Sydney Water Corporation

Combined Stage 1 and 2 Detailed Site Investigation

Sydney Water Ashfield Reservoir, 165-169 Holden Street, Ashbury, NSW

24 July 2015

PARSONS BRINCKERHOFF

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Abbreviations

ABC	Ambient background concentration
ACL	Added contaminant limit
ACM	Asbestos containing material
ASS	Acid sulfate soils
BTEX compounds	Benzene, toluene, ethylbenzene and xylene
CEC	Cation exchange capacity
CHCs	Chlorinated hydrocarbons
CSM	Conceptual site model
DP	Deposited Plan
DQI	Data quality indicator
DQO	Data quality objective
DSI	Detailed site investigation
EIL	Ecological investigation level
ESL	Ecological screening level
F1	TRH C_6-C_{10} minus BTEX compounds
F2	TRH >C_{10}-C_{16} minus naphthalene
F3	TRH >C_{16}-C_{34}
F4	TRH >C_{34}-C_{40}
HIL	Health investigation level
HSL	Health screening level
LEP	Local environmental plan
LGA	Local government area
mAHD	Metres Australian Height Datum
mBGL	Metres below ground level
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council

NEPM	*National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended 2013)
NL	Non-limiting
NSW EPA	New South Wales Environment Protection Authority
OCPs	Organochlorine pesticides
OPPs	Organophosphate pesticides
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PID	Photoionisation detector
PQL	Practical quantitation limit
PSI	Preliminary site investigation
QA/QC	Quality assurance/quality control
RPD	Relative percentage difference
SAQP	Sampling, analysis and quality plan
SOP	Standard operating procedure
SWL	Standing water level
TCLP	Toxicity characteristic leachate procedure
TEQ	Toxicity equivalent quotient
TRH	Total recoverable hydrocarbons
US EPA	United States Environmental Protection Agency
VOCs	Volatile organic compounds

Executive summary

Introduction and objectives

Parsons Brinckerhoff Australia Pty Ltd (Parsons Brinckerhoff) was commissioned by Sydney Water Corporation (Sydney Water) to undertake a combined Stage 1 and Stage 2 detailed site investigation (DSI) for surplus land ('the site') associated with the Sydney Water-owned Ashfield Reservoir located at 165-169 Holden Street, Ashbury, NSW ('the Sydney Water property'). The purpose of the DSI work was to provide a more detailed understanding of potential contamination at the site to facilitate remedial strategy assessment and potential divestment of the site by Sydney Water.

The objectives of the investigation were to:

- assess the current contamination status of the site
- assess the potential risks associated with contamination at the site (if identified), with respect to the current commercial/industrial land use and the proposed future land use (potentially to be re-zoned for low to medium density residential land use)
- provide inputs to assist with preparation of the following documents (if necessary):
  - a remediation cost estimate, including estimated volumes of contaminated soil exceeding the adopted site assessment criteria that will require removal to render the site suitable for the proposed future use
  - an in situ waste classification for soil exceeding the adopted site assessment criteria to be excavated from the site during any remedial works likely to take place and disposed of to a licensed off-site waste facility.

The site is currently zoned 'SP2 Water Supply System' under the *Canterbury Local Environmental Plan 2012* (Canterbury LEP). Sydney Water has indicated that the site may potentially be re-zoned for low to medium density residential land use prior to divestment.

Summary of site history

Prior to the commencement of the Stage 2 DSI works, a Stage 1 preliminary site investigation (PSI) desktop review of current and historical background information pertaining to the site was undertaken in order to establish whether there were any known environmental concerns associated with the site.

This indicated that the property had been owned by Sydney Water since 1909, with ownership prior to this time unknown. Sydney Water records indicated that the reservoir was built between 1912 and 1914, and a review of historical aerial photography indicated that the remainder of the property was in use as a reservoir since at least the earliest available photograph reviewed (1930). The neighbouring property immediately to the west of the site was observed to be in use as the South Ashfield Brickworks at that time, and it was therefore considered possible that materials from the brickworks may have been used in filling the site.

Early aerial photographs and records held by NSW WorkCover indicated that a greater number of buildings were present on the Sydney Water property for part of the site's history, likely comprising a combination of permanent structures (including those remaining at the site) and temporary demountable structures.

Historical licencing information held by NSW WorkCover also indicated that petroleum and diesel may have been stored on the Sydney Water property in the mid-1990s in storage sheds in the central western area of the Sydney Water property (i.e. the south-western area of the site), with up to 200 L potentially being stored on-site at any time. Other information held on file by Sydney Water indicated that lead paint had been flaking

from the external surface of the reservoir (located on the portion of the property to be retained by Sydney Water) prior to refurbishment works in the late 1990s.

With the exception of the South Ashfield Brickworks, which was redeveloped into Peace Park public recreation area sometime between 1986 and 1994, historical aerial photographs indicated that the surrounding area had remained primarily low density residential since at least 1930.

Records held by the City of Canterbury and the NSW EPA did not indicate any evidence of contamination or contaminating activities at the site or in the vicinity of the site.

Scope of work

The Stage 2 DSI works were undertaken in accordance with the approved sampling, analysis and quality plan (SAQP) for the site. The scope comprised undertaking soil investigations including excavation of fifteen test pits (TP01 to TP15) to depths of between 0.8 and 3.0 metres below ground level (mBGL).

Selected representative soil samples were collected and analysed for contaminants of concern comprising total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX compounds), polycyclic aromatic hydrocarbons (PAHs), heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos (by quantitative method).

Results and conclusions

The results of the investigation indicated that:

- Concentrations of BTEX compounds, OCPs, OPPs and PCBs in soil were below the laboratory PQLs, and therefore were below the adopted human health criteria for the site.
- Concentrations of TRH were below the laboratory PQLs or marginally above, with all concentrations well below the adopted HSLs (residential land use, commercial/industrial and direct contact). No odours or visible staining was observed in these locations.
- Total PAH concentrations were below the adopted HILs; however calculated benzo(a)pyrene TEQ (limit of reporting equals zero calculation method) concentrations exceeded HIL A (low density residential) in four soil samples collected. The samples were collected from TP03, TP09, TP12 and TP14 at depths ranging from the surface (0-0.1 mBGL) to 1.0 mBGL. Naphthalene concentrations were below or marginally above detection limits for all samples and therefore below the adopted HSLs.
- Heavy metal results were below the adopted HILs for low density residential land use and commercial/industrial use with the exception of the lead concentration (490 mg/kg) reported for the sample collected from TP12 at a depth of 0.5 mBGL which exceeded the HIL for low density residential land use. Samples collected from the surface of TP12 and at 1.0 mBGL reported significantly lower lead concentrations of 64 mg/kg and 14 mg/kg respectively.
- Zinc exceeded the adopted EILs at TP11 (0-0.1 mBGL) and TP12 (0.5-0.6 mBGL). The zinc concentration at TP11 (400 mg/kg) marginally exceeds the residential EIL but is well below the commercial/industrial EIL. The zinc concentration at TP14 (2,400 mg/kg) exceeds the residential EIL but is well below the commercial/industrial EIL. These concentrations are above the general range of zinc concentration reported for other samples analysed at the site, in particular for the sample collected from TP12 at 0.5-0.6 mBGL. The zinc exceedances are considered to be limited in nature and therefore are not considered to pose a significant risk to on-site ecological receptors.
- Benzo(a)pyrene exceeded the adopted ESL for urban residential land use in seven samples collected, from TP01, TP03, TP09, TP12, TP13 and TP14 at depths ranging from the surface to 1 mBGL. The adopted benzo(a)pyrene ESL for commercial/industrial land use was exceeding in four samples collected from TP03, TP09, TP12 and TP14 at depths ranging from the surface to 1 mBGL. It is recommended that any further assessment and/or remediation of benzo(a)pyrene undertaken on-site

(given the benzo(a)pyrene TEQ exceeding HIL A) includes further assessment of the risk posed to the on-site ecological receptors from benzo(a)pyrene concentrations, particularly prior to potential divestment for residential use.

- ACM in the form of cement sheeting fragments were observed at two locations on the site (at 0-0.1 mBGL in TP11 and 0.5-0.6 mBGL in TP14). Fragments collected from these locations (TP11_0_AS_FRAG and TP14_FC_FRAG Sieve) were sent to the laboratory for testing, with the laboratory confirming that asbestos was present in both fragments. The calculated concentration of bonded ACM for the sample collected from TP11 (0.0107%w/w) was above the adopted health screening levels for low density residential (0.01 %w/w) but below commercial/industrial (0.05 %w/w). The calculated concentration of bonded ACM for the sample collected from TP14 was below the adopted health screening level for low density residential and commercial/industrial. In addition, the adopted criterion of no asbestos material present for surface soils has not been met given that ACM in the form of a cement sheeting fragment was identified at TP11 (0-0.1 m). Asbestos quantification was also undertaken on 17 soil samples, with all concentrations below detection.
- An in situ waste classification was undertaken based on the laboratory results of soil samples collected from the site. The fill material at the site is considered to be classified as special waste (to be managed as asbestos) and general solid waste, for off-site disposal to an appropriately licensed waste facility. It is recommended that materials are excavated, stockpiled, and sampled ex situ to confirm waste classification prior to disposing of materials to an off-site waste facility.
- No perched water or groundwater was encountered during the works to the maximum depth of investigation (up to 3.0 mBGL). Soil data obtained from the site did not indicate any widespread leachable contamination which may have potentially caused an impact to underlying groundwater.

The site meets the adopted screening/investigations levels for the current land use (commercial/industrial) with the exception of asbestos in the form of a fragment of bonded ACM cement sheeting in surface soils at TP11 (0-0.1m BGL). Appropriate management and removal of the asbestos impact on-site is recommended to meet the criteria for the current site use.

The volume of material impacted by asbestos is estimated to be approximately 1,625 m^3. The estimated volume is based on the assumption that the asbestos impact is confined to the upper fill material across the entire site area (described as gravelly clay), comprising an area of approximately 2,708 m^2. This fill layer generally ranges between 0.2 to 0.5 mBGL in the north-eastern portion of the site but extends up to 0.95 mBGL in the south-western portion of the site. Fill material was recorded to extend up to 2.1 mBGL at TP09 and TP15, however the deeper fill material in this area has a different composition (sand) and no asbestos has been observed in this fill material. The assumptions above would need to be confirmed via observations and validation sampling during the remedial works. Based on these assumptions, the above volume has been calculated based on an estimated average depth of fill materials requiring excavation of 0.6 m. Should asbestos impacted be observed in the underlying sandy fill materials, further assessment may be required to determine the extent of the impacts and the works could result in removal of all fill materials from the site (as a worst case scenario). Fill thicknesses at the site were found to vary from 0.2 to 2.2 m and it was calculated that the total volume of fill material at the site was approximately 1,900 m^3.

Benzo(a)pyrene TEQs in four samples, lead in one sample and asbestos reported in surface soils at TP11 exceeded the relevant adopted screening/investigations levels for low to medium density residential. Seven benzo(a)pyrene concentrations exceeded the adopted ESL for urban residential land use. Appropriate management and removal of the asbestos, lead and PAH impact on-site is recommended to meet the criteria for potential future use as low to medium density residential, if the site is divested. Some deeper excavation would be required around investigation location TP09 as benzo(a)pyrene impacts were reported within the underlying sandy fill materials. Based on a surface area of approximately 50 m^2 and an additional depth of 1 m, the volume of soil in excess of the asbestos-impacted soil which is estimated to be affected by PAHs is considered to comprise approximately 50 m^3.

Aboveground structures and materials stored on-site (in sheds and storage areas) were not assessed as part of this DSI. These may require assessment for hazardous materials and/or other potential contaminants and potentially removal prior to potential divestment of the site.

1. Introduction

1.1 Background

Parsons Brinckerhoff Australia Pty Ltd (Parsons Brinckerhoff) was commissioned by Sydney Water Corporation (Sydney Water) to undertake a combined Stage 1 and Stage 2 detailed site investigation (DSI) for surplus land ('the site') associated with the Sydney Water-owned Ashfield Reservoir located at 165-169 Holden Street, Ashbury, NSW ('the Sydney Water property'). The location and boundaries of the Sydney Water property and the site are shown on Figures 1 and 2 respectively.

Sydney Water currently owns the site and has identified it as being surplus to its requirements. As such, Sydney Water is considering potential divestment options. The purpose of the combined Stage 1 and 2 DSI was to provide a more detailed understanding of potential contamination at the site to facilitate remedial strategy assessment and potential divestment.

The site is currently zoned 'SP2 Water Supply System' under the *Canterbury Local Environmental Plan 2012* (Canterbury LEP). Sydney Water has indicated that the site may potentially be re-zoned for low to medium density residential land use prior to divestment.

1.2 Objectives

The objectives of the investigation were to:

- assess the current contamination status of the site
- assess the potential risks associated with contamination at the site (if identified), with respect to the current commercial/industrial land use and the proposed future land use (potentially to be re-zoned for low to medium density residential land use)
- provide inputs to assist with preparation of the following documents (if necessary):
  - a remediation cost estimate, including estimated volumes of contaminated soil exceeding the adopted site assessment criteria that will require removal to render the site suitable for the proposed future use
  - an in situ waste classification for soil exceeding the adopted site assessment criteria to be excavated from the site during any remedial works likely to take place and disposed of to a licensed off-site waste facility.

2. Scope of works

Prior to the commencement of the Stage 2 DSI works, a Stage 1 preliminary site investigation (PSI) desktop review of current and historical background information pertaining to the site was undertaken in order to establish whether there were any known environmental concerns associated with the site. The findings of the Stage 1 PSI were then used to prepare a sampling, analysis and quality plan (SAQP) outlining the proposed Stage 2 DSI scope of work and methodology. This was detailed in the Parsons Brinckerhoff report titled *Stage 1 Preliminary Site Investigation and Sampling, Analysis and Quality Plan – Sydney Water Ashfield Reservoir, 165-169 Holden Street, Ashbury, NSW* (reference: 2201679B-CLM-LTR-1007 RevC, dated 14 May 2015).

The Stage 2 DSI works were undertaken in accordance with the approved SAQP, and the findings of the Stage 1 PSI are provided in Section 4 of this report.

The scope of works for the Stage 2 DSI comprised:

- undertaking soil investigations including excavation of 15 test pits (TP01 to TP15) using an excavator to depths of between 0.8 and 3.0 metres below ground level (mBGL) and collection of soil samples from all test pit locations
- laboratory analysis of selected representative soil samples for the contaminants of concern identified at the site
- preparation of this Stage 2 DSI report which focuses on assessing the soil contamination status of the site, assessing the need for remediation at the site, and evaluating the suitability of the site for the proposed potential future land uses.

3. Site location and setting

3.1 Site location and identification

The general site identification details are provided in Table 3.1.

Table 3.1 Summary of general site information

Site address	165-169 Holden Street, Ashbury, NSW 2193
Site identification	The Sydney Water property comprises Lot 1 in Deposited Plan (DP) 115504, Lot 1 in DP 911478, and Lot 1 in DP 711077. The portion of the property comprising the site to be assessed comprises part of Lot 1 in DP 115504 and part of Lot 1 in DP 911478.
Site area	The Sydney Water property comprises an area of approximately 8,280 m^2. The portion of the property comprising the site to be assessed is an area of approximately 2,708 m^2 (as defined on Figure 2).
Current site use	The site is currently a disused portion of a depot, associated with the adjoining Sydney Water Ashfield Reservoir and City Tunnel property.
Surrounding land uses	A review of current aerial photographs indicates that the areas surrounding the site generally comprise low to medium density residential properties and open space parkland (with Peace Park located immediately to the west of the site).
Local government area (LGA) and zoning	The site is located within the City of Canterbury LGA, and is zoned 'SP2 Water Supply System' under the Canterbury LEP.
Proposed site use	Sydney Water has indicated that the Sydney Water property is proposed to be subdivided, with the potential for the site area to be re-zoned for low to medium density residential land use prior to divestment.

3.2 Site inspection

The Sydney Water property and the site were inspected on 14 April 2015 by a Parsons Brinckerhoff environmental scientist in the presence of Sydney Water personnel.

The Sydney Water property is surrounded by residential properties to the north and south, and beyond Holden Street, which borders the site to the east. Peace Park adjoins the site to the west and north-west. The property is enclosed by a chain wire fence, with the exception of where it immediately borders residential properties to the north and south, where timber or colourbond fences are present. The property is accessible via two sets of gates off Holden Street, in the north-eastern and south-eastern areas of the property.

The property generally slopes down to the south and to the west, which is consistent with regional topography, although it has been levelled for construction of the reservoir and depot. This is evidenced by several retaining walls present around the property.

The following sections describe in further detail both the site and the remaining area of the property to be retained by Sydney Water. An aerial plan showing the site features is presented as Figure 2, and site photographs are provided in Appendix C.

3.2.1 Site

The site area is primarily paved with bitumen, with some grassed areas with trees and shrubs located along the western, northern and eastern boundaries. No distressed vegetation was observed in these landscaped areas of the site.

There are three buildings on the site, including a small brick building (likely used for storage) located along the northern boundary, and two larger corrugated metal buildings located along the western site boundary. The southernmost of these buildings appears to have been used for vehicle storage/maintenance, with the northernmost building potentially being used for storage or as a workshop. The southernmost building was indicated to have previously housed petroleum in cabinets on historical licencing information provided by NSW WorkCover (see Table 4.1). The buildings have fallen into disrepair and are no longer in use.

Some building/construction equipment has been placed/stored in the central area of the site, comprising traffic barriers, timber pallets and beams, sections of pipe, and stockpiled gravel/bitumen.

The site is separated from the lower south-western area of the property by a retaining wall, with the areas differing by approximately 1 m at the western side of the site.

3.2.2 Remainder of Sydney Water property (to be retained)

The area of the property to be retained by Sydney Water features the Ashfield Reservoir which is an elevated reservoir (on a large sandstone base structure) located in the central eastern area of the property. Areas of the property to the west and south of the reservoir are lower, with retaining walls having been constructed around this area of the property.

There is a large single storey brick building located to the north of the reservoir, which at the time of the site inspection appeared to be in use for storage of telecommunications equipment. A smaller brick building is located to the north-east of the reservoir, along the eastern property boundary.

Two buildings are located to the south of the reservoir. The easternmost of these buildings is currently set up as a workshop. A concrete bunded area was present immediately to the north of this building, with evidence of previous infrastructure that has been removed. It was considered likely that this may have formerly housed electrical transformers and associated equipment, as newer electrical kiosks are present along the eastern property boundary which may have replaced these.

The south-western area of the property comprises a vacant portion of the depot, primarily paved with bitumen and with no aboveground structures or infrastructure. There is some building rubble (sections of pipe, timber pallets and beams) on the western edge of the paved area. The western boundary of this area slopes steeply down to Peace Park and is generally covered in vegetation, although it has been sealed in some areas to prevent erosion and direct surface water flow into the park. The neighbouring residential properties to the south appear to have encroached onto the Sydney Water property, with their fencelines located within the boundaries of the Sydney Water-owned property.

3.3 Topography and surface water drainage

The site is situated at approximately 40-50 metres Australian Height Datum (mAHD) and slopes down to the south and west. The nearest surface water body is the Cooks River, located approximately 1.3 km south-west of the site.

