |
| Project Duration                    | <ul style="list-style-type: none"> <li>Approximately 21 months.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Approximately 18 months.                                                                                                                                                                                                                                                                                                                                                                                           |

## 2.3 Staging

The remediation works are anticipated to commence towards the end of 2016 and be completed by October 2018. An overview of the stages of both remediation strategies is provided in **Table 2** below.

**Table 2:** Hickson Road remediation anticipated sequential staging program

| Stage        | In-situ                                                                                                                                                                             | Duration months | Ex-situ                                                                                                                                                                                                                                                                           | Duration months |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1            | <ul style="list-style-type: none"> <li>• Installation of wells and infrastructure (west half); and</li> <li>• temporary removal of street parking and traffic diversions</li> </ul> | 1               | <ul style="list-style-type: none"> <li>• Removal of street trees, parking on eastern side;</li> <li>• divert traffic to west half;</li> <li>• service diversion;</li> <li>• retention wall systems; and</li> <li>• excavation enclosures and dewatering infrastructure</li> </ul> | 3               |
| 2            | <ul style="list-style-type: none"> <li>• Installation of wells, infrastructure and ground water control (east half); and</li> <li>• establish compound.</li> </ul>                  | 2               | Excavation and disposal (eastern half).                                                                                                                                                                                                                                           | 6               |
| 3            | Undertake ISCO remediation (east half).                                                                                                                                             | 6               | Validate remediation eastern half, backfill, restore road and decommission excavation enclosure.                                                                                                                                                                                  | 2               |
| 4            | Undertake ISCO remediation (west half).                                                                                                                                             | 6               | <ul style="list-style-type: none"> <li>• Divert traffic to eastern side;</li> <li>• remove trees parking on western side; and</li> <li>• service diversion, adjustment to retention wall systems, install excavation enclosures and dewatering infrastructure.</li> </ul>         | 3               |
| 5            | <ul style="list-style-type: none"> <li>• Validate remediation;</li> <li>• decommission wells (cap and remain in-situ); and</li> <li>• reinstate road and parking.</li> </ul>        | 6               | Excavation and disposal (western half).                                                                                                                                                                                                                                           | 2               |
| 6            | N/A                                                                                                                                                                                 |                 | <ul style="list-style-type: none"> <li>• Validate remediation western half, backfill, restore road and decommission excavation enclosure; and</li> <li>• reinstate street parking and trees</li> </ul>                                                                            | 2               |
| <b>Total</b> |                                                                                                                                                                                     | 21              |                                                                                                                                                                                                                                                                                   | 18              |

## 2.4 Project Need and Justification

The need to remediate the Declaration area (of which Hickson Road would be the final remediation stage) has been established by the EPA's Declaration (no. 21122) which identifies the site is contaminated in such a way as to present a significant risk of harm to human health and the environment.

The Applicant has stated the proposed remediation works will provide social, economic and environment benefits through:

- removing a significant risk identified to human health and the environment by removing contaminated material currently identified within Hickson Road;
- potentially contributing to the long-term improvement in groundwater quality migrating into Sydney Harbour; and
- delivering intergenerational equity consistent with the principles of ecologically sustainable development by ensuring that historic contamination is appropriately remediated.

### 3. STATUTORY CONTEXT

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#### 3.1 State Significant Development

The proposal has a maximum capital investment value (CIV) of \$32.1 million and is State significant development pursuant to section 89C of *Environmental Planning and Assessment Act 1979* (EP&A Act) because it is development at Barangaroo with a capital investment value (CIV) in excess of \$10 million, under clause 3 of Schedule 2 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Therefore, the Minister for Planning is the consent authority for the development.

Additionally, the EPA's decision to issue a Management Order under the *Contaminated Land Management Act 1997* has the effect of classifying the proposal as State significant development consistent with clause 24 of Schedule 1 of the SRD SEPP.

#### 3.2 Permissibility

Under clause 8 of *State Environmental Planning Policy No.55 - Remediation of Contaminated Land (SEPP 55)*, Category 1 remediation works may be carried out, despite any provision to the contrary in an Environmental Planning Instrument (EPI), with the consent of the consent authority.

The proposed remediation works are permissible as they are classified as Category 1 remediation works because they are subject to a Management Order and also as the works require consent under the SRD SEPP.

#### 3.3 Delegated Authority

On 16 February 2015, the Minister for Planning delegated responsibility for the determination of State significant development to the Executive Director, Key Sites and Industry Assessments, where:

- the relevant local council has not made an objection;
- a political disclosure statement has not been made; and
- there were less than 25 submissions in the nature of objection.

The proposal complies with the terms of the delegation as the City of Sydney Council (Council) did not object to the proposal, a political disclosure statement has not been made in relation to the application, and there were fewer than 25 submissions of objection.

Accordingly, the application is able to be determined by the Executive Director, Key Sites and Industry Assessments under delegation.

#### 3.4 Environmental Planning Instruments

Under section 79C of the EP&A Act, the consent authority, when determining a development application, must take into consideration the provisions of any environmental planning instruments (EPIs) and draft EPIs (that has been subject to public consultation and notified under the EP&A Act) that apply to the proposal.

The following EPIs apply to the site:

- *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP);
- *State Environmental Planning Policy (Major Development) 2005* (MD SEPP);
- *State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)*;
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)*;
- *State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007*;
- *Sydney Regional Environmental Plan (Sydney Harbour Catchment 2005)*; and

- *Sydney Harbour Foreshores and Waterways Development Control Plan 2005 (Sydney Harbour Waterways DCP).*

Detailed consideration of the provisions of all EPIs that apply to the proposed development is provided in **Appendix D** of this report. The Department is satisfied that the proposed development generally complies with the relevant provisions of these EPIs.

It is also noted that while DCPs do not apply to SSD under clause 11 of the SRD SEPP, consideration has been given to the relevant clauses of the Sydney Harbour Waterways DCP in **Appendix D**.

### 3.5 Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the EP&A Act, as set out in section 5.

The proposal complies with the objects of the EP&A Act as the proposal would result in the remediation of significantly contaminated land and it will ultimately promote the orderly and economic use and development of land at Barangaroo.

The Department's assessment in **Section 5** of this report demonstrates that the proposal would have no adverse impacts on native flora or fauna, including threatened species, populations and ecological communities, and their habitats and is therefore consistent with the principles of ESD (**Section 3.7**).

Accordingly, the application is considered consistent with the objectives of **Section 5**.

### 3.6 Compliance with Clause 3B of Schedule 6A of the EP&A Act

Clause 3B(2)(d) of Schedule 6A the EP&A Act specifies that a consent authority must not grant consent under Part 4 unless it is satisfied that a development is generally consistent with the terms of the approval of a Concept Plan. The Department has considered the proposed development and is of the opinion that the proposal is consistent with the Barangaroo Concept Plan for the following reasons:

- the original environmental assessment for the approved Barangaroo Concept Plan identified that parts of the site (particularly those within the known footprint of the former gasworks) were contaminated and would need to be remediated;
- the approved Concept Plan for Barangaroo (as modified, see **Appendix B**) outlines that the site is to be retained as a 'Road'. On completion of the remediation works, the proposal includes works to reinstate the road pavement and does not propose any alteration to the current use of the site; and
- importantly, the Department considers that the works will not restrict or preclude the future development of Barangaroo in accordance with the current Barangaroo Concept Plan.

### 3.7 Ecologically Sustainable Development

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes.

The Applicant has demonstrated the proposal is consistent with the principles of ESD as described in Section 7.17 of the EIS, which has been prepared in accordance with the requirements of Schedule 2 of the EP&A Regulation.

As concluded by the Department's assessment in **Section 5** of this report, the proposal has the potential to significantly reduce environmental harm through the remediation of historic contaminants

and results in an overall positive impact on current and future environmental resources and ecosystem integrity in the area. The proposal is therefore consistent with the principles of ESD.

### 3.8 Environmental Planning and Assessment Regulation 2000

Subject to any other references to compliance with the EP&A Regulation cited in this report, the requirements for notification (Part 6, Division 6) and fees (Part 15, Division 1AA) have been complied with.

### 3.9 Secretary's Environmental Assessment Requirements

Section 7.0 of the EIS addresses compliance with the Director-General's (now Secretary's) Environmental Assessment Requirements. These matters have been sufficiently addressed in the EIS to enable the Department to undertake a proper assessment of the proposal in accordance with the EP&A Act.

## 4. CONSULTATION AND SUBMISSIONS

### 4.1 Exhibition

In accordance with section 89(F) of the EP&A Act, the Department publicly exhibited the application from **Thursday 25 September 2014** until **Friday 7 November 2014**. The application was publicly available on the Department's website and exhibited at the Department's Information Centre and City of Sydney Council's One Stop Shop.

The Department also placed a public notice in the Sydney Morning Herald and the Daily Telegraph on **Wednesday 24 September 2014** and notified adjoining landholders and relevant State and local government authorities.

The Department received 13 submissions on the proposal (**Appendix E**), nine from government agencies and four public submissions. None of the government authorities objected to the proposal but issues of concern and clarification were raised with respect to the information provided. One public submission received from Jemena objected to the proposal.

### 4.2 Public Authority Submissions

**Table 3** below summarises comments from government agencies.

**Table 3** Summary of agency submissions on the proposed development.

| Agency         | Summary of Issues                                                                                                                                                                                                                                                                                                                   |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| City of Sydney | The City of Sydney Council did not object to the proposal but noted that NSW EPA is the ultimate regulatory authority for the revocation of the Declaration.                                                                                                                                                                        |
| EPA            | The EPA provided comprehensive comments requiring clarification and additional information on the following issues: <ul style="list-style-type: none"><li>• Air Quality Assessment;</li><li>• Chemical Risk;</li><li>• Health;</li><li>• Noise;</li><li>• Waste and contamination; and</li><li>• Surface and Groundwater.</li></ul> |
| DPI Water      | DPI commented the applicant has already applied for a licence for temporary dewatering to enable the remediation of contaminated material, if required.                                                                                                                                                                             |
| NSW Health     | NSW health requested the following information is provided to them:                                                                                                                                                                                                                                                                 |

