



Phase 1 Environmental Site Assessment

Infrastructure NSW
Proposed Walsh Bay Arts Precinct
Redevelopment

Walsh Bay Wharves
Dawes Point

14 November 2016

52304/105953 Rev 1

JBS&G Australia Pty Ltd

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Abbreviations

A list of the common abbreviations used throughout this report is provided below.

AST	Aboveground Storage Tank
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
COPC	Chemicals of Potential Concern
DME	Department of Minerals and Energy
DNR	Department of Natural Resources
DQI	Data Quality Indicator
DQO	Data Quality Objective
EPA	Environment Protection Authority
LNAPL	Light Non-Aqueous Phase Liquid
NSW	New South Wales
PAHs	Polycyclic Aromatic Hydrocarbons
PID	Photo-ionisation Detector
PPE	Personal Protective Equipment
PSH	Phase Separated Hydrocarbon
QA/QC	Quality Assurance/Quality Control
SAQP	Sampling, Analysis and Quality Plan
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Level
UST	Underground Storage Tank

Executive Summary

Introduction and Background

JBS&G (NSW & WA) Pty Ltd (JBS&G) was engaged by Infrastructure NSW (iNSW, the client) to prepare a Phase 1 Environmental Site Assessment (ESA) of the area of the proposed Walsh Bay Arts Precinct (WBAP). The Walsh Bay Arts Precinct, herein defined as 'the site' is legally defined as:

- Pier 2/3 – Lot 11 in DP 1138931;
- Wharf 4/5 (Pier 4/5 and its shore sheds) – Lot 65 in DP 1048377; and
- The area of water included in the redevelopment Precinct – Lot 12 in DP 1138931.

The objectives of this Phase 1 ESA are to characterise potential contamination at the site through:

- documenting the history of the site to identify areas of potential environmental concern and contaminants of potential concern associated with the current and former landuses;
- conducting a detailed inspection of current site conditions and surrounding land uses to identify potential on and off-site sources of site contamination; and
- drawing conclusions regarding the likely suitability of the site from a contamination viewpoint, for the proposed land use, or make recommendations to enable such conclusions to be drawn.

The investigation was conducted in general accordance with relevant guidelines made or endorsed by the NSW Environment Protection Authority (NSW EPA).

Summary of Findings

- Historical information indicates that the existing Pier 2/3, Wharf 4/5 and shore shed buildings were constructed circa 1910, however the alignment of the existing built structures and seawall are consistent with earlier versions of the Walsh Bay wharves in operation as early as 1890.
- While current use of the site is considered to have negligible potential for contamination of land and sea, the site was previously used as part of the Walsh Bay Wharves shipping facility. This former use, in combination with the location of the site in the central inner city indicated that heavy metals, organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH) and asbestos were contaminants of potential concern (COPCs) in soil and sediments;
- Limited soil sampling results were available from the land based area of the site adjacent to Pier 2/3 (HLA 1996) which encountered a 1m thick layer of fill in this location underlying the surface concrete slab (600 mm thick). Laboratory analysis of fill from this location was reported to contain low concentrations of TPH, PAHs, heavy metals and OCPs.
- These conditions suggest that while the presence of contaminated fill in the surrounding area has been widely documented, the potential for contamination in fill materials on the site is low.
- With respect to contaminated sediments in the seabed, review of current studies has indicated that impacts present in sediments across the Sydney Harbour area include heavy metals, PAHs, TPH, OCPs and PCBs. These impacts would be expected within the seabed portion of the site, however the impacts are considered not to be attributable to the current use of the site.

- Seawater in the vicinity of the site is likely to be impacted with heavy metals and bacteriological contaminants however this consistent within impacts across the entire the Sydney Harbour and are considered not to be attributable to the current use of the site.

Conclusions and Recommendations

In accordance with the limitations provided in **Section 6**, available information suggests that potential contaminants in soil, sediment and seawater at the site do not appear to represent a potential human health risk for continued commercial use of the site and the associated arts/cultural use. This is based on the following:

- With respect to harbor sediments, given that disturbances to the seabed based on the proposed pile installation method are anticipated to be minimal, there are considered to be no direct exposure pathways to potentially contaminated sediments that will exist following site redevelopment. Harbour sediment will remain separated from site users under a water column of at least 6m.
- With respect to potential exposure to seawater, as associated with use of the proposed Water Steps, it is considered that general exposure to harbor water is safe, subject to adherence to standard NSW EPA guidance on swimming after rainfall, and current NSW fisheries advice relating to fishing in Sydney Harbour.
- With respect to subsurface soils it is noted that the site is not founded wholly on land but is largely supported on piers installed into the seabed. Additionally, while the surrounding area is known to be underlain by fill that is potentially impacted with a range of common urban contaminants, the limited available sample results have indicated fill at the southern end of the site is not impacted.

These results suggest that the site is suitable for uses as proposed under the Stage 2 Development Application and associated Master Plan. However, it is considered that additional soil sampling data is required to adequately characterise the land-based portion of the WBAP and confirm the suitability of the site for the proposed use.

It is recommended that the a program of soil sampling be undertaken on the land based portion of the WBAP for the purposes of characterising subsurface soils at the site and confirming the suitability of the site for the proposed commercial/public domain use.

1. Introduction

1.1 Introduction and Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Infrastructure NSW (iNSW, the client) to prepare a Phase 1 Environmental Site Assessment (ESA) of the area of the proposed Walsh Bay Arts Precinct (WBAP).

The WBAP, herein defined as ‘the site’ is legally defined as:

- Pier 2/3 – Lot 11 in DP 1138931;
- Wharf 4/5 (Pier 4/5 and its shore sheds) – Lot 65 in DP 1048377; and
- The area of water included in the redevelopment Precinct – Lot 12 in DP 1138931.

The site has a street frontage to Hickson Road and forms part of the Walsh Bay area which is located adjacent to Sydney Harbour within the suburb of Dawes Point. The Barangaroo Precinct is located immediately to the south-west of the site.

It is understood that the client, on behalf of ARTS NSW, is delivering an enhanced arts precinct at Walsh Bay which will expand and strengthen the existing cluster of cultural institutions and attractions along Sydney’s harbour foreshore, complementing the other cultural initiatives in surrounding areas.

It is understood that the client is seeking approval for a Stage 2 State Significant Development Application (SSDA) for the proposed WBAP, to address the requirements of ‘State Environmental Planning Policy 55 – Remediation of Land’ (SEPP 55). SEPP 55 requires that development consent is not granted unless contamination has been considered and, if required, remediated.

JBS&G has previously prepared a preliminary assessment (JBS&G 2014¹) to identify the key areas of environmental concern at the WBAP. Following review of JBS&G (2014) as part of the Stage 1 Environmental Impact Statement (EIS), the NSW EPA recommended that the following conditions be applied to the WBAP Stage 2 SSDA:

1. Investigate the nature and extent of contamination of marine sediments in the vicinity of the proposed development; and
2. To engage a site auditor accredited by the NSW Environment Protection Authority under the Contaminated Land Management Act 1997:
 - a. Prepare a Site Audit Statement, certifying that the site is suitable for the proposed use; and
 - b. Determine the appropriateness of the proposed Construction EMP.

This updated Phase 1 ESA report has been prepared in consideration of the following additional documentation prepared since the completion of JBS&G (2014):

- Sediment sampling completed in proximity of the WBAP as documented in *Walsh Bay Redevelopment: Preliminary Sediment Investigation*, Cardno (NSW/ACT) Pty Ltd, 7 November 2016 (Cardno 2016).
- Construction Environmental Management Plan (CEMP) prepared for the site as documented in *‘Environmental, Construction and Site Management Plan’*, Cadence Australia Pty Ltd, 27 July 2016 (Cadence 2016).

¹ Phase 1 Environmental Site Assessment, Proposed Walsh Bay Arts Precinct Redevelopment, Walsh Bay Wharves, Dawes Point NSW, JBS&G 43329-56537 (Rev 2), JBS&G Australia Pty Ltd, 23 June 2014 (JBS&G 2014).

1.2 Objectives

The objectives of this Phase 1 ESA are to characterise potential contamination at the site through:

- documenting the history of the site to identify areas of potential environmental concern (AECs) and contaminants of potential concern (COPC) associated with the current and former landuses;
- conducting a detailed inspection of current site conditions and surrounding land uses to identify potential on and off-site sources of site contamination;
- drawing conclusions regarding the likely suitability of the site from a contamination viewpoint, for the proposed land use, or make recommendations to enable such conclusions to be drawn.

The investigation was conducted in general accordance with relevant guidelines made or endorsed by the NSW Environment Protection Authority (NSW EPA).

1.3 The Proposed Development

It is understood that the approved Stage 1 development application comprised:

- A new waterfront public square between Pier 2/3 and Wharf 4/5;
- A series of new stairs and balconies on Pier 2/3 and Wharf 4/5 and modification to the roof of Pier 2/3;
- The inclusion of new tenancy spaces in Pier 2/3 and Wharf 4/5 for arts and cultural activities; and,
- The use of the precinct for arts festivals, events and pop-ups and associated uses, including restaurants, cafes and bars.

The WBAP Stage 2 SSDA seeks consent for construction works for the above to realise the WBAP project, as well as the proposed external alterations and additions to all of Wharf 4/5. It also seeks consent for new commercial and event uses in the Precinct. Key aspects of the proposed development are outlined below:

Early works

- Early construction works comprising infrastructure upgrades, demolition, hazmat removal and sub structure works.

Pier 2/3

- Internal alterations and reconfiguration to provide for the following:
 - Performance venues;
 - Rehearsal rooms, production workshops, back of house facilities and offices;
 - Function spaces, bars, cafes and foyer spaces extending onto external gantry platforms (balconies) providing breakout space for internal foyers and allowing views of outdoor performances;
 - Mezzanine spaces for offices and back of house facilities;
 - Upgrades to meet compliance with current BCA, DDA and fire codes;
 - New lifts and stairs;
 - Creation of new commercial tenancies and public toilets;
 - Removal of some storey posts and beams to facilitate internal reconfiguration and new uses; and

- Retention of a large proportion of the ground floor in its existing 'raw' heritage state for events and festivals including Sydney Writers' Festival and Biennale including venue and commercial hire.
- External alterations and additions comprising:
 - New balconies and external stairs for fire egress;
 - New external lift for access;
 - Installation of glazing in existing cargo sliding door openings and other solid panels on the eastern, western and northern elevations to allow for views into and out of the building;
 - Roof penetrations within the central valley at the southern and northern end to accommodate new performance spaces and associated structural modifications including truss strengthening;
 - Installation of ESD elements, such as photovoltaic panels and seawater heat exchange systems; and
 - Raising of the external floor level on the eastern side by introducing a new raised deck and continuous set of stairs beyond the existing column line..

Wharf 4/5

- Internal alterations and reconfiguration to the Bangarra Dance Theatre (BDT) tenancy to provide for the following:
 - Upgrade of the main rehearsal and performance spaces;
 - Upgraded foyer and exhibition space along the eastern frontage;
 - Improved office space at mezzanine level including a new lift and stairs;
 - Provision of a function space at ground level of the northern end of wharf with associated kitchen facilities; and
 - New entrance and new glazing in bays of sliding cargo doors, opening up the foyer and main studio to the Pier 4 apron.
- Minor internal alterations and additions to the SDC tenancy comprising:
 - Reducing the existing workshop space to create a fifth dance studio; and
 - Upgrading office and reception areas.
- External alterations and additions to SDC tenancy comprising:
 - Raising of the timber wharf deck adjoining the SDC café and opening of the facade with new glazing to activate the waterfront square.
- Creation of new commercial tenancies and public toilets;
- External fabric alterations around the Sydney Theatre Company (STC) tenancy comprising:
 - Improved street entry at Hickson Road involving relocation of the stairs to allow for an improved landing and point of arrival to the STC;
 - New 'gantry' balconies, stairs and lifts mid-wharf and at the end of the wharf to provide for improved accessibility and compliance with fire engineering solutions;
 - Minor amendments to the existing façade to accommodate new entries and exits along the wharf;

- Roof penetrations within the central valley at two locations to accommodate theatre and workshop spaces and associated structural modifications including truss strengthening; and
- Reinstallation of existing photovoltaic panels where applicable.

Wharf 4/5 Shore Sheds

- Internal alterations to reconfigure the choir spaces, including provision of a mezzanine for choir administration;
- Creation of new commercial tenancies at ground and mezzanine levels; and
- Provision of office space at ground level.

Public Domain

- Construction of a new waterfront square comprising a deck on piled structure;
- Shaded informal performance space on piled structure; and
- Changes to existing levels and steps down to facilitate access between the existing apron and new waterfront square.

New Uses

- Use of the precinct for arts festivals, events and pop ups as well as a range of activating uses such as retail, restaurants, cafes and bars.