As described in Section 3.2, some cutting and/or filling is apparent at the Sydney Water property, with retaining walls used on the southern and western sides of some areas. Surface water is expected to flow to

the south and west, towards Peace Park, with the retaining wall in the south-western area of the property constructed to reduce the flow speed of surface water entering the park.

3.4 Geology

The regional geological map of the area (Department of Mineral Resources, 1983, 1:100,000 Geological Series Sheet 9130 (Edition 1)) indicates that the site is underlain by Ashfield Shale, comprising black to dark-grey shale and laminite.

The CSIRO Australian Soil Resource Information System (ASRIS) (http://www.asris.csiro.au/index_ie.html, accessed 16 April 2015) indicates that the soils in the vicinity of the site are characterised as being kurosols. Kurosols are characterised as having a strong texture contrast between A and B horizons and having unusual subsoil chemical features, typically high magnesium, sodium and aluminium.

The ASRIS also indicated that soils underlying the site are mapped as having a very low probability of occurrence of acid sulfate soils (ASS).

The site may have been subject to filling with materials from the adjacent South Ashfield Brickworks.

3.5 Hydrogeology

A review of the licensed borehole register on the NSW Government Water Information website (http://allwaterdata.water.nsw.gov.au/water.stm) indicated that there were no registered groundwater bores within a 500 m radius of the site.

Groundwater flow is likely to be to the west and south-west, based on the surrounding topography, towards the Cooks River which is located approximately 1.3 km south-west of the site at its closest point. A surface water body is also located within Canterbury Racecourse approximately 1.1 km south-west of the site, which has the potential to be partially fed by groundwater considering the elevation of that site.

Based on the elevation of the site and the local topography, it is considered likely that groundwater is present beneath the site within the underlying bedrock at depths of greater than 3-4 metres below ground level (mBGL).

4. Site history review

4.1 Stage 1 PSI historical searches

A Stage 1 PSI review of historical land use information pertaining to the site was undertaken to identify any known environmental concerns. A summary of the searches undertaken is provided in Table 4.1.

Table 4.1 Summary of Stage 1 PSI historical search results

Search	Results
Titles search	Historical land title information provided by Sydney Water indicated that the property has been owned by Sydney Water (as Board of Water Supply and Sewerage) since 1909. It is unknown who owned the land prior to this time. The title documentation is provided in Appendix D.
Historical aerial photographs	Historical aerial photographs from 1930, 1951, 1961, 1970, 1978, 1986 and 1994 were requested from NSW Land and Property Information (a division of the Office of Finance and Services), and were reviewed along with the current (2014) photograph. In the 1930 aerial photograph, the Sydney Water property appeared to have been constructed, with the elevated reservoir clearly visible. Structures are visible on the property in the north-western and south-western areas of the property, and to the north of the reservoir in the north-eastern area of the property. Due to the shadow of the reservoir it was unclear whether structures were present in the south-east area of the property. The surrounding area was observed to be primarily low density residential properties to the north, south and east. The property immediately to the west of the property (now Peace Park) appears to be in use as an industrial facility. It is understood that this in use as the South Ashfield Brickworks during this period. Structures are present on the property, and a large excavation area, potentially containing water, located approximately 10-20 m from the site at its closest point. In the 1961 aerial photograph, the Sydney Water property is clearer and it is apparent that there were at least 10 structures on the property to the north, west and south of the reservoir. The surrounding area remained generally unchanged. In the 1970 aerial photograph, the number of structures on the property had reduced. The structures remaining on the property appear to be consistent with those currently viewed during the site walkover. The surrounding area remained generally unchanged. No significant changes to the property or the surrounding area were observed in the 1986 aerial photograph with the exception that backfilling of the brick works appears to have commenced. In the 1994 aerial photograph, the Sydney Water property remained the same. The brickworks to the west appeared to have been filled, levelled and grassed and was now parkland. No significant changes to the property or the surrounding area were observed in the current (2014) aerial photograph. Copies of the historical aerial photographs reviewed during the Stage 1 PSI are provided in Appendix E.

Search	Results
Council Section 149 certificate	A Section 149 certificate was reviewed for each of the three Lots (Lot 1 DP 115504, Lot 1 DP 711077 and Lot 1 DP 911478). The following apply to the Section 149 certificates. The Section 149 certificates indicated that the Sydney Water property is currently zoned as 'SP2 Infrastructure' under the City of Canterbury LEP. The 'SP2 Infrastructure' zoning exists to provide for infrastructure and related uses, and to prevent development that is not compatible with or that may detract from the provision of infrastructure. The development of roads is permitted without consent. Among the other conditions noted on the certificates were the following: ■ The Sydney Water property is located within the Ashbury Conservation Area and is subject to specific provisions in the environmental planning instrument and development control plan. The Ashfield Reservoir is listed as a State Significant Heritage Item. ■ Development on the property is not subject to flood related development controls ■ The property is not proclaimed to be a mine subsidence district. ■ The property is not subject to road widening or road realignment under the LEP. ■ The property is not subject to Council or other public authorities' policies relating to hazard risk restrictions for land for landslip, bushfire, acid sulfate soils and tidal inundation that may restrict development. ■ The property is not affected by an environmental planning instrument or proposed environmental planning instrument that provides for the acquisition of the land by a public authority. ■ A tree preservation order applies to the whole of the City of Canterbury ■ The property is subject to the council's adopted policy on contaminated land. The policy restricts development of land: ▸ which is affected by contamination ▸ which has been used for certain purposes, in respect of which there is not sufficient information about contamination ▸ which is proposed to be used for certain purposes ▸ in other circumstances contained in the policy. A copy of the Section 149 certificates provided by the City of Canterbury are included in Appendix F.
NSW WorkCover Dangerous Goods records	A dangerous goods licences search was conducted by NSW WorkCover involving a search of the stored chemical information database and microfiche records held by WorkCover. Historical licence information was provided for 1995 and 1996. The information provided indicates that petroleum was kept in cabinets in the southern portion of the building located in the western area of the site, and that a diesel shed was located to the south of this building (on the portion of land to be retained by Sydney Water). The licence application indicates that up to 200 L of fuel may have been stored on the Sydney Water property. The plan included in the WorkCover information indicates that the western area of the property featured multiple demountable buildings in 1995/1996 in addition to the permanent structures that remain on the property. A total of seven demountable amenities buildings were shown on the plan on the portion of the property comprising the site to be assessed. Copies of the NSW WorkCover Dangerous Goods search results are provided in Appendix G.
Environment Protection Authority (EPA) online notice records	Online searches of the NSW EPA *Protection of the Environment Operations Act 1997* public register (http://www.epa.nsw.gov.au/prpoeoapp/) and the NSW EPA contaminated land record database (http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx) indicated that no licences or notices were on record for the property or other properties in the vicinity of the property.

Search	Results
Sydney Water records	A review of a portfolio of information held by Sydney Water in relation to the site was undertaken on 20 April 2015. Relevant information is summarised below: ■ A review of environmental factors (Australian Water Technologies Pty Ltd (AWT), 1996) was on file. This had been prepared for proposed maintenance and refurbishment of the reservoir. The proposed activities were considered necessary to maintain the structural integrity of the reservoir, to protect the environment from contamination with red lead and to enable the reservoir to continue to operate. The report noted that breakdown of lead paint was apparent on the external surfaces of the reservoir and repair to the external render was proposed. ■ Historical title information was provided by Sydney Water and has been included as Appendix D. This information is discussed earlier in this table. ■ Two hazardous building materials register and asbestos management plan reports have been prepared for the Sydney Water property by Parsons Brinckerhoff. These relate to the water reservoir (2014) and the tunnel shaft (2015), both of which are located on the area of the site to be retained by Sydney Water. Lead-based paint was present on both structures, with asbestos containing material (ACM) also identified on the reservoir and bonded synthetic mineral fibres (SMF) also identified on the tunnel shaft. No hazardous building materials survey is known to have been undertaken of the buildings on the western portion of the site. According to the Sydney Water online list of heritage assets (http://www.sydneywater.com.au/SW/water-the-environment/what-we-re-doing/Heritage-search/index.htm) the reservoir was built between 1912 and 1914; filling of the site is presumed to have been undertaken prior to that time.

4.2 Previous environmental investigations

No previous environmental investigations are known to have been conducted at the site.

4.3 Summary of site history

The site has been owned by Sydney Water since 1909, with ownership prior to this time unknown. A review of historical aerial photography indicated that the Sydney Water property has been in use as a reservoir and associated depot since at least 1930, with the site having been filled and levelled prior to this time. Sydney Water records indicate that the reservoir was built between 1912 and 1914. Based on the proximity of the site to the South Ashfield Brickworks at this time (neighbouring the site to the west), it is considered possible that materials from the brickworks may have been used in filling the site.

Early aerial photographs indicated that there were a greater number of buildings on the Sydney Water property for part of the site's history, which is supported by information provided by NSW WorkCover. It is considered that buildings on the site may have been a combination of permanent structures (including those remaining at the site) and temporary demountable structures.

Historical licencing information held by NSW WorkCover indicated that petroleum and diesel may have been stored on the Sydney Water property in the mid-1990s in storage sheds in the central western area of the Sydney Water property (i.e. the south-western area of the site), with up to 200 L potentially being stored on-site at any time. Other information held on file by Sydney Water indicated that lead paint had been flaking from the external surface of the reservoir (located on the portion of the property to be retained by Sydney Water) prior to refurbishment works in the late 1990s.

Historical aerial photographs indicated that the surrounding area has remained primarily low density residential since at least 1930, although the property located immediately to the west and downgradient of the site was observed to be in use as the South Ashfield Brickworks from some time prior to 1930, before being redeveloped into Peace Park public recreation area at some time between 1986 and 1994.

Records held by the City of Canterbury and the NSW EPA do not indicate any evidence of contamination or contaminating activities at the site or in the vicinity of the site, including no records held for the South Ashfield Brickworks.

4.4 Preliminary conceptual site model

Based on the site inspection and the desktop review of site setting and historical land use information, a preliminary conceptual site model (CSM) was prepared. This is summarised in Table 4.2.

Table 4.2 Preliminary CSM

Likely on-site sources of impact	Likely sources of impact at the site include: ■ uncontrolled fill materials which would have historically been used to level the site (some time prior to 1912) ■ potential waste dumping at the site, including any potential waste from the demolition of former site structures ■ historical use of the site as a Sydney Water depot, including storage of equipment, fuel and vehicles ■ possible leaks/spills of oil/petrol from vehicle activity and storage on the site ■ potential asbestos containing materials (ACM) from imported materials, previously demolished site building/s, and weathering of existing site buildings ■ potential lead paint flaking from the reservoir structure prior to refurbishment ■ pesticides used historically and recently to maintain the site.
Potentially impacted media	Soil: Impacts from historical use of the site as a depot, contaminated fill or waste materials, storage of petroleum, storage and maintenance of vehicles, hazardous building materials, or from pesticides used on-site. Groundwater: Migration from soil impacts, although this is considered unlikely given the elevation of the site, and that groundwater is likely to be located within underlying bedrock. There is the potential for some discontinuous perched water to be present at shallower depths at the site.
Contaminants of concern	Contaminants of concern at the site comprise: ■ petroleum compounds including total recoverable hydrocarbons (TRH) and benzene, toluene, ethylbenzene and xylene (BTEX compounds) ■ polycyclic aromatic hydrocarbons (PAHs) ■ heavy metals (including lead) ■ organochlorine and organophosphate pesticides (OCPs/OPPs) ■ polychlorinated biphenyls (PCBs) ■ asbestos.
Migration pathways	Potential migration pathways include: ■ flaking of hazardous building materials (asbestos/lead) from structures onto the site surface ■ vertical migration of contaminants in soil from infiltration of rain water ■ migration of contaminants through underground service trenches ■ run-off of surface contaminants in rain water ■ volatilisation of hydrocarbon contamination ■ airborne migration of contamination in dust or vapour.

Potential exposure pathways	Potential exposure pathways include: ■ inhalation of dust or vapours by site users or nearby site users ■ ingestion or dermal contact with contaminated surface soils or near surface soils by current commercial/industrial, future residential site users or excavation/maintenance workers ■ ingestion or dermal contact with contaminated water downgradient of the site through extraction of groundwater via domestic bores or the use of downgradient surface water bodies for recreation (e.g. the Cooks River).
Potential sensitive receptors	Based on the site setting, sensitive receptors potentially include: ■ underlying soil and groundwater ■ current commercial/industrial users of the site ■ future residential users of the site ■ users of domestic bores in the vicinity of or downgradient of the site, although no registered bores were identified within a 500 m radius of the site ■ surface watercourses receiving groundwater from the site, possibly including surface water at Canterbury Racecourse and the Cooks River located 1.1 km and 1.3 km south-west of the site respectively ■ users of the neighbouring Peace Park recreation area ■ occupiers of residential properties surrounding and downgradient of the site ■ on-site and off-site construction or utility workers (those working within service pit trenches).

5. Data quality objectives

Systematic planning is critical to successful implementation of an environmental assessment and is used to define the type, quantity and quality of data needed to inform decisions. The United States Environmental Protection Agency (US EPA) has defined a process for establishing data quality objectives (DQOs) (US EPA, 2000a and 2000b), which has been referenced in the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM, as amended 2013).

DQOs ensure that:

- the study objectives are set
- appropriate types of data are collected (based on contemporary land use and chemicals of concern)
- the tolerance levels are set for potential decision making errors.

The DQO process is a seven-step iterative planning approach. The outputs of the DQO process are qualitative and quantitative statements which are developed in the first six steps. They define the purpose of the data collection effort, clarify what the data should represent to satisfy this purpose and specify the performance requirements for the quality of information to be obtained from the data. The output from the first six steps is then used in the seventh step to develop the data collection design that meets all performance criteria and other design requirements and constraints. The DQO process adopted for the Stage 2 DSI works is outlined in Table 5.1.

Table 5.1 DQO process

Step	Description	Outcomes
1	State the problem	Sydney Water plans to divest the site, with the potential for the site to be rezoned for low to medium density residential land use. The purpose of the Stage 2 DSI works is to determine the contamination status of soils beneath the site.
2	Identify the decisions/goal of the investigation	The decisions to be made based on the results of the investigation are as follows: ■ Has the soil been adequately sampled? ■ Were all the contaminants of concern analysed? ■ Is there sufficient data to prepare the Stage 2 DSI report? ■ Is there a risk to future users or occupiers of the site?
3	Identify the inputs to the decision	The inputs required to make the above decisions are as follows: ■ geological data ■ concentrations of contaminants of concern in soil ■ site assessment criteria for soil (outlined in Section 7) ■ observation data including presence of odours and discoloration of the soil ■ distribution of identified soil contamination.
4	Define the study boundaries/ constraints on data	The boundaries of the investigation have been identified as follows: ■ Spatial boundaries: the spatial boundary of the investigation area is defined as the geographical extent of the investigation area and the potential receptors of concern that need to be considered by the study. ■ Temporal boundaries: the date of the project inception (April 2015) to the completion of the fieldwork under the proposed investigation.

Step	Description	Outcomes
5	Develop a decision rule	The purpose of this step is to define the parameters of interest, specify the action levels and combine the outputs of the previous DQO steps into an 'if…then…' decision rule that defines the conditions that would cause the decision maker to choose alternative actions. The parameters of interest are concentrations of contaminants of concern (metals, pesticides, asbestos and hydrocarbons) in soil. An assessment of the concentrations of the contaminants of concern is to be undertaken to develop the DSI and the suitability for the current commercial/industrial and proposed future residential land use. Should concentrations exceed the adopted assessment criteria remedial options will be considered.
6	Specify limits on decision errors	The acceptable limits on decision errors to be applied in the investigation and the manner of addressing possible decision errors have been developed based on the data quality indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness and are presented in Table 5.2 and 5.3.
7	Optimise the design for obtaining data	The purpose of this step is to identify a resource-effective data collection design for generating data that satisfies the DQOs. This assessment has been designed considering the information and data obtained during the Stage 1 PSI and site inspection (Sections 3 to 4). The resource effective data collection design that is expected to satisfy the DQOs is described in detail in Section 6 (methodology). To ensure the design satisfies the DQOs, DQIs (for accuracy, comparability, completeness, precision and reproducibility) have been established to set acceptance limits on field methodologies and laboratory data collected.

DQIs for sampling techniques and laboratory analyses of collected soil samples define the acceptable level of error for this validation assessment. The adopted field methodologies and data obtained have been assessed by reference to DQIs as follows:

- precision: a quantitative measure of the variability (or reproducibility) of data
- accuracy: a quantitative measure of the closeness of reported data to the true value
- representativeness: the confidence (expressed qualitatively) that data are representative of each media present on the site
- comparability: a qualitative parameter expressing the confidence with which one data set can be compared with another
- completeness: a measure of the amount of useable data (expressed as a percentage) from a data collection activity.

A summary of the field and laboratory DQIs for the validation assessment are provided in Tables 5.2 and 5.3.

Table 5.2 DQIs for field techniques

DQI
Precision
Standard operating procedures (SOPs) appropriate and complied with
Collection of inter-laboratory and intra-laboratory duplicates
Accuracy
Parsons Brinckerhoff SOPs appropriate and complied with
Collection of field and trip blanks and trip spikes
Representativeness

Appropriate media sampled
Comparability
Same SOPs used on each occasion
Experienced sampler
Climatic conditions (temperature, rainfall, wind) considered
Same type of samples collected
Completeness
SOPs appropriate and complied with
All required samples collected

Table 5.3 DQIs for laboratory

DQI	Acceptable limits
Precision	
Analysis of laboratory duplicates for: ■ PAHs, TRH, BTEX and total metals in soil	<10% x PQL - ±30% RPD 4-10% x PQL - ±50-70% RPD <4% x PQL - ± 2 x PQL
■ PAHs, TRH, BTEX and total and dissolved metals in water	<10% x PQL - ±10-20% RPD 4-10% x PQL - ±25-40% RPD <4% x PQL - ± 2 x PQL
Analysis of laboratory prepared trip spikes (one per day per batch volatiles)	70-130%
National Association of Testing Authorities (NATA) certified laboratories	NATA accreditation for analyses performed
Accuracy	
Analysis of laboratory prepared trip blanks (one per batch)	Non-detect for contaminants analysed
Analysis of rinsate blanks (one per day)	Non-detect for contaminants analysed
Analysis of laboratory blanks	Non-detect for contaminants analysed
Analysis of laboratory matrix spikes, laboratory control samples and surrogate recoveries	70-130% inorganics/metals 60-140% organics 10-40% semi-volatile organic compounds
Analysis of laboratory duplicates for: ■ PAHs, TRH, BTEX and total metals in soil	<10% x PQL - ±30% RPD 4-10% x PQL - ±50 -70% RPD <4% x PQL - ± 2 x PQL
■ PAHs, TRH, BTEX and total and dissolved metals in water	<10% x PQL - ±10-20% RPD 4-10% x PQL - ±25-40% RPD <4% x PQL - ± 2 x PQL
Representativeness	

All required samples analysed	As per Section 6.2 of the SAQP (Parsons Brinckerhoff, 2015)
Comparability	
Sample analytical methods used (including clean-up)	As per NEPM (2013)
Same units	Justify/quantify if different
Same laboratories	Justify/quantify if different
Sample practical quantification limits (PQLs)	Less than nominated criteria
Completeness	
All critical samples analysed	As per Section 6.2 of the SAQP (Parsons Brinckerhoff, 2015)
All required analytes analysed	As per Section 6.2 of the SAQP (Parsons Brinckerhoff, 2015)
Appropriate methods and PQLs	As per NEPM (2013)
Sample documentation complete	
Sample holding times complied with	

6. Sampling and analysis program

6.1 Sampling rationale

Prior to undertaking the Stage 2 DSI works, an SAQP was prepared by Parsons Brinckerhoff to present the methodologies and protocols to be adopted to adequately characterise soil at the site.