| Agency                           | Summary of Issues                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  | <ul style="list-style-type: none"> <li>all air and water quality monitoring results;</li> <li>results from the in-situ remediation trial;</li> <li>contacts for any public health emergency; and</li> <li>copies of all external communications such as community newsletters.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>SafeWork NSW</b>              | <p>SafeWork NSW provided the following comments:</p> <ul style="list-style-type: none"> <li>Revise the Preliminary Hazards Analysis (PHA) to include all hazardous chemicals not just those defined as 'dangerous goods'; and</li> <li>detail the quantities and extended storage time periods of hazardous materials on site require the following information to be provided: <ul style="list-style-type: none"> <li>a site manifest;</li> <li>notification to SafeWork NSW;</li> <li>a site emergency plan to be lodged with FRNSW;</li> <li>placards (outer placards and bulk storage placards);</li> <li>hazardous chemical register and up to date relevant safety data sheets; and</li> <li>other specific requirements including; packaging, labelling, spill containment, separation distances, hazardous areas, transfer options, protection from damage and containment.</li> </ul> </li> </ul> |
| <b>Sydney Water</b>              | <p>Sydney Water noted the Applicant continues to consult to confirm protection, trade waste and monitoring requirements, specifically:</p> <ul style="list-style-type: none"> <li>a trade waste licence is required. Water and waste systems may need to be upgraded at the Applicant's cost;</li> <li>further application and approval is required by SWC for the protection and monitoring requirements of work near SWC assets;</li> <li>the application must be supported by an Environmental Management Plan, structural assessments, geotechnical studies and other relevant information;</li> <li>emergency and operational access to assets must be retained; and</li> <li>any works impacting Sydney water systems that require environmental approval will need to be considered under the EIS approval.</li> </ul>                                                                              |
| <b>RMS</b>                       | <p>RMS requested a Construction Traffic Management Plan (CTMP) be provided detailing:</p> <ul style="list-style-type: none"> <li>routes, numbers of trucks, hours of operation, access, traffic control;</li> <li>impact on site access and traffic movements on Hickson Road from the new signalised intersection (Sussex, Hickson &amp; Napoleon); and</li> <li>a road occupancy licence is required for any works impacting on traffic flows on Hickson Road.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Port Authority of NSW</b>     | <p>The Port Authority did not object but raised concerns as Hickson Road is now the major access route for large vehicles to the Port's Overseas Passenger Terminal in Circular Quay, noting:</p> <ul style="list-style-type: none"> <li>24-hour access is to be maintained along Hickson Road suitable for 19m articulated trucks;</li> <li>minimum 3 months' notice of road changes and closures;</li> <li>no temporary road closures scheduled on cruise ship days;</li> <li>the Port Authority is to be consulted with regard to matters impacting traffic;</li> <li>update traffic assessment to consider impacts of the George Street light rail project; and</li> <li>update assessment modelling and intersection analysis based on current numbers (not figures from 2013 as used).</li> </ul>                                                                                                    |
| <b>Transport for NSW (TfNSW)</b> | <p>TfNSW requested a detailed Construction Pedestrian and Traffic Management Plan (CPTMP) be prepared and endorsed by TfNSW which includes:</p> <ul style="list-style-type: none"> <li>an analysis on the impacts of other construction projects in Barangaroo and Wynyard, specifically the Ferry Wharf and Wynyard Walk;</li> <li>temporary road closures during remediation works;</li> <li>impacts on bus services in the area; and</li> <li>provision of pedestrian footway and cycle ways and safe crossing points.</li> </ul> <p>TfNSW also noted that a Road Occupancy Licence must be obtained any activity impact road efficiency.</p>                                                                                                                                                                                                                                                           |

### 4.3 Public Submissions

Four public submissions were received, one objected to the proposal, two raised issues of concern and the fourth submission supported the proposed remediation works.

The public objection was submitted by Jemena, who cited the below reasons:

- the remediation strategy is based on a Human Health and Ecological Risk Assessment (HHERA) which contains flawed assumptions including the presence of groundwater dependent ecosystems (GDEs) and the risk to unprotected maintenance workers. Jemena submit there are no GDEs present and risks to intrusive maintenance workers can be managed by a site management plan (as for 36 Hickson Road);
- any impact to ecological receptors within Darling Harbour from contaminants potentially migrating to the Harbour will be mitigated by the proposed development at Barangaroo which includes the construction of basement walls in Block 1-3, Block 4, perimeter walls at Block 5 and works proposed down gradient for the hotel resort. Jemena also submit there is no technical evidence to indicate that contaminants are migrating into Darling Harbour;
- the EIS does not provide appropriate justification that the risks from the current contamination based on the use of the site as a public road would be greater than the proposed intrusive remediation works; and
- contamination in Hickson Road would be managed more effectively via less intrusive methods such as cap and contain.

Two public submissions were received from local residents. One raised concerns in relation to impacts on air quality and specifically the need for an emergency warning system should pollutants be released and further consideration of low frequency noise impacts at night time.

The second public submission was received from the commercial owners at 36 Hickson Road, Sydney, requesting the following conditions are placed upon any development consent:

- compensation be provided to commercial and business operators for any financial or business loss incurred due to remediation works being carried out;
- written consent must be sought to access the property to carry out remediation works;
- detailed engineering assessment must be undertaken and mitigation measures implemented to protect adjacent land and assets from potential damage.

A fourth public submission supported the proposed remediation works.

### 4.4 Response to Submissions

On 23 March 2016, the Applicant lodged its RTS for the proposed development. The RTS provided;

- a Remediation Action Plan Addendum and supporting Site Auditor Statement;
- a revised Air Quality Impact Assessment (AQIA);
- amended Health Impact Assessment;
- amended Waste Management Plan;
- amended Soil and Water Management Plan; and
- a detailed response to the objection received from Jemena.

The Public Authority submissions in response to the RTS are summarised in **Table 4**.

**Table 4: Public Authority submissions to RTS**

| Agency                       | Summary of Issues                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EPA</b>                   | <p>The EPA requested additional information to further clarify issues summarised below. Where issues have been effectively resolved recommended conditions were provided.</p> <p><u>AQIA</u></p> <ul style="list-style-type: none"> <li>- clarify if key Volatile Organic Compounds (VOCs) exceed target criteria at maximum potential emission limits; and</li> <li>- clarify the increases in ground level concentrations in the revised AQIA (compared to the concentrations utilised in the originally submitted AQIA).</li> </ul> <p><u>Contaminants and Risk</u></p> <ul style="list-style-type: none"> <li>- outline methods for further assessment of potential impacts should detailed project design(s) change significantly from that assessed;</li> <li>- provide appropriate contingencies to handle onsite storage of contaminated materials;</li> <li>- the AQIA should detail potential impacts on elevated receptors to occupied buildings, within Barangaroo South;</li> <li>- clarify assumptions to calculate odour emission rates for the odour control structures;</li> <li>- confirm emission rates utilised to model excavation enclosure stack emissions; and</li> <li>- detail the emission estimates used for the proposed Stage 1C works.</li> </ul> |
| <b>DPI Water</b>             | Groundwater management plan (GMP) to include ongoing monitoring at the eastern edge of the Barangaroo site. The GMP should be prepared in consultation with DPI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>NSW Health</b>            | Requested notification requirements are included as conditions for any project approval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Port Authority of NSW</b> | The Port Authority is satisfied the issues raised have been appropriately addressed in the RTS. Further consultation is required in relation to any proposed traffic changes on Hickson Road.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Transport for NSW</b>     | <ul style="list-style-type: none"> <li>• Reiterated the previous request for a CPTMP which must detail the construction program and consider that cumulative impact of projects in the local area including the Sydney Light Rail; and</li> <li>• a Road Occupancy licence is required.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

A further public submission was received from a local resident on review of the RTS, which reiterated concerns outlined in their original submission on the impact of low frequency noise advising the issue had not been directly addressed in the RTS. No further public submissions were received on the RTS.

#### 4.5 Second Response to Submissions

On 22 June 2016, a Second RTS was provided to address further comments from the EPA, specifically to:

- clarify the amended AQIA and clarifying the management of emissions external to emission control tents;
- correct figures presented in the noise and traffic impact assessments; and
- address the concerns raised by a local resident in relation to “low frequency noise”.

This report assesses the Applicant’s proposal as put forward in the RTS and Second RTS and considers the relevant public and government authorities’ final position on the proposed development, as amended by the RTS and Second RTS.

## 5. ASSESSMENT

### 5.1 Section 79C Evaluation

Section 79C(1) of the EP&A Act sets out the matters to be considered by the consent authority in determining a development application. The Department's consideration of these matters is set out in **Table 5** below.

**Table 5:** Considerations under Section 79C of the EP&A Act

| Section of EP&A Act | Matter for Consideration                                                                                                | Consideration in this Report                                                                                   |
|---------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 79C(1)(a)(i)        | Provisions of any Environmental Planning Instrument.                                                                    | <b>Section 3.4 and Appendix D</b>                                                                              |
| 79C(1)(a)(ii)       | Any proposed instrument that has been subject to consultation under the EP&A Act and notified by the consent authority. | N/A                                                                                                            |
| 79C(1)(a)(iii)      | Any development control plan.                                                                                           | N/A - <b>Section 3.4 and Appendix D</b>                                                                        |
| 79C(1)(a)(iiia)     | Any planning agreement entered into under section 93F.                                                                  | N/A                                                                                                            |
| 79C(1)(a)(iv)       | The regulations                                                                                                         | The Department has undertaken its assessment in accordance all relevant matters prescribed by the regulations. |
| 79C(1)(a)(v)        | Any coastal zone management plans.                                                                                      | N/A                                                                                                            |
| 79C(1)(a)(b)        | The likely impacts of the development.                                                                                  | <b>Section 5 and Appendix C</b>                                                                                |
| 79C(1)(a)(c)        | Suitability of the site for the development.                                                                            | <b>Section 1 to Section 3</b>                                                                                  |
| 79C(1)(a)(d)        | Any submissions received.                                                                                               | <b>Section 4 and Section 5</b>                                                                                 |
| 79C(1)(a)(e)        | The public interest.                                                                                                    | <b>Section 5.9</b>                                                                                             |

The Department has considered the EIS, the issues raised in submissions, the Applicant's RTS and second RTS in its assessment of the proposal. The Department considers the key issues to be:

- remediation and waste management;
- air quality and odour;
- noise, vibration and hours of construction;
- health impacts;
- water management and quality;
- traffic and parking;
- hazardous chemical management; and
- tree removal.

All other environmental impacts are considered to be minor. The Department's assessment of all other issues is provided in **Section 5.10**.

### 5.2 Remediation and waste management

#### 5.2.1 Remediation

The EPA has declared the site to be a 'remediation site' under the *Contaminated Land Management Act 1997* as the soil and groundwater is contaminated with gasworks waste in such a way as to present significant risk of harm to human health and the environment. An overview of the contaminants present is provided in **Section 1.4**.

In July 2013 a site specific *NSW Declared Remediation Site No. 21122 Remedial Action Plan* (Declaration Area RAP) was prepared by AECOM. The Declaration Area RAP outlines the remediation activities necessary to remove or treat the contaminated material, to ensure the protection of human health and the environment and enable the revocation of the EPA Declaration (no. 21122) under the current land use of the site.

The Declaration Area RAP has been reviewed and endorsed by an independent EPA-accredited Site Auditor (Mr. Graeme Nyland). The Site Auditor has issued Section B Site Audit Statements verifying the nature and extent of contamination has been appropriately determined and the Declaration Area RAP is appropriate to facilitate the revocation of the Declaration. The Declaration Area RAP also provides a validation process which requires further site audit statements to confirm successful remediation on completion of the works.

The proposed remediation at Hickson Road involves two possible remediation methods, the preferred option of in-situ remediation (chemical oxidation) or alternatively ex-situ remediation (excavate, off-site disposal and backfill). Both methodologies are detailed in **Section 2.0**. Importantly, the Department notes both remediation methods are consistent with the Declaration Area RAP which has been subsequently endorsed by the Site Auditor.

### 5.2.2 Waste Management

Careful waste management is required as both the ex-situ and the in-situ remediation methods propose the excavation, off site treatment and disposal of contaminated material and liquid waste. Excavation and subsequent disposal of contaminated material is expected to be limited under the in-situ remediation process. A Waste Management Plan (WMP) provided with the EIS outlines waste sources, the indicative quantities of waste associated with both remediation strategies and identifies potential reuse, transport and disposal options in accordance with relevant EPA guidelines. Waste streams anticipated from both proposed remediation methods is summarised in **Table 1**. The RTS provided an addendum to the Declaration Area RAP which also outlines detailed environmental controls to reduce emissions and manage the off-site transportation of untreated contaminated material, consistent with the management of contaminated materials from earlier stages of remediation approved at Barangaroo (Block 4 and Block 5). The Site Auditor has endorsed the RAP Addendum as providing suitable controls to manage the off-site transport of contaminated waste.