2. Site Condition & Surrounding Environment

2.1 Site Identification

The location of the site is shown on **Figure 1**. The available site details are summarised in **Table 2.1** and described in detail in the following sections.

The Walsh Bay Arts Precinct (WBAP) (the “site”) generally comprises Pier 2/3, Pier 4/5 and its shore sheds which make up Wharf 4/5, as well as the adjoining waterway. The site has a street frontage to Hickson Road. The site is part of the Walsh Bay area which is located adjacent to Sydney Harbour within the suburb of Dawes Point. The site is located within the City of Sydney Local Government Area.

Walsh Bay is strategically located to the north of Sydney’s CBD in the vicinity of major tourist destinations including the Sydney Harbour Bridge, the historic areas of Millers Point and The Rocks, Circular Quay and the Sydney Opera House. The Barangaroo redevelopment precinct is located immediately to the south-west.

Table 2.1: Summary Site Details

Lot/DP	Lot 11 DP 1138931 and Lot 65 in DP 1048377
Address	Hickson Road, Dawes Point, NSW 2000
Local Government Authority	City of Sydney Council
Site Zoning	Lot 11 DP 1138931: Zone 1-Walsh Bay Conservative Zone and Zone 2-Walsh Bay Waterway Zone in Sydney Regional Environmental Plan No 16. Lot 65 DP 1048377: Zone 1-Walsh Bay Conservative Zone-Sydney Regional Environmental Plan 16.
Approximate co-ordinates of the centre of the site (MGA 56)	Easting: 334091.675 Northing: 6252401.537
Current Use	Owned by Roads and Maritime Services (RMS) and occupied by Arts NSW and Department of Justice under various lease arrangements primarily for arts and cultural uses
Previous Use	Berths for international and inter-state shipping
Site Area	Approximately 18,090 m ²

Pier 2/3 is legally described as Lot 11 in DP 1138931 and Wharf 4/5 is legally described as Lot 65 in DP 1048377. The total area for these lots is 18,090m².

The area of water that the project proposes to build over is also owned by RMS. Its land title description is Lot 12 in DP 1138931.

2.2 Site Description

The site forms part of the Walsh Bay Wharves (**Figure 1**) which are located adjacent to Sydney Harbour. The current formation of the Walsh Bay Wharves comprises ten berths constructed between 1908 and 1922 for international and inter-state shipping, as follows:

- Pier 1 currently occupied by the Sebel Pier One Sydney Hotel;
- Pier 2/3 the last remaining undeveloped pier (has previously received approval for cultural uses, temporary arts events and some commercial events);
- Wharf 4/5 which is occupied by the Sydney Theatre Company (STC), the Australian Theatre for Youth Program (ATYP), Sydney Dance Company (SDC), Bangarra Dance Theatre and the choirs comprising Gondwana, the Song Company and Sydney Philharmonia;
- Pier 6/7 which has been redeveloped for residential apartments and associated boat marina;
- Pier 8/9 which has been redeveloped for office uses; and

- Shore sheds aligning Hickson Road which contain a range of commercial activities, including restaurants, bars, shops and offices.

The recent redevelopment works mentioned above are understood to have occurred between 1997 and 2004 by the NSW Government in conjunction with the Walsh Bay Partnership. The areas of recently development at the Walsh Bay Wharves are external to the boundaries of the site.

A detailed inspection of the site was conducted by JBS&G on 19 February 2014 which included inspection of the nearby surrounding infrastructure. The site layout is shown on **Figure 2**. Entry to Pier 2/3 (and associated shore sheds) and Wharf 4/5 was through vehicle driveways and pedestrian access points (i.e. breezeways) along Hickson Road. Wharf 4/5 was occupied by a large rectangular four storey timber building, extending from the landward end at Hickson Road, to the northern end of the wharf. Pier 2/3 consisted of a wharf occupied by a vacant heritage-listed two-storey warehouse building. Shore sheds, comprising two storey warehouse buildings, were present at the landward end of Pier 2/3, currently occupied by a café/restaurant and small performing arts studio. Land between these buildings and extending to the edges of the Piers comprised a concrete apron which provided public access to the foreshore.

Additionally, visible sections of the seawall were present at the southeastern end of the site. Access stairs to sea level between Pier 2/3 and Wharf 4/5 allowed for observation of foundations underlying the Shore Shed buildings. Timber piles were visible under the concrete apron of the wharf and parts of the Shore Sheds. **Figure 3** shows the approximate position of the seawall under the site based on these locations. Based on this position it is considered that part of the shore shed buildings are supported on timber footings. The client's representative, present during the site inspection, confirmed that only the southern end of the Shore Sheds is founded on land.

Anecdotal information provided during the site inspection from the client's representative indicated that Pier 2/3 is the last wharf structure within the Walsh Bay Wharves remaining in its original state. The following features were observed upon inspection of the Pier 2/3 building:

- structural columns present throughout the building;
- a stairway located towards the central portion of the warehouse building, providing access from the ground floor to the second storey level;
- an elevator lift noted within proximity of the stairway;
- several sections of the building were barricaded, including a small section on the ground level in the western portion of building, and on the second storey towards the central to northern portion of the upper building area was barricaded. These barricaded areas contained several heritage items, including construction material and metal works owned by RMS; and
- basic utility services were present in the building comprising electricity mains and sewer system located on the ground level and storm water conduits located on top of the roof. Observations were also made of new roof insulation installed through the warehouse building.

Anecdotal information provided by the client's representative indicated that several columns will be removed (replaced by steel trusses) to facilitate the proposed arts and cultural development plans. Additionally, it was indicated that the heritage materials observed in the building may potentially be incorporated into the Design.

The Shore Sheds were observed to consist of a row of double-storey (double brick and timber) warehouse sheds, located at the landward end of Pier 2/3. Observations of the Shore Sheds noted that they are currently occupied by commercial tenancies (ground level) and arts and cultural organisations (performing arts studios). Due the current occupancy of the Shore Sheds, a detailed

site inspection was unable to be completed within these buildings. The client's representative confirmed that the general structure of the Shore Sheds will be retained as part of the Master Plan, with any upgrade works restricted to internal refurbishment.

The Wharf 4/5 building was occupied by the STC, ATYP, BDT and other arts organisations at the time of the inspection. A café/restaurant was also located at the southern end of the Wharf 4/5 building. The client's representative confirmed that the Stage 2 DA does not propose any change to the exterior of the Wharf 4/5 building, with works limited to an internal realignment of the existing performance areas, foyers and rehearsal spaces. The third level of the building (towards the central to southern portion of the building) consisted of the stage design/prop workshop. According to Arts NSW, no change was proposed to the workshop as part of the Stage 2 DA works. Observations noted that various painting and oil chemicals were used in the workshop in the construction of stage performance props. A staff member from the Sydney Theatre Company confirmed that an oil and waste recycling drainage system was installed the building. Furthermore, air filtration systems were installed within the workshop area to reduce inhalation exposure to chemicals for employees.

During the inspection of Wharf 4/5, JBS&G field staff were informed that the rooftop of the building is installed with 'green' pipework which collects rainwater as part of the 'Greening the Wharf' project for the City of Sydney Council, a harvesting, storage and reticulation system which supplies non-potable water for all Pier 4/5 amenities. It is also understood that solar panels were also installed to the rooftop of the building on Wharf 4/5 as part of the 'Greening the Wharf' project.

2.3 Surrounding Landuse

The current landuse of adjacent properties or properties across adjacent roads is summarised below.

- North – immediately north is Sydney Harbour.
- East – to the east is Sydney Harbour Bridge, The Rocks, Circular Quay and Sydney Opera House.
- South – to the south are a series of smaller property lots which appear to be used for either residential or commercial purposes. South of the site is Sydney's CBD.
- West – to the west are Walsh Bay wharves (Piers 6/7 and Piers 8/9), Millers Point and Sydney Harbour. South-west of the site is the Barangaroo redevelopment precinct.

Inspection of the surrounding properties was beyond the scope of this Phase 1 ESA, however based only on the external viewing of these areas and review of aerial photography, there did not currently appear to be any significant potential offsite contamination sources located in the properties around the site.

2.4 Topography

Survey plans provided indicate that the area of the site is flat and present at a relative level of 2.5m above Australian Height Datum (m AHD) which is level with the adjacent Hickson Road. Site observations noted large sandstone rockfaces are present opposite the site at the southern end of Hickson Road, and that the site is some 10 to 20m below the ground level along Pottinger Street and areas located further south.

2.5 Hydrology

The site is adjacent to, and is in part suspended above, Walsh Bay which forms part of Sydney Harbour. The site is predominantly sealed, covered in concrete footpaths, over which surface water generated by heavy or prolonged rainfall is likely to be run directly into the harbour.

2.6 Geology

Review of the regional geological map (DMR 1983) indicated the site is located in an area of Middle Triassic Hawkesbury Sandstone, part of the Wianamatta Group. The Wianamatta Group comprises medium to coarse-grained quartz sandstone, very minor shale and laminite lenses.

Review of the regional soil map (SCS NSW 1989) indicated that the site is located on the Gynea residual soil landscape group. The typical Gynea landscape is characterised by undulating to rolling rises and low hills on Hawkesbury Sandstone. Gynea soils are shallow to moderately deep Yellow Earths and Earthy Sands on crests and inside of benches; shallow Siliceous Sands on leading edges and benches; localised Gleyed Podzolic Soils and Yellow Podzolic Soils on shale lenses; shallow to moderately deep Siliceous Sands and Leached Sands along drainage lines. Limitations of soils in the Gynea group are localised steep slopes, high soil erosion hazard, rock outcrop, shallow highly permeable soil, very low soil fertility.

Review of the Natural Resource Atlas (DNR website) indicated that the site is located in an area of potential acid sulphate soils (ASS).

2.7 Hydrogeology

Registered groundwater bore information obtained from the Natural Resources Atlas database identified 36 groundwater bores within one km of the site. Details registered for these bores is included in **Appendix A** and summarised in **Table 2.2** below.

All bores on the database within 1km of the site have been registered for use as monitoring wells. The monitoring wells are installed to depths of between 3 and 17 m, with standing water levels reported for only two wells at depths of approximately 2.5m below ground level (m bgl).

Where the geology encountered was reported, it consisted of clay, silty sand or gravel fill.

It is anticipated that groundwater in the vicinity of the site would migrate in a northerly direction towards Walsh Bay. As such, and noting that the site borders Walsh Bay, it is considered that the monitoring wells listed in **Table 2.2** would not be influenced by activities at the site.

Table 2.2: Groundwater Bores Summary Details

Bore ID	Location (approximate)	Intended Purpose	Drilled Depth (m bgl)	Standing Water Level (m bgl)
GW109085	660 m west of site, property of Sydney water	Monitoring	5.68	N/A
GW109086	661 m west of site, property of Sydney water	Monitoring	5.68	N/A
GW109087	662 m west of site, property of Sydney water	Monitoring	8.50	N/A
GW111570	201 m west of site, within Barangaroo Headland	Monitoring	6.00	2.72
GW111571	200 m west of site, within Barangaroo Headland	Monitoring	6.00	2.65
GW112871	520 m south east of site, within Sydney Opera House premises	Monitoring	20.00	N/A
GW112872	510 m south east of site, within Sydney Opera House premises	Monitoring	20.12	N/A
GW112873	510 m south east of site, within Sydney Opera House premises	Monitoring	15.10	N/A
GW113553	260 m west of site, within Barangaroo Headland	Monitoring	5.20	N/A
GW113554	310 m west of site, within Barangaroo Headland	Monitoring	5.00	N/A
GW113555	351 m south west of site, within Barangaroo Headland	Monitoring	14.00	N/A
GW113556	350 m south west of site, within Barangaroo Headland	Monitoring	14.00	N/A
GW113557	400m south west of site, within Barangaroo Headland	Monitoring	12.00	N/A
GW113558	410 m south west of site, within Barangaroo Headland	Monitoring	14.00	N/A
GW113559	450 m south west of site, within Barangaroo Headland	Monitoring	4.00	N/A
GW113560	460 m south west of site, within Barangaroo Headland	Monitoring	3.60	N/A
GW113561	480 m south west of site, within Barangaroo Headland	Monitoring	4.50	N/A
GW113562	500 m south west of site, within Barangaroo Headland	Monitoring	10.70	N/A
GW113563	530 m south south-west of site, within Barangaroo	Monitoring	11.70	N/A

	Headland			
GW113564	550 m south south-west of site, within Barangaroo Headland	Monitoring	7.00	N/A
GW113565	540 m south south-west of site, within Barangaroo Headland	Monitoring	4.00	N/A
GW113566	530 m south south-west of site, within Barangaroo Headland	Monitoring	3.00	N/A
GW113596	510 m west of site, within Barangaroo Headland	Monitoring	14.10	N/A
GW113597	510 m west of site, within Barangaroo Headland	Monitoring	9.50	N/A
GW113598	520 m west of site, within Barangaroo Headland	Monitoring	13.20	N/A
GW113599	560 m west of site, within Barangaroo Headland	Monitoring	13.50	N/A
GW113602	550 m west of site, within Barangaroo Headland	Monitoring	17.00	N/A
GW113603	555 m west of site, within Barangaroo Headland	Monitoring	14.50	N/A
GW113604	540 m west of site, within Barangaroo Headland	Monitoring	8.20	N/A
GW113605	535 m west of site, within Barangaroo Headland	Monitoring	3.00	N/A
GW113606	545 m west of site, within Barangaroo Headland	Monitoring	13.00	N/A
GW113607	530 m west of site, within Barangaroo Headland	Monitoring	7.20	N/A
GW113608	520 m west of site, within Barangaroo Headland	Monitoring	13.00	N/A
GW113610	525 m west of site, within Barangaroo Headland	Monitoring	12.20	N/A
GW113611	550 m west of site, within Barangaroo Headland	Monitoring	7.50	N/A
GW113612	520 m west of site, within Barangaroo Headland	Monitoring	13.00	N/A

2.8 Detailed Consideration of Proposed Redevelopment

A summary of the works associated with the development as provided by the client is presented in **Table 2.3** along with the anticipated built form and landscape modifications required.