A sampling plan comprising a combination of grid-based and targeted locations was adopted to sufficiently assess the site. For grid-spaced sampling, Table A in the NSW EPA 1995, *Sampling Design Guidelines* provides the recommended minimum number of sampling points required for site characterisation based on detecting circular hot spots. The guidelines indicate that a minimum of nine sampling points are recommended for a 3,000 m^2 site, which would allow for detection of a hot spot of 21.5 m diameter with 95% confidence. As the site covers a slightly larger area of approximately 3,270 m^2, a slightly higher density was adopted for grid-spaced investigation at the site (10 locations).

The proposed sampling plan comprised 10 grid-spaced sampling locations (TP01 to T10) and five additional targeted locations (TP11 to TP15), selected to assess areas of concern identified during the Stage 1 PSI. Table 6.1 details the investigations and the sampling rationale. The sample locations are shown on Figure 2.

Table 6.1 Sampling rationale

Location ID/s	Rationale
TP01-TP10	Grid-spaced locations providing general site coverage
TP11	Targeting fill materials in the northern area of the site in the vicinity of the small storage shed building
TP12	Targeting fill materials in the north-western area of the site, adjacent to Peace Park
TP13	Targeting the storage area in the central area of the site, and the historical site of demountable sheds
TP14	Targeting fill materials immediately to the east of the south-western building. NSW WorkCover records indicated that petroleum was stored within a shed in this building near to this test pit location
TP15	Targeting fill materials immediately to the south-west of the south-western building. NSW WorkCover records indicated that petroleum was stored within a shed in this building near to this test pit location

All 15 locations were proposed to be investigated via excavation of test pits to a maximum depth of 3.0 mBGL, or 0.5 m into natural underlying soil, whichever occurred first. This method was chosen to facilitate a thorough visual inspection of subsurface materials.

No groundwater assessment was proposed to be undertaken as part of the Stage 2 DSI. Based on the elevation of the site and the local topography, groundwater is considered likely to be present within the underlying bedrock at depths of greater than 3-4 mBGL. As such, the likelihood for groundwater contamination at the site is considered to be low. It was therefore considered appropriate to investigate soil contamination during the Stage 2 DSI, with the understanding that groundwater investigation may need to be considered at a later stage (either prior to or during any remediation works) should significant soil contamination be identified at the site.

6.2 Fieldwork

6.2.1 Preliminaries – service location

A desktop search for underground services using the 'Dial Before You Dig' service was undertaken prior to intrusive investigations. Sampling locations were cleared prior to the commencement of intrusive works by an experienced service locater. The service locater was provided with information/plans from the relevant asset owners and site-specific plans from Sydney Water. In addition, a toothless bucket was used to undertake 50 mm scrapes to a depth of 1.5 mBGL for all test pit locations prior to the use of a toothed bucket.

6.2.2 Intrusive investigation works and soil sampling

Following the clearing of locations, intrusive investigation works were undertaken at the site on 13 and 14 May 2015. An excavator equipped with a batter bucket and a toothed bucket was used to advance 15 test pits (TP01 to TP15) to a maximum depth of 3.0 mBGL under the supervision of a Parsons Brinckerhoff environmental scientist.

Soil samples were generally collected from the surface (0.0-0.2 mBGL), 0.5-0.6 mBGL, 1.0-1.1 mBGL, every metre thereafter, and where changes in lithology or evidence of contamination were observed. A duplicate sample was also collected in a zip lock bag and was screened with a photoionisation detector (PID) to analyse for volatile organic compounds (VOCs). The PID was calibrated at the beginning of the day of field works, using fresh air and 100 ppm isobutylene calibration standard. PID readings were used to aid in selecting soil samples for laboratory analysis.

Subsurface conditions were logged by an experienced environmental scientist. Soil samples were placed in 250 mL jars, leaving minimal headspace, and closed using Teflon-coated lids.

For collection of samples for asbestos analysis, the sampling methodology outlined in the WA DoH 2009, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* was adopted, as referenced by the NEPM (2013). For ACM and friable asbestos (FA) a 10 L sample was collected and screened manually on-site through a ≤7 mm sieve. Any ACM/FA retained on the sieve (i.e. >7 mm in size) was bagged and sent to the primary laboratory for analysis. For asbestos fines (AF) a separate sample of approximately 500 mL was collected in a bag. This entire sample was sent to the laboratory for sieving and gravimetric determination of asbestos (<7 mm).

Samples were stored on ice in an esky and transported to the laboratory under chain of custody.

Dedicated disposable nitrile gloves were worn for each sampling episode to minimise the potential for cross contamination. Sample containers were filled completely prior to being stored in an ice cooled esky and transported to the laboratory with the samples.

A hand held GPS was used to record the coordinates of each sampling location. In addition, a 'mud map' was prepared in the field showing measured distances to locations of site features (e.g. site boundaries, fences) and between locations.

6.3 Laboratory analysis

Selected soil samples collected were submitted to the primary analytical laboratory for analysis for contaminants of concern at the site. In accordance with the approved SAQP, soil samples were selected based on a combination of sample location and field observations, including PID results.

Primary samples and intra-laboratory samples were analysed by SGS Australia Pty Ltd (SGS), with inter-laboratory duplicate samples analysed by Australian Laboratory Services Pty Ltd (ALS). Both laboratories are accredited by NATA for the analytical suites requested, with the exception of asbestos quantification.

Table 6.2 provides a summary of the laboratory analytical schedule for soil samples for the Stage 2 DSI.

Table 6.2 Laboratory sampling and analysis plan - Soil

Analyte	Primary samples	Duplicates/ Triplicates	Field blank	Trip blank	Trip spike
TRH	18	2	2	1	-
BTEX compounds	18	2	2	1	1
PAHs	25	4	2	-	-
8 heavy metals	25	4	2	-	-
OCPs/OPPs	15	2	2	-	-
PCBs	15	2	2	-	-
Asbestos (quantitative)	17	-	-	-	-
pH	16	-	-	-	-
CEC	1	-	-	-	-
Clay content	1	-	-	-	-

TRH	Total recoverable hydrocarbons
BTEX compounds	Benzene, toluene, ethylbenzene and xylene
PAHs	Polycyclic aromatic hydrocarbons
8 heavy metals	Arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc
OCPs/OPPs	Organochlorine pesticides/organophosphate pesticides
PCBs	Polychlorinated biphenyls
CEC	Cation exchange capacity

Following receipt of results, additional samples were also analysed as follows:

- One additional sample collected from 1.0 mBGL at test pit location TP12 was analysed for lead to vertically delineate impacts reported at this location.
- Toxicity characteristic leachate procedure (TCLP) analysis was undertaken on two samples for lead, three samples for nickel and three samples for benzo(a)pyrene to facilitate in situ waste classification.

7. Soil assessment criteria

The assessment criteria for the investigation have been based on an analysis of land uses and potential receptors. Based on this, assessment criteria provided in the following guidelines have been identified as being applicable for assessing laboratory analytical data:

- NEPM (2013)
- Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) *Technical Report No. 10 Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, Part 2: Application Document* (Friebel & Nadebaum, 2011).

7.1 Health investigation levels and health screening levels

To assess the presence and extent of soil contamination at a site, the NSW EPA refers to the NEPM (2013) which provides health investigation levels (HILs) and health screening levels (HSLs) for the assessment of impacted soil.

HILs provide an assessment of potential risk to human health from chronic exposure to contaminants, and have been developed based on land use setting. As the purpose of this investigation is to assess the site against both the current and potential future land use to facilitate divestment, both the 'HIL A' criteria for low density residential land use with gardens/accessible soil and the 'HIL D' criteria for commercial/industrial land use have been adopted.

HSLs have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the vapour intrusion and inhalation pathway. The HSLs depend on specific soil physicochemical properties and land use scenarios. They apply to different soil types and depths. For the purpose of this investigation, both the 'HSL A' criteria for low density residential land use with gardens/accessible soil and the 'HSL D' criteria for commercial/industrial land use have been adopted.

HSLs have been adopted based on a subsurface comprising of clay. This soil type has been selected based on the results of clay content analysis undertaken on soils at the site and from observations of the soil profile. Analysis of a residual soil sample collected from 0.5-0.6 mBGL at location TP01 indicated that clay content was 89%. This sample was selected for analysis as it was considered to be representative of the residual clay materials encountered at the site.

HSLs are also provided for asbestos contamination in soil, for bonded ACM, FA and AF. As per the WA DoH (2009) guidelines, a 10 L sample is collected and screened manually on-site through a ≤7 mm sieve or spread out for inspection on a contrasting material for visual inspection. Any ACM/FA retained on the sieve (i.e. >7 mm in size) is then analysed in the laboratory for bonded ACM, with results quantified in per cent weight by weight (%w/w). For FA/AF a separate sample of approximately 500 mL is collected, sieved in the laboratory and gravimetric determination of asbestos (<7 mm) undertaken. The results are then compared to the NEPM HSLs. If the HSLs are not exceeded then no contamination management options are required provided the surface soil is free of visual asbestos. If results exceed the HSLs, further assessment, management and/or remediation is required.

The HSL for friable asbestos and asbestos fines (FA/AF) provided in the NEPM (2013) is 0.001% for all land use types. Current Australian methodologies for asbestos quantification, as outlined in Australian Standard AS4964 2004, *Method for Qualitative Identification of Asbestos in Bulk Samples*, indicate that the presence or absence of free (i.e. respirable) asbestos fibres can be determined with a PQL of 0.01%, an order of

magnitude greater than the HSL. It is noted that laboratories typically report with a PQL of 0.001% for FA/AF, however due to the limitations with the method adopted it is possible that free respirable asbestos fibre contamination exists in samples at concentrations up to an order of magnitude greater than the reported detection limit. In the absence of a methodology with a more appropriate PQL, it is considered appropriate to compare analytical results obtained against the HSL, taking into consideration the limitations inherent in the method.

The CRC CARE Technical Report No. 10 (Friebel & Nadebaum, 2011) provides HSLs for petroleum hydrocarbons specifically for vapour inhalation for intrusive maintenance workers in shallow trenches, and for direct contact. These have also been adopted.

The soil assessment criteria for this investigation is summarised in Table 7.1.

	HSL A (in clay)[1] (mg/kg)				HIL A[2] (mg/kg)	Direct contact[3] (mg/kg)	HSL D (in clay)[1] (mg/kg)				HIL D[2] (mg/kg)	Direct contact[3] (mg/kg)	HSLs (in clay)	
	0 to <1 m	1 to <2 m	2 to <4 m	4 m +			0 to <1 m	1 to <2 m	2 to <4 m	4 m +			0 to <2 m	2 to <4 m
TRH/BTEX compounds														
	-	-	-	-	-	4,400	-	-	-	-	-	26,000	NL	NL
1)	50	90	150	290	-	-	310	480	NL	NL	-	-	-	-
	-	-	-	-	-	3,300	-	-	-	-	-	20,000	NL	NL
alene	280	NL	NL	NL	-	-	NL	NL	NL	NL	-	-	-	-
	-	-	-	-	-	4,500	-	-	-	-	-	27,000	-	-
	-	-	-	-	-	6,300	-	-	-	-	-	38,000	-	-
	0.7	1	2	3	-	100	4	6	9	20	-	430	350	NL
	480	NL	NL	NL	-	14,000	NL	NL	NL	NL	-	99,000	NL	NL
	NL	NL	NL	NL	-	4,500	NL	NL	NL	NL	-	27,000	NL	NL
	110	310	NL	NL	-	12,000	NL	NL	NL	NL	-	81,000	NL	NL
PAHs														
	5	NL	NL	NL	-	1,400	NL	NL	NL	NL	-	11,000	NL	NL
	-	-	-	-	300	-	-	-	-	-	4,000	-	-	-
	-	-	-	-	3	-	-	-	-	-	40	-	-	-
OCPs/OPPs														
	-	-	-	-	10	-	-	-	-	-	80	-	-	-
	-	-	-	-	6	-	-	-	-	-	50	-	-	-
	-	-	-	-	6	-	-	-	-	-	45	-	-	-
	-	-	-	-	50	-	-	-	-	-	530	-	-	-
	-	-	-	-	270	-	-	-	-	-	2,000	-	-	-
	-	-	-	-	240	-	-	-	-	-	3,600	-	-	-
	-	-	-	-	10	-	-	-	-	-	100	-	-	-
	-	-	-	-	300	-	-	-	-	-	2,500	-	-	-
	-	-	-	-	160	-	-	-	-	-	2,000	-	-	-
PCBs														
	-	-	-	-	1	-	-	-	-	-	7	-	-	-

	0 to <1 m	1 to <2 m	2 to <4 m	4 m +	HIL A[2] (mg/kg)	Direct contact[3] (mg/kg)	0 to <1 m	1 to <2 m	2 to <4 m	4 m +	HIL D[2] (mg/kg)	Direct contact[3] (mg/kg)	0 to <2 m	2 to <4 m
Heavy metals														
	-	-	-	-	100	-	-	-	-	-	3,000	-	-	-
	-	-	-	-	20	-	-	-	-	-	900	-	-	-
	-	-	-	-	100[6]	-	-	-	-	-	3,600[6]	-	-	-
	-	-	-	-	6,000	-	-	-	-	-	240,000	-	-	-
	-	-	-	-	300	-	-	-	-	-	1,500	-	-	-
	-	-	-	-	40	-	-	-	-	-	730	-	-	-
	-	-	-	-	400	-	-	-	-	-	6,000	-	-	-
	-	-	-	-	7,400	-	-	-	-	-	400,000	-	-	-

Table 1A(3) Soil HSLs for vapour intrusion (mg/kg)
Table 1A(1) Health investigation levels for soil contaminants (mg/kg)
4 Soil HSLs for direct contact (mg/kg)
3 Soil HSLs for vapour intrusion (mg/kg)
uivalent quotient (TEQ), calculated as a sum of weighted selected PAHs. Further details available in NEPM (2013) Schedule B2
ed for total chromium as a conservative approach
ilable
m vapour concentrations being below the acceptable health risk level

7.2 Ecological screening levels and ecological investigation levels

The NEPM (2013) provides ecological screening levels (ESLs) for TRH, BTEX compounds and PAHs for use as an initial screening risk assessment to determine whether laboratory analysed concentrations of contaminants potentially pose a risk to plant growth. For the purpose of this investigation, ESLs for 'urban residential and public open space' and 'commercial and industrial' land uses with fine grained soil textures have been considered. These are outlined in Table 7.2.

Table 7.2 Soil assessment criteria - ESLs

Analyte	ESLs (mg/kg dry soil)	
	Urban residential and public open space	Commercial and industrial
TRH C_6-C_{10} minus BTEX (F1)	180	215
TRH >C_{10}-C_{16} minus naphthalene (F2)	120	170
TRH >C_{16}-C_{34} (F3)	1,300	2,500
TRH >C_{34}-C_{40} (F4)	5,600	6,600
Benzene	65	95
Toluene	105	135
Ethylbenzene	125	185
Xylene (Total)	45	95
Benzo(a)pyrene	0.7	1.4

The NEPM (2013) also provides ecological investigation levels (EILs), which were developed for metals, naphthalene and pesticides. The EILs take into consideration the physiochemical properties of soil and contaminants and the capacity of the local ecosystem to accommodate increases in the contaminant levels. The EILs are derived using the following equation:

$$EIL = added\ contaminant\ limit\ (ACL) + ambient\ background\ concentration\ (ABC)$$

The ABC is the background contaminant level and requires measurement at appropriate reference points at the site. The ACL, which is provided in the NEPM (2013), is the maximum contaminant concentration added to the naturally occurring background level, exceedances of which may result in adverse effects on plant health. EILs corresponding to urban residential land use were applicable for this investigation and are further discussed in Section 8.2.2.

8. Investigation results

8.1 Subsurface conditions

A summary of the subsurface profile encountered during intrusive works is presented in Table 8.1.

Table 8.1 General subsurface profile

Depth (mBGL)	General soil description
0.0 m generally to 0.2-0.7. m (fill extends up to 2.2m at TP15 in south-western corner of site)	Fill; Gravelly clay, grey, low to medium plasticity, subangular gravels. Bricks were encountered in fill material in TP09, TP11 and TP15.
0.2-0.7 m up to 1.5 m	Clay; Red/brown with increasing grey mottles with depth, medium plasticity, stiff.
0.7-2.2 m to maximum depth of investigation (3 m)	Weathered shale; Grey and orange/brown mottled, extremely weathered. Encountered at depths of 0.75-2.2 m in all locations, with the exception of TP02, TP03, TP06 and TP07. These test pits were excavated to maximum depths of 0.95-1.5 m and were terminated within residual clay materials and were not required to be excavated deeper into the underlying shale.

A significant increase in the depth of fill material was observed in test pits undertaken in the south-western portion of the site (TP09, TP14 and TP15). A medium grained sand fill material was observed at TP09 and TP15 below a depth of 0.6 to 0.9 m, which varied from the upper fill material observed at the majority of test pits (gravelly clay). Bricks, terracotta, concrete and metal were among the material observed to be present in this lower layer of fill. No potential ACM was observed in this lower fill layer.

Headspace analysis of VOCs was undertaken on all soil samples collected using a calibrated PID. PID readings reported were between 0.0 and 0.1 ppm, suggesting that soils were unlikely to contain significant concentrations of VOCs.

Potential ACM fragments were encountered at test pit location TP11 and TP14. A fragment from each test pit was collected and submitted to the laboratory for analysis for asbestos. The laboratory confirmed the presence of asbestos in each of the potential ACM fragments submitted for analysis.

No other ACM were observed at the site.

No perched water or groundwater was encountered during the investigation works to the maximum extent of the investigations undertaken (up to 3.0 mBGL).

Environmental test pit logs (including GPS coordinates and PID readings) are provided in Appendix H, and sampling locations are shown on Figure 2. A ‘mud map’ showing measured distances of sampling locations from site features and measurements between locations is provided as Figure 4.

8.2 Analytical results

Selected soil samples collected from test pits were analysed for contaminants of concern. Soil samples were selected based on a combination of sample location (to provide site coverage) and field observations (to target areas of potential concern).

The following sections provide a summary of the results of the soil investigation. More detailed summary tables of analytical results are provided in Tables A1 to A6 in Appendix A, and laboratory reports are provided in Appendix I.

8.2.1 HILs/HSLs

Table 8.2 provides a summary of the number of primary samples analysed, analytes tested for, minimum/maximum constituent concentrations, and samples that exceeded the adopted HILs and/or HSLs for the site.