In response to issues raised by the EPA (**Section 4.2**), an updated WMP was provided to clarify that no waste material is to be re-used on site and material will not be excavated unless appropriate disposal facilities can receive the waste or there is sufficient storage available within excavation enclosures. The Applicant also states as the waste is going to appropriately licensed facilities concerns raised by the EPA in relation to potential impacts associated with handling, tipping and treating contaminated waste are addressed and managed by the licensed facility. The Department notes the preferred licenced facility has not yet been identified although a number of facilities are identified as potential options.

The Department considers effective waste management and handling can be achieved and the EPA comments can be addressed through a requirement to amend the WMP to incorporate detailed information on the licensed treatment and disposal facility to be utilised, the treatment methodologies and EPA licences held by the facility to minimise any adverse risk to the environment. The WMP must also demonstrate current best practice in the treatment and disposal of contaminated materials is considered in identifying suitable licensed facilities and appropriate contingencies are in place, including storage or altered works programs (i.e. halt excavations), should waste material not be able to be transported off-site to the licensed facilities.

### 5.2.3 Suitability of remediation method and assessment

Jemena submitted an objection to the proposed remediation based on the following issues:

- flawed assumptions in the Human Health and Ecological Risk Assessment (HHERA) in that there is no evidence of groundwater dependent ecosystems;
- no evidence that contaminants are migrating;

- increased risks in undertaking remediation works relative to the risk of maintaining the current land use; and
- the remediation methodologies proposed are overly intrusive compared to methods such as cap and contain.

The Applicant has responded in detail to the issues raised in the submission in the RTS (**Appendix F**).

The Department's assessment acknowledges the need for remediation works has been established by the EPA's Declaration of a Remediation Site (Declaration Number 21122) under the *Contaminated Land Management Act 1997*, whereby the EPA has determined that the site is contaminated in such way as to present significant risk of harm to human health and the environment.

The Department considers the assumptions utilised in the HHERA, potential risk of migration of contaminants and the risks of the proposed remediation methodology are more appropriately considered, as required, through a Remedial Action Plan which has been independently assessed by an accredited site auditor. The Department's assessment notes the HHERAs, Declaration Area RAP and RAP Addendum have been certified and endorsed by an accredited EPA site auditor and reviewed by the EPA. Therefore the Department considers the HHERA and associated RAP can be relied upon to ensure the land will be remediated using appropriate methodologies, to facilitate the revocation of the EPA Declaration (no. 21122) consistent with the requirements of SEPP 55 (**see Appendix D**).

The Department has considered Jemena's further point in relation to the relative risks of the remediation works and notes the remediation works will ultimately result in a net improvement to the environment through removing an existing significant risk identified via the Declaration, to human health and the environment. The Department considers the risks of either remediation method can be appropriately managed, subject to the implementation of environmental management processes to mitigate potential construction and health impacts as outlined in the subsequent sections of this report.

The Department notes the RAP contemplates other remediation technologies such as 'cap and contain' and resolves that such a remediation method is not consistent with the remediation hierarchy required by the NSW EPA and provided in the *National Environmental Protection (Assessment of Site Contamination) Measure 1999*. For example, on site treatment so the contamination is destroyed is preferred over off-site treatment, which in turn is preferred to on site management without treatment (i.e. cap and contain) which requires the implementation of long term environmental management to monitor contaminated materials.

The Department has recommended conditions that require the remediation works to be carried out in accordance with the Declaration Area RAP, the RAP Addendum and supporting HHERAs which have been reviewed and endorsed by an EPA-accredited site auditor. The Department's recommended conditions also include a requirement for an EPA accredited site auditor to complete a site audit statement and a validation report, to ensure the site is appropriately remediated on completion of the works.

The Department has carefully considered the points raised by Jemena and concludes that with the recommended conditions in place, the site can be successfully remediated and validated in accordance with the relevant legislation.

### 5.3 Air Quality

The management of odours and emissions from contaminated material has been identified as a key impact to be addressed during the remediation works. The EIS therefore includes an Air Quality Impact Assessment (AQIA) to identify pollutants of concern, nearest sensitive receivers and dispersion modelling to assess potential air quality impacts for both remediation methods (in-situ and ex-situ) in accordance with the relevant guidelines.

Primary air pollutants of concern include; heavy metals, Volatile Organic Compounds (VOCs), exhaust emissions (nitrates,  $\text{NO}_2$ ) phenol, naphthalene, dust i.e. small soil particles ( $\text{PM}_{10}$ ) and odour. These pollutants were identified as being generated during excavation and handling of contaminated materials, during the combustion of diesel fuels and where heavy metals from contaminated soil may be released to the air attached to dust.

The AQIA provides that air emissions from the in-situ remediation are anticipated to be primarily emitted and controlled through a soil vapour extraction system. Air emissions from the ex-situ remediation will be managed by undertaking excavation, handling and loading of contaminated materials within large sealed tent structures (excavation enclosures) operated under negative pressure and connected to air filtration systems (emission control systems) (Figure 11).



**Figure 11:** Example of excavation enclosures on site at Barangaroo (Source: site visit 29 June 2016)

On review, the EPA queried the assumptions used in the Applicant's AQIA dispersion modelling, and required further analysis of the air quality exceedances identified by the modelling, sources of exceedances and specific controls to mitigate the potential emissions. Concerns were also raised by local residents in relation to air quality impacts and the need for an emergency warning system should high levels of pollutants be released.

In response, the Applicant provided further modelling which predicts slight exceedances of air quality criteria for nitrates ( $\text{NO}_2$ ) and particulate matter ( $\text{PM}_{10}$ ) for the proposed ex-situ remediation method only. On further analysis the exceedances in nitrates occurs only during the cumulative scenario which includes background levels (worst case scenario) and only at one receptor location. The analysis of the nitrate exceedance concludes it is due to conservative assumptions in the modelling which assume equipment is located adjacent to the site boundary and operates continuously, whereas this is unlikely under actual operating scenarios. The exceedance of the particulate matter only occurred where all cumulative activities including background levels were modelled. On further analysis the ex-situ remediation works were found to result in a minor contribution to overall particulate matter (2.5% of total  $\text{PM}_{10}$  concentration or  $2\mu\text{g}/\text{m}^3$  against a cumulative amount of  $80\mu\text{g}/\text{m}^3$ ). No further exceedances of the EPA air quality criteria were predicted.

The EPA agree that provided ex-situ activities are undertaken in enclosures, exceedances in particulate matter are unlikely. The EPA also concur that conservative assumptions within the modelling have likely resulted in an exceedance in nitrates, where as in reality this is unlikely.

The Applicant has advised some activities are required to be undertaken outside of excavation enclosures and has provided a Perimeter Retention Wall Odour Control Plan (PRW) to detail the specific activities along with appropriate controls to mitigate emissions, such as limiting excavation areas and the use of a foam suppressant to cover excavated material. The EPA has noted that wherever possible activities are to be conducted within the enclosures which act as a primary control to mitigate emissions, however, has accepted the controls for works outside of enclosures as appropriate. The EPA has provided recommended conditions of consent, including a requirement for a detailed Air Quality Management Plan (AQMP) and detailed designs for either the Soil Vapour Extraction system or Emission Control System are provided for review through an Air Quality Verification Report.

The Department supports the recommended conditions as provided by the EPA including the implementation of a detailed an AQMP incorporating the methodologies outlined in the amended AQIA, the RAP addendum and the PRW to ensure air quality impacts from the proposed remediation works and any off-site transport can be effectively managed. The AQMP will also provide mitigation measures including ongoing monitoring and reactive management during the works to address any actual air emissions above acceptable air quality criteria. The Department considers the requirement to provide an air quality verification assessment will enable final design parameters to be appropriately considered by the EPA, and specifically enable any findings from the Hickson Road remediation pilot trial to be incorporated into the detailed design for the in-situ remediation method and appropriately reviewed by the EPA.

The Department concludes that with the recommended conditions in place, emissions and odour from either remediation method can be appropriately managed so they do not adversely impact the environment or human health.

## **5.4 Noise, vibration and construction hours**

The construction noise and vibration assessment (CNVA) carried out by Wilkinson Murray Pty Ltd (Wilkinson Murray) outlines that remediation works using either the ex-situ or in-situ remediation method will take approximately 18 months or 21 months to complete. It is proposed to undertake the works from 7 am to 6 pm (Monday to Friday) and from 7 am to 5 pm on Saturdays. The proposed hours of construction on Saturdays are outside of the EPA's standard construction hours which are from 8 am to 1 pm. While the proposed hours on Saturday exceed the EPA's standard construction hours they are considered reasonable by the Department for this project and will enable the works to be completed in a more efficient and timely manner. The Department also notes the proposed hours are consistent with the City of Sydney hours for construction projects in the Central Business District. Only activities that are essential to the safe operation of the site are able to operate 24-hours, 7-days-a-week such as essential maintenance (e.g. dust suppression), the water treatment plant (WTP) if utilised, odour control systems and generators in the remediation enclosures. As such, the Department recommends works required outside of the approved hours are explicitly specified in conditions of consent.

### **5.4.1 Noise assessment**

Key sources of noise identified in the CNVA for both the in-situ and ex-situ remediation works include bulldozers, excavators, rock saws, trucks, piling, ground water pump extraction and remediation plant. Noise Management Levels (NML) or acceptable noise levels for the remediation works are based on the EPA's Interim Construction Noise Guidelines. The Guidelines define NMLs for potential residential receivers as background noise levels plus 10dBA during the day (standard construction hours) and plus 5dBA at all other times. The guidelines also provide the maximum acceptable construction noise level of 75dBA at the nearest receptors.

The CNVA found noise from construction activities for both the in-situ and ex-situ remediation methods exceed noise management criteria (NML). The greatest exceedances were identified at residential properties along Hickson Road primarily due to the proximity of these residences to the site. Noise levels are also anticipated to exceed the 'highly noise effected' level of 75dBA for some in-situ stages of work and all ex-situ stages of work. Exceedances of up to 22dBA for the in-situ remediation and between 23-26 dBA for the ex-situ remediation, were identified during the extended hours of operation on Saturdays (**Table 6**). Night time ex-situ works are predicted to exceed noise management levels at the Hickson Road residences during some stages by up to 12 dBA.