Table 2.3: Summary of Works Required for Redevelopment

Proposed Change in Land Use	Anticipated Built Form or Landscape Change
The transformation of Pier 2/3 building to accommodate the Australian Chamber Orchestra, Bell Shakespeare and Australian Theatre for Young People. The retention of a large 'raw' space in Pier 2/3 for events, festivals and functions.	Removal of internal columns within the Pier 2/3 building
A major upgrade of ground floor facilities at Wharf 4/5, allowing Bangarra to confirm its place as the premier Indigenous performing arts company and maximise new tourist and engagement opportunities	Removal of internal columns within the Wharf 4/5 building, repair of the external Wharf 4/5 building walls
The expansion of creative and commercial activities along the shore sheds offering cafes, restaurants, retail and commercial activities to further enhance the visitor experience	New tenancies to be established in Pier 2/3 and Wharf 4/5 shore shed buildings but no changes of note to building structures
A new north facing waterfront square supported with new boardwalks which will significantly increase public open space and create a central platform for activity, collaborative outdoor performances, events, festivals and public art	Construction of a new floating platform (the Waterfront Square and the Wings) with retractable roofing and construction of the Water Steps which connect the Waterfront Square to the harbour

The works described in **Table 2.3** will be completed within, or will connect to, the original Walsh Bay commercial wharves which are close to 100 years old. JBS&G has been provided with 'Walsh Bay Arts Precinct, Conceptual Structural Design Report' prepared by Taylor Thomas Whiting and dated February 2014 (TTW 2014) for the proposed works. A copy of TTW (2014) including copies of the proposed redevelopment footprint is provided as **Appendix B**. In assessing the current condition of structures at the site TTW (2014) confirmed that Pier 2/3 and Wharf 4/5 are all timber wharves comprising turpentine timber piles with hardwood pile caps, beams and decking. Some of the exposed apron decks were reportedly replaced with thin concrete slabs in the 1930s.

The wharves were reported to be present in typically 6 to 15 metres depth of water, but the seabed was considered to be extremely soft, with the depth to founding materials in excess of 20m below

seabed level at some locations. Apron deck levels were reported to be typically between 4 and 6m AHD.

It was also reported that the supporting structure for the proposed WBAP will be constructed with reinforced concrete headstocks and beams with hardwood timber bearers supporting the deck planks. All concrete would be reinforced with V-rod reinforcing (glass fibre reinforced deformed plastic) to avoid chloride attack on steel reinforcing.

It was further assumed that piles would all be spirally wound steel tube piles driven to foundation levels below the deep marine muds. The seabed between Piers 3 and 4 was considered to comprise deep, very soft overburdens overlying Hawkesbury Sandstone, which in turn is typically characterised by a number of buried "cliffs".

TTW (2014) reported that the original timber piles at Walsh Bay are set out on a 10ft by 10ft grid in the Piers. In the previous upgrades and repairs carried out on the Piers, many of the piles were regarded as redundant and not repaired as the live load for the recent use was considered to be much less than the original design loads as part of a cargo wharf. It was considered that for the proposed Master Plan, the opportunity exists to add jack-up piles in these redundant pile locations to provide extra footing capacity to support the additional loads intended for Pier 2/3.

It was also noted that routine rehabilitation of existing piles under Pier 2/3 and Wharf 4/5 has been occurring over the last decade, understood to comprise the replacement of between 5 and 10 piles per year based on the severity of degradation. It is understood that the routine maintenance works replace the existing timber piles with 'jack-up' piles or pile segments through exposing the existing timber pile, cutting (or splicing) the pile to the sound timber stump, cleaning of the stump, inserting a steel collar at the stump and insert a new pile segment through the collar. TTW (2014) estimated that approximately 180 new jack-up piles are anticipated to be required for the Pier 2/3 building. Approximately 4 new jack-up piles were estimated as required for the Wharf 4/5 building.

TTW (2014) reported that structural support for the new waterfront square and water steps will comprise new steel tube piles driven into the seabed and founded on sandstone bedrock.

3. Site History

3.1 Aerial Photographs

Copies of aerial photographs were obtained from the Department of Land and Property Information, with copies provided in **Appendix C**. Additional aerial photographic imagery from the period from 2011 to September 2016 was reviewed online using NearMap Imagery. Relevant information from the aerial photograph review is summarised below.

- 1930: The quality of the 1930 image is poor which prevented a detailed viewing of the site area. Wharf structures consistent with the current (i.e. 2014) configuration are visible at Pier 2/3 and Wharfs 4/5. Smaller buildings are visible between Pier 2/3 and Wharf 4/5 and the southern end and to the southwest of Wharf 4/5 consistent with the current (i.e. 2014) configuration of the shore sheds. Large shipping vessels are visible adjacent to Piers 2 and 3, consistent with use of this area ship berthing, associated activities and other commercial operations.
- At the eastern end of the site Pier 1 is visible, and the western end of the site Piers 6/7 and 8/9 are visible, also with large shipping vessels adjacent to each structure.
- 1951: The site and surrounding areas appear generally similar to the previous aerial image. Shipping vessels are visible in Darling Harbour adjacent to all piers and wharfs forming the Walsh Bay Wharves. Large buildings are also clearly visible on the 1951 image adjacent to all piers and wharfs forming the Walsh Bay Wharves.
- The road network visible in the area to the south of the Walsh Bay Wharves appears to have undergone significant redevelopment since the previous image.
- 1961: The site appears generally similar to the previous aerial image. The road network visible in the area to the south of the Walsh Bay Wharves appears to have undergone significant redevelopment since the previous image.
- 1970: The site and surrounding areas appear to be generally similar to the previous aerial image.
- 1986: The site and surrounding areas appear to be generally similar to the previous aerial image.
- 1999: The roofing material on the Wharf 4/5 building and the shore sheds on the site appear to have been upgraded, however the shape and nature of these buildings appears to be unchanged. Apart from this minor difference, the site and surrounding areas appear to be generally similar to the previous aerial image.
- 2011: The roofing material on the all buildings on the site appears to have been changed since the 1999 image, however the shape and nature of these buildings appears to be unchanged. Apart from this minor difference, the site and surrounding areas appear to be generally similar to the previous aerial image.
- 2014-2016: The site and surrounding areas remained unchanged in comparison to the 2011 image.

3.2 EPA Records

A search of the EPA's public register under the Protection of the Environment Operations Act 1997 was undertaken (**Appendix D**). The search identified that, for the site, there were:

- No prevention, clean-up or prohibition notices;

- No transfer, variation, suspension, surrender or revocation of an environment protection licence.

A search was also undertaken through the EPA's public contaminated land register (**Appendix D**). The search identified that there have been no notices issued under the Contaminated Land Management Act 1997 (CLM Act) for the site.

The site has not been notified to the EPA as containing significant contamination. It is noted that the nearby site of the former Millers Point gasworks on Hickson Road was subject to several notices (2 current and 2 former) in which the EPA states the former gasworks may be contaminated with the following substances: polycyclic aromatic hydrocarbons (PAHs); benzene, toluene, ethylbenzene and xylene (BTEX); copper; cyanide; lead; and phenol. The latest entry with respect to the former gasworks indicates that the notice has been lifted by the EPA and the former gasworks is no longer subject to regulation by the EPA.

The site is considered not to have been impacted by the former Millers Point gasworks.

3.3 Title Details

A historical title search was conducted for Pier 2/3 (Lot 11 in DP 1138931), and Wharf 4/5 (Lot 65 in DP 1048377). Copies of title records are included in **Appendix E**.

The property lots which comprise the site are incorporated within the Sydney Harbour and foreshores title. Numerous leases and easements have been registered over the subject land, however detailed investigation of this complex title is beyond the current scope of works. In lieu of this detailed analysis of title the following information was obtained from the basic historical title search:

- The site is currently registered to the Maritime Authority of New South Wales, and has been in the ownership of the Maritime Authority of New South Wales (currently Roads and Maritime Services) or its predecessors since around 1900; and
- Both Pier 2/3 and Wharf 4/5 are occupied under various leases with the NSW Minister for the Arts including leases registered for Lot 65 in DP 1048377 for the Bangarra Dance company, Australian Dance Council, Australian Theatre for Young People.

3.4 Council Records

The zoning certificate for the site was obtained from Sydney City Council, and is included in **Appendix F**. Relevant information for the site (Lot 11 in DP 1138931 and Lot 65 in DP 1048377) is summarised below:

- Pier 2/3 (Lot 11 DP 1138931) is zoned in Zone 1-Walsh Bay Conservative Zone-Sydney Regional Environment Plan 16 and Zone 2-Walsh Bay Waterway Zone-Sydney Regional Environmental Plan No 16.
- Wharf 4/5 (Lot 65 DP 1048377) is zoned in Zone 1-Walsh Bay Conservative Zone-Sydney Regional Environmental Plan 16.
- The land does not include or comprise critical habitat. The property has been identified within a Heritage Conservation Area and has been identified of state heritage significance, and entered on the State Heritage Register.
- The land has been identified as being on an Acid Sulphate Soils Map as being Class 1 or Class 2.
- The land is not a declared investigation area or remediation site, or the subject of an investigation order or remediation order under the CLM Act 1997. The land is not the subject

of a voluntary investigation or remediation proposal or a site audit statement within the meaning of the CLM Act 1997.

3.5 WorkCover Dangerous Goods Licence Database

A search of the NSW WorkCover Stored Chemical Information Database (SCID) was conducted, and the results are included in **Appendix G**. WorkCover records show that a licence for the storage of up to 250L of flammable goods has been obtained by the Sydney Theatre Company as part of their operations on Wharf 4/5. The flammable goods registered for the site are ethylmethyl ketone, isopropanol and turpentine substitute and have been listed as being required for production of live performances. Sketches of the storage submitted as part of the licence show these items stored within a flammable gas cupboard within the ground floor props workshop and also within a roofed store. The last renewal of this licence was dated 2006 and is understood to be current.

3.6 Heritage Listings

A heritage assessment of the proposed development was undertaken on the site was documented in the report *'Walsh Bay Arts Precinct; Heritage Assessment Report', Design 5 Architects, dated February 2014, (Design 5, 2014)*.

Design 5 (2014) included an assessment of items of national, state and local heritage significance that may be present at the site. It was noted that the entire Walsh Bay Wharves Precinct is listed on the State Heritage Register (SHR).

With respect to history of the Walsh Bay Precinct the following was noted:

- Upon colonisation, the first industry in the area included windmills and quarrying.
- As import/export trades prospered, this increased the value of waterfront areas for merchants and private wharves were constructed in the area. Continued wealth from the Gold Rush during the 1850s boosted Sydney's local economy and the larger sailing vessels of the 1860s and 1870s prompted the expansion of private wharves, and the building of jetties and wharves. By 1900 there were fourteen finger wharves in Walsh Bay (**Figure 4**). The original shoreline through some areas of Walsh Bay was extended through land reclamation, and the building of parallel wharves to reach out to the deep waters where large vessels berthing commenced.
- Private ownership of the wharves prior to 1900 reportedly resulted in makeshift developments and poor conditions. The outbreak of the Bubonic Plague in 1900 acted as a catalyst for the creation of the Sydney Harbour Trust and the resumption of the wharves by the Government. The construction of the present configuration of wharves in Walsh Bay was made possible at that time.
- Sydney Harbour Trust oversaw development of the current timber-pile wharves, two longshore wharves, shore sheds, a low level roadway and an upper level road. Renewal projects commenced in 1909 with the construction of the low-level Hickson Road. This progress was critical to the redevelopment of the area, providing shoreline access to the wharves as well as connectivity to the railway yards at Darling Harbour and the wharves at the Pyrmont peninsula.
- In 1910, as a response to the general panic prompted by the plague, the Sydney Harbour Trust developed an innovative rat-proof sea wall constructed of reinforced concrete, spanning from the head of Darling Harbour to Millers Point. Construction of overhead bridges connecting the Walsh Bay Wharves to Pottinger Street commenced in 1913.
- Pier 2/3 was reportedly commenced in 1912, completed in 1922 and leased to the Adelaide Steamship Company. Pier 2/3 was also reportedly used as a general cargo wharf for overseas vessels from 1925 to the 1970s.