Table 8.2 Summary of soil analytical results with respect to HILs/HSLs

No. of primary samples	Analyte	Conc. (mg/kg)		Samples exceeding adopted HILs/HSLs		
		Min.	Max.	Low density residential	Commercial/ industrial	Maintenance/ excavation workers
TRH/BTEX compounds						
18	TRH C_6-C_{10}	<25	<25	-	-	-
18	TRH C_6-C_{10} minus BTEX (F1)	<25	<25	-	-	-
18	TRH >C_{10}-C_{16}	<25	29	-	-	-
18	TRH >C_{10}-C_{16} minus naphthalene (F2)	<25	29	-	-	-
18	TRH >C_{16}-C_{34} (F3)	<90	640	-	-	-
18	TRH >C_{34}-C_{40} (F4)	<120	630	-	-	-
18	Benzene	<0.1	<0.1	-	-	-
18	Toluene	<0.1	<0.1	-	-	-
18	Ethylbenzene	<0.1	<0.1	-	-	-
18	Xylene (Total)	<0.3	<0.3	-	-	-
PAHs						
25	Naphthalene	<0.1	0.6	-	-	-
25	PAHs (Total)	<0.8	150	-	-	-
25	Benzo(a)pyrene TEQ	<0.2	10	4 samples (TP03_0_AS, TP09_1.0_AS, TP12_0.5_AS, TP14_0.5_AS)	-	-
OCPs/OPPs						

No. of primary samples	Analyte	Conc. (mg/kg)		Samples exceeding adopted HILs/HSLs		
		Min.	Max.	Low density residential	Commercial/ industrial	Maintenance/ excavation workers
15	HCB	<0.1	<0.1	-	-	-
15	Heptachlor	<0.1	<0.1	-	-	-
15	Aldrin & dieldrin	<0.3	<0.3	-	-	-
15	Chlordane	<0.1	<0.1	-	-	-
15	Endosulfan	<0.2	<0.2	-	-	-
15	DDE, DDD & DDT	<0.3	<0.3	-	-	-
15	Endrin	<0.2	<0.2	-	-	-
15	Methoxychlor	<0.1	<0.1	-	-	-
PCBs						
15	PCBs (Total)	<1	<1	-	-	-
Asbestos						
17	Bonded ACM	Non Detect	Detect	TP11 (0.0-0.1 mBGL) and TP14 (0.5-0.6 mBGL)		
17	Friable asbestos and asbestos fines	<0.001 % w/w	<0.001 % w/w	-		
Heavy metals						
25	Arsenic	<3	28	-	-	-
25	Cadmium	<0.3	1.1	-	-	-
25	Chromium	2.7	42	-	-	-
25	Copper	1.1	110	-	-	-
25	Lead	7	490	TP12 (0.5m BGL)	-	-
25	Mercury	<0.01	0.59	-	-	-

No. of primary samples	Analyte	Conc. (mg/kg)		Samples exceeding adopted HILs/HSLs		
		Min.	Max.	Low density residential	Commercial/ industrial	Maintenance/ excavation workers
25	Nickel	<0.5	130	-	-	-
25	Zinc	3.6	2400	-	-	-

8.2.2 EILs/ESLs

8.2.2.1 EIL concentrations

As discussed in Section 7.2, EIL concentrations are required to assess the potential ecological impacts of metals, pesticides and naphthalene contamination.

Tables 1B(4) and 1B(5) of the NEPM (2013) provide generic EILs for aged arsenic and lead, and fresh DDT and naphthalene in soils (irrespective of their physicochemical properties). Aged values are applicable for contamination present in soil for at least two years. EILs are provided for various land uses including 'areas of ecological significance', 'urban residential and open space' and 'commercial and industrial'. The 'urban residential and open space' and 'commercial and industrial' land use EILs have been considered for this investigation.

Site-specific EILs for chromium (III), copper, nickel and zinc have been calculated using the CSIRO Ecological Investigation Level Calculation Spreadsheet provided online in the ASC NEPM Toolbox (http://www.scew.gov.au/node/941). These calculations require an understanding of the cation exchange capacity (CEC), clay content and pH of the residual soil at the site.

A soil sample collected from 0.5-0.6 mBGL in location TP01 was analysed for CEC and clay content. Based on these analyses, the following values were used for calculations of EILs:

- a CEC of 12 cmolc/kg dwt
- clay content of 89 %
- pH of 5.5

To calculate aged ABCs, the spreadsheet requires the state and traffic volume to also be entered. These were entered as 'NSW' and 'high' respectively.

Table 8.3 outlines the EILs (generic and derived) for this investigation.

Table 8.3 Generic and calculated EIL concentrations

Analyte	NEPM (2013) EILs (mg/kg)	
	Urban residential and open public spaces	Commercial and industrial
Arsenic[1]	100	160
Chromium (III)[2]	830	1400
Copper[2]	160	220
DDT[1]	180	640
Lead[3]	1,100	1,800
Nickel[2]	190	330
Zinc[2]	390	540
Naphthalene[1]	170	370

(1) NEPM (2013) Schedule B1 Table 1B(5) Generic EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

(2) Calculated using the CSIRO Ecological Investigation Level Calculation Spreadsheet

(3) NEPM (2013) Schedule B1 Table 1B(4) Generic added contaminant limits for lead in soils irrespective of their physicochemical properties

8.2.2.2 Comparison of analytical results with ESLs/EILs

Table 8.4 summarises soil concentrations which exceeded the adopted ESLs/EILs for 'urban residential and open public spaces' and 'commercial and industrial' land use adopted for the site.

Table 8.4 Summary of soil ESL/EIL exceedances

Analyte	Samples exceeding adopted ESLs/EILs	
	Urban residential and open public spaces	Commercial and industrial
TRH/BTEX compounds		
TRH C_6-C_{10} minus BTEX (F1)	-	-
TRH >C_{10}-C_{16} minus naphthalene (F2)	-	-
TRH >C_{16}-C_{34} (F3)	-	-
TRH >C_{34}-C_{40} (F4)	-	-
Benzene	-	-
Toluene	-	-
Ethylbenzene	-	-
Xylene (Total)	-	-
PAHs		
Naphthalene	-	-
Benzo(a)pyrene	7 samples	4 samples
OCPs		
DDT	-	-
Heavy metals		
Arsenic	-	-
Chromium (III)	-	-
Copper	-	-
Lead	-	-
Nickel	-	-
Zinc	2 samples	-

9. QA/QC

9.1 DQIs for analytical data

The DQIs for sampling techniques and laboratory analyses of collected representative soil samples define the acceptable level of error required for this investigation. The DQOs have been assessed by reference to the attributes presented in Table 9.1.

Table 9.1 Data quality indicators

DQI	Description	Applicability
Representativeness	The confidence that the data are representative of each media present on the site. Expresses the degree to which sample data accurately and precisely represents a characteristic of a population or an environmental condition. Controlled through selecting sampling locations that exemplify site conditions and obtaining suitable samples.	Consistent and repeatable sampling techniques and methods were utilised.
Precision	The quantitative measure of the variability (or reproducibility) of data. Expressed as relative percentage differences (RPDs), assessed by determining the RPDs between the original and duplicate samples tested. Validity of the data is questioned if the RPD limits are exceeded and upon further investigation a reason cannot be determined.	Work was conducted in accordance with Parsons Brinckerhoff standard procedures. The precision of the data was assessed by calculating the RPDs of duplicate samples following AS 4482.1 (2005).
Accuracy	The quantitative measure of the closeness of reported data to the true values. Accuracy can be undermined by such factors as field contamination of samples, poor preservation or preparation techniques.	Accuracy was assessed by using equipment blanks and laboratory QA/QC analytical results (including laboratory control samples, spikes, and reference samples).
Completeness	The measure of the amount of usable data from a data collection activity. Valid chemical data are the values that have been identified as acceptable or validated.	The completeness goal was set at there being sufficient valid data generated during the study. Measurements made were judged to be valid measurements.
Comparability	The confidence that data may be considered to be equivalent for each sampling analytical event, i.e. the confidence with which one data set can be compared with another. Achieved through qualitative assessment of QA/QC procedures, using comparable field sampling, laboratory sample preparation and analytical procedures and reporting units.	The sampling was in general accordance with the sampling and analysis procedures and as per standard industry procedures. Each sample was analysed using identical methods for each analyte and laboratory practical quantitation limits (PQLs) were consistent over each laboratory batch. A check laboratory was used to provide data to make a comparative assessment of variability between laboratories.

Table 9.2 summarises conformance to specific QA/QC procedures.

Table 9.2 Data quality assurance

Item	Objectives met
Environmental consultant	The environmental consultant maintains quality assurance systems certified to AS/NZS ISO 9001:2000. Qualified and experienced environmental scientists with 2 to 5 years' experience completed field works.
Procedures	All work was conducted in accordance with relevant statutory work health and safety (WHS) and environmental sampling guidelines, as well as standard company WHS and environmental field procedures. Standard field sampling sheets were used. Details recorded included Parsons Brinckerhoff staff and contractors present, time on/off-site, weather conditions, calibration records and comments.
Sampling	Collection of samples was undertaken by appropriately qualified and experienced personnel following Parsons Brinckerhoff standard field procedures which are based on industry accepted standard practice. Chain of custody was used to ensure the integrity of samples from collection to receipt by the laboratory.
Field equipment	Equipment was serviced and calibrated as per the manufacturer requirements.
Equipment decontamination	Undertaken after each sampling episode where equipment used was not dedicated. Field blanks to be non-detect for the potential contaminants (one field blank per day). Field sampling procedures conformed to Parsons Brinckerhoff QA/QC protocols to prevent cross contamination, preserve sample integrity, and allow for collection of a suitable data set from which to make technically sound and justifiable decisions with data of satisfactory usability. QA/QC sample results are presented in in Appendix B.
Transportation	Samples were stored in chilled eskies on-site and during transport via courier to the laboratory. A chain of custody form was completed on-site and sent with the samples. The laboratory confirmed receipt of the samples and specified the condition on delivery and the scheduled analyses. Appropriate holding times were met. Trip blank samples were carried during field works (at a rate of one per sample batch) to assess contamination through field activities and transport. Results were below laboratory PQLs.
Field QA/QC	Two field blanks were collected during the soil field works. All blanks were analysed for TRH, BTEX compounds, PAHs, OCPs, OPPs, PCBs and heavy metals. All results were below PQLs. One trip blank sample was analysed for TRH, BTEX compounds and naphthalene. All results were below PQLs. One trip spike sample was analysed for BTEX compounds. Recovery results were reported between 85% and 100%. This was considered acceptable. QA/QC sampling was undertaken to industry standard procedures including approximately 1 in 20 blind duplicates (intra-laboratory) to the primary laboratory and approximately 1 in 20 blind duplicates (inter-laboratory) to the secondary laboratory. Field and laboratory acceptable limits are between 30-50% RPD as stated by AS 4482.1-1997. Non-compliances have been documented in Section 9.2 of this report.
Laboratory analysis	Analysis was carried out by laboratories with NATA certification for the required analyses with the exception of asbestos quantification. NATA has noted that there is no accepted valid method in Australia for this estimation and that they do not offer accreditation for this activity. Detection limits were sufficient to enable comparison against the appropriate guidelines. All PQLs adopted by the laboratories were less than the adopted assessment criteria. Although the primary laboratory has adopted a PQL of 0.001% for FA/AF, it is noted that there are limitations inherent in the adopted methodology. Although some forms of asbestos can be detected to this limit, due to the limitations there is the potential that free respirable asbestos fibre contamination exists within samples at concentrations up to an order of magnitude greater than the reported detection limit. In the absence of an alternative method with a more appropriate PQL, this methodology has been adopted and the limitations of the method noted.

Item	Objectives met
Acceptable limits for QA/QC samples	Primary laboratory QA/QC acceptance limits for recovery of surrogates, control samples are matrix spikes to be 70 to 130% for organics and 80 to 120% recovery for inorganics and waters. All method blanks to be less than PQL.
Reporting	Report generally complies with the NEPM (2013).

9.2 Field QA/QC

The following sections discuss the field QA/QC program. Summary tables of QA/QC results are provided as Tables B1 to B5 in Appendix B, and the results for internal and external QA/QC procedures are provided within the laboratory analysis reports in Appendix I.

9.2.1 Blind duplicates

9.2.1.1 Analytical program

The field QA/QC soil sampling program comprised collection and analysis of:

- one intra-laboratory duplicate (DUP1_AS) and one inter-laboratory duplicate (DUP1A_AS) of primary soil samples TP06_0.45_AS. analysed for PAHs, heavy metals, TRH, BTEX compounds, OCPs, OPPs and PCBs
- one intra-laboratory duplicate (DUP2_AS) and one inter-laboratory duplicate (DUP2A_AS) of primary soil samples TP07_0.05_AS analysed for PAHs and heavy metals.

No field duplicate analysis was undertaken for asbestos quantification. The purpose of collecting duplicate samples is to measure the potential for inaccuracy in sample results due to field or laboratory procedures. Analysis of anonymised duplicate samples by the primary and secondary laboratories serves to determine the degree to which sample analyses which should provide identical results do, in fact, provide them. The way this is measured is through the calculation of RPDs.

For contaminants which are discrete within the matrix being sampled, such as bonded asbestos, fibrous asbestos or asbestos fines in soil, the duplication of a particular sample does not logically support the objective of duplicate sampling. Chemical contaminants tend, through a variety of processes, to diffuse towards homogeneous concentrations. However, as asbestos contamination represents foreign bodies present in the soil which do not diffuse except through mechanical mixing there is no logical expectation of similar quantities in any two discrete samples, even two samples split from one larger one. Therefore, the results of the analyses of two such samples should not be expected to adhere to the same RPD criteria by which chemical contaminants are measured.

9.2.1.2 RPDs

RPDs were calculated for the primary and duplicate samples for assessment of the data quality, in particular for assessment of the reproducibility of the analytical data measurements or ‘precision’ given the adopted field and laboratory methods.

The RPDs were calculated using the formula below, and the results are presented in Tables B1 to B4 in Appendix B.

$$RPD\% = \frac{|Ro - Rd|}{|(Ro + Rd)/2|} \times 100\%$$

Where Ro is the primary sample and Rd is the primary duplicate.

The RPD values were compared to the 30–50% RPD acceptance criterion outlined in Australian Standard AS 4482.1 (for non- and semi-volatiles in soil) and NEPM (2013) Schedule B3. For volatile compounds no published RPD acceptance criteria exists, however RPDs of <100% are considered acceptable where concentrations are at least 10 times the PQL. RPDs for results less than the PQL were not calculated. In instances where results were greater than the PQL for the one sample, but below PQL for the corresponding primary or duplicate sample, a result equal to the PQL was adopted in order to calculate an RPD.

RPD exceedances were reported as follows:

- an exceedance for TRH >C_{34}-C_{40} fraction (132%) for primary sample TP06_0.45_AS and its corresponding inter-laboratory duplicate (DUP1A)
- an exceedance for chromium (74%) for primary sample TP07_0.05_AS and its corresponding intra-laboratory duplicate (DUP02_AS)
- an exceedance for chromium (73%) for primary sample TP07_0.05_AS and its corresponding inter-laboratory duplicate (DUP02A_AS).

The limited number of elevated RPDs are considered to be representative of variable concentrations of contaminants present in the fill materials observed at the site. The concentrations of chromium reported for the samples listed above are within the general range of concentrations reported in other soil materials collected from fill material at the site. The TRH concentration in the inter-laboratory sample was higher than other results for the site, although remains at least an order of magnitude below all adopted site criteria.

All other RPDs were considered to be acceptable.

9.2.2 Blanks/spikes

Two field blanks, one trip blank and one trip spike sample were also collected and analysed. All results for blank samples were below PQLs and results for the trip spikes were between 85% and 100%, considered to be acceptable.

Quality control parameter frequency compliance, provided by both laboratories, indicated that quality control analysis was undertaken within the required frequency and matrix spike recoveries were reported to be within recovery limits.

9.3 Summary of QA/QC results

Parsons Brinckerhoff considers that the sample collection, documentation, handling, storage and transportation procedures utilised are of an acceptable standard and the analytical results provided by the laboratories are deemed reliable and complete, therefore the data are considered fit for purpose.

It is considered that the QA/QC procedures and results were acceptable and that the conclusions of the report have not been significantly affected by the sampling or analytical procedures. Based on the results of laboratory QA/QC samples and the sampling and handling procedures used for the collection and analysis of soil, the data were considered representative and appropriate for use in this assessment.

10. Discussion of results

10.1 HIL/HSL exceedances

All results for BTEX compounds, OCPs, OPPs and PCBs in soil were below the laboratory PQLs, and therefore were below the adopted human health criteria for the site.

Minor concentrations of TRH C_{10}-C_{16}, TRH C_{16}-C_{34} and TRH C_{34}-C_{40} fraction were detected in the majority of test pits, however the concentrations were generally an order of magnitude lower than the guidelines adopted. No odours or visible staining was observed during test pitting location.

Total PAH concentrations were below the adopted HILs; however calculated benzo(a)pyrene TEQ (limit of reporting equals zero calculation method) concentrations exceeded HIL A (low density residential) in four soil samples collected. The samples were collected from TP03, TP09, TP12 and TP14 at depths ranging from the surface (0-0.1 mBGL) to 1.0 mBGL. Naphthalene concentrations were below or marginally above detection limits for all samples and therefore below the adopted HSLs.

Concentrations of each of the heavy metals assessed were reported in the majority of the soil samples analysed, however these were generally consistent between locations and in most cases are considered to be representative of background heavy metal concentrations. All heavy metal results were below the adopted HILs for low density residential land use and public open space and commercial/industrial use with the exception of the lead concentration (490 mg/kg) reported for the sample collected from TP12 at a depth of 0.5 mBGL which exceeded the HIL for low density residential land use and public open space. A sample collected from the surface of TP12 reported a significantly lower lead concentration (64 mg/kg). The sample collected from TP12 at 0.5 mBGL also reported an elevated zinc concentration (2,400 mg/kg), however it was below the adopted HILs.

ACM in the form of cement sheeting fragments were observed at two locations on the site. Two cement sheeting fragments (TP11_0_AS_FRAG and TP14_FC_FRAG Sieve) were sent to the laboratory for testing with the laboratory confirming that asbestos was present in both fragments.

Asbestos quantification was undertaken on 17 soil samples. The samples collected from TP11 at 0-0.1 mBGL and TP14 from 0.5-0.6 m contained bonded ACM in the form of cement sheeting fragments (>7mm). To determine the bonded ACM concentrations in soil a soil density (clay 1.5 kg/L) and asbestos by weight in cement bonded ACM (15%) were applied. The weight of the bonded ACM from TP11 and TP14 was reported by the laboratory as 10.70 and 4.40 g, respectively. The calculated concentration of bonded ACM for the sample collected from TP11 was above the adopted health screening levels for low density residential (0.01 %w/w) but below commercial/industrial (0.05 %w/w). The calculated concentration of bonded ACM for the sample collected from TP14 was below the adopted health screening level for low density residential and commercial/industrial. The calculations are shown in Table 10.1 below.

Table 10.1 Bonded ACM concentration in soil calculations

Location	Depth (m)	Weight of 10 L soil (sandy soil 1.5 kg/L)	Weight bonded ACM cement sheeting (g)	Weight of asbestos (15% of cement ACM, g)	Bonded ACM (%w/w)
TP11	0.0-0.1	15 kg	10.70	1.605	0.0107
TP14	0.5-0.6	15 kg	4.40	0.660	0.0044

Of the 17 soil samples submitted to the laboratory for quantification of asbestos fines and fibrous asbestos (AF/FA), all samples were below detection. The adopted criterion of no asbestos material present for surface

soils has not been met given that ACM in the form of cement sheeting fragments identified at TP11 (0-0.1m). Table 10.2 below summaries the asbestos detections and Figure 3 shows the location of the detections.