**Table 6:** Extract from the CNVA showing the worst case cumulative noise exceedances predicted for the ex-situ remediation works during the extended hours on Saturdays (Source: Applicant's EIS)

| Location                  | Predicted (dBA) |       | Saturday Extended Criteria (dBA) (1pm – 5pm) | Exceedance (dBA) |
|---------------------------|-----------------|-------|----------------------------------------------|------------------|
|                           | Day             | Night |                                              |                  |
| Hickson Rd Residences     | 81              | 66    | 55                                           | 26               |
| High Street Residences    | 60              | 33    | 50                                           | 10               |
| Merriman St Residences    | 55              | 30    | 51                                           | 4                |
| Balmain East Residences   | 56              | 30    | 51                                           | 5                |
| Darling Island Residences | 58              | 30    | 55                                           | 3                |
| Sydney Wharf Residences   | 65              | 30    | 55                                           | 10               |
| R8 Residences             | 72              | 39    | 56                                           | 16               |

As noise impacts are predicted to exceed the highly noise affected level of 75dBA for some in-situ and all ex-situ scenarios, the CNVA recommends that all reasonable and feasible measures are implemented to address noise impacts, including:

- power supplied by grid, where feasible to reduce the use of generators;
- select low noise equipment;
- install attenuators on exhaust fan, filtration and air handling plant, reduce plant settings out of construction hours;
- localised treatments such as barriers and or shrouds on fixed plant such as pumps, generators and extraction plant;
- plant noise audit, operator instruction, appropriate equipment selection (i.e. use of rock saws and rippers as opposed to rock hammers), site noise planning, noise barrier between the site and street frontages; and
- where generators are required (i.e. it is not feasible or possible to connect to mains power) locate all generators and air extraction fans to the far west of the site and apply acoustic screens.

The EPA and the Department acknowledge the noise exceedances identified, and potential impacts given the close proximity of the works to sensitive land uses. Both remediation methodologies will result in noise levels which exceed the applicable noise criteria at sensitive receptors, and as such all feasible and reasonable mitigation measures must be applied in these instances to ensure careful noise management. The Department also notes public submissions were received outlining concerns in relation to construction and vibration noise, specifically 'low frequency' noise from equipment required to operate 24-hours-a-day, 7-days-a-week, such as generators, air filtration systems and self-powered lights.

The Department has considered the following points in the context of its assessment of potential noise impacts, as provided in the CNVA:

- the noise modelling undertaken in the CNVA provides worst case scenarios and predicted noise levels at nearby sensitive receivers are likely to be less than forecast by applying the identified noise mitigation measures;
- **Table 6** applies a more sensitive Noise Management Level (NML) for works outside of standard hours on Saturday. Noise levels throughout the project will be of lesser impact than the maximum exceedances shown in the cumulative worst case scenario in **Table 6**;

- the Applicant has committed to implementing all reasonable and feasible noise mitigation measures, and due to the close proximity of construction works to adjacent residents, there is limited scope to further reduce remediation noise levels through engineered noise controls; and
- the Applicant has committed to implementing a Noise and Vibration Monitoring Plan to outline measures to manage and monitor noise levels. The Plan will also include actions for responding to any noise limit exceedance and complaints.

The Department also recognises the works and associated noise impacts are temporary in nature and the proposal will provide a long-term public benefit by removing contamination that presents significant risk to human health and the environment as demonstrated by the EPA's Declaration (no. 21122).

A number of conditions are recommended by the Department to ensure active management of noise levels, including the provision of an updated CNVMP to include all mitigation measures as outlined in the CNVA, community liaison, site contacts (24 hour), real-time monitoring and reactive management procedures to minimise and implement appropriate management measures to address potential exceedances of NMLs.

The Department concludes the remediation works are in the broader public interest and providing the conditions recommended above and mitigation measures are appropriately implemented construction noise impacts on nearby sensitive receivers would be temporary in nature and will be minimised as far as is reasonably practicable.

#### **5.4.2 Vibration assessment**

The CNVA evaluates the vibrations from the operation of rock breakers and vibratory rollers during excavation works which may impact human comfort and/or cause structural damage in nearby buildings. Vibrations from rock breaking and vibratory rollers is assessed as these activities are considered to result in the most significant vibration impacts. The Bond building (commercial) at 30-34 Hickson Road, 36 Hickson Road (commercial) and 38 Hickson Road (residential) are located adjacent to the proposed remediation area. The minimum distance between rock breaking activities and the two heritage buildings at 36 Hickson Road is approximately 10 - 20 metres. The in-situ works will not cause excessive vibration impacts, however, the ex-situ works will generate vibration levels which may exceed human comfort criteria at properties along Hickson Road and may impact buildings.

The Department notes the adjacent owners at 38 Hickson Road, have raised concerns in relation to the potential impact of the remediation works on the structural integrity of adjacent buildings and structures and have requested appropriate engineering assessment and consultation.

The CNVA recommends trial testing of vibration levels be conducted where equipment is identified as having the potential to exceed human comfort criteria, notification of occupants adjacent to the site when vibratory machinery is to be used and utilising the smallest sized vibratory roller to mitigate potential impacts. The assessment also recommends that a structural engineer be consulted to ensure the construction methods proposed will not result in undue risk of structural damage to adjacent buildings

Further assessment of vibrational impacts is provided in the specialist geotechnical desktop report which outlines vibration limits above which minor building damage is possible. The assessment notes the installation of groundwater retention walls and or bulk excavation of sandstone bedrock may cause vibrational impacts. Further assessment is recommended to determine appropriate construction methods with least impact, along with dilapidation surveys and survey monitoring to determine any movement or structural impacts from vibrations.

The Department notes the geotechnical review provided is a desk top review and as such recommends further assessment at detailed design stage. The detailed assessment is recommended to assess the construction methodology and type of retention wall to be installed, as this is considered to result in the highest risk for potential vibrational and structural impacts.

The Department has recommended the following conditions of consent to ensure vibration impacts are minimised as far as is practical and to ensure measures are in place to address any potential damage as a result of the proposed works:

- the approval of an updated Noise and Vibration Management Plan that incorporates all recommendations of the CNVA including the requirement to undertake trial vibration monitoring;
- specifying vibration limits to ensure human comfort criteria are not exceeded and structural damage avoided;
- geotechnical review and approval of the proposed remediation method at detailed design stage;
- survey and monitoring, including dilapidation surveys pre and post remediation works;
- CNVA to include further mitigation measures where vibration limits are exceeded (respite periods, community consultation, planning and programming works for periods of least impact); and
- the Applicant to reinstate any damage caused to adjacent buildings and public infrastructure as a result of the works.

With these conditions in place, the Department considers the vibration impacts will be minimised and monitored as far as is possible and damage as a result of the works can be appropriately identified and reinstated.

#### **5.4.3 Traffic Noise**

The CNVA assesses potential traffic noise in accordance with the EPA's *Road Noise Policy* (RNP) which provides acceptable levels for additional noise from construction traffic. Where the noise level goals are currently exceeded, the objective of increasing existing noise levels by less than 2dBA is applicable. The CNVA concludes the Hickson Road remediation traffic will increase noise levels at the nearest residences by approximately 1dBA, and increase levels to 1.4dBA under the cumulative scenario of all Barangaroo South operational traffic. The CNVA notes that as traffic noise is not predicted to increase noise levels by more than 2dBA, the traffic noise levels satisfy the requirements of the RNP. The Department concludes the noise impacts associated with traffic are acceptable.

### **5.5 Health Impacts**

A Health Impact Assessment (HIA) is included in the EIS to address the risk to human health from potential exposure to contaminated material during remediation. The HIA identifies key sensitive receptors (human workers, site visitors, nearby residents and ecological receptors) that may be affected by contaminants and investigates potential exposure scenarios including inhalation of chemicals on airborne particles (i.e. dust), inhalation of soil or ground water vapours, incidental ingestion and or dermal absorption of chemicals from the soil and groundwater.

Irrespective of the remediation methodology, the HIA identifies the primary risk of exposure is through inhalation of suspended particles and vapours (soil and water) and/or dermal contact and is likely to be a higher risk for site workers. All other identified potential exposure pathways to sensitive receptors (such as nearby residents and pedestrians) are considered low to moderate risk.

In response to comments from the EPA and SafeWork NSW, the Applicant provided an updated HIA with the RTS, to address potential risk of inhalation of vapours from all sources (including groundwater) and included an ambient vapour monitoring requirement. Works proposed to be conducted outside excavation enclosures have been included within the HIA and associated environmental controls are outlined, including minimising excavation areas, covering materials with odour suppressant foams and the use of soil vapour monitoring points.

Other controls to ensure the health risks to workers is minimised include:

- air quality monitoring to monitor emission levels and nominate trigger criteria for investigation or reactive management, odours from in-situ volatilisation will also need to be carefully monitored;

- source controls include minimising fugitive dust by visual inspection and sprays, minimising excavation areas, using excavation enclosures and covering surfaces and loads, installing groundwater control and retention walls to control groundwater movement; and
- pathway controls (addressing how the pollutant may contact sensitive receptors) include mandatory issue of PPE, use fine sprays to control dust, install security fencing to avoid access and inadvertent impacts to the public.

The AQMP will also monitor air quality to further address potential inhalation pathways (the primary risk of exposure) and outline corrective work actions in case of any exceedances in air quality criteria. The EPA has requested the air quality controls along with the requirement for ambient vapour monitoring be included in the Air Quality Management Plan (AQMP) to ensure there is a consistency in approach between the management plans implemented on the site.

The Department has reviewed the updated HIA provided by the Applicant and is satisfied the mitigation measures provided can effectively manage potential health impacts. In addition, the Department has recommended key conditions which require the Applicant to prepare an Emergency Management Plan, Health Management Plan, Hazardous Chemical Management Plan (**Section 5.7**) and Asbestos Management Plan consistent with previous requirements for remediation works at Barangaroo to detail the specific controls to protect human health and additional precautions as required.

With the implementation of these control measures and the EPA requirements, the Department's assessment concludes the potential health impacts associated with the remediation works can be effectively managed.

## 5.6 Water Quality and Management

The EIS includes two Soil and Water Impact Assessments (SWIAs) which assess potential impacts on groundwater, stormwater, harbour water and marine ecology from the proposed in-situ remediation process (iSWIA) and the ex-situ remediation process (eSWIA).

### 5.6.1 Potential Impacts from ex-situ process

Potential impacts from the ex-situ remediation process include uncontrolled movement and release of contaminated groundwater and surface water to the harbour. Impacts on groundwater ecosystems are low given its unlikely the existing contaminated groundwater systems support functioning ecosystems. Some settlement may occur as a result of dewatering. However, settlement movements are unlikely to impact buildings due to existing sandstone foundations.

The eSWIA found the impact to both surface and groundwater can be managed through the application of specific mitigation measures. Mitigation measures include treatment of all contaminated water before release at the WTP, the use of groundwater retention walls to manage groundwater flows during the works, implementation of on-site erosion and sedimentation controls and turbidity curtains within the harbour. Potential impacts will also be monitored through water quality monitoring both prior to the release and within the harbour to ensure water quality objectives are achieved. Services are recommended to be monitored to ensure movement is recorded and managed to avoid damage.

The EPA's advice has focused on applying appropriate surface and groundwater discharge criteria to effectively manage water quality. The EPA has recommended a surface and groundwater management plan be prepared to incorporate a consolidated set of water quality criteria, provided specific water quality targets for discharge points, requirements for monitoring, and trigger criteria for reactive management to be implemented onsite.

### 5.6.2 Potential Impacts from in-situ process

Potential impacts on surface and groundwater from the in-situ remediation process include: overflows, spills or leaks from injection or extraction wells and chemical storage areas, release of vapours from oxidation processes, injected materials causing uncontrolled movement of chemicals

or subsurface contaminated materials, chemicals entering stormwater pipes and uncontrolled stormwater runoff mixing with contaminated materials and moving materials off site.