- Wharf 4/5 was reportedly commenced in 1913, completed in 1923, and leased to the Maritime Services Board until 1928;
- By the 1960s Pier 2/3 was reported to be in a deteriorating state and required repairs, including the replacement of the timber apron with concrete, and the renewal of the piles and deck in 1974. By the 1970s the Walsh Bay wharves, unable to accommodate container freight, ceased functioning as commercial wharfage. By the early 1980s the wharves were reported to be severely neglected, and faced 'the very real danger of collapse'; and
- In the 1980s Pier 4/5 was secured by the Sydney Theatre Company which marked the transition of the area into a cultural use space.

3.7 Previous Investigations

3.7.1 Soil and Groundwater Investigations

JBS&G has been provided with a copy of *'Initial Contamination Assessment, Walsh Bay Redevelopment Project, Sydney NSW'* Prepared by HLA-Envirosciences Pty Limited and dated August 1996 (HLA 1996). HLA (1996) documents a historical review and limited soil sampling program undertaken across the Walsh Bay Wharves including Hickson Road, but excluding Wharf 4/5. Nine soil bores were drilled in areas considered likely to be underlain by fill and/or in areas likely to require excavation as part of any future Walsh Bay upgrade.

Of relevance to the site, was the drilling of one location, BH-7, which was placed at the southern end of Pier 2/3 and just inside the sea wall. The profile encountered at this location comprised concrete to 0.4m, overlying brown silty sand fill to 1.7m and then weathered sandstone. Refusal in BH-7 was encountered on competent sandstone at 2.5m below ground level. A sample of the fill material at 1 to 1.5 metres from BH-7 was submitted for analysis. While the full set of laboratory results was not summarised in the copy of HLA (1996) provided for review, the tabulated results for this location reported a total polycyclic aromatic hydrocarbons (PAHs) concentration of 23 mg/kg, a concentration of mercury, cadmium and all total petroleum hydrocarbons (TPH) fractions less than the laboratory detection limit and arsenic, lead, copper and zinc concentrations less than 50mg/kg.

While HLA (1996) did not provide detailed assessment or discussion of these results, the report generally concluded that the investigation came across some areas of soil and groundwater contamination that should be considered in the planning of Walsh Bay. However, it was considered that none of the identified contamination was significant enough to affect the feasibility of proposed Walsh Bay redevelopment.

As part of the report review JBS&G has compared the results reported in HLA (1996) to the Health based Investigation Levels (HILs), outlined in NEPC 2013², for commercial/industrial land use (HIL-D) and public open space use (HIL-C). Concentrations in the BH-7 1-1.5m sample were all less than the current HIL-C and HIL-D criteria applicable to the site. This indicates that fill material under the site, if present, is not likely to be grossly impacted.

3.7.2 Marine Impact Assessment

JBS&G has been provided with a copy of *'Walsh Bay Redevelopment, Master Plan Development Application Marine Report'* prepared by Patterson Britton Pty Limited dated 1996 (PB 1996). The report summarises the marine environment at Walsh Bay and assessment of how the marine environment would be affected by the 1996 Master Plan.

In characterising the marine environment at Walsh Bay, PB (1996) noted that:

² National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra.

- the piers associated with the existing Walsh Bay Wharves encroach some 40m into Port Jackson;
- water depths ranged between 6m (in shore areas) to 15m moving west across the wharves;
- the top of the seabed floor under Walsh Bay ranges from RL-3m to RL -15m. Recently deposited surficial silts and clayey silts overlay older marine sediments consisting of interbedded clays, sands and clayey sands. The profile near the seawall is extremely shallow consisting of several metres of recently deposited silts overlying sandstone. The profile towards the ends of the wharves typically consists of up to 8m of recently deposited very soft silts and clayey silts overlying approximately 15 m of loose to medium dense sands and clayey sands, approximately 20m of soft marine clay and then sandstone; and
- the top of the sandstone bedrock under Walsh Bay ranges from RL-5m near the seawall end to RL -51m at the end of the wharves. Sandstone bedrock ranges from extremely weathered to very strong and fresh;

With respect to the effects of the development on the marine environment PB (1996) concluded that:

- repairs or replacement of piles will cause no material disturbance of the seabed while divers are cutting off the top of the pile just above the seabed in order to insert a jacket over the top of the timber stub. It was also noted that such pile replacements works are carried out on a continuous basis at Walsh Bay, and that the completion of such works even in areas of high contamination of seabed material is considered not to cause any deleterious effects due to the localised areas of works and the short time period required for the seabed to subsequently stabilise and recover.
- installation of new piles by driving tubular steel piles were considered to have an almost imperceptible disturbance of seabed materials or re-suspension of sediments during these operations.

Prior to the completion of Cardno (2016), as summarised in **Section 3.7.4**, and in the absence of any readily available documentation regarding sediment quality at the site, JBS&G undertook a review of sediment quality data available for the general Port Jackson area including sediments within Darling Harbour and adjacent to the nearby Barangaroo development site, with the following noted:

- a study of sediment toxicity in the 50km² area of the Sydney Harbour (Birch et al. 2008) reported that sediments collected from the central embayment of Sydney Harbour, which includes Walsh Bay, were contaminated with heavy metals, polychlorinated aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs). While sources of these impacts were not discussed in detail they were generally attributed to urban runoff and discharges.
- With respect to Darling Harbour and the vicinity of Barangaroo, sediments in these areas have also been reported as impacted with heavy metals, PAHs, OCPs and PCBs in addition to petroleum hydrocarbons. The source of these impacts has been reported to be the dumping of fuel and waste from ships and shipping associated operations, discharges from former gasworks, and other commercial operations, directly into the local stormwater network, leaching of antifouling paints, and other land based discharges into Darling Harbour and other areas of Port Jackson.

3.7.3 Building Assessments

JBS&G has been provided with a copy of *'Hazardous Materials Re-Assessment, Wharf 4-5 Hickson Road Walsh Bay NSW'* Prepared by Prensa Pty Limited and dated September 2012 (Prensa 2012). Prensa (2012) documented and inspection of the interior and exterior of the Wharf building during

which bonded asbestos, lead containing paint, synthetic mineral fibres and polychlorinated biphenyls were all identified as present within the fabric of the current structure. Prensa (2012) included recommendations for management of these items during the proposed redevelopment including nominating conditions which would trigger the need for an Occupational Hygienist to be present during redevelopment works to ensure appropriate management of identified/suspected hazardous materials as may be disturbed during site works.

3.7.4 Sediment Investigation

JBS&G has been provided with a copy of 'Walsh Bay Redevelopment Preliminary Sediment Investigation' prepared by Cardno (NSW/ACT) Pty Ltd and dated 7 November 2016 (Cardno 2016). Cardno (2016) documents a historical review and a sediment sampling program undertaken to characterise the marine sediments in the vicinity of the Walsh Bay Wharves. Sediment samples were collected from seven sites (S1-S7) within the proposed waterfront square between Pier 2/3 and Wharf 4/5, with additional samples collected from two reference sites (S8-S9) between Wharf 4/5 and Wharf 6/7.

Sediment samples were collected using handheld corers (7 cm diameter and 40 cm length) by divers at a water depth of approximately 10-12 m. The top and bottom 20 cm of the core was separated, mixed and placed in different containers. Samples from S1, S2, S4, S6 and two reference samples were submitted for laboratory analysis. The 95% upper confidence limit (UCL) values calculated were used to assess data using screening levels adopted from National Guidelines for Dredging (Commonwealth of Australia 2009) and Interim Sediment Quality Guidelines (ISQGs) in ANZECC/ARMCANZ (2000), revised as Sediment Quality Guideline Values (SQGV) in Simpson et al (2013).

While laboratory certificates of analysis for sediment samples were not included in Cardno (2016), tabulated analytical results were provided in the report. The 95% UCL calculated for arsenic and chromium marginally exceeded SQGV (low) value in top and bottom sediment, whilst copper was reported several times above this level. The 95% UCL calculated for lead, silver and zinc exceeded SQGV (low) and SQGV (high) values in top and bottom sediment. 95% UCL for total PAHs and OCP compound DDD in bottom sediment and OCP compound DDE in top sediment marginally exceeded SQGV (low) values. All detected TPHs were below adopted assessment criteria, while BTEX was reported below laboratory limit of reporting.

Cardno (2016) considered that contaminant concentrations were generally comparable between top and bottom sediments with the exception of OCP compound HCB detected at low concentrations in the S6 bottom sediment. Additionally, it was considered that the contaminant concentrations reported within the site were also comparable with the reference samples. It was noted that heavy metals, PAHs and OCPs concentrations reported exceeding assessment criteria were considered indicative of historical industrial practices in the wider Sydney Harbour area, with reported concentration comparable with or less than historical data from other locations in Sydney Harbour. As such, further assessment of bioavailability and toxicity of sediment bound contaminants to determine possible ecosystem risk was not considered to be necessary. Additionally, the amount of disturbance to the seabed due to proposed development was considered relatively minimal and would be confined to the area in the immediate vicinity of individual piles. Furthermore, as no off-site disposal or transportation of sediment was expected to take place, this would minimise the risk of spread of contaminants and effects on the marine environment in nearby locations.

3.7.5 Environmental, Construction and Site Management Plan

JBS&G has been provided with a copy of Draft 'Environmental, Construction and Site Management Plan' prepared by Cadence Australia Pty Ltd dated 27 July 2016 (Cadence 2016). Cadence (2016) documents provisions for occupational health and safety measures; identification of hazardous materials; unexpected finds relating to contamination; remediation of identified hazardous

materials; handling of hazardous substances; sediment and water discharge/management; dust control and waste management during the proposed construction and fitout works associated with the WBAP.

Sediment and water discharge management measures were provided as follows:

- Existing stormwater discharge provisions will need to be maintained during construction, however, protective measures may include use of filter fabric, hay bales and temporary diversion gutters and drains. Risk mitigating measures to prevent any concrete entering the harbour during placement may include use of local silt fences along the edge of the pier, temporary hay bales to catch any cement slurry runoff and temporary plastic sheeting to catch any concrete spills. The contractor should have within its standard procedures, the requirement to use spill kits for hazardous materials also including environmental audits that review the usage and storage of hazardous materials onsite.
- Construction zones will need to be kept clean to ensure trucks/vehicles exit the site in same condition as entering.
- During construction of the Waterfront Square, silt curtains will need to be positioned around the construction area to confine sediment generation, with regular monitoring/inspection to be conducted. The silt curtains will need to be installed prior to commencement of works, allowing a 5-15 m buffer zone. Vessel movements across the silt curtain need to be minimised during works and suspended sediments should be allowed to settle prior to removal of the curtain.
- Water quality parameters (primarily turbidity) should be monitored to validate effectiveness of control measures. Monitoring can include visual inspection of water turbidity and sediment plumes; and monitoring of metal contaminants that had been recorded in the sediments. A suitable approach to monitoring of water quality would include sampling of turbidity immediately inside and outside of the silt curtain; and baseline monitoring of water quality in the immediate vicinity of Walsh Bay to provide data for comparison with that measured during construction.

The implementation of above controls was considered to be sufficient to reduce residual impacts to the marine environment due to the project to acceptable levels.

4. Evaluation of Land Suitability

4.1 Potential Areas of Environmental Concern

Based on the history review and observations of the site, areas of environmental concern (AECs) and associated COPCs have been identified and are presented in **Table 4.1**. AECs in **Table 4.1** are based only on the known historical activities undertaken at the site.