Table 10.2 Asbestos Detections Table

Location	Sample ID	Description
TP11	TP11_0_AS_FRAG	Amosite, chrysotile and crocidolite asbestos detected (40×40×3mm), collected in 10 L sample
TP14	TP14_FC_FRAG Sieve	Chrysotile asbestos detected (55×40×3mm), collected in 10 L sample

10.2 ESL/EIL exceedances

Two reported concentrations of zinc exceeded the adopted EILs, at TP11 (0-0.1 mBGL) and TP12 (0.5-0.6 mBGL). The zinc concentration at TP11 (400 mg/kg) marginally exceeds the residential EIL but is well below the commercial/industrial EIL. The zinc concentration at TP14 (2,400 mg/kg) exceeds the residential EIL but is well below the commercial/industrial EIL. These concentrations are above the general range of zinc concentration reported for other samples analysed at the site, in particular for the sample collected from TP12 at 0.5-0.6 mBGL. The zinc exceedances are considered to be limited in nature and therefore are not considered to pose a significant risk to on-site ecological receptors. The distribution of these concentrations is shown on Figure 3.

The adopted benzo(a)pyrene ESL for urban residential land use was exceeded in seven samples collected, from TP01, TP03, TP09, TP12, TP13 and TP14 at depths ranging from the surface to 1 mBGL. The adopted benzo(a)pyrene ESL for commercial/industrial land use was exceeding in four samples collected from TP03, TP09, TP12 and TP14 at depths ranging from the surface to 1 mBGL. Given the calculated benzo(a)pyrene TEQ concentrations exceeded HIL A (low density residential) in four soil samples it is recommended that any further assessment and/or remediation of benzo(a)pyrene undertaken on-site includes further assessment of the risk posed to the on-site ecological receptors from benzo(a)pyrene concentrations, particularly prior to divestment for residential use.

10.3 In situ waste classification

The results of the laboratory analyses were also compared to the contaminant threshold values for classifying waste by chemical assessment without the leaching test as detailed in Table 1 of the NSW EPA (2014) *Waste Classification Guidelines Part 1: Classifying Waste*. The following results exceeded the criteria for general solid waste:

- benzo(a)pyrene concentrations at TP01 (0.05 mBGL), TP03 (0-0.1 mBGL), TP09 (1.0-1.1 mBGL), TP12 (0.5-0.6 mBGL), TP13 (0.05 mBGL and small stockpile of road base and bitumen material above TP13) and TP14 (0.5-0.6 mBGL)
- lead concentrations at TP01 (0.05 mBGL), TP02 (0.5-0.6 mBGL), TP03 (0-0.1 mBGL), TP04 (0.05 mBGL), TP11 (0-0.1 mBGL), TP12 (0.5-0.6 mBGL) and TP15 (2.0 mBGL)
- nickel concentrations at TP01 (0.05 mBGL), TP04 (0.05 mBGL), TP08 (0.05 mBGL), TP09 (0.5-0.6 mBGL), TP10 (0.5-0.6 mBGL), TP12 (0.05 mBGL) and TP15 (0.5-0.6 mBGL).

A selection of the samples listed above (three for benzo(a)pyrene, two for lead and three for nickel) were subsequently submitted to the laboratory for analysis using the toxicity characteristic leaching procedure (TCLP) to confirm whether these elevated concentrations were considered to be leachable. Generally the sample with the highest concentration was selected to undergo TCLP analysis and other samples were selected to provide assessment across the soil profile. The results were then compared to Table 2 of the

NSW EPA (2014) guidelines for classifying waste with the TCLP test. All results were below the criteria for general solid waste, however it is noted that asbestos in the form of cement sheeting fragments has been detected at TP11 and TP14. Based on this, the fill material at the site is considered to be classified as special waste (to be managed as asbestos) as well as general solid waste, for off-site disposal to an appropriately licensed waste facility.

Although the soil profile encountered at the site was found to be generally consistent, it is noted that this in situ waste classification is based on samples collected from discrete test pit locations, and did not involve visual observation of stockpiled materials. It is recommended that materials are excavated, stockpiled, and sampled ex situ to confirm waste classification prior to disposing of materials to an off-site waste facility.

Summary tables of results in comparison to waste classification criteria are provided as Tables A61 to A10 in Appendix A.

10.4 Updated CSM

Table 10.1 provides an updated CSM, which has been revised based on the findings of the combined Stage 1 and 2 DSI work.

Table 10.3 Updated CSM

Sources of on-site impact	Likely sources of impact at the site include: ■ uncontrolled fill materials which would have historically been used to level the site (some time prior to 1912) ■ potential waste dumping at the site, including any potential waste from the demolition of former site structures ■ historical use of the site as a Sydney Water depot, including storage of equipment, fuel and vehicles ■ possible leaks/spills of oil/petrol from vehicle activity and storage on the site ■ potential asbestos containing materials (ACM) from imported materials, previously demolished site building/s, and weathering of existing site buildings ■ potential lead paint flaking from the reservoir structure prior to refurbishment
Impacted media	Soil: Impacts from historical use of the site as a depot, contaminated fill or waste materials, storage of petroleum, storage and maintenance of vehicles or hazardous building materials. Groundwater: Migration from soil impacts, although this is considered unlikely given laboratory results for concentration and leachability of soil samples collected from the site, the elevation of the site and the fact that groundwater is likely to be located within underlying bedrock.
Contaminants of concern	Contaminants of concern at the site comprise: ■ petroleum compounds including TRH and BTEX compounds ■ PAHs ■ heavy metals (including lead) ■ pesticides ■ PCBs ■ asbestos. Based on the soil laboratory results the revised contaminant of concerns for the site are considered to be: ■ TRH ■ PAHs ■ heavy metals ■ asbestos.

Migration pathways	Potential migration pathways include: ■ flaking of hazardous building materials (asbestos/lead) from structures onto the site surface ■ vertical migration of contaminants in soil from infiltration of rain water ■ migration of contaminants through underground service trenches ■ run-off of surface contaminants in rain water ■ volatilisation of hydrocarbon contamination ■ airborne migration of contamination in dust or vapour.
Potential exposure pathways	Potential exposure pathways include: ■ inhalation of dust or vapours by site users or nearby site users ■ ingestion or dermal contact with contaminated surface soils or near surface soils by current commercial/industrial, future residential site users or excavation/maintenance workers.
Potential sensitive receptors	Based on the site setting and laboratory results, sensitive receptors potentially include: ■ underlying soil and groundwater ■ future residential users of the site ■ users of domestic bores in the vicinity of or downgradient of the site, although no registered bores were identified within a 500 m radius of the site ■ surface watercourses receiving groundwater from the site, possibly including surface water at Canterbury Racecourse and the Cooks River located 1.1 km and 1.3 km south-west of the site, respectively ■ users of the neighbouring Peace Park recreation area ■ occupiers of residential properties surrounding and downgradient of the site ■ on-site and off-site construction or utility workers (those working within service pit trenches).
Data gaps	The volume of affected fill material has been estimated based on this assessment but may be refined following further work. No assessment was undertaken beneath the on-site buildings. The effect of the South Ashfield Brickworks and its potential impacts to the local environment is not known.

11. Conclusions

The Stage 2 DSI works were undertaken to assess the current contamination status of the site, and potential risks associated with this contamination with respect to the current commercial/industrial land use and the proposed future land use (potentially to be re-zoned for low to medium density residential land use).

The results of the investigation indicated that:

- Concentrations of BTEX compounds, OCPs, OPPs and PCBs in soil were below the laboratory PQLs, and therefore were below the adopted human health criteria for the site.
- Concentrations of TRH were below the laboratory PQLs or marginally above, with all concentrations well below the adopted HSLs (residential land use, commercial/industrial and direct contact). No odours or visible staining was observed in these locations.
- Total PAH concentrations were below the adopted HILs; however calculated benzo(a)pyrene TEQ (limit of reporting equals zero calculation method) concentrations exceeded HIL A (low density residential) in four soil samples collected. The samples were collected from TP03, TP09, TP12 and TP14 at depths ranging from the surface (0-0.1 mBGL) to 1.0 mBGL. Naphthalene concentrations were below or marginally above detection limits for all samples and therefore below the adopted HSLs.
- Heavy metal results were below the adopted HILs for low density residential land use and commercial/industrial use with the exception of the lead concentration (490 mg/kg) reported for the sample collected from TP12 at a depth of 0.5 mBGL which exceeded the HIL for low density residential land use. Samples collected from the surface of TP12 and at 1.0 mBGL reported significantly lower lead concentrations of 64 mg/kg and 14 mg/kg respectively.
- Zinc exceeded the adopted EILs at TP11 (0-0.1 mBGL) and TP12 (0.5-0.6 mBGL). The zinc concentration at TP11 (400 mg/kg) marginally exceeds the residential EIL but is well below the commercial/industrial EIL. The zinc concentration at TP14 (2,400 mg/kg) exceeds the residential EIL but is well below the commercial/industrial EIL. These concentrations are above the general range of zinc concentration reported for other samples analysed at the site, in particular for the sample collected from TP12 at 0.5-0.6 mBGL. The zinc exceedances are considered to be limited in nature and therefore are not considered to pose a significant risk to on-site ecological receptors.
- Benzo(a)pyrene exceeded the adopted ESL for urban residential land use in seven samples collected, from TP01, TP03, TP09, TP12, TP13 and TP14 at depths ranging from the surface to 1 mBGL. The adopted benzo(a)pyrene ESL for commercial/industrial land use was exceeding in four samples collected from TP03, TP09, TP12 and TP14 at depths ranging from the surface to 1 mBGL. It is recommended that any further assessment and/or remediation of benzo(a)pyrene undertaken on-site (given the benzo(a)pyrene TEQ exceeding HIL A) includes further assessment of the risk posed to the on-site ecological receptors from benzo(a)pyrene concentrations, particularly prior to potential divestment for residential use.
- ACM in the form of cement sheeting fragments were observed at two locations on the site (at 0-0.1 mBGL in TP11 and 0.5-0.6 mBGL in TP14). Fragments collected from these locations (TP11_0_AS_FRAG and TP14_FC_FRAG Sieve) were sent to the laboratory for testing, with the laboratory confirming that asbestos was present in both fragments. The calculated concentration of bonded ACM for the sample collected from TP11 (0.0107%w/w) was above the adopted health screening levels for low density residential (0.01 %w/w) but below commercial/industrial (0.05 %w/w). The calculated concentration of bonded ACM for the sample collected from TP14 was below the adopted health screening level for low density residential and commercial/industrial. In addition, the adopted criterion of no asbestos material present for surface soils has not been met given that ACM in the form of a cement sheeting fragment was identified at TP11 (0-0.1 m). Asbestos quantification was also undertaken on 17 soil samples, with all concentrations below detection.

- An in situ waste classification was undertaken based on the laboratory results of soil samples collected from the site. The fill material at the site is considered to be classified as special waste (to be managed as asbestos) and general solid waste, for off-site disposal to an appropriately licensed waste facility. It is recommended that materials are excavated, stockpiled, and sampled ex situ to confirm waste classification prior to disposing of materials to an off-site waste facility.
- No perched water or groundwater was encountered during the works to the maximum depth of investigation (up to 3.0 mBGL). Soil data obtained from the site did not indicate any widespread leachable contamination which may have potentially caused an impact to underlying groundwater.

The site meets the adopted screening/investigations levels for the current land use (commercial/industrial) with the exception of asbestos in the form of a fragment of bonded ACM cement sheeting in surface soils at TP11 (0-0.1m BGL). Appropriate management and removal of the asbestos impact on-site is recommended to meet the criteria for the current site use.

The volume of material impacted by asbestos is estimated to be approximately 1,625 m^3. The estimated volume is based on the assumption that the asbestos impact is confined to the upper fill material across the entire site area (described as gravelly clay), comprising an area of approximately 2,708 m^2. This fill layer generally ranges between 0.2 to 0.5 mBGL in the north-eastern portion of the site but extends up to 0.95 mBGL in the south-western portion of the site. Fill material was recorded to extend up to 2.1 mBGL at TP09 and TP15, however the deeper fill material in this area has a different composition (sand) and no asbestos has been observed in this fill material. The assumptions above would need to be confirmed via observations and validation sampling during the remedial works. Based on these assumptions, the above volume has been calculated based on an estimated average depth of fill materials requiring excavation of 0.6 m. Should asbestos impacted be observed in the underlying sandy fill materials, further assessment may be required to determine the extent of the impacts and the works could result in removal of all fill materials from the site (as a worst case scenario). Fill thicknesses at the site were found to vary from 0.2 to 2.2 m and it was calculated that the total volume of fill material at the site was approximately 1,900 m^3.

Benzo(a)pyrene TEQs in four samples, lead in one sample and asbestos reported in surface soils at TP11 exceeded the relevant adopted screening/investigations levels for low to medium density residential. Seven benzo(a)pyrene concentrations exceeded the adopted ESL for urban residential land use. Appropriate management and removal of the asbestos, lead and PAH impact on-site is recommended to meet the criteria for potential future use as low to medium density residential, if the site is divested. Some deeper excavation would be required around investigation location TP09 as benzo(a)pyrene impacts were reported within the underlying sandy fill materials. Based on a surface area of approximately 50 m^2 and an additional depth of 1 m, the volume of soil in excess of the asbestos-impacted soil which is estimated to be affected by PAHs is considered to comprise approximately 50 m^3.

Aboveground structures and materials stored on-site (in sheds and storage areas) were not assessed as part of this DSI. These may require assessment for hazardous materials and/or other potential contaminants and potentially removal prior to potential divestment of the site.

12. Limitations

1. This Report has been prepared by Parsons Brinckerhoff Australia Pty Limited ("*Parsons Brinckerhoff")* for the benefit of Sydney Water Corporation ("*Sydney Water"*), the registered proprietor of the site requested to be investigated by Parsons Brinckerhoff ("Site") under its agreement with Sydney Water dated 20 April 2011 ("Agreement").

2. The nature and extent of the contamination assessment of the Site detailed in the Report reflects the scope of the Services set out in the Specification in the Agreement.

3. A potential purchaser (but not including a purchaser's successor in title) of the Site may rely on the findings contained in the Report for the purpose of assessing the level of contamination of that Site ("Permitted Purpose").

4. The findings contained in the Report are subject to the qualifications, assumptions and limitations set out in the Report or otherwise communicated to, or, by Sydney Water. To the extent of any inconsistency between this Limitation Statement and the qualifications, assumptions and limitations in the Report, this Limitation Statement shall prevail.

5. The Report may contain information provided by others. Except as otherwise stated in the Report, Parsons Brinckerhoff has not verified the accuracy or completeness of this information. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the Report ("Conclusions") are based in whole or in part on this information, those Conclusions are contingent upon the accuracy and completeness of that information. Parsons Brinckerhoff accepts no responsibility for the reliability, accuracy, completeness or adequacy of information provided by others.

6. Parsons Brinckerhoff has prepared the Report without regard to any special or particular interest of any person (including that of a potential purchaser), other than Sydney Water when undertaking the Services or setting out its findings in the Report.

7. Matters material to a potential purchaser, may have been omitted from the Report, or may not have bene investigated because of the scope of the Services. It follows that a potential purchaser may rely only on what is expressed in the Report, including any restrictions set out in the Report.

8. The Report can only be relied upon for the Permitted Purpose and may not be relied upon for any other purpose and does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the Site.

9. The Report has not and will not be updated for events occurring after the date of the Report or any other matter which may have a material effect on its contents which come to light after the date of the Report. Parsons Brinckerhoff will not be obliged to inform a potential purchaser of any matter arising or coming to its attention after the date of the Report, which may affect or qualify the Report.

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    a. its own actual knowledge and inquiries;
    b. inquiries made by its advisers; or
    c. matters which a potential purchaser should have been aware of by making reasonable inquiry.

11. To the fullest extent permitted at law, Parsons Brinckerhoff, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable to any potential purchaser for, or in relation to, any losses, damages or expresses (including any indirect, consequential or punitive losses or damages or any amounts for loss of income or profit, revenue or loss of opportunity to earn profit) of any kind (arising in contract, tort (including negligence or otherwise), suffered or incurred by a potential purchaser (or any other third party) arising out of or in connection with any matter outside the ambit of the Permitted Purpose in relation to the Report or findings expressed in the Report.

13. References

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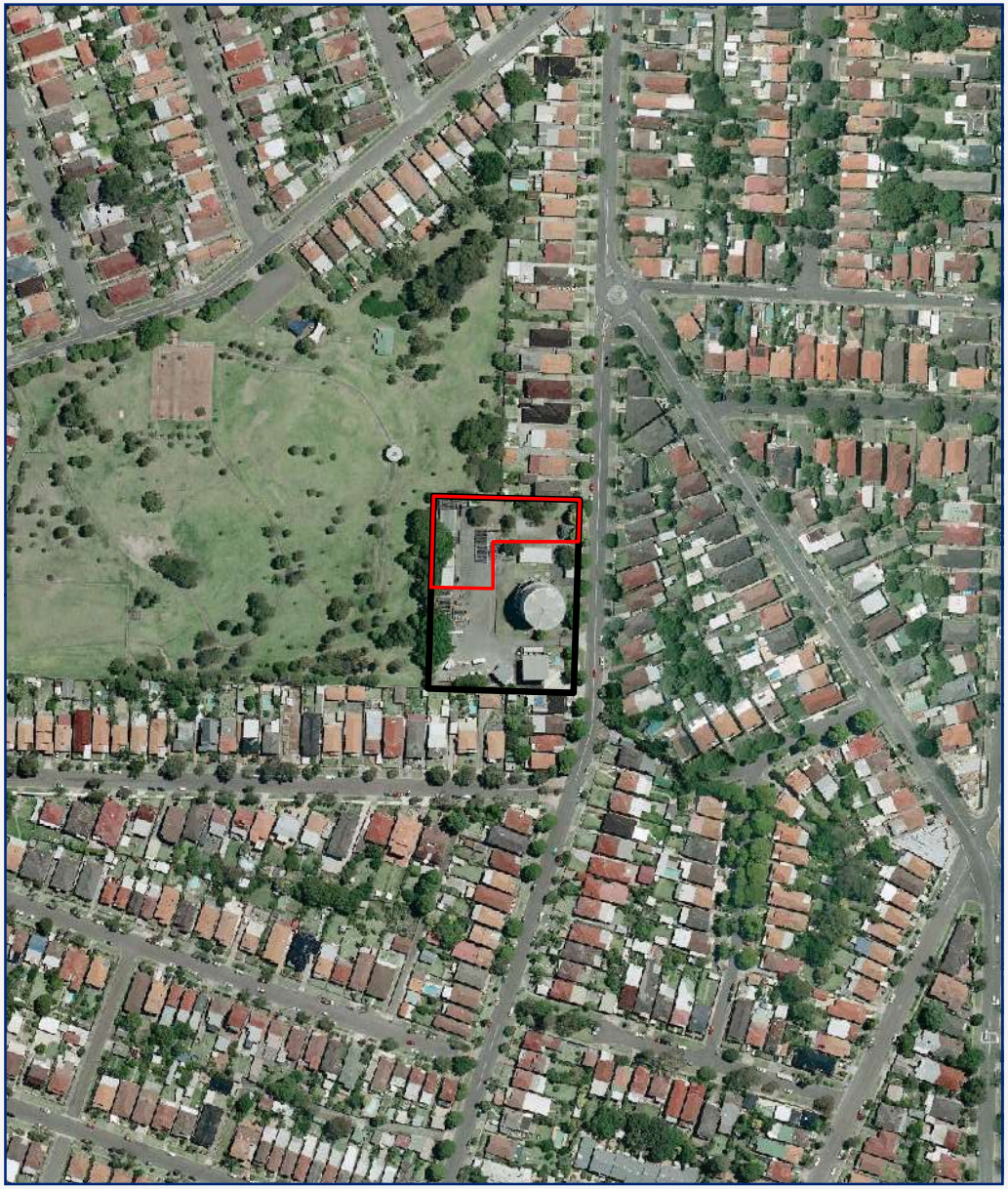
Figures