The iSWIA found the potential for adverse impacts to local soil and groundwater systems can be managed during the in-situ remediation process through the application of suitable mitigation measures and monitoring regimes. The iSWIA outlines a monitoring program to track the movement and performance of the chemicals in the subsurface, optimise treatment and include groundwater sampling, soil sampling, soil vapour sampling and harbour water monitoring. Water extracted from the in-situ process will either be treated at the Water Treatment Plant (WTP) or alternatively tankered off site to an appropriately licensed treatment facility. Mitigation measures include applying industry standard erosion and sediment controls to control water movement across the site, bunding and lining chemical storage areas with high quality plastic liner (i.e. High Density Polyethylene) to manage spills, monitoring vapours released through the soil vapour extraction system, monitoring the progression of the subsurface 'injection front' and utilise groundwater extraction to control subsurface movement and appropriately storing and testing extracted groundwater to determine suitable treatment or disposal.

The geotechnical desktop review also flagged the potential for injected chemicals to interact with substructures and services (the interaction may produce heat and or gas) and recommended any potential impact should be verified prior to the commencement of works.

The Department and the EPA both raised the issue of controlling the subsurface chemical movement, with the EPA further raising issues of consistency between the in-situ and ex-situ water quality monitoring plans, appropriate commissioning periods for the WTP (if utilised) and appropriate management to ensure contaminated waters do not mix with clean waters entering the site. The Applicant provided a revised in-situ Soil and Water Impact assessment to clarify the progression of the subsurface chemical front will be closely monitored by groundwater monitoring wells. The revised iSWIA notes the risk of uncontrolled movement of subsurface chemicals will ultimately be controlled by the perimeter retention walls located on the western side of the Block 4 and Block 5. The EPA has not raised any further issue in response to water quality management. DPI Water has requested the groundwater management plan be prepared in consultation with DPI and include ongoing monitoring at the eastern edge of the Barangaroo site.

The Department's assessment has carefully considered the ex-situ and in-situ remediation processes and acknowledges the proposed in-situ remediation technology is currently being trialed at Barangaroo (under major project approval MP10\_0087 - SISCO Pilot trial). Details from the trial will further inform the detailed design for the in-situ process including, chemicals to be utilised, anticipated subsurface movement and chemical interaction with services.

The Department recommends that once the preferred remediation strategy is identified, a specific and detailed surface and groundwater management plan (S&GWMP) be submitted to the EPA for review. The S&GWMP must outline all water quality criteria and triggers consistent with EPA licence requirements, monitoring and reactive management procedures for the final detailed design of the preferred remediation methodology. The S&GWMP will also detail:

- any on site water treatment plant and appropriate commissioning and performance testing; and
- if water is to be tankered off site, appropriate management measures for the storing and transferring liquid waste for transport and off-site treatment and or disposal.

The Department concurs with the EPA's comments that providing appropriate 'water quality triggers' or discharge criteria is an effective way to ensure water quality is maintained during the remediation works. Compliance with water quality limits provided by the EPA and included in the relevant environmental protection licence will be reiterated in recommended conditions. Overall, the Department considers the short term water quality impacts can be managed appropriately through the application of strict water quality limits, ground water retention walls and management procedures. The Department also notes the remediation works will ultimately result in long-term net benefit to water quality both within the area and potentially on receiving water bodies such as the harbour through the removal of sub-surface contamination.

## 5.7 Traffic and Transport

A Traffic Impact Assessment (TIA) was prepared and included in the EIS for both the preferred remediation in-situ methodology and the alternate ex-situ remediation methodology.

### 5.7.1 Traffic

The TIA utilises the predicted traffic movements as a result of the ex-situ remediation method as a worst case scenario, noting that should the in-situ remediation method be utilised, the number of daily vehicle movements will reduce.

The TIA found a cumulative worst-case of 335 vehicle movements, which includes impacts from concurrent construction activities at Barangaroo, would be generated during the AM peak hour. Of these only a small proportion (3% or 10 vehicle movements) are attributable to the Hickson Road remediation works. Using the predicted worst-case vehicle movements identified above, the TIA concludes the construction traffic movements associated with the ex-situ remediation would not impact on the overall operation of the local road network, can be effectively managed and require no further works to accommodate the traffic levels anticipated.

A supplementary addendum to the TIA has been provided to respond to the Port Authority of NSW concerns on the impact of the works on heavy vehicle access along Hickson Road to the Overseas Passenger Terminal (OPT). The Port Authority requested the traffic assessments and modelling consider impacts of the George Street light rail, the assessment use more current traffic counts and provide for ongoing consultation and advance notice of temporary road closures.

The TIA addendum presents more recent traffic counts (undertaken on Thursday 26 November 2015) and found that the traffic volumes on the Barangaroo precinct have decreased compared to earlier counts used. The TIA also analyses the potential impact of traffic from the Sydney Light Rail Project and the Sydney Metro station works. The analysis found that existing traffic displaced by the light rail project on George Street, will be redirected onto adjacent north south corridors but importantly, Hickson Road is not expected to support the displaced traffic. The assessment notes no details are available to assess traffic impacts from the proposed Sydney Metro stations at this stage.

Both RMS and TfNSW requested a Construction Pedestrian and Traffic Management Plan (CPTMP) to include details on the final remediation strategy, associated works zones, construction vehicles, routes, consultation strategies, traffic impacts from other construction projects, temporary road closures, impacts on bus routes (temporary relocation of stops) and provision of safe footways and cycle ways. TfNSW and RMS also noted that a Road Occupancy Licence will be required for any activity that impacts the road efficiency.

To ensure traffic impacts can be managed and issues raised by TfNSW, RMS and the Port Authority of NSW are addressed (**Section 4.2**), the Department has recommended a condition requiring the Applicant to prepare the CPTMP in consultation with Port Authority of NSW, RMS and TfNSW. The Plan is required to be approved by TfNSW as requested in its submission.

The Department has reviewed the revised TIA and with the above conditions in place has concluded the surrounding road network can safely accommodate the anticipated traffic generated by the remediation activities.

### 5.7.2 Parking

No on-site parking is to be provided for construction workers consistent with other major CBD construction projects. It is expected workers will travel to the site via public transport outside the morning and afternoon peak commuter periods. Lend Lease operates a green travel program to provide information about available travel options and to encourage public transport. A number of parking bays along Hickson Road will be temporarily unavailable as a result of the works, with users to be notified prior to works commencing.

The Department concludes the parking arrangements are appropriate for the remediation works noting the arrangements are consistent with other major CBD construction projects. The Department has formalised the requirement for a CPTMP (incorporating a Green Travel Plan) into the recommended conditions of consent.

### 5.7.3 Access

The Barangaroo construction site entry will be via the existing gate house located approximately 350m north of the Sussex Street/Napolean Street intersection.

Hickson Road will be partially sectioned off (western and then eastern sides) to vehicular traffic during the works irrespective of the remediation methodology. Construction access to the work site on Hickson Road, particularly truck movements, will be coordinated for traffic efficiencies with set down areas within the work zones. Where vehicles are required to turn right to access the work zones along the eastern side of Hickson Road, they will enter the Barangaroo construction area to turn around and access the Hickson Road work zone via a left turn. Where a right turn into the site is unavoidable, truck movements will be managed by a traffic controller to minimise traffic impacts along Hickson Road.

Council and TfNSW did not raise any concerns in relation to the proposed access arrangements. The Department concludes that, given the limitations of the site, the proposed access arrangements are appropriate for the remediation works. The Department has formalised the requirement to include access arrangements, including careful loading and unloading management into the CPTMP in the recommended conditions of consent.

## 5.8 Hazardous Chemical Management

A Preliminary Hazards Assessment (PHA) has been prepared in accordance with the *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* (SEPP 33) as the proposed in-situ remediation works involve the use and storage of potentially hazardous substances.

The proposed in-situ remediation works are classified as a 'potentially hazardous industry' as outlined in *Apply SEPP 33 Hazardous and Offensive Development Application Guidelines 2011 (Appendix D)* as the works involve the storage of approximately 10,000 litres of oxidising agents (classified as Dangerous Goods) which exceeds the screening threshold of 5,000 litres. Accordingly further risk assessment scenarios were undertaken, to characterise the risk outside the boundaries of the site from the storage and handling of hazardous substances.

The ex-situ remediation technology will not directly involve the use or storage of dangerous goods in excess of the screening thresholds, but may involve the use of a water treatment plant (WTP) which will require the storage of diesel, hydrochloric acid, sodium hydroxide and peroxide, and as such, the ex-situ remediation works has been included in the risk assessment scenarios.

The risk assessment undertaken identifies potential offsite risks through hazard identification, consequence and frequency analysis to determine overall risk. Overall risk was then compared to risk acceptability criteria provided in *Hazardous Industry Planning Advisory Paper 4: Risk Criteria for Land Use Safety Planning* (HIPAP No. 4). Where risks exceed acceptable criteria, further risk mitigation mechanisms are required. The PHA assessment identified all dangerous goods must be stored in a dangerous good cabinet able to contain a potential fire and allow for emergency response procedures to be actioned. Drums of chemicals must also be plastic wrapped on pallets to reduce potential movement and damage. Providing the identified mitigation measures are implemented, the risk assessment found that off-site risks can be reduced below acceptable risk criteria.

On review, the Department and Safe Work NSW requested the PHA be revised to include consideration of all chemicals on site not just those defined as dangerous goods, clarification of the hazards associated with the in-situ subsurface remediation reactions, possible release of toxic or flammable substance(s) and further detail on the soil vapour extraction system including the type of

gasses to be collected, the potential treatment proposed and any potential for mixture of incompatible materials on site.

The Applicant has advised a Hazardous Chemical Management Plan will be provided to clearly document the management of all chemicals on site. The Applicant has also advised a further PHA can be provided, if the findings of the pilot trial alter the detailed design of the in-situ remediation method or alternate chemicals are proposed to be utilised. The Applicant has emphasised the current PHA has been finalised in accordance with SEPP 33 and is sufficient to confirm the proposed remediation works can appropriately manage risks associated with handling and storing dangerous goods on site. The possible release of toxic or flammable substance(s) is appropriately managed through the soil vapour extraction system and the potential air quality impacts are detailed in the air quality impact assessment (**Section 5.2**).

The Department's assessment has found the potential release of substances is unlikely to result in an off-site impact. The Department notes the final detailed design of the in-situ remediation process is dependent on the completion of the Hickson Road pilot trail. Where details are unknown, such as the type of chemicals (i.e. surfactant) to be utilised, the assessment has utilised a 'worst case' material to appropriately assess a worst case risk. The Department has reviewed the PHA and further management and mitigation procedures proposed by the Applicant and considers the approach and recommendations to be acceptable.

To ensure appropriate handling of chemicals on site, the Department recommends all general and specific recommendations from the PHA are included as conditions of consent. In addition, to ensure the final design of the proposal is appropriately assessed and managed the Department has recommended conditions which require:

- the Applicant prepare a hazard and operability study and a final hazard analysis to ensure all detailed design information is appropriately analysed prior to the commencement of the works. Where elements change significantly further assessment may be required;
- a Hazardous Chemical Management plan be prepared to include all recommendations of the PHA and to manage risks associated with the handling and storage of chemicals on the site; and
- an Emergency Management Plan and Safety Management System detailing appropriate emergency procedures developed in consultation with NSW Fire & Rescue and Safe Work NSW to ensure that should an incident occur appropriate information is readily available on the chemicals stored and handled on site, the potential risks to health and appropriate control measures.