Table 4.1 Areas of Environmental Concern and Associated Contaminants of Potential Concern

Area of Environmental Concern	Nature of Environmental Concern	Contaminants of Potential Concern
AEC 1: Shore shed building southern end 3m strip of fill/soil inside seawall –	Use of potentially contaminated imported material as fill	Heavy metals, TPH, BTEX, PAHs, OCP/OPPs, PCBs, asbestos, VOCs, SVOCs
AEC 2: All site area with the exception of the land based portion of site (mentioned above)	Potential contaminants in seabed sediments	Heavy metals, TPH, BTEX, PAHs, OCP/OPPs, PCBs, asbestos
AEC 3: Areas of potential access to seawater -	Potential contaminants in seawater	Heavy metals, TPH, BTEX, PAHs, OCP/OPPs, viruses/bacteria/pathogens
AEC 4: Pier 2/3, Wharf 4/5 and Shore Shed building exteriors and interiors	Use of hazardous materials in building construction	Asbestos, lead based paint, SMF, PCBs

Notes: BTEX = Benzene, Toluene, Ethylbenzene and Xylene

Heavy metals = 8 priority heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, mercury and zinc)

OCPs = organochlorine pesticides

OPPs = organophosphorus pesticides

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

TPH = Total Petroleum Hydrocarbons

VOCs = volatile organic compounds

SVOCs = semi-volatile organic compounds

In addition to the specific AECs, wide-scale filling has previously occurred in land to the south of Hickson Road, and as noted in **Section 3.2**, the Millers Point gasworks was operational in the general vicinity of the site between 1841 and 1921. As such it is likely that impacted fill from the surrounding area has been historically used in neighbouring land to the south of the site. This may include fill material as sourced from the gasworks. However, noting that development of Walsh Bay occurred as part of the shipping use of the area and the alignment of the initial wharves suggest that limited filling was required as part of the wharf construction, it is considered that use of imported fill near the site, if at all, was likely to have been highly localised. It is also considered unlikely that gasworks waste or significant volumes of other fill materials were imported onto the site. Should small volumes of imported fill have been used on the site then the range of contaminants potentially present would be consistent with those listed in **Table 4.1**.

4.2 Potentially Contaminated Media

Potentially contaminated media present at the site were listed in **Table 4.1** and comprised:

- Potential fill materials present in the small land based area of the site inside the seawall. This was included in **Table 4.1** for completeness, however based on consideration of the HLA (1996) results relevant to the site, it is considered that the potential for fill under the site to be contaminated is very low.
- Hazardous materials present in the building fabric and that have the potential to be released during the proposed building upgrades. It is however considered that if the works on the building are completed (and validated) in accordance with the recommendations of the hazardous materials assessment (Prensa 2012), then these exposure pathways will be rendered incomplete for future users of the site. Hazardous materials are therefore no longer considered a significant AEC for the site.

- Seabed sediments impacted by urban runoff and other emissions from the surrounding foreshore area.

Cardno (2016), as summarised in **Section 3.7.3**, provides an initial assessment of the condition of sediments in proximity of the WBAP. Impacts to sediment, and seawater, if any are influenced by the dynamic tidal system and not readily quantifiable. As such while these media have been identified as potentially contaminated, their effect on suitability of the proposed redevelopment of the site has been assessed based on whether the pathways to these potentially contaminated media are complete.

Table 4.2 summarises the potential exposure pathways associated with the identified AECs.

Table 4.2: Potential Exposure Pathways for Long Term Users Following Redevelopment of the site

AEC	Population	Exposure Pathways <u>Post Construction During Long Term Use</u> (Complete or Not Complete?)			
		Inhalation - Particulates	Inhalation – Vapour	Oral	Dermal
1 – potentially impacted sediment seabased portion of site	Commercial Site worker	N	C	N	N
	Subsurface Maintenance Worker	C	C	C	C
	Site Patron	N	C	N	N
2 – potential contaminated seawater	Commercial Site worker	N	N	C	C
	Site Patron	N	N	C	C

Notes:

C = potentially complete exposure pathway

NC = exposure pathway incomplete

- = exposure pathway not applicable for user group

Review of **Table 4.2** indicates that:

- at least one potentially complete exposure pathway exists for future above ground users of the WBAP, i.e. inhalation of vapours, if any, as originating from subsurface materials present below the existing ground slab; and
- multiple exposure pathways also exist for any future subsurface excavation workers on the land-based portion of the WBAP.

On this basis it is considered that while the potential for impacted fill material to be present on site is low, there is currently insufficient data with respect to subsurface soils on the land based portion of the site to provide an assessment of site suitability.

While seabed sediment underlying the site may be contaminated, review of **Table 4.2** confirms that future users will have no complete exposure pathways to this material. Sediments will remain below a minimum depth of 6m of water, and advice provided in the assessment of maritime conditions (**Section 3.7.2**) has confirmed that the proposed pile construction methods are likely to result in only minor and localised disruptions to the seabed.

The construction of the water steps as part of the development will provide future site users with access to sea water at the site. It is noted that the NSW EPA Beachwatch Monitoring Program reports that Sydney Harbour is generally safe for swimming. There is only one general precaution provided by Beachwatch for recreational use of Sydney Harbour as based on bacterial contamination. This precaution states that swimming in Sydney Harbour should be avoided for up to three days following rainfall or for as long as stormwater is present. Similarly, Fisheries NSW advises that recreational boating activities, swimming and fishing in the Harbour is safe, but consumption of seafood caught in the Harbour should be limited to recommended maximum values based on the

potential for sea organisms to have consumed contaminated sediments. Based on these assessments of safe recreational use of the Harbour, the risks from exposure to seawater for users of the proposed Water Steps are considered to be negligible.

In addition to the receptors listed in **Table 4.2**, it is considered that completion of the proposed redevelopment works may provide the opportunity for construction site personnel to be exposed to fill, sediment and seawater at the site. However, it is considered that implementation of the construction management plan measures as documented in Cadence (2016) and summarised in **Section 3.7.3**, should adequately manage risks to the health and safety of the construction site staff and the surrounding marine environment.

5. Conclusions and Recommendations

5.1 Findings

- The site is located within the Walsh Bay Conservation Zone, with a surrounding locality comprised of residential, commercial and public domain land uses.
- The site, which comprises the Walsh Bay Pier 2/3 and Wharf 4/5 structures, the adjacent Shore Shed buildings and associated wharf aprons, is estimated to have an approximate area of 2 hectares. The proposed redevelopment will also extend approximately 40m into Port Jackson, through construction of a floating platform supported on timber piles driven into the seabed.
- Historical information indicates that the existing Pier 2/3, Wharf 4/5 and shore shed buildings were constructed circa 1910, however the alignment of the existing built structures and seawall are consistent with earlier versions of the Walsh Bay wharves in operation as early as 1890.
- At the time of the site inspection completed as part of this assessment the entire site surface comprised a concrete ground slab, with the exception of the existing water zone area of the proposed floating platform into Port Jackson. The site was being used as a commercial performing arts centre with public foreshore access external to the existing buildings. The existing Pier 2/3 and Wharf 4/5 buildings were observed to be fully suspended structures founded on timber piles driven into the seabed. Based on observations made during the inspection it would appear that more than 50% of the shore shed buildings are similarly founded on timber piles driven in the seabed. Less than 50% of the existing shore shed buildings are founded on a seawall and possible backfill material.
- Whilst current use of the site is considered to have negligible potential for contamination of land and sea, the site was previously used as part of the Walsh Bay Wharves shipping facility. This former use, in combination with the location of the site in the central inner city suggested that heavy metals, OCPs, PCBs, PAHs, PCBs, TPH and asbestos were contaminants of potential concern in soil and sediments underlying the site. The proximity of the WBAP to the former Millers Point Gasworks has also lead the inclusion of VOCs and SVOCs as potential contaminants of concern for the site.
- Limited soil sampling results from historical site investigation activities (HLA 1996) were available from the land based area of the site adjacent to the Pier 2/3 building. This investigation data indicated a 1m thick layer of fill underlying this portion of the site beneath a ground surface concrete slab (600 mm thick). Laboratory analysis of fill from this location (BH-7 1-1.5m) was reported to contain low concentrations of TPH, PAHs, heavy metals and OCPs. The soil analytical results were assessed against the Health based Investigation Levels (HILs), outlined in NEPC 2013, for commercial/industrial land use (HIL-D) and public open space use (HIL-C). Concentrations in the BH-7 1-1.5m sample were all less than the current criteria applicable to the site.
- These results suggest that while the presence of contaminated fill in the broader surrounding area of Hickson Road and the Barangaroo redevelopment site has been widely documented, the potential for contamination in fill materials at the WBAP site is low. However, at present insufficient soil contamination data exists to characterise the subsurface fill and soils on the site at a suitable density to draw final conclusions regarding the suitability of the site for the proposed use.
- With respect to contaminated sediments in the seabed, review of current studies has indicated that impacts present in sediments across the Sydney Harbour area include heavy

metals, PAHs, TPH, OCPs and PCBs. These impacts would be expected to be present within the seabed portion of the site, however the impacts are considered not to be attributable to the current or recent historical use of the site.

- Seawater in the vicinity of the site is likely to be impacted with heavy metals and bacteriological contaminants, however this is consistent within impacts across the entire Sydney Harbour and are considered not to be attributable to the current use of the site.

5.2 Conclusions

In accordance with the limitations provided in **Section 6**, available information suggests that potential contaminants in soil, sediment and seawater at the site do not appear to represent a potential human health risk for continued commercial use of the site and the associated arts/cultural use. This is based on the following:

- With respect to harbor sediments, given that disturbances to the seabed based on the proposed pile installation method are anticipated to be minimal, there are considered to be no direct exposure pathways to potentially contaminated sediments that will exist following site redevelopment. Harbour sediment will remain separated from site users under a water column of at least 6m.
- With respect to potential exposure to seawater, as associated with use of the proposed Water Steps, it is considered that general exposure to harbor water is safe, subject to adherence to standard NSW EPA guidance on swimming after rainfall, and current NSW fisheries advice relating to fishing in Sydney Harbour.
- With respect to subsurface soils it is noted that the site is not founded wholly on land but is largely supported on piers installed into the seabed. Additionally, while the surrounding area is known to be underlain by fill that is potentially impacted with a range of common urban contaminants, the limited available sample results have indicated fill at the southern end of the site is not impacted.

These results suggest that the site is suitable for the uses proposed under the Stage 2 DA and the associated Master Plan. However, it is considered that additional soil sampling data is required to adequately characterise the land-based portion of the WBAP and confirm the suitability of the site for the proposed use.

5.3 Recommendations

It is recommended that the following works be undertaken on the land based portion of the WBAP site for the purposes of characterising subsurface soils at the site and confirming the suitability of the site for the proposed commercial/public domain use:

- Soil sampling from 6 bores installed across the land based portion of the site;
- Analysis of representative soil samples for potential contaminants of concern;
- Preparation of a report documenting the results of the soil sampling, including comment on whether the site requires further assessment or remediation;
- Should results of soil sampling identify the presence of impacts in subsurface fill and soils, amendment of the construction EMP as may be appropriate to ensure worker health and safety requirements are appropriately addressed and preparation of a long term EMP with provisions that would enable use of the WBAP for the intended purpose.

A sampling, analytical and quality plan (SAQP) for the above proposed works has been included as **Appendix H**.

6. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

7. References

JBS&G Australia Pty Ltd, *'Phase 1 Environmental Site Assessment, Proposed Walsh Bay Arts Precinct Redevelopment, Walsh Bay Wharves, Dawes Point NSW, JBS&G 43329-56537 (Rev 2), 23 June 2014 (JBS&G 2014)*

Design 5 Architects, *'Walsh Bay Arts Precinct; Heritage Assessment Report', February 2014, (Design 5 2014)*

Cadence Australia Pty Ltd, Draft *'Environmental, Construction and Site Management Plan'* 27 July 2016, (Cadence 2016).

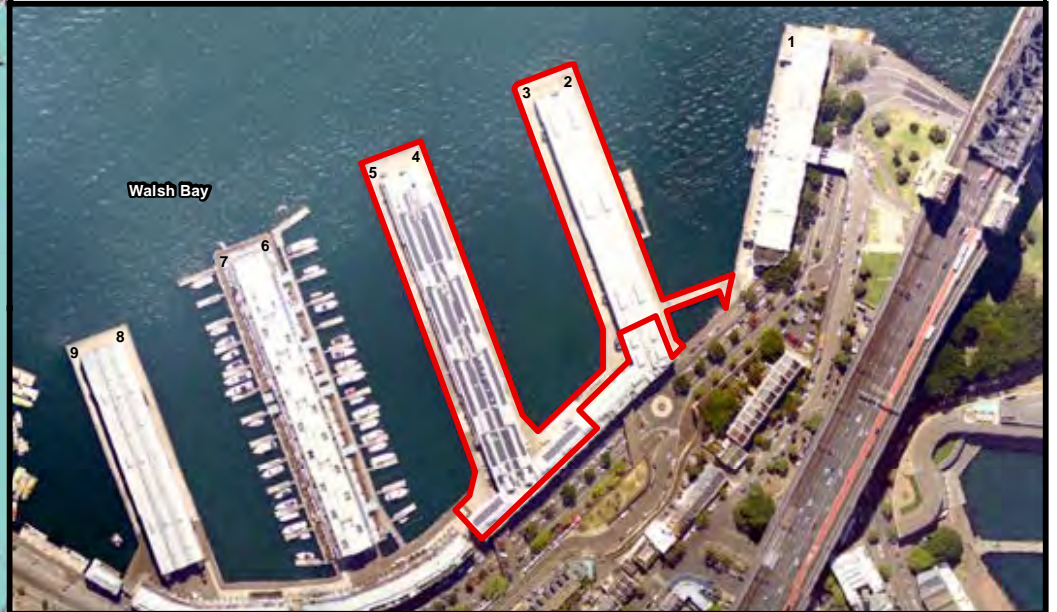
Cardno (NSW/ACT) Pty Ltd, 7 November 2016 *Walsh Bay Redevelopment Preliminary Sediment Investigation'* (Cardno 2016).