Site extent

Sydney Water property

0 100

Metres

Figure 1 Site location plan
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW

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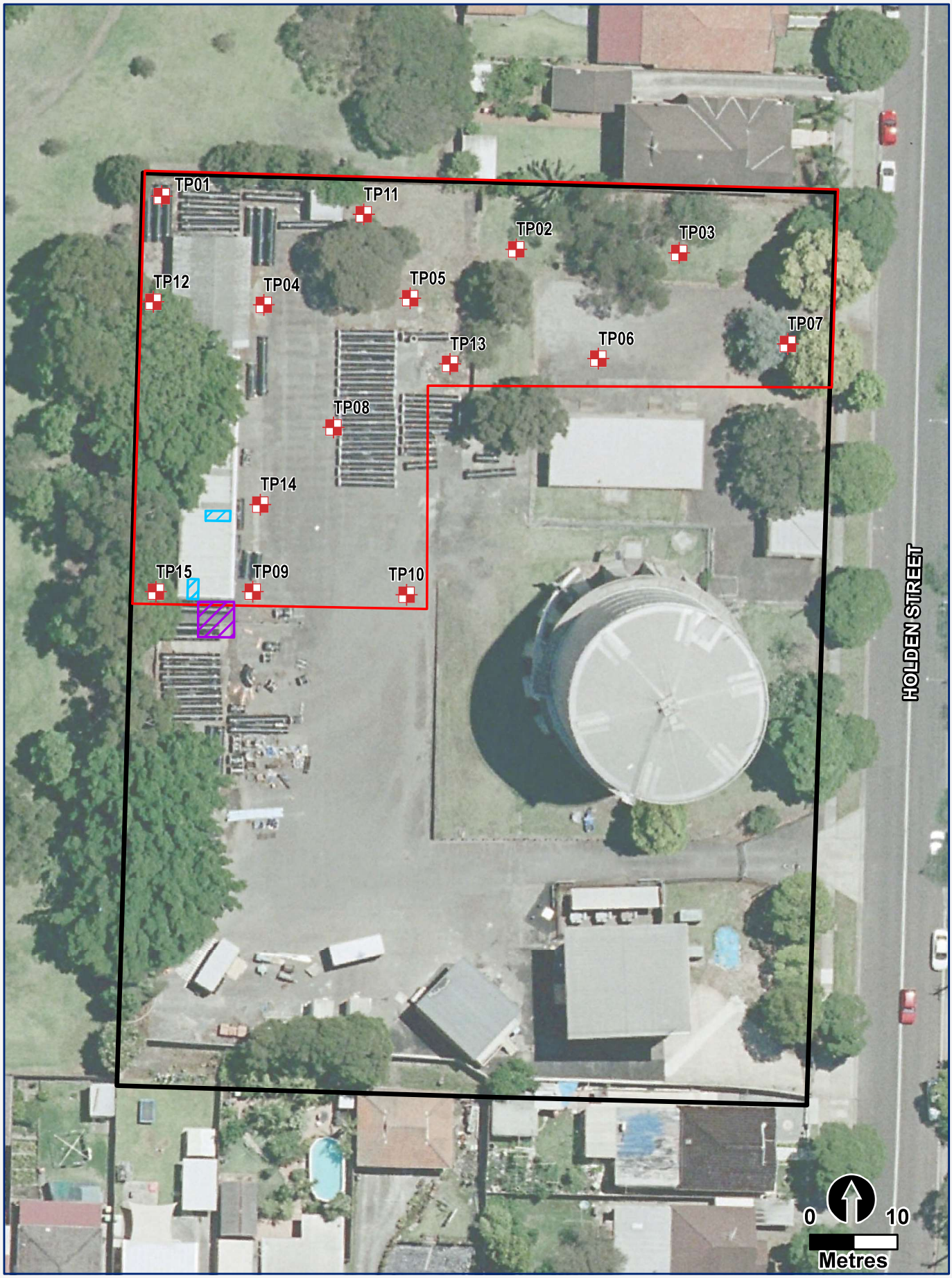

Site extent
Sydney Water property
Approximate former location of petroleum storage in cabinets
Approximate former location of diesel shed
Test pit locations

Figure 2 Sampling location plan
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW

Aerial source: ©SKM2010 (GoogleEarth)

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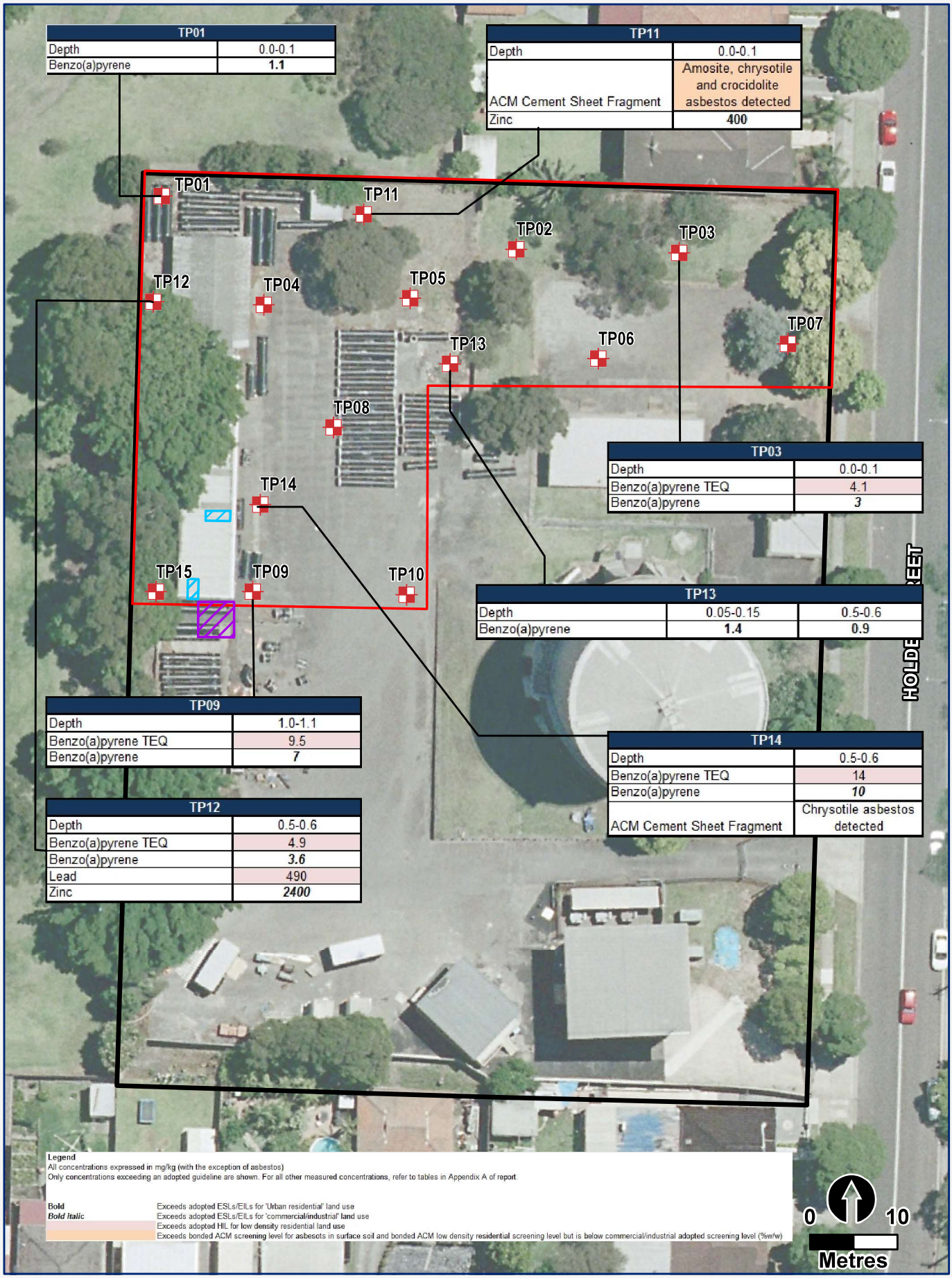
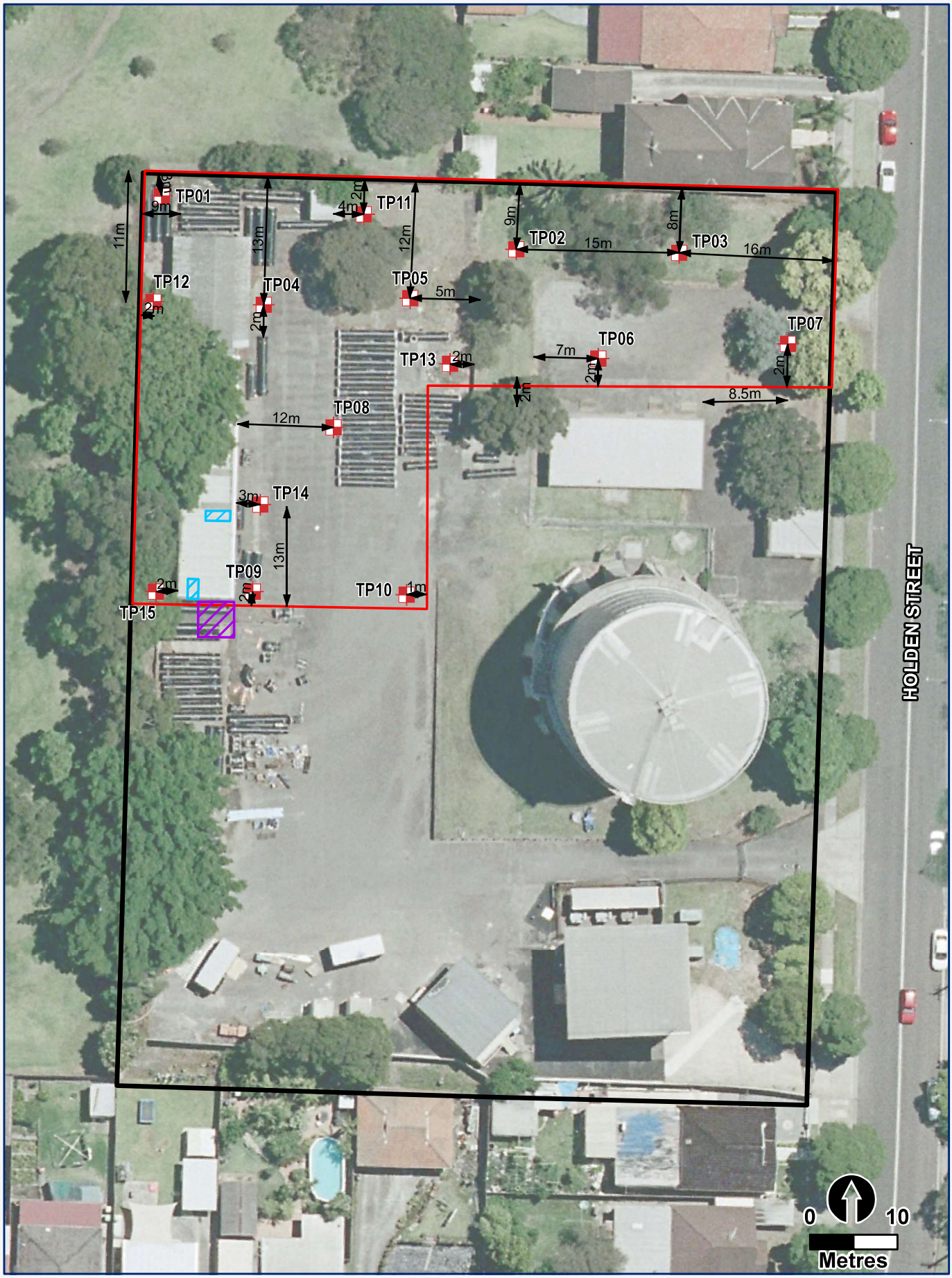


Site extent
Sydney Water property
Approximate former location of petroleum storage in cabinets
Approximate former location of diesel shed
Test pit locations

Figure 3 Soil Exceedances
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW



Site extent
Sydney Water property
Approximate former location of petroleum storage in cabinets
Approximate former location of diesel shed
Test pit locations

Figure 4 Mudmap
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW

Aerial source: ©SKM2010 (GoogleEarth)

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Appendix A

Analytical results tables

Table A1
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Soil analytical results - TRH/BTEXN compounds

	TRH						BTEX						
	>C6-C10	>C10-C16	>C16-C34	>C34-C40	C6-C10 less BTEX (F1)	>C10-C16- Naphthalene (F2)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	10	25	90	100	10		0.1	0.1	0.1	0.2	0.1	0.3	0.2
Health-based investigation levels - Residential A[1]	-	-	-	-	-	-	-	-	-	-	-	-	-
Health-based investigation levels - Commercial Industrial D[1]	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL A - 0 m to <1 m (in clay) [2]	-	-	-	-	50	280	0.7	480	NL	-	-	110	-
HSL A - 1 m to <2 m (in clay) [2]	-	-	-	-	90	NL	1	NL	NL	-	-	310	-
Soil HSLs for direct contact - HSL A[4]	4,400	3,300	4,500	6,300	-	-	1,000	1,400	4,500	-	-	12,000	-
HSL D - 0 m to <1 m (in clay) [2]	-	-	-	-	310	NL	4	NL	NL	-	-	NL	-
HSL D - 1 m to <2 m (in clay) [2]	-	-	-	-	480	NL	6	NL	NL	-	-	NL	-
Soil HSLs for direct contact - HSL D[4]	26,000	20,000	27,000	38,000	-	-	430	99,000	27,000	-	-	81,000	-
ESL Urban Residential, Fine Soil - 0 m to <2 m (in clay) [3]	-	-	1,300	5,600	180	120	65	105	125	-	-	45	-
ESL Commercial/Industrial, Fine Soil - 0 m to <2 m (in clay)[3]			2,500	6,600	215	170	95	135	185			95	
Soil HSLs for direct contact - Intrusive maintenance worker (shallow trench)[4]	82,000		62,000	85,000		120,000	1,100	120,000	85,000	-	-	130,000	-
Soil HSLs - Intrusive maintenance worker (shallow trench)[5] - 0 m to <2 m (in clay)	NL	NL	-	-	-	-	350	NL	NL	-	-	NL	-
Field ID	**Location**	**Date**											
TP01_0.05_AS	TP01	13/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP01_0.5_AS	TP01	13/05/2015	-	-	-	-	-	-	-	-	-	-	-	-	-
TP02_0.5_AS	TP02	14/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP03_0_AS	TP03	14/05/2015	<25	<25	180	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP04_0.05_AS	TP04	13/05/2015	<25	<25	200	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP05_0_AS	TP05	14/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP06_0.45_AS	TP06	14/05/2015	<25	<25	270	130	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
Dup1_AS	TP06	13/05/2015	<25	<25	290	160	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
DUP1A_AS	TP06	13/05/2015	<10	<50	520	630	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2
TP07_0.05_AS	TP07	14/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP08_0.05_AS	TP08	14/05/2015	<25	<25	240	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP09_0.5_AS	TP09	13/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP09_1.0_AS	TP09	13/05/2015	<25	26	390	<120	<25	26	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP10_0.05_AS	TP10	13/05/2015	<25	<25	180	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP11_0_AS	TP11	14/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP12_0.05_AS	TP12	13/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP12_0.5_AS	TP12	13/05/2015	<25	<25	120	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP13_0.05_AS	TP13	14/05/2015	<25	<25	110	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP14_0.5_AS	TP14	14/05/2015	<25	29	640	<120	<25	29	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP15_0.5_AS	TP15	13/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6
TP15_1.0_AS	TP15	13/05/2015	<25	<25	<90	<120	<25	<25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.6

[1] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1A(1) Health investigation levels for soil contaminants - Residential A and Commerical/Industrial D
[2] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1A(3) Soil HSLs for vapour intrusion - HSL A and HSL D
[3] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1B(6) ESLs for Urban Residential & Commercial/Industrial, fine Soil
[4] CRC CARE (2011) Table B4 Soil HSLs for direct contact (mg/kg)
[5] CRC CARE (2011) Table B3 Soil HSLs for vapour intrusion (mg/kg)
- no assessment criteria available

Bold	Exceeds ESLs/EILs
	Exceeds adopted low density residential land use criteria
	Exceeds the adopted low density residential land use criteria and the commercial/industrial land use criteria
	Exceeds both adopted land use criteria and the maintenance/excavation workers (shallow trench) criteria

Table A2
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Soil analytical results - Polycyclic Aromatic Hydrocarbons