Based on the information provided in the PHA, and noting all safeguards are required to be implemented as part of the Department's recommended conditions, the Department's assessment concludes the remediation activities would not pose an unacceptable risk to surrounding land uses.

## 5.9 Tree Removal

There are currently 46 trees located within and adjacent to the remediation site on Hickson Road, consisting of 42 Hills Figs, 1 Moreton Bay Fig and 3 Fan Palms (Figure 12). The EIS includes an Arboriculture Impact Assessment Report (AIA) which assesses the impacts on these trees as a result of both the in-situ and ex-situ remediation processes.



**Figure 12** View to North along Hickson Road illustrating existing street trees (Source: Google Streetview)

#### In-situ Remediation:

The in-situ process does not require any trees to be removed and appropriate tree protection measures are recommended in the AIA to ensure there is no significant impact on the condition or health of the existing trees.

#### Ex-situ Remediation:

The ex-situ process requires the removal of up to 15 Hills Fig trees, the majority of which are located on the western side of Hickson Road, with the remainder of the trees to be appropriately protected during the works through a comprehensive range of mitigation and management recommendations.

The AIA notes that to off-set the impact of tree removal, new street trees appropriately advanced and of the same species (i.e. Hills Fig trees) will be planted at the completion of the works.

One public submission raised concerns in relation to the protection of Tree 45, which the Applicant has subsequently confirmed will be retained and protected in accordance with the recommendations of the AIA. The Applicant has committed to carrying out the work in accordance with the AIA and appointing a project arborist to monitor all tree removal, tree health and preservation works in accordance with the AIA.

The Department's assessment concludes tree removal may be necessary to facilitate the remediation of the site, however, the impacts can be effectively managed through maximising the retention of trees on site and where trees must be removed by providing appropriate replacement trees at the completion of the works.

The Department has formalised the requirement for the Applicant to undertake all tree removal works in accordance with the AIA in the recommended conditions, including the requirement to replace any trees removed to facilitate the works with appropriately advanced trees of the same species.

## 5.10 Other Matters

| Issue                                                                                                                                                                                                                                                                                                                                                                      | Consideration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>Impact on Structures, Services and Utilities</b>                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>The <b>ex-situ method</b> which involves excavation will require the protection and diversion of sub surface services.</p> <p>The <b>in-situ method</b> will not require any diversion of services, however, there may be corrosive or heat impacts on services.</p> <p>Chemical movement from the in-situ process may also impact on adjacent building structures.</p> | <p>Mitigation measures including, applying vibration limits, undertaking detailed settlement/movement analysis and careful design are identified as management measures to minimise damage to services.</p> <p>The Department is satisfied the Applicant will work closely with the relevant service providers, so that the impacts of the development on services can be effectively managed.</p> <p>On-going monitoring is required to ensure the injection of chemicals results in minimal fluctuation in groundwater levels and potential corrosion or damage to services is verified prior to the commencement of the works.</p> <p>Sydney Water (SWC) made no objection to either remediation process but noted further approval is required for the appropriate protection and monitoring requirements of work near SWC assets including additional structural and geotechnical assessments. Emergency and operational access to assets must be retained.</p> <p>The Department has formalised requirements for the Applicant to obtain a Section 73 Certificate from SWC for works that may impact on SWC assets into the recommended conditions. Relevant utility and service providers must also be notified prior to works commencing.</p> <p>The geotechnical review provided found the water storage and treatment facilities in operation for the existing basements at 30-38 Hickson Road can accommodate any potential short term increase in groundwater seepage as a result of the in-situ remediation process.</p> <p>Chemical movement will be carefully monitored and managed throughout the process to reduce movement towards basement structures. The Department is satisfied the movement of chemicals will be closely monitored in accordance with the groundwater management requirements.</p> |
| <b>European Heritage</b>                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Potential impacts on European Heritage</p>                                                                                                                                                                                                                                                                                                                              | <p>A Heritage Impact Statement (HIS) concluded that although the site is likely to contain significant archaeological resources the area is not considered to reach the State significance threshold. The site is of local significance.</p> <p>The HIS notes that should the remediation works be carried out by in-situ remediation the impact on European heritage will be minimal. Where the ex-situ remediation process is utilised the HIS recommends a methodology be developed by the Applicant for archaeological monitoring and recording of remains (where possible) during the remediation works.</p> <p>The Applicant has committed to the above recommendation and the Department has incorporated this requirement into the recommended conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| <b>Indigenous Heritage</b>                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Potential impacts on Indigenous Heritage.                                                                                                                                                                                                                                                                                             | <p>An Indigenous Heritage Assessment (IHA) concluded the site does not contain any known sites of Aboriginal cultural significance.</p> <p>The Department notes the IHA assessment and recommends the following be included as a recommended condition for any unexpected finds:</p> <ul style="list-style-type: none"> <li>• should any remains be uncovered during works all works must cease and further advice be sought from the Metropolitan Local Aboriginal Land Council.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Visual Impact</b>                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Potential visual impacts particularly of the proposed tented excavation enclosures.                                                                                                                                                                                                                                                   | <p>The Department is satisfied the visual impacts of the development would be minimal. The works are temporary and the visual nature of the works would be largely indistinguishable from existing and concurrent construction works at Barangaroo.</p> <p>Recommended conditions require detailed plans of the proposed excavation enclosures and site layout be submitted to the Secretary for approval, to enable the Department to ensure the structures will not result in adverse visual impacts when the detailed design has been confirmed.</p> <p>The Department also notes the Applicant has stated night time lighting will be of low levels and will be consistent with Australian Standard AS1680 Lighting and the Visual Environment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Commercial Impacts</b>                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>The submission from Miller Commercial Group Pty Ltd at 36 Hickson Road requests commercial compensation for financial loss as a direct result of the remediation works</p> <p>In addition the owner has requested the Applicant seek written consent for any access into adjacent property to undertake the remediation works.</p> | <p>The EP&amp;A Act 1979 directs the Minister to evaluate applications against Section 79C of the Act. The Department considers Section 79C requires consideration of the potential environmental and amenity impact of the proposal in order to appropriately mitigate the impacts identified. The Department has carefully considered the impacts through this report and is satisfied that the impacts can be appropriately mitigated with careful on site management.</p> <p>In addition, the Department considers access into property and any financial compensation is a matter more appropriately negotiated between the Applicant and the relevant land owner.</p> <p>The Applicant has confirmed that landowner's consent will be obtained prior to accessing the adjacent land. The Applicant has also provided relevant case law to justify any condition for financial reimbursement of an unquantified liability is not a valid or reasonable condition.</p> <p>The Department recommends that should the dilapidation surveys and associated monitoring detect damage as a result of the works, the Applicant will be required to reinstate the property/asset to its previous condition (or near as is practically possible). The Department also recommends the Applicant engage in effective consultation with adjacent landowners and use all reasonable endeavours to minimise the impact of the works on the ongoing operations of businesses in the near area.</p> |
| <b>Ecology</b>                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Potential impacts on terrestrial and aquatic ecology through uncontrolled movements or release of contaminants.                                                                                                                                                                                                                       | A series of human health and ecological risk assessments were carried out as part of the Remedial Action Plan (RAP) to address the EPA Declaration. As part of these assessments relevant ecological receptors (terrestrial and aquatic) were identified along with marine water quality criteria to ensure the protection of aquatic ecological                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>receptors. Appropriate parameters have therefore been established and will be implemented via the Declaration Area RAP to ensure minimal impacts on ecological receptors.</p> <p>The proposed works are set back from and separated via perimeter retention walls from the closest aquatic ecological receptors (in Darling Harbour). As such, the risk of contaminants moving through groundwater to Darling Harbour is considered low.</p> <p>The Department's assessment concludes the proposal would result in minimal impacts to marine ecology. The remediation works have the potential to improve water quality in the area potentially resulting in improvements to nearby aquatic habitats</p> |
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## 5.8 Public Interest

The application is considered to be in the public interest as it will provide the following key public benefits:

- address the significant risk of harm to human health and the environment identified by the EPA's Declaration (no. 21122) within Hickson Road;
- indirectly facilitate the development of the Barangaroo site which is identified as an important opportunity to extend Sydney's CBD, provide commercial space, increase transport links and deliver world class open space in *A Plan for Growing Sydney*; and
- improve the long-term water quality in Darling Harbour therefore enhancing Sydney Harbour and its environment consistent with *A Plan for Growing Sydney's* goal to provide a sustainable and resilient city that protects the natural environment.

## 6. CONCLUSION

The Department has assessed the merits of the development having regard to the objects of the EP&A Act and the principles of ecologically sustainable development. The Department has reviewed the EIS and duly considered advice from public authorities, as well as issues raised in public submissions in accordance with section 75I(2) of the EP&A Act.

The key issues relating to the assessment of the remediation works include remediation and waste management, construction impacts (air quality, noise and vibration, water quality, traffic, chemical management) and health impacts.

The Department has closely consulted with the EPA to carefully assess the key issues identified. The Department's assessment also notes the remediation methodologies have been certified and endorsed by an accredited EPA site auditor and reviewed by the EPA.

All key issues associated with the proposal have been considered and appropriate conditions recommended, where necessary. Conditions include:

- confirmation of the final remediation methodology;
- Air Quality Verification report to detail relevant emission limits for the protection of health and amenity;
- dilapidation reports to monitor and evaluate any potential damage to adjacent buildings and structures; and
- the submission of a number of management plans to monitor and manage the construction impacts including, noise and vibration, waste management, traffic and water quality.

The Department concludes the remediation works can be undertaken in accordance with the requirements of SEPP 55 to facilitate the revocation of the EPA Declaration (no. 21122). The application is generally consistent with the Barangaroo Concept Plan, and with the implementation

of the recommended conditions of consent, the impacts of the development can be mitigated and/or managed to ensure an acceptable level of environmental performance.

Consequently, the Department considers the development is in the public interest and should be approved, subject to conditions.

## 7. RECOMMENDATION

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It is recommended that the Executive Director, Key Sites and Industry Assessments:

- **consider** all relevant matters prescribed under section 79C of the EP&A Act, as contained in the findings and recommendations of the assessment report and appended documentation;
- **grant consent** to the development application, subject to conditions, under section 89E of the EP&A Act, having considered all relevant matters in accordance with the above; and
- **sign** the attached instrument of consent at **Appendix A**.

Prepared by: M Nettlefold

Endorsed by:



Cameron Sargent  
**Team Leader**  
**Key Sites Assessments**

Endorsed by:



Ben Lusher  
**Director**  
**Key Sites Assessments**

Approved by:

Anthea Sargeant  
**Executive Director**  
**Key Sites and Industry Assessments**

## **APPENDIX A    RECOMMENDED CONDITIONS**

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## **APPENDIX B     BARANGAROO CONCEPT PLAN – PLANNING HISTORY**

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### **Barangaroo Concept Plan MP 06\_0162**

The then Minister for Planning approved the Barangaroo Concept Plan (MP 06\_0162) on 9 February 2007.