Prensa Pty Limited *'Hazardous Materials Re-Assessment, Wharf 4-5 Hickson Road Walsh Bay NSW,* dated September 2012 (Prensa 2012).

HLA-Envirosciences Pty Limited *'Initial Contamination Assessment, Walsh Bay Redevelopment Project, Sydney NSW'* dated August 1996 (HLA 1996).

Patterson Britton Pty Limited *'Walsh Bay Redevelopment, Master Plan Development Application Marine Report'* dated 1996 (PB 1996).

Figures



0 200 400 800
m
Scale: 1:20,000

Source: Base Image - © SIX Maps www.maps.six.nsw.gov.au, accessed 17-03-2014

0 50 100 200
m
Scale: 1:4,750

Source: Base Image - © NearMap www.nearmap.com, imagery date 19-0-2013, accessed 17-03-2014

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Legend:

Approximate Site Boundary



Figure 1: Site Location

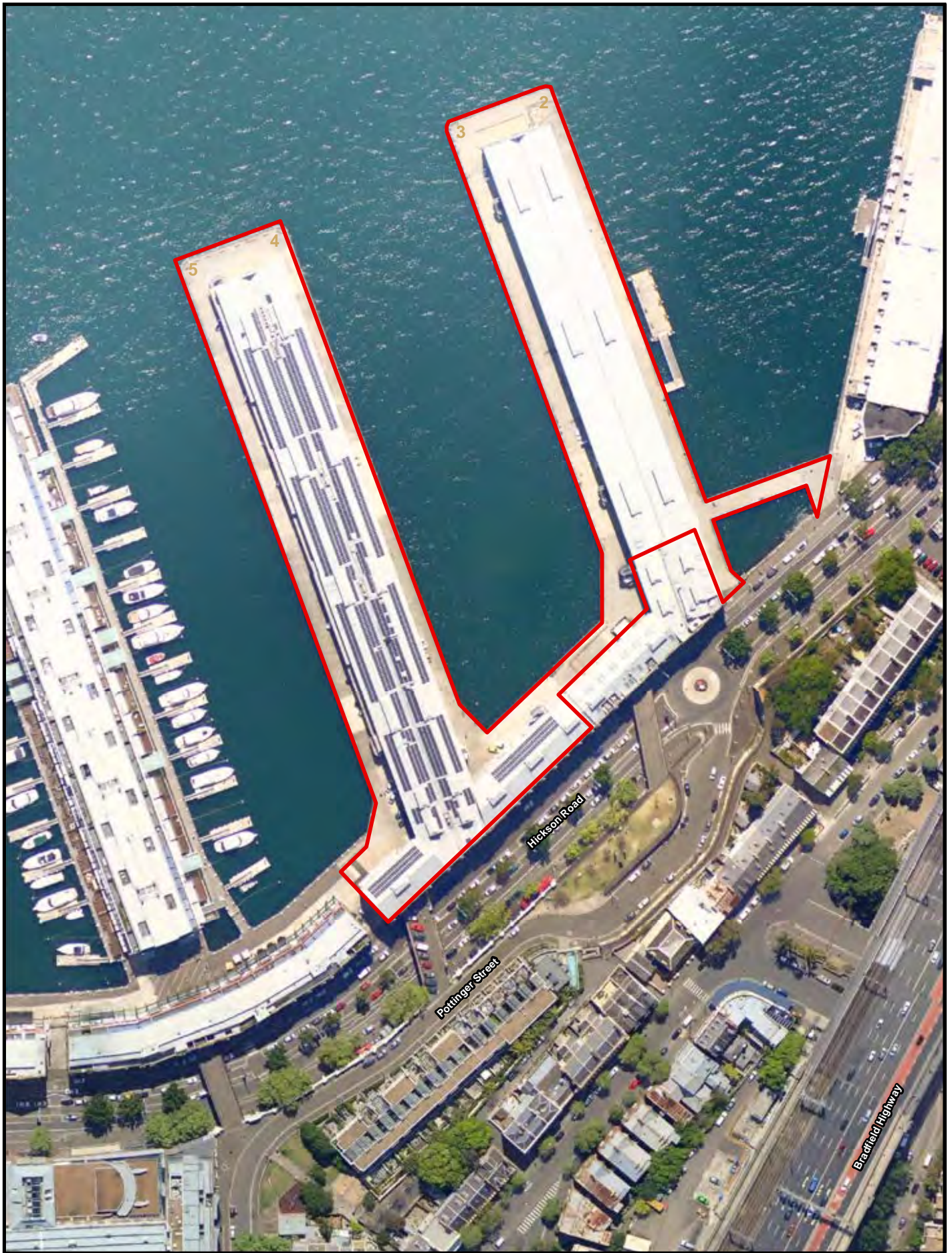
Client: Infrastructure NSW

Project: Walsh Bay Arts Precinct

Job No: 52304

File Name: 52304_01

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A4			
A	Original Issue - R01	SE	07-11-2016
Rev	Description	Dmn.	Date:



Source: Base Image - © www.nearmap.com.au - Imagery Date September 19, 2013

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Scale: 1:1,800			
Datum: GDA 1994 MGA Zone 56 - AHD			
A4			
A	Original Issue - R01	SE	07-11-2016
Rev	Description	Dm.	Date:

Legend:
 Approximate Site Boundary

JBS&G Figure 2: Site Layout

Client: Infrastructure NSW

Project: Walsh Bay Arts Precinct

Job No: 52304

File Name: 52304_02





Source: Base Image - © www.nearmap.com.au - Imagery Date September 19, 2013

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0 15 30 60
m

Scale: 1:1,800

Datum: GDA 1994 MGA Zone 56 - AHD

A4			
A	Original Issue - R01	SE	07-11-2016
Rev	Description	Dm.	Date:

Legend:

Approximate Site Boundary

Approximate Extent of Waterfront Square, The Wings and The Watersteps

Approximate Location of Seawall

Former Soil Sampling Location (HLA 1996)



Figure 3: Proposed Building Envelope

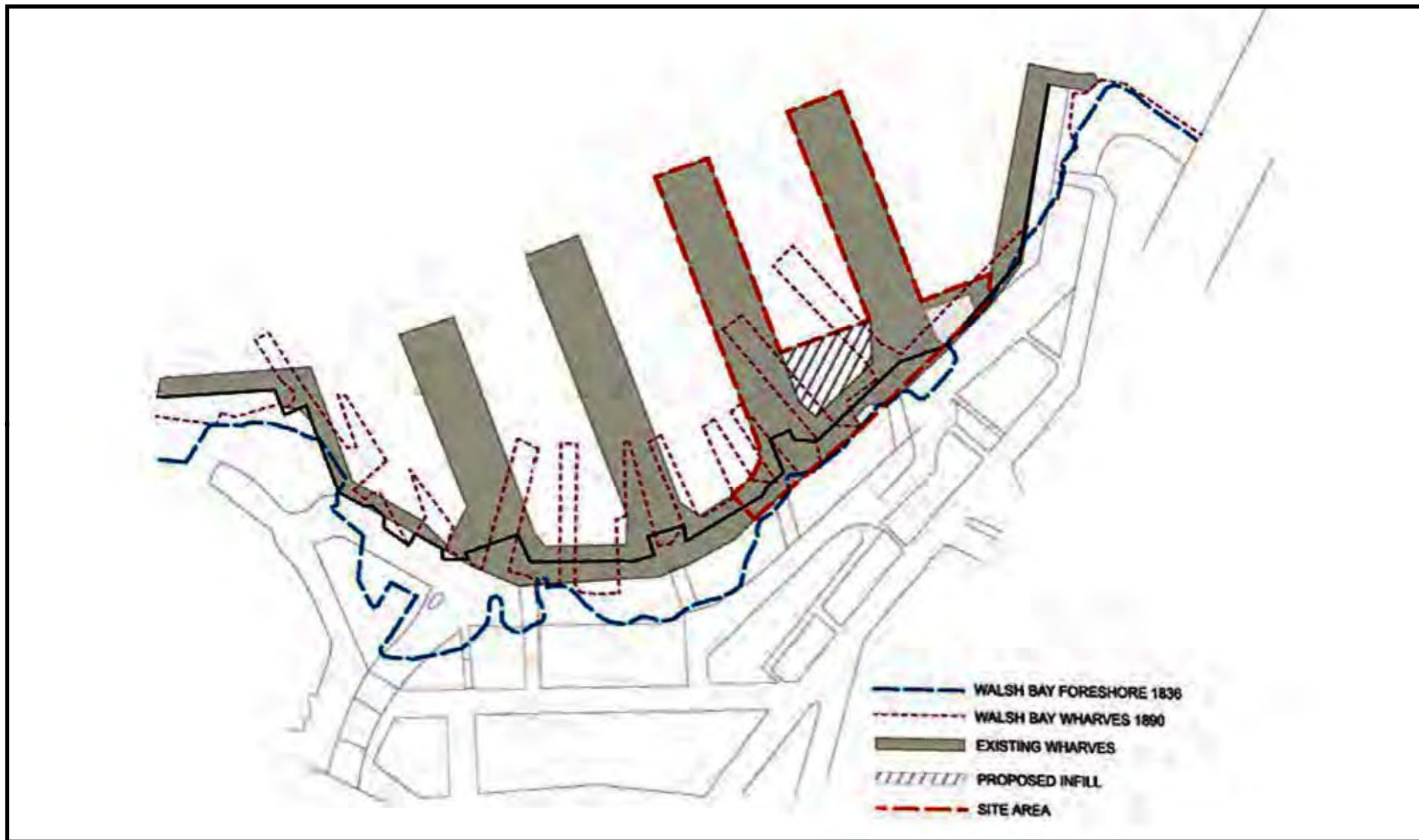
Client: Infrastructure NSW

Project: Walsh Bay Arts Precinct

Job No: 52304

File Name: 52304_03





Source: Base Image - Design 5 Architects, 2014. Walsh Bay Arts Precinct, Heritage Assessment Report DRAFT.

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0 25 50 100 m			
Scale: 1:3,750			
Datum: GDA 1994 MGA Zone 56 - AHD			
A4			
A	Original Issue - R01	SE	07-11-2016
Rev	Description	Drm.	Date:



Figure 4: Approximate overlay of current wharves with early foreshore and early wharves

Client: Infrastructure NSW

Project: Walsh Bay Arts Precinct

Job No: 52304

File Name: 52304_04



Source: Base Image - © www.nearmap.com.au - Imagery Date September 19, 2013

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0 10 20 40 m			
Scale: 1:1,000			
Datum: GDA 1994 MGA Zone 56 - AHD			
A4			
A	Original Issue - R01	SE	10-11-2016
Rev	Description	Dm.	Date:

Legend:	
	Approximate Site Boundary
	Approximate Extent of Waterfront Square, The Wings and The Watersteps
	Approximate Location of Seawall
●	Former Soil Sampling Location (HLA 1996)
●	Proposed Sample Locations