	PAH/Phenols																				
	1-Methylnaphthalene	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	Benzo(a) pyrene TEQ
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.1	0.1
Health-based investigation levels - Residential A[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	300	3
Health-based investigation levels - Commercial/Industrial D[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	4000	40
Soil HSLs for vapour intrustion - HSL A low density residential land use[2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 m to <1 m (in clay)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-
1 m to <2 m (in clay)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NL	-	-	-	-
Soil HSLs for direct contact - HSL A[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1400	-	-	-	-
Soil HSLs for vapour intrustion - HSL D commercial/industrial land use[2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
0 m to <1 m (in clay)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NL	-	-	-	-
1 m to <2 m (in clay)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NL	-	-	-	-
Soil HSLs for direct contact - HSL D[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,000	-	-	-	-
Soil ESLs for Urban Residential, Fine Soil 0 m to <2 m (in clay)[3]	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-		-	-	-	-
Soil ESLs for Commerical/Industrial, Fine Soil 0 m to <2 m (in clay)[3]							1.4													
Soil HSLs for direct contact - Intrusive maintenance worker (shallow trench)[4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29,000	-	-	-	-
Soil HSLs for vapour intrusions - Intrusive maintenance worker (shallow trench)[5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
0 m to <2 m (in sand)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NL	-	-	-	-
Generic and Calculated EIL for urban residential and public open space [6]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170	-	-	-	-
Generic and Calculated EIL for commercial/industrial [6]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	370	-	-	-	-
Field ID	**Location**	**Date**																			
TP01_0.05_AS	TP01	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	**1.1**	0.5	1	0.6	0.7	<0.1	0.8	<0.1	1	<0.1	0.2	0.8	7.6	1.5
TP01_0.5_AS	TP01	13/05/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP02_0.5_AS	TP02	14/05/2015	<0.1	<0.1	<0.1	<0.1	0.2	0.6	0.6	0.2	0.6	0.3	0.4	<0.1	1.4	<0.1	0.5	<0.1	0.8	1.3	7	0.9
TP03_0_AS	TP03	14/05/2015	0.2	0.2	0.6	1.1	0.8	2.8	**3**	1.7	2.6	1.6	2.5	0.1	5.1	0.3	2.4	<0.1 - 0.5	3.7	5.4	34	4.1
TP04_0.05_AS	TP04	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.2	0.2	0.1	0.1	<0.1	0.2	<0.1	0.2	<0.1	<0.1	0.2	1.5	0.2
TP05_0_AS	TP05	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.3	0.7	0.2	0.4	<0.1	0.7	<0.1	0.5	<0.1	0.3	0.7	4.7	0.7
TP06_0.45_AS	TP06	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.8	<0.2
Dup1_AS	TP06	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.8	<0.2
DUP1A_AS	TP06	13/05/2015	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP07_0.05_AS	TP07	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	0.1	0.3	0.2	0.3	<0.1	0.4	<0.1	0.3	<0.1	0.2	0.4	2.7	0.4
Dup2_AS	TP07	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	0.1	0.3	0.2	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.2	0.5	2.8	0.4
DUP2A_AS	TP07	13/05/2015	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP07_0.5_AS	TP07	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8	<0.2
TP08_0.05_AS	TP08	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.1	0.1	0.2	0.1	0.2	<0.1	0.2	<0.1	<0.1	<0.1	0.1	0.3	1.5	<0.2
TP09_0.5_AS	TP09	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	0.6	0.3	0.6	0.2	0.4	<0.1	0.9	<0.1	0.6	<0.1	0.3	0.9	5.3	0.8
TP09_1.0_AS	TP09	13/05/2015	0.1	0.2	0.1	1.5	1.1	5.6	**7**	3.2	8.3	3.7	4.1	0.4	7.3	0.2	4.9	<0.1 - 0.6	2.3	8.3	59	9.5
TP09_2.1_AS	TP09	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8	<0.2
TP10_0.05_AS	TP10	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8	<0.2
TP10_0.5_AS	TP10	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8	<0.2
TP11_0_AS	TP11	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	0.1	0.4	0.1	0.3	<0.1	0.5	<0.1	0.3	<0.1	0.3	0.6	3.1	0.4
TP12_0.05_AS	TP12	13/05/2015	<0.1	<0.1	<0.1	0.2	0.2	0.8	0.7	0.3	0.7	0.4	0.6	<0.1	1.7	0.1	0.6	<0.1	1.3	1.5	9.1	0.9
TP12_0.5_AS	TP12	13/05/2015	<0.1	<0.1	<0.1	0.7	0.6	3.6	**3.6**	1.3	3.5	1.8	2.7	0.1	5.5	0.2	2.5	<0.1 - 0.2	2.1	5.4	34	4.9
TP13_0.05_AS	TP13	14/05/2015	<0.1	<0.1	<0.1	0.2	0.3	1.3	**1.4**	0.6	1.3	0.7	1.1	<0.1	3.7	<0.1	1.2	<0.1	1.9	3.6	17	1.8
TP13_SP_AS	TP13	14/05/2015	<0.1	<0.1	<0.1	0.2	0.2	1	**0.9**	0.4	0.8	0.5	0.8	<0.1	1.7	<0.1	0.7	<0.1	0.9	1.8	9.9	1.2
TP14_0.5_AS	TP14	14/05/2015	1.2	1.5	5.2	0.4	7.4	14	**10**	3.4	12	3.4	12	0.6	16	4.1	1.8	<0.1 - 2.1	30	24	150	14
TP14_1.0_AS	TP14	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8	<0.2
TP15_0.5_AS	TP15	13/05/2015	<0.1	<0.1	<0.1	<0.1	0.1	0.5	0.4	0.2	0.5	0.2	0.5	<0.1	0.9	<0.1	0.2	<0.1	0.5	0.9	4.9	0.6
TP15_1.0_AS	TP15	13/05/2015	<0.1	<0.1	<0.1	0.1	<0.1	0.6	0.7	0.3	0.7	0.3	0.5	<0.1	1	<0.1	0.5	<0.1	0.3	1.1	6.2	1
TP15_2.0_AS	TP15	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.4	0.1	0.3	0.2	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.3	0.5	3.2	0.5
TP15_2.9_AS	TP15	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8	<0.2

[1] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1A(1) Health investigation levels for soil contaminants - Residential A and Commercial/Industrial D
[2] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1A(3) Soil HSLs for vapour intrusion - HSL A and HSL D
[3] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1B(6) ESLs for Urban Residential & Commerical/Industrial, Fine Soil
[4] CRC CARE (2011) Table B4 Soil HSLs for direct contact (mg/kg)
[5] CRC CARE (2011) Table B3 Soil HSLs for vapour intrusion (mg/kg)
[6] NEPC (2013) NEPM - Schedule B1-Investigation Levels for Soil and Groundwater - Table 1B(1) -(5) Soil-specific and calculated EILs for urban residential and public open space
- no assessment criteria available

Bold	Exceeds ESLs/EILs
	Exceeds adopted low density residential land use criteria
	Exceeds the adopted low density residential land use criteria and the commercial/industrial land use criteria
	Exceeds both adopted land use criteria and the maintenance/excavation workers (shallow trench) criteria

Table A3
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Soil analytical results - Heavy metals and Asbestos

			Metals							
			Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Zinc
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			1	3	0.3	0.3	0.5	0.01	0.5	0.5
Health-based investigation levels - Residential A[1]			300	100	20	100	6,000	40	400	7,400
Health-based investigation levels - Commercial/Industrial D[1]			1,500	3,000	900	3,600	240,000	730	6,000	400,000
Generic and Calculated EIL for urban residential and public open space [2]			1,100	100	-	830	160	-	190	390
Generic and Calculated EIL for commercial/industrial [2]			1,800	160	-	1,400	220	-	330	540
Field ID	**Location**	**Date**								
TP01_0.05_AS	TP01	13/05/2015	170	4	0.7	19	51	0.02	62	260
TP01_0.5_AS	TP01	13/05/2015	-	-	-	-	-	-	-	-
TP02_0.5_AS	TP02	14/05/2015	110	11	0.5	22	20	0.59	11	71
TP03_0_AS	TP03	14/05/2015	210	6	0.4	24	26	0.05	25	150
TP04_0.05_AS	TP04	13/05/2015	120	4	0.6	18	86	0.02	67	160
TP05_0_AS	TP05	14/05/2015	51	3	<0.3	13	15	0.2	18	67
TP06_0.45_AS	TP06	14/05/2015	17	4	<0.3	38	15	<0.01	36	44
Dup1_AS	TP06	13/05/2015	15	4	<0.3	34	15	0.01	37	41
DUP1A_AS	TP06	13/05/2015	14	<5	<1	40	13	<0.1	34	34
TP07_0.05_AS	TP07	14/05/2015	34	<3	0.3	15	43	0.05	11	47
Dup2_AS	TP07	13/05/2015	37	<3	<0.3	6.9	43	0.04	11	47
DUP2A_AS	TP07	13/05/2015	37	<5	<1	7	46	<0.1	11	44
TP07_0.5_AS	TP07	14/05/2015	15	12	0.4	25	1.1	<0.01	0.7	8
TP08_0.05_AS	TP08	14/05/2015	16	<3	0.4	42	40	<0.01	130	67
TP09_0.5_AS	TP09	13/05/2015	59	<3	0.4	12	57	0.02	77	79
TP09_1.0_AS	TP09	13/05/2015	61	4	0.3	12	33	0.03	13	52
TP09_2.1_AS	TP09	13/05/2015	7	<3	<0.3	2.7	9.5	<0.01	<0.5	4.2
TP10_0.05_AS	TP10	13/05/2015	76	<3	0.5	31	110	<0.01	91	180
TP10_0.5_AS	TP10	13/05/2015	8	3	<0.3	4.4	2.9	<0.01	<0.5	3.6
TP11_0_AS	TP11	14/05/2015	130	6	0.4	15	48	0.02	35	**400**
TP12_0.05_AS	TP12	13/05/2015	64	<3	0.4	9	79	0.01	61	190
TP12_0.5_AS	TP12	13/05/2015	490	15	1.1	27	13	0.05	3.3	**2,400**
TP12_1.0_AS	TP12	13/05/2015	14	-	-	-	-	-	-	-
TP13_0.05_AS	TP13	14/05/2015	64	4	0.4	15	35	<0.01	23	70
TP13_SP_AS	TP13	14/05/2015	25	<3	<0.3	8	32	0.04	7.5	56
TP14_0.5_AS	TP14	14/05/2015	82	7	0.5	15	31	0.04	39	140
TP14_1.0_AS	TP14	14/05/2015	18	17	0.4	16	10	<0.01	1.1	33
TP15_0.5_AS	TP15	13/05/2015	13	<3	0.4	11	56	<0.01	100	74
TP15_1.0_AS	TP15	13/05/2015	99	5	0.3	14	25	0.05	34	100
TP15_2.0_AS	TP15	13/05/2015	110	7	0.3	15	17	0.05	11	180
TP15_2.9_AS	TP15	13/05/2015	10	28	0.4	15	30	<0.01	0.9	9.7

[1] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1A(1) Health investigation levels for soil contaminants - Residential A and Commercial D
[2] NEPC (2013) NEPM - Schedule B1-Investigation Levels for Soil and Groundwater - Table 1B(1) -(5) Soil-specific and calculated EILs for urban residential and public open space
- no assessment criteria available

Bold	Exceeds ESLs/EILs
	Exceeds adopted low density residential land use criteria
	Exceeds the adopted low density residential land use criteria and the commercial/industrial land use criteria

	Hexach	2,4-DDT	4,4-DDE	a-BHC	Aldrin	Aldrin +	b-BHC	Chlorda	gamma	d-BHC	DDD	DDT	DDT+D	Dieldrin	Endosu	Endosu	Endosu	Endrin	Endrin	Endrin	g-BHC	Heptac	Heptac	Isodrin	Methox	Mirex	o,p-DD	o,p'-DD	trans-N	Azinop	Bromop	Chlorpy	Diazino	Dichlor	Dimeth	Ethion	Fenitro	Malathi	Methida	Parathi
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.5	0.5	0.5	0.2	0.2	0.2	0.5	0.2
	10	-	-	-	-	6	-	50		-	-	-	240	-		270		10	-	-	-	6	-	-	300	10	-	-	-	-	-	160	-	-	-	-	-	-	-	-
	80	-	-	-	-	45	-	530		-	-	-	3,600	-		2,000		100	-	-	-	50	-	-	2,500	100	-	-	-	-	-	2,000	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	180		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	640		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date																																								
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
05/2015		<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2

roundwater - Table 1A(1) Health investigation levels for soil contaminants - Residential A and Commercial/Industrial D

roundwater - Table 1B(1) -(5) Soil-specific and calculated EILs for urban residential and public open space

al land use criteria

dential land use criteria and the commercial/industrial land use criteria

Table A5
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Soil analytical results - Polychlorinated biphenyls

			Polychlorinated Biphenyls									
			Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Arochlor 1268	Aroclor 1262	PCBs (Sum of total)
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Health-based investigation levels - Residential A[1]			-	-	-	-	-	-	-	-	-	1
Health-based investigation levels - Commercial/industrial D[1]			-	-	-	-	-	-	-	-	-	7
Field ID	**Location**	**Date**										
TP01_0.05_AS	TP01	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP02_0.5_AS	TP02	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP03_0_AS	TP03	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP04_0.05_AS	TP04	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP05_0_AS	TP05	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP06_0.45_AS	TP06	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
Dup1_AS	TP06	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP07_0.05_AS	TP07	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP08_0.05_AS	TP08	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP09_0.5_AS	TP09	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP10_0.05_AS	TP10	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP11_0_AS	TP11	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP12_0.5_AS	TP12	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP13_0.05_AS	TP13	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP14_0.5_AS	TP14	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP15_0.5_AS	TP15	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1

[1] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1A(1) Health investigation levels for soil contaminants - Residential A and Commercial/Industrial D

Exceeds adopted low density residential land use criteria

Exceeds the adopted low density residential land use criteria and the commercial/industrial land use criteria

Table A6
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Soil analytical results - Asbestos

			Asbestos ID in soil		Asbestos Quantification in soil		
			ACM below surface	Surface soil	>7mm ACM	<2mm AF/FA	>2mm to <7mmm AF/FA
					mg/kg	mg/kg	mg/kg
EQL					10	25	90
HSL A - Bonded ACM				Not visible in soil	0.01%w/w		
HSL A - Friable asbestos and asbestos fines						0.001%w/w	
HSL D - Bonded ACM				Not visible in soil	0.05%w/w		
HSL D - Friable asbestos and asbestos fines						0.001%w/w	
Field ID	**Location**	**Date**					
TP01_0.05_AS	TP01	13/05/2015	-	-	<0.01	<0.001	<0.001
TP02_0_AS	TP02	14/05/2015	-	-	<0.01	<0.001	<0.001
TP03_0_AS	TP03	14/05/2015	-	-	<0.01	<0.001	<0.001
TP04_0.05_AS	TP04	13/05/2015	-	-	<0.01	<0.001	<0.001
TP05_0_AS	TP05	14/05/2015	-	-	<0.01	<0.001	<0.001
TP06_0.45_AS	TP06	14/05/2015	-	-	<0.01	<0.001	<0.001
TP07_0.05_AS	TP07	14/05/2015	-	-	<0.01	<0.001	<0.001
TP08_0.05_AS	TP08	14/05/2015	-	-	<0.01	<0.001	<0.001
TP09_0_AS	TP09	13/05/2015	-	-	<0.01	<0.001	<0.001
TP09_0.5_AS	TP09	13/05/2015	-	-	<0.01	<0.001	<0.001
TP10_0.05_AS	TP10	13/05/2015	-	-	<0.01	<0.001	<0.001
TP11_0_AS_FRAG	TP11	13/05/2015	-	ACM cement sheet fragment	0.0107	-	-
TP12_0.05_AS	TP12	13/05/2015	-	-	<0.01	<0.001	<0.001
TP13_0.05_AS	TP13	14/05/2015	-	-	<0.01	<0.001	<0.001
TP14_0.05_AS	TP14	14/05/2015	-	-	<0.01	<0.001	<0.001
TP14_0.5_AS	TP14	14/05/2015	-	-	<0.01	<0.001	<0.001
TP14_FC_FRAG	TP14	14/05/2015	ACM cement sheet fragment	-	0.0044	-	-
TP15_0_AS	TP15	13/05/2015	-	-	<0.01	<0.001	<0.001
TP15_0.5_AS	TP15	13/05/2015	-	-	<0.01	<0.001	<0.001

[1] NEPC (2013) NEPM - Schedule B-1 Investigation Levels for Soil and Groundwater - Table 1A(3) Soil HSLs for vapour intrusion - HSL A and HSL D

Exceeds adopted low density residential land use criteria
Exceeds the adopted low density residential land use criteria and the commercial/industrial land use criteria

Table A7
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Waste classification soil analytical results - TRH/BTEXN compounds

			TRH		BTEX					
			C6-C9	TRH C10 - C36 (total)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			10	100	0.1	0.1	0.1	0.2	0.1	0.3
General solid waste (CT1)[1]			650[2]	10,000[2]	10	288	700	-	-	1,000
Restricted solid waste (CT2)[1]			2,600[2]	40,000[2]	40	1,152	2,400	-	-	4,000
Field ID	**Location**	**Date**								
TP01_0.05_AS	TP01	13/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP01_0.5_AS	TP01	13/05/2015	-	-	-	-	-	-	-	-
TP02_0.5_AS	TP02	14/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP03_0_AS	TP03	14/05/2015	<20	210	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP04_0.05_AS	TP04	13/05/2015	<20	240	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP05_0_AS	TP05	14/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP06_0.45_AS	TP06	14/05/2015	<20	380	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
Dup1_AS	TP06	13/05/2015	<20	420	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
DUP1A_AS	TP06	13/05/2015	<10	730	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
TP07_0.05_AS	TP07	14/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
Dup2_AS	TP07	13/05/2015	-	-	-	-	-	-	-	-
DUP2A_AS	TP07	13/05/2015	-	-	-	-	-	-	-	-
TP07_0.5_AS	TP07	14/05/2015	-	-	-	-	-	-	-	-
TP08_0.05_AS	TP08	14/05/2015	<20	300	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP09_0.5_AS	TP09	13/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP09_1.0_AS	TP09	13/05/2015	<20	470	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP09_2.1_AS	TP09	13/05/2015	-	-	-	-	-	-	-	-
TP10_0.05_AS	TP10	13/05/2015	<20	200	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP10_0.5_AS	TP10	13/05/2015	-	-	-	-	-	-	-	-
TP11_0_AS	TP11	14/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP12_0.05_AS	TP12	13/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP12_0.5_AS	TP12	13/05/2015	<20	130	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP13_0.05_AS	TP13	14/05/2015	<20	130	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP13_SP_AS	TP13	14/05/2015	-	-	-	-	-	-	-	-
TP14_0.5_AS	TP14	14/05/2015	<20	730	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP14_1.0_AS	TP14	14/05/2015	-	-	-	-	-	-	-	-
TP15_0.5_AS	TP15	13/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP15_1.0_AS	TP15	13/05/2015	<20	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
TP15_2.0_AS	TP15	13/05/2015	-	-	-	-	-	-	-	-
TP15_2.9_AS	TP15	13/05/2015	-	-	-	-	-	-	-	-

Concentrations expressed as mg/kg

ND = Not detected

- no investigation levels available

[1] Contaminant threshold values for classying waste by chemical assessment - NSW EPA (2014) *Waste Classification Guidelines*

[2] These chemicals are assessed using the specific contaminant concentrations (SCC1 and SCC2)

Exceeds criteria for general solid waste
Exceeds criteria for restricted solid waste

Table A8
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Waste classification soil analytical results - Polycyclic Aromatic Hydrocarbons