The Concept Plan approval allowed for:

- mixed use development involving a maximum of 388,300 sqm of gross floor area (GFA) contained within eight blocks on a total site area of 22 hectares (ha);
- approximately 11 ha of new public open space/public domain, including a 1.4 kilometre (km) public foreshore promenade;
- a maximum of 8,500 sqm GFA for a passenger terminal and a maximum of 3,000 sqm GFA for active uses that support the public domain within the public recreation zone;
- built form design principles, maximum building heights and maximum GFA for each development block within the mixed use zone;
- alteration of the existing seawalls and creation of a partial new shoreline to the Harbour;
- retention of the existing Sydney Ports Corporation Port Safety Operations and Harbour Tower Control Operations including employee parking; and
- an underground car park beneath the northern headland park, containing approximately 300 car parking spaces.

The capital investment value (CIV) of the approved Concept Plan was \$1.5 billion with up to 16,000 operational jobs

The following outlines the subsequent 7 modification approvals to the Concept Plan:

### **MP 06\_0162 MOD 1**

On 25 September 2007, the Executive Director, Strategic Sites and Urban Renewal, as delegate of the Minister for Planning, approved a minor modification to the approved Concept Plan to correct minor typographical errors and re-wording of the design excellence terms. This modification did not alter the maximum GFA or mix of uses.

### **MP 06\_0162 MOD 2**

On 16 February 2009, the then Minister for Planning approved a second modification to the Concept Plan to increase the GFA of commercial uses by 120,000 sqm in Blocks 2, 3, 4 and 5, to a total overall GFA of 438,000 sqm. The modification increased the total maximum GFA for Barangaroo to 508,300 m<sup>2</sup> (an increase of 120,000 sqm or 31 per cent over the whole site).

### **MP 06\_0162 MOD 3**

On 11 November 2009, the then Minister for Planning approved a third modification to the Concept Plan, generally meeting the requirements of the Concept Plan approval relating to the northern headland and northern cove, with other changes as follows:

- the reinstatement of a headland at the northern end of the site with a naturalised shape and form including a build up of height and a landscaped connection to physically link Clyne Reserve to allow direct pedestrian access from Argyle Place;
  - an enlargement of the northern cove to achieve a greater naturalised shape, form and edges (note this modification and the one above were required modifications in the terms of the original Concept Plan, contained in Modification B1 and B2, and following recommendations made in the jury report regarding the original winning competition scheme);
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- the consequential re-alignment of Globe Street to turn right towards Hickson Road immediately south of the enlarged cove, rather than continuing north around the headland;
- the consequential removal of development Block 8 and part of Block 7 and redistribution of the associated land use mix;
- the demolition of three heritage items being the Sandstone Seawall; the Sydney Ports Harbour Control Tower; and the MWS & DB Sewage Pumping Station; and
- amendments to the Statement of Commitments relating to the preparation of relevant plans and strategies so that work can commence in stages.

This modification slightly reduced the approved GFA and mix of uses, with a resulting total GFA of 501,000 m<sup>2</sup> (comprising 489,500 m<sup>2</sup> of mixed uses and 11,500 m<sup>2</sup> for the passenger terminal and active uses in the open space zone).

#### **MP 06\_0162 MOD 4**

On 16 December 2010, the then Minister for Planning approved a fourth modification to the Concept Plan. The modified Concept Plan provides for the following:

- a maximum of 563,965 sqm mixed uses GFA, including residential, commercial and retail uses which includes:
  - a maximum of 128,763 sqm of residential uses
  - a maximum of 50,000 sqm of tourist uses GFA; and
  - a maximum of 39,000 sqm of retail GFA.
- a maximum of 4,500 sqm of active uses GFA (3,000 sqm of which will be in Barangaroo South);
- a minimum of 12,000 sqm of community uses GFA (10,000 sqm of which will be in Barangaroo South);
- approximately 11 hectares of new public open space/public domain, with a range of formal and informal open space serving separate recreational functions and includes a 2.2 km public foreshore promenade;
- built form principles, maximum building heights and GFA for each development block within the mixed use zone;
- public domain landscape concept including parks, streets and pedestrian connections; and
- alteration of the existing seawalls and creation of a portion of the new shoreline to the Harbour.

In order to accommodate the changes made to the Concept Plan, Schedule 3 of Part 12 of the Major Development SEPP was concurrently amended. The amendment rezoned parts of the Barangaroo site and the adjoining areas from 'RE1 Public Recreation' and 'W1 Maritime Waters and Transport' to 'B4 Mixed Use' and 'RE1 Public Recreation'. Modifications to the distribution of GFA and building heights were also included in the amendment.

#### **MP 06\_0162 MOD 5**

This modification was lodged in February 2011, and proposed modifications to clarify the outcomes with respect to the distribution of community uses GFA across the Barangaroo site, and to correct a number of minor typographical errors. This application was subsequently withdrawn on 22 March 2011.

#### **MP06\_0162 MOD 6**

This modification application proposed to modify the Barangaroo Concept Plan for Barangaroo South. The proposed modifications, as publicly exhibited, sought approval for the following:

- the realignment of the development block boundaries for Blocks 3, 4A and 4B;
- revisions to the Urban Design Controls to reflect the changes to the Block boundaries for Blocks 3, 4A and 4B;
- change the requirement for a 'minimum' of 12,000 sqm of community uses gross floor area (GFA) to be delivered to a 'maximum';
- allow architectural roof elements and building management units to be excluded from the maximum height limit definition; and
- specify the car parking rates for 'other' uses thus removing the requirement to comply with City of Sydney Council's current car parking rates.

On 25 March 2014, the Planning Assessment Commission approved the application.

#### **MP06\_0162 MOD 7**

On 11 April 2014, the then Minister for Planning and Infrastructure approved a seventh modification to the Concept Plan to allow the construction, operation and maintenance of a concrete batching plant to supply concrete for the construction of future development under this Concept Plan at Barangaroo South.

#### **MP06\_0162 MOD 8**

On the 28 June 2016, the Planning Assessment Commission approved an eighth modification to the Concept Plan, providing for the following modifications:

- increase in the maximum total gross floor area (GFA) from 563,965 to 594,354 sqm, and increase in maximum GFA contained in the development blocks from 549,465 to 579,354 sqm;
  - increase in height from RL 170 m to RL 275 m and GFA from 33,000 to 77,500 sqm for Block Y; increase in height from RL 41.5 m to RL 250 m and GFA from 8,150 to 86,979 sqm for Block 4A;
  - decrease in height from RL 175 m to RL 107 m and GFA from 29,900 to 19,158 sqm for Block 4B; decrease in height from RL 80 m to RL 25 m and GFA from 9,400 to 1,927 sqm for Block 1; and deletion of Block 4C;
  - decrease in GFA from 209,213 to 197,280 sqm for Block 2, and decrease in GFA from 142,669 to 129,934 sqm for Block 3;
  - amend development block configurations for Block Y and Blocks 4A and 4B;
  - increase GFA outside of blocks from 14,500 to 15,000 sqm;
  - amend GFA allocated for various land uses (residential, tourist, retail, active);
  - amendment of Barangaroo site boundary, relocation of pier and reduction in the Southern Cove (now Watermans Cove); and
  - amendment of Built Form Principles and Urban Design Controls.
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## **APPENDIX C      ENVIRONMENTAL IMPACT STATEMENT**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=6617](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6617)

## **APPENDIX D      CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS**

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### **State Environmental Planning Policy (State and Regional Development) 2011**

The aims of this SEPP are to identify State significant development and State significant infrastructure and provide the necessary functions to joint regional planning panels to determine development applications.

The proposal is a State significant development pursuant to section 89C of *Environmental Planning and Assessment Act 1979* (EP&A Act) because it is development at Barangaroo with a capital investment value (CIV) in excess of \$10 million, under clause 3 of Schedule 2 of *State Environmental Planning Policy (State and Regional Development) 2011*. Therefore, the Minister for Planning is the consent authority for the development.

### **State Environmental Planning Policy (State Significant Precincts) 2005**

The aims of the SSP SEPP are to facilitate the redevelopment of important sites such as Barangaroo for the benefit of the State and provide for the development of major sites for a public purpose.

The proposed development is considered to be consistent with the SSP SEPP as it will enable the future development of Stage 1 of the Barangaroo site in accordance with the approved Barangaroo Concept Plan (as modified).

### **State Environmental Planning Policy No. 55 – Remediation of Land**

SEPP 55 aims to provide a State wide approach to the remediation of contaminated land. In particular, SEPP 55 aims to promote the remediation of contaminated land to reduce the risk of harm to human health and the environment by specifying:

- under what circumstances consent is required;
- the relevant considerations for consent to carry out remediation work; and
- that remediation works undertaken meet certain standards and notification requirements.

As the proposed remediation activities require consent under the provisions of clause 3 of Schedule 2 of *State Environmental Planning Policy (State and Regional Development) 2011*, the proposed works are classified as 'Category 1' works under clause 9 of SEPP 55 and the Applicant must obtain consent before undertaking the remediation works.

Clause 7 of the SEPP prevents a consent authority from issuing development consent unless it has considered:

- whether the subject site is contaminated;
- whether a contaminated site is suitable for its proposed use in its current state, or will be suitable following remediation; and
- whether it is satisfied that the site will be remediated before the land is used for the purpose proposed under the application.

In addition, where remediation works are required, Clause 17 of the SEPP requires all works to be undertaken in accordance with the EP&A Act, any guidelines drafted under the *Contaminated Land Management Act 1997*, and a remedial action plan (if works are 'Category 1' works), prepared in accordance with the *Contaminated Land Planning Guidelines*. Clause 18 also requires the Applicant to notify the relevant Council within 30 days of the completion of remedial works.

In May 2009, the EPA considered that the area, which includes part of the and within Barangaroo including part Hickson Road, was contaminated in such a way as to present a significant risk of

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harm to human health and the environment and as such declared part of Millers Point to be a remediation site (no. 21122) under the *Contaminated Land Management Act 1997* (CLM Act).

A site specific *NSW Declared Remediation Site No. 21122 Remedial Action Plan* (Declaration Area RAP) has been prepared by AECOM for the proposed remediation and included in the EIS. The proposed remediation works will be undertaken in conformance with the abovementioned Declaration Area RAP and the supporting detailed Human Health and Ecological Risk Assessments (HHERAs). The Declaration Area RAP has been prepared and approved by an independent EPA-accredited Site Auditor (Mr. Graeme Nyland). The Site Auditor has issued Section B Site Audit Statements verifying the nature and extent of the contamination has been appropriately determined and the Declaration Area RAP is appropriate to achieve the desired outcomes.

The objective of the proposed works is to remediate the land to facilitate the revocation of the EPA Declaration under the current land use. No further development or amendment to the current land use is proposed.

The Department's assessment concludes that the approved HHERAs and Declaration Area RAP can be relied upon to ensure that the land would be remediated in accordance with the requirements of SEPP 55 to enable the revocation of the EPA Declaration (**Section 5.1**). In order to ensure this occurs, the Department has recommended a number of conditions requiring:

- all remediation works to be undertaken in accordance with the approved HHERAs and the Declaration Area RAP and the RAP Addendum;
- the Applicant to submit a detailed site audit summary report, site audit statement and validation report verifying that the land has been remediated in accordance with the Declaration Area RAP and RAP Addendum to the EPA, the Secretary, the Certifying Authority, and the Council within six months of the completion of remediation works; and
- the Applicant to notify the Council that remediation works have been completed, as per the requirements of Clauses 17 and 18 of SEPP 55.