Figure 5: Proposed Sampling Locations

Client: Infrastructure NSW

Project: Walsh Bay Arts Precinct

Job No: 52304

File Name: 52304_05

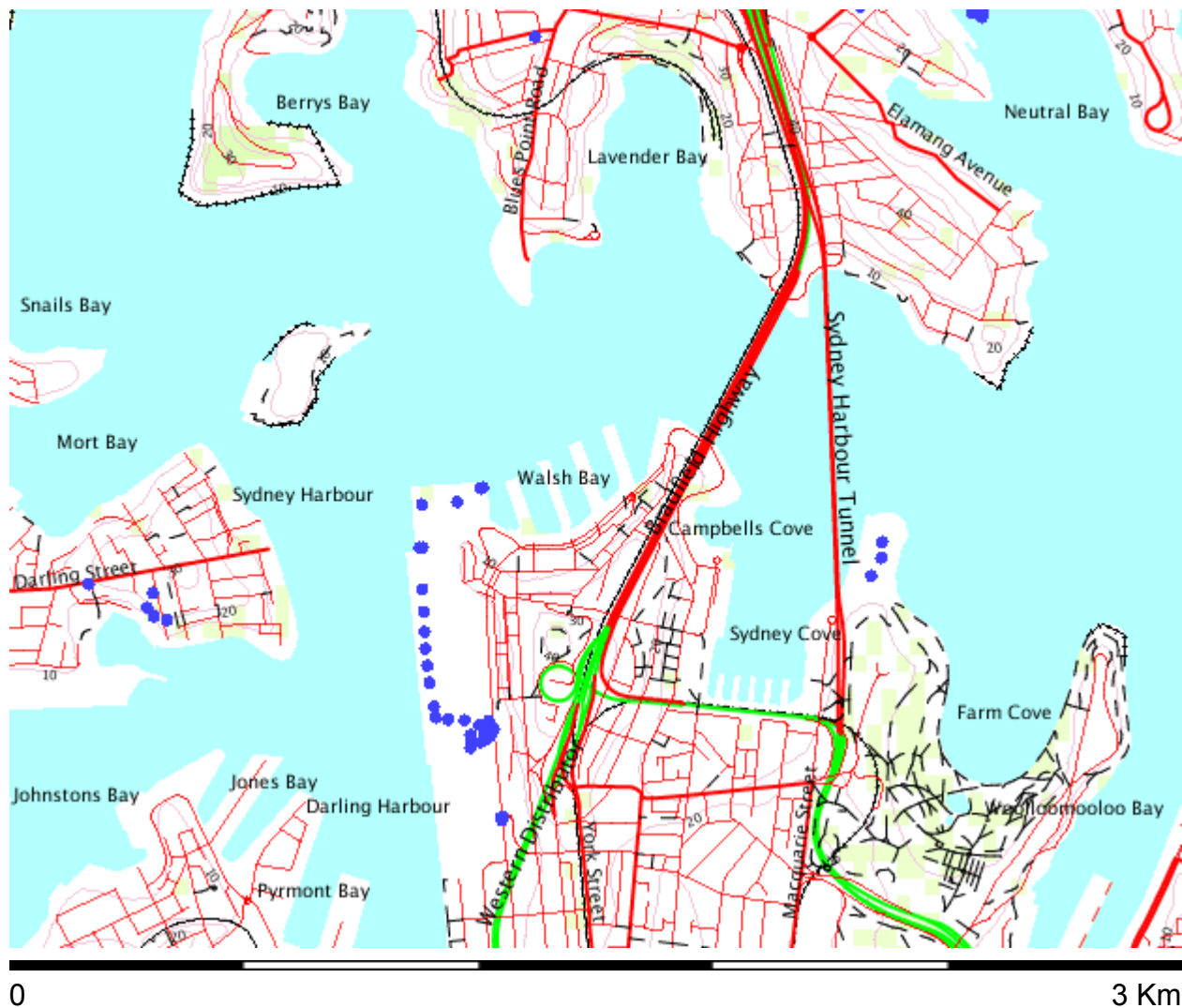


Appendix A Registered Groundwater Bore Search

43329

Map created with NSW Natural Resource Atlas - <http://www.nratlas.nsw.gov.au>

Wednesday, February 12, 2014



Legend

Symbol	Layer	Custodian
	Cities and large towns	renderImage: Cannot build image from features
	Populated places	renderImage: Cannot build image from features
	Towns	
	Groundwater Bores	
	Catchment Management Authority boundaries	
	Major rivers	

Topographic base map

Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109085

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109085
LIC-NUM	10BL602334
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Other Govt
COMMENCE-DATE	
COMPLETION-DATE	2008-07-22
FINAL-DEPTH (metres)	5.68
DRILLED-DEPTH (metres)	5.68
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	SYDNEY WATER
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251263.00
EASTING	333786.00
LATITUDE	33 51' 57"
LONGITUDE	151 12' 11"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH ST PHILIP
 PORTION-LOT-DP 1//87659

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH ST PHILIP
 PORTION-LOT-DP 1 87659

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	5.68	120			
1	1	Casing	P.V.C.	0.00	3.20	40			

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.30	1.30	FILL,SILTY SAND MEDIUM TO COARSE		
1.30	2.10	0.80	FILL,SILT SAND CLAY MIXTURE		
2.10	2.20	0.10	FILL, SHINY GRAVEL ,BLACK SILT		
2.20	3.10	0.90	FILL,SILTY SAND BROWN RED		
3.10	4.00	0.90	FILL CLAY,GREY,BROWN,MOIST		
4.00	5.68	1.68	SAND,FINE TO MEDIUM		

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Groundwater Works Summary

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Work Requested -- GW109086

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109086
LIC-NUM	10BL602334
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Other Govt
COMMENCE-DATE	
COMPLETION-DATE	2008-07-22
FINAL-DEPTH (metres)	5.68
DRILLED-DEPTH (metres)	5.68
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	SYDNEY WATER
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251262.00
EASTING	333781.00
LATITUDE	33 51' 57"
LONGITUDE	151 12' 11"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST PHILIP
PORTION-LOT-DP 1//87659

Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST PHILIP
PORTION-LOT-DP 1 87659

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	5.80	120			
1	1	Casing	P.V.C.	0.00	3.20	40			

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.50	0.50	FILL,MEDIUM TO COARSE		
0.50	1.00	0.50	FILL,SILTY SAND		
1.00	1.80	0.80	FILL,CLAYEY SAND FINE GRAINED		
1.80	2.00	0.20	FILL,GRAVELLY SAND		
2.00	3.20	1.20	FILL,SAND WITH SOME SILT		
3.20	3.80	0.60	FILL SILTY SAND		
3.80	4.50	0.70	FILL CLAY SILT SAND MIXTURE		
4.50	5.68	1.18	SAND,FINE TO MEDIUM GRAINED		

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Work Requested -- GW109087

Works Details [\(top\)](#)

GROUNDWATER NUMBER GW109087
LIC-NUM 10BL602334
AUTHORISED-PURPOSES MONITORING BORE
INTENDED-PURPOSES MONITORING BORE
WORK-TYPE Bore
WORK-STATUS
CONSTRUCTION-METHOD
OWNER-TYPE Other Govt
COMMENCE-DATE
COMPLETION-DATE 2008-07-22
FINAL-DEPTH (metres) 8.50
DRILLED-DEPTH (metres) 8.50
CONTRACTOR-NAME
DRILLER-NAME
PROPERTY SYDNEY WATER
GWMA -
GW-ZONE -
STANDING-WATER-LEVEL
SALINITY
YIELD

Site Details [\(top\)](#)

REGION 10 - SYDNEY SOUTH COAST
RIVER-BASIN
AREA-DISTRICT
CMA-MAP
GRID-ZONE
SCALE
ELEVATION
ELEVATION-SOURCE
NORTHING 6251252.00
EASTING 333783.00
LATITUDE 33 51' 57"
LONGITUDE 151 12' 11"
GS-MAP

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH ST PHILIP
 PORTION-LOT-DP 1//87659

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH ST PHILIP
 PORTION-LOT-DP 1 87659

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	8.50	120			
1	1	Casing	P.V.C.	0.00	3.20	40			

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.00	1.00	FILL,CLAY MIXED WITH COARSE GRAVEL		
1.00	1.50	0.50	FILL SAND MEDIUM GRAINED		
1.50	2.20	0.70	FILL,SILTY SAND,MOIST,FIRM WITH GRAVEL		
2.20	3.50	1.30	FILL,SAND MEDIUM GRAINED,GREY/BROWN		
3.50	4.00	0.50	FILL,SILTY SAND,MOIST,LOOSE TO FIRM		
4.00	4.50	0.50	FILL,CRUSHED SANDSTONE		
4.50	5.90	1.40	SAND MEDIUM TO FINE ,SILT BROWN,CLAY		
5.90	7.00	1.10	CLAY,HIGH PLASTICITY,WET,SHELLS		
7.00	8.50	1.50	SAND,FINE TO MEDIUM GRAINED,BEIGE		

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Work Requested -- GW109712

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109712
LIC-NUM	10BL163286
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Other Govt
COMMENCE-DATE	
COMPLETION-DATE	2004-01-21
FINAL-DEPTH (metres)	5.80
DRILLED-DEPTH (metres)	5.80
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MINISTER FOR POLICE
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.64
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251938.00
EASTING	332788.00
LATITUDE	33 51' 35"
LONGITUDE	151 11' 33"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1//773671

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1 812813

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	5.80	100			
1	1	Casing	PVC Class 18	0.00	5.80	50			Screwed; Seated on Bottom
1		Annulus	Crushed Aggregate	0.00	0.00				Graded; GS: 1- 5.8mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D- L	YIELD	TEST-HOLE- DEPTH (metres)	DURATION	SALINITY
0.00	5.80	5.80		2.64					

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	1.50	1.50	TOPSOIL AND FILL		
1.50	5.80	4.30	WEATHERED SANDSTONE,MEDIUM TO COARSE GRAINED		

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Work Requested -- GW109713

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109713
LIC-NUM	10BL163286
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Other
OWNER-TYPE	Other Govt
COMMENCE-DATE	
COMPLETION-DATE	2004-01-21
FINAL-DEPTH (metres)	6.00
DRILLED-DEPTH (metres)	6.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MINISTER FOR POLICE
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.52
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251951.00
EASTING	332750.00
LATITUDE	33 51' 34"
LONGITUDE	151 11' 31"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1//812813

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1 812813

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	6.00	100			Other
1	1	Casing	PVC Class 18	0.00	6.00	50			Screwed
1		Annulus	Crushed Aggregate	0.00	0.00				Graded; GS: 1- 6mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D- L	YIELD	TEST-HOLE- DEPTH (metres)	DURATION	SALINITY
6.00	6.00	0.00		2.52					

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	2.60	2.60	FILL		
2.60	6.00	3.40	SANDSTONE,WEATHERED,MEDIUM TO COARSE GRAINED/SOME CLAY		

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109714

Works Details [\(top\)](#)

GROUNDWATER NUMBER GW109714
LIC-NUM 10BL163286
AUTHORISED-PURPOSES MONITORING BORE
INTENDED-PURPOSES MONITORING BORE
WORK-TYPE Well
WORK-STATUS
CONSTRUCTION-METHOD Other
OWNER-TYPE Other Govt
COMMENCE-DATE
COMPLETION-DATE 2004-01-22
FINAL-DEPTH (metres) 5.90
DRILLED-DEPTH (metres) 5.90
CONTRACTOR-NAME
DRILLER-NAME
PROPERTY MINISTER FOR POLICE
GWMA -
GW-ZONE -
STANDING-WATER-LEVEL 2.55
SALINITY
YIELD

Site Details [\(top\)](#)

REGION 10 - SYDNEY SOUTH COAST
RIVER-BASIN
AREA-DISTRICT
CMA-MAP
GRID-ZONE
SCALE
ELEVATION
ELEVATION-SOURCE
NORTHING 6252032.00
EASTING 332745.00
LATITUDE 33 51' 32"
LONGITUDE 151 11' 31"
GS-MAP

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1//812813

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1 812813

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	5.90	100			Other
1	1	Casing	PVC Class 18	0.00	5.90	50			Screwed; Seated on Bottom
1		Annulus	Crushed Aggregate	0.00	0.00				Graded; GS: .5- 5.9mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D- L	YIELD	TEST-HOLE- DEPTH (metres)	DURATION	SALINITY
0.00	5.90	5.90		2.55					

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	1.20	1.20	FILL		
1.20	5.90	4.70	SANDSTONE WEATHERED,MEDIUM TO COARSE,GRAINED,SOME CLAY		

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Groundwater Works Summary

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Work Requested -- GW109715

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109715
LIC-NUM	10BL163286
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Other
OWNER-TYPE	Other Govt
COMMENCE-DATE	
COMPLETION-DATE	2004-01-22
FINAL-DEPTH (metres)	5.90
DRILLED-DEPTH (metres)	5.90
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MINISTER FOR POLICE
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	4.40
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252060.00
EASTING	332556.00
LATITUDE	33 51' 31"
LONGITUDE	151 11' 24"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1//812813

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1 812813

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	5.90	100			Other
1	1	Casing	PVC Class 18	0.00	5.90	50			Screwed; Seated on Bottom
1		Annulus	Crushed Aggregate	0.00	0.00				Graded; GS: 1- 5.9mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D- L	YIELD	TEST-HOLE- DEPTH (metres)	DURATION	SALINITY
0.00	5.90	5.90		4.40					

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	1.20	1.20	FILL		
1.20	5.90	4.70	SANDSTONE WEATHERED MEDIUM TO COARSE GRAINED,CLAY SEAMS		

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109716

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109716
LIC-NUM	10BL163286
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Other
OWNER-TYPE	Other Govt
COMMENCE-DATE	
COMPLETION-DATE	2004-01-22
FINAL-DEPTH (metres)	6.00
DRILLED-DEPTH (metres)	6.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MINISTER FOR POLICE
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	1.79
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251981.00
EASTING	332729.00
LATITUDE	33 51' 33"
LONGITUDE	151 11' 30"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1//812813

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH PETERSHAM
 PORTION-LOT-DP 1 812813

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	6.00	100			Other
1	1	Casing	PVC Class 18	0.00	6.00	50			Screwed; Seated on Bottom
1		Annulus	Crushed Aggregate	0.00	0.00				Graded; GS: 1- 5mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D- L	YIELD	TEST-HOLE- DEPTH (metres)	DURATION	SALINITY
0.00	6.00	6.00		1.79					

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	4.20	4.20	FILL		
4.20	5.80	1.60	MARINE SILT		
5.80	6.00	0.20	SANDSTONE		

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Groundwater Works Summary

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Work Requested -- GW111570

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW111570
LIC-NUM	10BL604689
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Other Govt
COMMENCE-DATE	
COMPLETION-DATE	2011-06-27
FINAL-DEPTH (metres)	6.00
DRILLED-DEPTH (metres)	6.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	SYDNEY PORTS CORPORATION
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.72
SALINITY	
YIELD	1.00

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252417.00
EASTING	333701.00
LATITUDE	33 51' 20"
LONGITUDE	151 12' 8"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH ST PHILIP
 PORTION-LOT-DP 2//876514

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH ST PHILIP
 PORTION-LOT-DP 2 876514

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	6.00	90			Auger - Solid Flight
1	1	Casing	PVC Class 18	0.00	2.00	61	51		Screwed; Seated on Bottom; End cap
1	1	Opening	Slots - Horizontal	2.00	5.80	61			PVC Class 18; Casing - Machine Slotted; SL: 40mm; A: .5mm; Screwed
1		Annulus	Bentonite/Grout	0.10	1.00				
1		Annulus	Crushed Aggregate	1.00	6.00				Graded; GS: 1-3mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO- DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D-L	YIELD	TEST- HOLE- DEPTH (metres)	DURATION	SALINITY
2.50	6.00	3.50		2.72	5.80	1.00			

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	CONCRETE		

0.20	1.00	0.80	FILL,CLAYEY SAND,YELLOW BROWN
1.00	6.00	5.00	FILL. SAND,YELLOW

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Groundwater Works Summary

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Work Requested -- GW111571

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW111571
LIC-NUM	10BL604689
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Other Govt
COMMENCE-DATE	
COMPLETION-DATE	2011-06-27
FINAL-DEPTH (metres)	6.00
DRILLED-DEPTH (metres)	6.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	SYDNEY PORTS CORPORATION
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.65
SALINITY	
YIELD	1.00

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252420.00
EASTING	333707.00
LATITUDE	33 51' 20"
LONGITUDE	151 12' 9"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH ST PHILIP
 PORTION-LOT-DP 2//876514

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH ST PHILIP
 PORTION-LOT-DP 2 876514

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	6.00	90			Auger - Solid Flight
1	1	Casing	PVC Class 18	0.00	2.00	61	51		Screwed; Seated on Bottom; Open End
1	1	Opening	Slots - Horizontal	2.00	5.80	61			PVC Class 18; Casing - Machine Slotted; SL: 40mm; A: .5mm; Screwed
1		Annulus	Bentonite/Grout	0.10	1.00				
1		Annulus	Crushed Aggregate	1.00	6.00				Graded; GS: 1-3mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO- DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D-L	YIELD	TEST- HOLE- DEPTH (metres)	DURATION	SALINITY
2.50	6.00	3.50		2.65	5.80	1.00			

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	CONCRETE		

0.20	1.80	1.60	FILL,CLAYEY SAND,YELLOW BROWN
1.80	6.00	4.20	FILL,SAND YELLOW

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Groundwater Works Summary

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Work Requested -- GW112871

Works Details [\(top\)](#)

GROUNDWATER NUMBER GW112871
LIC-NUM 10BL604486
AUTHORISED-PURPOSES MONITORING BORE
INTENDED-PURPOSES MONITORING BORE
WORK-TYPE Well
WORK-STATUS
CONSTRUCTION-METHOD
OWNER-TYPE Private
COMMENCE-DATE
COMPLETION-DATE 2011-02-11
FINAL-DEPTH (metres) 20.00
DRILLED-DEPTH (metres)
CONTRACTOR-NAME
DRILLER-NAME
PROPERTY SYDNEY OPERA HOUSE TRUST
GWMA -
GW-ZONE -
STANDING-WATER-LEVEL
SALINITY
YIELD

Site Details [\(top\)](#)

REGION 10 - SYDNEY SOUTH COAST
RIVER-BASIN
AREA-DISTRICT
CMA-MAP
GRID-ZONE
SCALE
ELEVATION
ELEVATION-SOURCE
NORTHING 6252193.00
EASTING 334880.00
LATITUDE 33 51' 28"
LONGITUDE 151 12' 54"
GS-MAP

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST JAMES
PORTION-LOT-DP 5//775888

Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST JAMES
PORTION-LOT-DP 5 775888

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW112872

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW112872
LIC-NUM	10BL604486
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-04-28
FINAL-DEPTH (metres)	20.12
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	SYDNEY OPERA HOUSE TRUST
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252249.00
EASTING	334881.00
LATITUDE	33 51' 26"
LONGITUDE	151 12' 54"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST JAMES
PORTION-LOT-DP 5//775888

Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST JAMES
PORTION-LOT-DP 5 775888

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW112873

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW112873
LIC-NUM	10BL604486
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-04-28
FINAL-DEPTH (metres)	15.10
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	SYDNEY OPERA HOUSE TRUST
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252129.00
EASTING	334851.00
LATITUDE	33 51' 30"
LONGITUDE	151 12' 53"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST JAMES
PORTION-LOT-DP 5//775888

Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST JAMES
PORTION-LOT-DP 5 775888

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW113553

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113553
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	5.20
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252368.00
EASTING	333632.00
LATITUDE	33 51' 21"
LONGITUDE	151 12' 6"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113554

Works Details [\(top\)](#)

GROUNDWATER NUMBER GW113554
LIC-NUM 10BL604425
AUTHORISED-PURPOSES MONITORING BORE
INTENDED-PURPOSES MONITORING BORE
WORK-TYPE Bore
WORK-STATUS
CONSTRUCTION-METHOD
OWNER-TYPE Private
COMMENCE-DATE
COMPLETION-DATE 2011-01-06
FINAL-DEPTH (metres) 5.00
DRILLED-DEPTH (metres)
CONTRACTOR-NAME
DRILLER-NAME
PROPERTY BARANGAROO DELIVERY AUTHORITY
GWMA -
GW-ZONE -
STANDING-WATER-LEVEL
SALINITY
YIELD

Site Details [\(top\)](#)

REGION 10 - SYDNEY SOUTH COAST
RIVER-BASIN
AREA-DISTRICT
CMA-MAP
GRID-ZONE
SCALE
ELEVATION
ELEVATION-SOURCE
NORTHING 6252357.00
EASTING 333529.00
LATITUDE 33 51' 21"
LONGITUDE 151 12' 2"
GS-MAP

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113555

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113555
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	14.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252205.00
EASTING	333533.00
LATITUDE	33 51' 26"
LONGITUDE	151 12' 2"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113556

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113556
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	14.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252205.00
EASTING	333524.00
LATITUDE	33 51' 26"
LONGITUDE	151 12' 1"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113557

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113557
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	12.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6252060.00
EASTING	333535.00
LATITUDE	33 51' 31"
LONGITUDE	151 12' 2"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113558

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113558
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	14.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251980.00
EASTING	333541.00
LATITUDE	33 51' 34"
LONGITUDE	151 12' 2"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113559

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113559
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	4.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251910.00
EASTING	333544.00
LATITUDE	33 51' 36"
LONGITUDE	151 12' 2"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113560

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113560
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	3.60
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251850.00
EASTING	333548.00
LATITUDE	33 51' 38"
LONGITUDE	151 12' 2"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113561

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113561
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	4.50
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251791.00
EASTING	333555.00
LATITUDE	33 51' 40"
LONGITUDE	151 12' 2"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113562

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113562
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	10.70
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251731.00
EASTING	333562.00
LATITUDE	33 51' 42"
LONGITUDE	151 12' 3"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113563

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113563
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	11.70
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251647.00
EASTING	333577.00
LATITUDE	33 51' 45"
LONGITUDE	151 12' 3"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113564

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113564
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	7.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251610.00
EASTING	333582.00
LATITUDE	33 51' 46"
LONGITUDE	151 12' 3"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113565

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113565
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	4.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251603.00
EASTING	333619.00
LATITUDE	33 51' 46"
LONGITUDE	151 12' 5"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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COUNTY CUMBERLAND
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COUNTY CUMBERLAND
PARISH ST PHILIP
PORTION-LOT-DP 5 876514

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113566

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113566
LIC-NUM	10BL604425
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2011-01-06
FINAL-DEPTH (metres)	3.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251601.00
EASTING	333667.00
LATITUDE	33 51' 46"
LONGITUDE	151 12' 7"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Licensed [\(top\)](#)

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW113596

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113596
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2009-12-08
FINAL-DEPTH (metres)	14.10
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251591.00
EASTING	333741.00
LATITUDE	33 51' 46"
LONGITUDE	151 12' 9"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Licensed [\(top\)](#)

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113597

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113597
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2009-12-07
FINAL-DEPTH (metres)	9.50
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251600.00
EASTING	333738.00
LATITUDE	33 51' 46"
LONGITUDE	151 12' 9"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Licensed [\(top\)](#)

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113598

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113598
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-02-10
FINAL-DEPTH (metres)	13.20
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251581.00
EASTING	333745.00
LATITUDE	33 51' 47"
LONGITUDE	151 12' 10"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113599

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113599
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-02-09
FINAL-DEPTH (metres)	13.50
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251505.00
EASTING	333687.00
LATITUDE	33 51' 49"
LONGITUDE	151 12' 7"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113602

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113602
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-02-11
FINAL-DEPTH (metres)	17.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251531.00
EASTING	333727.00
LATITUDE	33 51' 48"
LONGITUDE	151 12' 9"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113603

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113603
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-02-19
FINAL-DEPTH (metres)	14.50
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251525.00
EASTING	333717.00
LATITUDE	33 51' 49"
LONGITUDE	151 12' 9"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113604

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113604
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-02-23
FINAL-DEPTH (metres)	8.20
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251538.00
EASTING	333735.00
LATITUDE	33 51' 48"
LONGITUDE	151 12' 9"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Work Requested -- GW113605

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113605
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-02-23
FINAL-DEPTH (metres)	3.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251547.00
EASTING	333744.00
LATITUDE	33 51' 48"
LONGITUDE	151 12' 10"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113606

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113606
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-03-04
FINAL-DEPTH (metres)	13.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251550.00
EASTING	333686.00
LATITUDE	33 51' 48"
LONGITUDE	151 12' 7"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113607

Works Details [\(top\)](#)

GROUNDWATER NUMBER GW113607
LIC-NUM 10BL604366
AUTHORISED-PURPOSES MONITORING BORE
INTENDED-PURPOSES
WORK-TYPE Well
WORK-STATUS
CONSTRUCTION-METHOD
OWNER-TYPE Private
COMMENCE-DATE
COMPLETION-DATE 2010-02-22
FINAL-DEPTH (metres) 7.20
DRILLED-DEPTH (metres)
CONTRACTOR-NAME
DRILLER-NAME
PROPERTY BARANGAROO DELIVERY AUTHORITY
GWMA -
GW-ZONE -
STANDING-WATER-LEVEL
SALINITY
YIELD

Site Details [\(top\)](#)

REGION 10 - SYDNEY SOUTH COAST
RIVER-BASIN
AREA-DISTRICT
CMA-MAP
GRID-ZONE
SCALE
ELEVATION
ELEVATION-SOURCE
NORTHING 6251558.00
EASTING 333727.00
LATITUDE 33 51' 48"
LONGITUDE 151 12' 9"
GS-MAP

AMG-ZONE 56
COORD-SOURCE
REMARK

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COUNTY CUMBERLAND
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Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST PHILIP
PORTION-LOT-DP 3 876514

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)

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Work Requested -- GW113608

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113608
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-03-02
FINAL-DEPTH (metres)	13.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251570.00
EASTING	333754.00
LATITUDE	33 51' 47"
LONGITUDE	151 12' 10"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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COUNTY CUMBERLAND
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Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH ST PHILIP
PORTION-LOT-DP 3 876514

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

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Work Requested -- GW113610

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113610
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-02-26
FINAL-DEPTH (metres)	12.20
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251579.00
EASTING	333722.00
LATITUDE	33 51' 47"
LONGITUDE	151 12' 9"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW113611

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113611
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-03-02
FINAL-DEPTH (metres)	7.50
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251539.00
EASTING	333687.00
LATITUDE	33 51' 48"
LONGITUDE	151 12' 7"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW113612

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW113612
LIC-NUM	10BL604366
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2010-03-03
FINAL-DEPTH (metres)	13.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	BARANGAROO DELIVERY AUTHORITY
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6251585.00
EASTING	333710.00
LATITUDE	33 51' 47"
LONGITUDE	151 12' 8"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

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Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

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