The Department's assessment therefore concludes that the proposal is consistent with the relevant provisions of SEPP 55.

### **State Environmental Planning Policy No. 33 – Hazardous and Offensive Development**

SEPP 33 aims to define potentially hazardous and or offensive developments with the potential for significant risk and or adverse impacts on the surrounding locality (i.e. risk of explosion or emissions of noise and/or odour). Risk screening methods to determine the classification of the project are provided in the current guidelines '*Applying SEPP 33 Hazardous and Offensive Development Application Guidelines 2011*'.

SEPP 33 requires that a Preliminary Hazards Analysis (PHA) be carried out for a potentially hazardous development to ensure hazards are systematically evaluated as part of the overall environmental assessment.

The EIS includes a Preliminary Hazards Assessment (PHA) prepared by AECOM because the preferred remediation (in-situ remediation) works are 'potentially hazardous' as defined by *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)*. This is due to the large quantities of oxidising agents (Dangerous Goods Class 5.1) to be stored on site and used to treat contaminated soil under the preferred remediation methodology.

The PHA assessment identified that dangerous goods must be stored in a dangerous good cabinet that can contain any potential fire for a sufficient period to enable emergency response procedures to be actioned. Drums of chemicals must also be plastic wrapped on pallets to reduce potential movement and damage. Providing the identified mitigation measures are applied, the risk assessment found that off-site risks can be reduced below acceptable risk criteria provided in *Hazardous Industry Planning Advisory Paper 4: Risk Criteria for Land Use Safety Planning* (HIPAP No. 4).

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The PHA also provides for the safe handling, storage and transport and appropriate emergency response procedures in relation to all chemicals being handled and stored on site.

The Department's assessment therefore concludes that the proposal would not pose an unacceptable risk to surrounding land uses consistent with the relevant provisions of SEPP 33.

### State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007

Consideration of the relevant clauses in SEPP (Miscellaneous Consent Provisions) 2007 are addressed in Table 1 below:

**Table 1:** Consideration of SEPP (Miscellaneous Consent Provisions) 2007

|                                                              | Criteria                                                                                                                                                                                                           | Department Comment / Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Complies   |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Part 1, clause 3</b><br><b>Aims, objectives</b>           | <ul style="list-style-type: none"> <li>This policy aims to ensure suitable provision is made to ensure the safety of patrons and the protection of the environment in relation to temporary structures.</li> </ul> | <ul style="list-style-type: none"> <li>Recommended conditions of consent require the Applicant to provide the Certifying Authority with documentation from a suitably qualified structural engineer certifying that all structures (including temporary structures) comply with the State's building laws (i.e. the Building Code of Australia), and ensure structures will not have a detrimental impact on the environment.</li> </ul>                                                                                                                                                                                                                                                                                                                                                   | <b>YES</b> |
| <b>Part 2, clause 12</b><br><b>Matters for consideration</b> | <ul style="list-style-type: none"> <li>Whether number of persons should be restricted.</li> <li>Adverse noise impacts.</li> <li>Limitation on hours of operation</li> <li>Parking impacts</li> </ul>               | <ul style="list-style-type: none"> <li>Not Applicable</li> <li>Conditions of consent will ensure noise impacts are controlled as far as is reasonably practical whilst the remediation works are undertaken.</li> <li>The Department has carefully considered the appropriateness of the proposed hours of construction/remediation in <b>Section 5</b> of this report.</li> <li>No parking is proposed on site for construction workers who would use public transport consistent with other major CBD construction projects. A Green Travel Plan would be prepared by the Applicant to encourage public transport use and other non-car travel options and reduce construction traffic.</li> <li>The application includes site security via large hoardings and fences. These</li> </ul> | <b>YES</b> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | <ul style="list-style-type: none"> <li>• Principles for minimising crime risk</li> <li>• Satisfactory location</li> <li>• Toilets</li> <li>• Whether it is located on land that comprises a State heritage item, an item of environmental heritage (Aboriginal objects etc) or is in a heritage conservation area or a place of significant Aboriginal significance.</li> <li>• Duration of consent</li> <li>• Conditions relating to dismantling or removal of structures.</li> </ul> | <p>measures are expected to minimise the risk of crime and unauthorised access.</p> <ul style="list-style-type: none"> <li>• Recommended conditions require the Applicant to submit final detailed plans and design drawings of all structures to the Secretary for approval, prior to issue of the relevant Construction Certificate – initial plans indicate the proposed position of excavation enclosures is acceptable, given site limitations.</li> <li>• Amenities will be provided in accordance with BCA requirements.</li> <li>• There are no listed local or State heritage items located on the site. Notwithstanding, conditions are recommended that would ensure there is archaeological monitoring and recording, where possible, of some non-Aboriginal heritage remains to be removed during the remediation.</li> <li>• Development consent will be limited to 5 years.</li> <li>• Recommended conditions of consent require temporary structures to be dismantled and removed from the site within 3 months of the completion of the remediation works.</li> </ul> |  |
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## Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

Consideration of the relevant clauses in SREP (Sydney Harbour Catchment) 2005 are addressed in Table 2 below.

**Table 2:** Consideration of SREP (Sydney Harbour Catchment) 2005

| <b>SREP</b>                                                                         | <b>Criteria</b>                                                                                                                                                                                   | <b>Department Assessment</b>                                                                                                                                                                                                                                                                                                                                   | <b>Comment /</b> | <b>Complies</b>       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------|
| <b>Part 3, clause 17<br/>Zoning<br/>W1 Maritime<br/>Waters</b>                      |                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>No impact on the operation of maritime waters</li> </ul>                                                                                                                                                                                                                                                                |                  | <b>Not Applicable</b> |
| <b>Part 3, clause 18<br/>Development control</b>                                    |                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                |                  | <b>Not Applicable</b> |
| <b>Part 3, clause 20<br/>Matters for Consideration</b>                              | <ul style="list-style-type: none"> <li>The matters referred to in Division 3 must be considered by the consent authority.</li> </ul>                                                              | <ul style="list-style-type: none"> <li>The Department has considered the relevant matters below.</li> </ul>                                                                                                                                                                                                                                                    |                  | <b>YES</b>            |
| <b>Part 3, clause 21<br/>Biodiversity, ecology &amp; environmental protection</b>   | <ul style="list-style-type: none"> <li>The consent authority must take into consideration biodiversity, ecology and environmental protection matters that are outlined in this clause.</li> </ul> | <ul style="list-style-type: none"> <li>The proposed development is likely to have a positive effect on water quality in Darling Harbour as it will reduce and potentially remove the risk of contaminated groundwater migrating west from the EPA Declaration Area into the water body. This is likely to have a positive effect on marine ecology.</li> </ul> |                  | <b>YES</b>            |
| <b>Part 3, clause 22<br/>Public access to, and use of, foreshores and waterways</b> | <ul style="list-style-type: none"> <li>The consent authority must take into consideration measures to maintain public access to foreshores and waterways.</li> </ul>                              | <ul style="list-style-type: none"> <li>Public access is provided along the foreshore and will be retained along Hickson Road during the works.</li> </ul>                                                                                                                                                                                                      |                  | <b>YES</b>            |
| <b>Part 3, clause 23<br/>Maintenance of a working harbour</b>                       | <ul style="list-style-type: none"> <li>The consent authority must take into consideration measures to maintain maintenance of a working harbour.</li> </ul>                                       | <ul style="list-style-type: none"> <li>The application will not impact on the ability of the site to maintain a working harbour.</li> </ul>                                                                                                                                                                                                                    |                  | <b>YES</b>            |
| <b>Part 3, clause 24<br/>Interrelationship of waterway and foreshore uses</b>       | <ul style="list-style-type: none"> <li>The consent authority must take into consideration the interrelationship of waterway and foreshore uses.</li> </ul>                                        | <ul style="list-style-type: none"> <li>The development does not propose any works in the waterway and public access along the foreshore would be maintained.</li> </ul>                                                                                                                                                                                        |                  | <b>YES</b>            |
| <b>Part 3, clause 25<br/>Foreshore and waterways scenic quality</b>                 | <ul style="list-style-type: none"> <li>The consent authority must take into consideration measures to maintain or enhance the scenic quality of foreshores and waterways.</li> </ul>              | <ul style="list-style-type: none"> <li>The works are considered to be consistent with the overall visual character of on-going extensive construction works at Barangaroo South.</li> <li>The works are temporary and on completion the site will be reinstated as a road and as such will have no impact on the scenic quality of</li> </ul>                  |                  | <b>YES</b>            |

|                                                                                                        |                                                                                                                                             |                                                                                                                                                                                                                                                                                         |                           |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                                                                        |                                                                                                                                             | foreshores and waterways would be maintained.                                                                                                                                                                                                                                           |                           |
| <b>Part 3, clause 26<br/>Maintenance,<br/>protection and<br/>enhancement of<br/>views</b>              | <ul style="list-style-type: none"> <li>The consent authority must take into consideration measures to maintain or enhance views.</li> </ul> | <ul style="list-style-type: none"> <li>Public views of the remediation works would be screened at ground level by hoardings along Hickson Road.</li> <li>The remediation works and enclosures would be temporary and would be removed following the completion of the works.</li> </ul> | <b>YES</b>                |
| <b>Part 3, clause 27<br/>Boat storage<br/>facilities</b>                                               |                                                                                                                                             |                                                                                                                                                                                                                                                                                         | <b>Not<br/>Applicable</b> |
| <b>Part 3, clause 29<br/>Foreshores &amp;<br/>Waterways<br/>Development<br/>Advisory<br/>Committee</b> |                                                                                                                                             |                                                                                                                                                                                                                                                                                         | <b>Not<br/>Applicable</b> |

## Sydney Harbour Foreshores and Waterways DCP 2005

Consideration of the relevant clauses in Sydney Harbour Foreshores and Waterways Development Control Plan (DCP) 2005 are addressed in Table 3 below.

**Table 3:** Summary of Compliance with the relevant provisions of the Sydney Harbour Foreshores and Waterways DCP

| DCP                                                                | Key controls                                                                                                                         | Department's Comment / Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Complies                                       |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Ecological assessment (Part 2)</b>                              |                                                                                                                                      | The site contains no terrestrial or aquatic ecological communities as identified in the DCP.                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Not Applicable</b>                          |
| <b>Landscape assessment (Part 3)</b>                               |                                                                                                                                      | The site contains no landscape characters as identified in the DCP.                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Not Applicable</b>                          |
| <b>Design Guidelines (General &amp; Land/Water based – Part 5)</b> | <ul style="list-style-type: none"><li>• Foreshore access (5.2)</li><li>• Signage (5.5)</li><li>• Waterfront Industry (5.8)</li></ul> | <ul style="list-style-type: none"><li>• public access will remain along the foreshore and along Hickson Road.</li><li>• Temporary site identification signage is proposed. The Department is confident that the signage would be consistent with the requirements of Section 5.5.</li><li>• The Department has considered the relevant provisions of Section 5.8 of the DCP in Section 5 of this report and considers that the development would not adversely impact the waterway.</li></ul> | <b>YES</b><br><br><b>YES</b><br><br><b>YES</b> |

## **APPENDIX E      SUBMISSIONS**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=6617](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6617)

## **APPENDIX F      RESPONSE TO SUBMISSIONS (RTS) AND SECOND RTS**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=6617](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6617)