			PAH/Phenols																		
			1-Methylnaphthalene	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(a) pyrene TCLP	Benzo(g,h,i)perylene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.1
General solid waste (CT1)[1]			-	-	-	-	-	-	0.8	-	-	-	-	-		-	-	-	-	-	-	200
Restricted solid waste (CT2)[1]			-	-	-	-	-	-	3.2	-	-	-	-	-		-	-	-	-	-	-	800
General solid waste (SCC1/TCLP1)[1]			-	-	-	-	-	-	10	0.04	-	-	-	-		-	-	-	-	-	-	-
Restricted solid waste (SCC2/TCLP2)[1]			-	-	-	-	-	-	23	0.16	-	-	-	-		-	-	-	-	-	-	-
Field ID	**Location**	**Date**																				
TP01_0.05_AS	TP01	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	1.1	<0.0001	0.5	1	0.6	0.7	<0.1	0.8	<0.1	1	<0.1	0.2	0.8	7.6
TP01_0.5_AS	TP01	13/05/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP02_0.5_AS	TP02	14/05/2015	<0.1	<0.1	<0.1	<0.1	0.2	0.6	0.6	-	0.2	0.6	0.3	0.4	<0.1	1.4	<0.1	0.5	<0.1	0.8	1.3	7
TP03_0_AS	TP03	14/05/2015	0.2	0.2	0.6	1.1	0.8	2.8	3	-	1.7	2.6	1.6	2.5	0.1	5.1	0.3	2.4	<0.1 - 0.5	3.7	5.4	34
TP04_0.05_AS	TP04	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	-	0.2	0.2	0.1	0.1	<0.1	0.2	<0.1	0.2	<0.1	<0.1	0.2	1.5
TP05_0_AS	TP07	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	-	0.3	0.7	0.2	0.4	<0.1	0.7	<0.1	0.5	<0.1	0.3	0.7	4.7
TP06_0.45_AS	TP06	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.8
Dup1_AS	TP06	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.8
DUP1A_AS	TP06	13/05/2015	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP07_0.05_AS	TP07	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	-	0.1	0.3	0.2	0.3	<0.1	0.4	<0.1	0.3	<0.1	0.2	0.4	2.7
Dup2_AS	TP07	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	-	0.1	0.3	0.2	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.2	0.5	2.8
DUP2A_AS	TP07	13/05/2015	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP07_0.5_AS	TP07	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
TP08_0.05_AS	TP08	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.1	-	0.1	0.2	0.1	0.2	<0.1	0.2	<0.1	<0.1	<0.1	0.1	0.3	1.5
TP09_0.5_AS	TP09	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	0.6	-	0.3	0.6	0.2	0.4	<0.1	0.9	<0.1	0.6	<0.1	0.3	0.9	5.3
TP09_1.0_AS	TP09	13/05/2015	0.1	0.2	0.1	1.5	1.1	5.6	7	<0.0001	3.2	8.3	3.7	4.1	0.4	7.3	0.2	4.9	<0.1 - 0.6	2.3	8.3	59
TP09_2.1_AS	TP09	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
TP10_0.05_AS	TP10	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
TP10_0.5_AS	TP10	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
TP11_0_AS	TP11	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	-	0.1	0.4	0.1	0.3	<0.1	0.5	<0.1	0.3	<0.1	0.3	0.6	3.1
TP12_0.05_AS	TP12	13/05/2015	<0.1	<0.1	<0.1	0.2	0.2	0.8	0.7	-	0.3	0.7	0.4	0.6	<0.1	1.7	0.1	0.6	<0.1	1.3	1.5	9.1
TP12_0.5_AS	TP12	13/05/2015	<0.1	<0.1	<0.1	0.7	0.6	3.6	3.6	-	1.3	3.5	1.8	2.7	0.1	5.5	0.2	2.5	<0.1 - 0.2	2.1	5.4	34
TP13_0.05_AS	TP13	14/05/2015	<0.1	<0.1	<0.1	0.2	0.3	1.3	1.4	-	0.6	1.3	0.7	1.1	<0.1	3.7	<0.1	1.2	<0.1	1.9	3.6	17
TP13_SP_AS	TP13	14/05/2015	<0.1	<0.1	<0.1	0.2	0.2	1	0.9	-	0.4	0.8	0.5	0.8	<0.1	1.7	<0.1	0.7	<0.1	0.9	1.8	9.9
TP14_0.5_AS	TP14	14/05/2015	1.2	1.5	5.2	0.4	7.4	14	10	<0.0001	3.4	12	3.4	12	0.6	16	4.1	1.8	<0.1 - 2.1	30	24	150
TP14_1.0_AS	TP14	14/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
TP15_0.5_AS	TP15	13/05/2015	<0.1	<0.1	<0.1	<0.1	0.1	0.5	0.4	-	0.2	0.5	0.2	0.5	<0.1	0.9	<0.1	0.2	<0.1	0.5	0.9	4.9
TP15_1.0_AS	TP15	13/05/2015	<0.1	<0.1	<0.1	0.1	<0.1	0.6	0.7	-	0.3	0.7	0.3	0.5	<0.1	1	<0.1	0.5	<0.1	0.3	1.1	6.2
TP15_2.0_AS	TP15	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.4	-	0.1	0.3	0.2	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.3	0.5	3.2
TP15_2.9_AS	TP15	13/05/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8

Concentrations expressed as mg/kg except where noted

- no investigation levels available

[1] Contaminant threshold values for classying waste by chemical assessment - NSW EPA (2014) *Waste Classification Guidelines*

Exceeds criteria for general solid waste
Exceeds criteria for restricted solid waste

Table A9
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Waste classification soil analytical results - Heavy metals and Asbestos

			Metals										
			Lead	Lead TCLP	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Nickel TCLP	Zinc	Asbestos
			mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	
EQL			1	0.02	3	0.3	0.3	0.5	0.01	0.5	0.5	0.5	
General solid waste (CT1)[1]			100	-	100	20	100	-	4	40	-	-	-
Restricted solid waste (CT2)[1]			400	-	400	80	400	-	16	160	-	-	-
General solid waste (SCC1/TCLP1)[1]			1,500	5	-	-	-	-	-	1,050	2	-	-
Restricted solid waste (SCC2/TCLP2)[1]			6000	20	-	-	-	-	-	4200	8	-	-
Field ID	**Location**	**Date**											
TP01_0.05_AS	TP01	13/05/2015	170	-	4	0.7	19	51	0.02	62	-	260	NAD
TP01_0.5_AS	TP01	13/05/2015	-	-	-	-	-	-	-	-	-	-	-
TP02_0_AS	TP02	14/05/2015	-	-	-	-	-	-	-	-	-	-	NAD
TP02_0.5_AS	TP02	14/05/2015	110	-	11	0.5	22	20	0.59	11	-	71	-
TP03_0_AS	TP03	14/05/2015	210	-	6	0.4	24	26	0.05	25	-	150	NAD
TP04_0.05_AS	TP04	13/05/2015	120	-	4	0.6	18	86	0.02	67	-	160	NAD
TP05_0_AS	TP07	14/05/2015	51	-	3	<0.3	13	15	0.2	18	-	67	NAD
TP06_0.45_AS	TP06	14/05/2015	17	-	4	<0.3	38	15	<0.01	36	-	44	NAD
Dup1_AS	TP06	13/05/2015	15	-	4	<0.3	34	15	0.01	37	-	41	-
DUP1A_AS	TP06	13/05/2015	14	-	<5	<1	40	13	<0.1	34	-	34	-
TP07_0.05_AS	TP07	14/05/2015	34	-	<3	0.3	15	43	0.05	11	-	47	NAD
Dup2_AS	TP07	13/05/2015	37	-	<3	<0.3	6.9	43	0.04	11	-	47	-
DUP2A_AS	TP07	13/05/2015	37	-	<5	<1	7	46	<0.1	11	-	44	-
TP07_0.5_AS	TP07	14/05/2015	15	-	12	0.4	25	1.1	<0.01	0.7	-	8	-
TP08_0.05_AS	TP08	14/05/2015	16	-	<3	0.4	42	40	<0.01	130	-	67	NAD
TP09_0_AS	TP09	13/05/2015	-	-	-	-	-	-	-	-	-	-	NAD
TP09_0.5_AS	TP09	13/05/2015	59	-	<3	0.4	12	57	0.02	77	0.037	79	NAD
TP09_1.0_AS	TP09	13/05/2015	61	-	4	0.3	12	33	0.03	13	-	52	-
TP09_2.1_AS	TP09	13/05/2015	7	-	<3	<0.3	2.7	9.5	<0.01	<0.5	-	4.2	-
TP10_0.05_AS	TP10	13/05/2015	76	-	<3	0.5	31	110	<0.01	91	0.055	180	NAD
TP10_0.5_AS	TP10	13/05/2015	8	-	3	<0.3	4.4	2.9	<0.01	<0.5	-	3.6	-
TP11_0_AS	TP11	14/05/2015	130	-	6	0.4	15	48	0.02	35	-	400	-
TP11_0_AS_FRAG	TP11	13/05/2015	-	-	-	-	-	-	-	-	-	-	Detected
TP12_0.05_AS	TP12	13/05/2015	64	-	<3	0.4	9	79	0.01	61	-	190	NAD
TP12_0.5_AS	TP12	13/05/2015	490	0.55	15	1.1	27	13	0.05	3.3	-	2400	-
TP12_1.0_AS	TP12	13/05/2015	14	-	-	-	-	-	-	-	-	-	-
TP13_0.05_AS	TP13	14/05/2015	64	-	4	0.4	15	35	<0.01	23	-	70	NAD
TP13_SP_AS	TP13	14/05/2015	25	-	<3	<0.3	8	32	0.04	7.5	-	56	-
TP14_0.05_AS	TP14	14/05/2015	-	-	-	-	-	-	-	-	-	-	NAD
TP14_0.5_AS	TP14	14/05/2015	82	-	7	0.5	15	31	0.04	39	-	140	NAD
TP14_1.0_AS	TP14	14/05/2015	18	-	17	0.4	16	10	<0.01	1.1	-	33	-
TP14_FC_FRAG	TP14	14/05/2015	-	-	-	-	-	-	-	-	-	-	Detected
TP15_0_AS	TP15	13/05/2015	-	-	-	-	-	-	-	-	-	-	NAD
TP15_0.5_AS	TP15	13/05/2015	13	-	<3	0.4	11	56	<0.01	100	0.084	74	NAD
TP15_1.0_AS	TP15	13/05/2015	99	-	5	0.3	14	25	0.05	34	-	100	-
TP15_2.0_AS	TP15	13/05/2015	110	<0.02	7		15	17	0.05	11	-	180	-
TP15_2.9_AS	TP15	13/05/2015	10		28	0.4	15	30	<0.01	0.9	-	9.7	-

- NAD: No asbestos detected

[1] Contaminant threshold values for classying waste by chemical assessment - NSW EPA (2014) *Waste Classification Guidelines*

Exceeds criteria for general solid waste
Exceeds criteria for restricted solid waste

	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	-	-	-	-	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	<50
	-	-	-	-		-	-	-	-	-	-	-	-	240	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	<50
Date																																								
05/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
05/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
05/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3
5/2015	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.3

(2014) *Waste Classification Guidelines*

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Table A11
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
Waste classification soil analytical results - Polychlorinated biphenyls

			Polychlorinated Biphenyls									
			Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Arochlor 1268	Aroclor 1262	PCBs (Sum of total)
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
General solid waste (CT1)[1]			-	-	-	-	-	-	-	-	-	<50
Restricted solid waste (CT2)[1]			-	-	-	-	-	-	-	-	-	<50
Field ID	**Location**	**Date**										
TP01_0.05_AS	TP01	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP02_0.5_AS	TP02	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP03_0_AS	TP03	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP04_0.05_AS	TP04	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP05_0_AS	TP05	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP06_0.45_AS	TP06	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
Dup1_AS	TP06	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP07_0.05_AS	TP07	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP08_0.05_AS	TP08	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP09_0.5_AS	TP09	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP10_0.05_AS	TP10	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP11_0_AS	TP11	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP12_0.5_AS	TP12	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP13_0.05_AS	TP13	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP14_0.5_AS	TP14	14/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
TP15_0.5_AS	TP15	13/05/2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1

Concentrations expressed as mg/kg except where noted

- no investigation levels available

[1] Contaminant threshold values for classying waste by chemical assessment - NSW EPA (2014) *Waste Classification Guidelines*

Exceeds criteria for general solid waste
Exceeds criteria for restricted solid waste

Appendix B

QA/QC results tables

Table B1
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
QA/QC Soil analytical results - TRH/BTEX compounds

	TRH C_6-C_{10} Fraction	TRH >C_{10}-C_{16} Fraction	TRH >C_{16}-C_{34} Fraction	TRH >C_{34}-C_{40} Fraction	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene
TP06_0.45_AS	<25	<25	270	130	<0.1	<0.1	<0.1	<0.2	<0.1
Dup1_AS (intra-laboratory duplicate of TP06_0.45_AS)	<25	<25	290	160	<0.1	<0.1	<0.1	<0.2	<0.1
RPD (%)	-	-	7%	21%	-	-	-	-	-
TP06_0.45_AS	<25	<25	270	130	<0.1	<0.1	<0.1	<0.2	<0.1
DUP1A_AS (inter-laboratory duplicate of TP06_0.45_AS)	<10	<50	520	630	<0.2	<0.5	<0.5	<0.5	<0.5
RPD (%)	-	-	63%	**132%**	-	-	-	-	-
TP07_0.05_AS	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1
Dup2_AS (intra-laboratory duplicate of TP07_0.05_AS)	-	-	-	-	-	-	-	-	-
RPD (%)	-	-	-	-	-	-	-	-	-
TP07_0.05_AS	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1
DUP2A_AS (inter-laboratory duplicate of TP07_0.05_AS)	-	-	-	-	-	-	-	-	-
RPD (%)	-	-	-	-	-	-	-	-	-

Notes:
All results are expressed in mg/kg
Italics: A value equal to the PQL has been used for the calculation of RPDs

BOLD RPD exceeds acceptable levels.

Table B2
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
QA/QC Soil analytical results - Polycyclic aromatic hydrocarbons

	1-Methylnaphthalene	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
TP06_0.45_AS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1
Dup1_AS (intra-laboratory duplicate of TP06_0.45_AS)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
RPD (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP06_0.45_AS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1
DUP1A_AS (inter-laboratory duplicate of TP06_0.45_AS)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP07_0.05_AS	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	0.1	0.3	0.2	0.3	<0.1	0.4	<0.1	0.3	<0.1	0.2	0.4
Dup2_AS (intra-laboratory duplicate of TP07_0.05_AS)	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	0.1	0.3	0.2	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.2	0.5
RPD (%)	-	-	-	-	-	-	-	-	-	-	-	-	22%	-	40%	-	-	22%
TP07_0.05_AS	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.3	0.1	0.3	0.2	0.3	<0.1	0.4	<0.1	0.3	<0.1	0.2	0.4
DUP2A_AS (inter-laboratory duplicate of TP07_0.05_AS)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
All results are expressed in mg/kg
Italics: A value equal to the PQL has been used for the calculation of RPDs

BOLD RPD exceeds acceptable levels.

Table B3
Detailed Site Assessment:
Sydney Water - 165-169 Holden Street, Ashbury NSW
QA/QC Soil analytical results - Heavy metals

	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Zinc
TP06_0.45_AS	17	4	<0.3	38	15	<0.01	36	44
Dup1_AS (intra-laboratory duplicate of TP06_0.45_AS)	15	4	<0.3	34	15	0.01	37	41
RPD (%)	13%	-	-	11%	-	-	3%	7%
TP06_0.45_AS	17	4	<0.3	38	15	<0.01	36	44
DUP1A_AS (inter-laboratory duplicate of TP06_0.45_AS)	14	<5	<1	40	13	<0.1	34	34
RPD (%)	19%	22%	-	5%	14%	-	6%	26%
TP07_0.05_AS	34	<3	0.3	15	43	0.05	11	47
Dup2_AS (intra-laboratory duplicate of TP07_0.05_AS)	37	<3	<0.3	6.9	43	0.04	11	47
RPD (%)	8%	-	-	**74%**	-	22%	-	-
TP07_0.05_AS	34	<3	0.3	15	43	0.05	11	47
DUP2A_AS (inter-laboratory duplicate of TP07_0.05_AS)	37	<5	<1	7	46	<0.1	11	44
RPD (%)	8%	-	-	**73%**	18%	-	5%	7%

Notes:
All results are expressed in mg/kg
Italics: A value equal to the PQL has been used for the calculation of RPDs

BOLD RPD exceeds acceptable levels.

2,4-DDT	4,4-DDE	a-BHC	Aldrin	Aldrin + Die	b-BHC	Chlordane (	gamma-Chl	d-BHC	DDD	DDT	DDT+DDE+	Dieldrin	Endosulfan	Endosulfan	Endosulfan	Endrin	Endrin alde	Endrin keto	g-BHC (Lind	Heptachlor	Heptachlor	Isodrin	Methoxychl	Parathion	o,p-DDD	o,p'-DDE	trans-Nonac	Azinophos	Bromophos	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Methidathio	Mirex
<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2
<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

PDs

	Xylene (m & p)	µg/L	1	<1	<1
	Xylene (o)	µg/L	0.5	<0.5	<0.5
	Xylene Total	µg/L	1.5	<1.5	<1.5
	C6-C10 less BTEX (F1)	mg/L	0.05	<0.05	<0.05
	Lead (Filtered)	mg/L	0.001	<0.001	<0.001
	Arsenic (Filtered)	mg/L	0.001	<0.001	<0.001
	Cadmium (Filtered)	mg/L	0.0001	<0.0001	<0.0001
	Chromium (III+VI) (Filtered)	mg/L	0.001	<0.001	<0.001
	Copper (Filtered)	mg/L	0.001	0.002	0.002
	Mercury (Filtered)	mg/L	0.0001	<0.0001	<0.0001
	Nickel (Filtered)	mg/L	0.001	<0.001	<0.001
	Zinc (Filtered)	mg/L	0.005	0.007	0.007
Pesticides	2,4-DDT	µg/L	0.1	<0.1	<0.1
	4,4-DDE	µg/L	0.1	<0.1	<0.1
	a-BHC	µg/L	0.1	<0.1	<0.1
	Aldrin	µg/L	0.1	<0.1	<0.1
	b-BHC	µg/L	0.1	<0.1	<0.1
	Chlordane (cis)	µg/L	0.1	<0.1	<0.1
	gamma-Chlordane	mg/L	0.0001	<0.0001	<0.0001
	d-BHC	µg/L	0.1	<0.1	<0.1
	DDD	µg/L	0.1	<0.1	<0.1
	DDT	µg/L	0.1	<0.1	<0.1
	Dieldrin	µg/L	0.1	<0.1	<0.1
	Endosulfan I	µg/L	0.1	<0.1	<0.1
	Endosulfan II	µg/L	0.1	<0.1	<0.1
	Endosulfan sulphate	µg/L	0.1	<0.1	<0.1
	Endrin	µg/L	0.1	<0.1	<0.1
	Endrin aldehyde	µg/L	0.1	<0.1	<0.1
	Endrin ketone	µg/L	0.1	<0.1	<0.1
	g-BHC (Lindane)	µg/L	0.1	<0.1	<0.1
	Heptachlor	µg/L	0.1	<0.1	<0.1
	Heptachlor epoxide	µg/L	0.1	<0.1	<0.1
	Methoxychlor	µg/L	0.1	<0.1	<0.1
	o,p-DDD	mg/L	0.0001	<0.0001	<0.0001
	o,p'-DDE	mg/L	0.0001	<0.0001	<0.0001
	trans-Nonachlor	mg/L	0.0001	<0.0001	<0.0001
rous	Azinophos methyl	µg/L	0.2	<0.2	<0.2
	Bromophos-ethyl	µg/L	0.2	<0.2	<0.2
	Chlorpyrifos	µg/L	0.2	<0.2	<0.2
	Diazinon	µg/L	0.5	<0.5	<0.5
	Dichlorvos	µg/L	0.5	<0.5	<0.5
	Dimethoate	µg/L	0.5	<0.5	<0.5
	Ethion	µg/L	0.2	<0.2	<0.2
	Fenitrothion	µg/L	0.2	<0.2	<0.2
	Malathion	µg/L	0.2	<0.2	<0.2
	Methidathion	µg/L	0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/L	0.0001	<0.0001	<0.0001
	1-Methylnaphthalene	µg/L	0.1	<0.1	<0.1
	2-methylnaphthalene	µg/L	0.1	<0.1	<0.1
	Acenaphthene	µg/L	0.1	<0.1	<0.1
	Acenaphthylene	µg/L	0.1	<0.1	<0.1
	Anthracene	µg/L	0.1	<0.1	<0.1
	Benz(a)anthracene	µg/L	0.1	<0.1	<0.1
	Benzo(a) pyrene	µg/L	0.1	<0.1	<0.1
	Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1
	Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1
	Chrysene	µg/L	0.1	<0.1	<0.1
	Dibenz(a,h)anthracene	µg/L	0.1	<0.1	<0.1
	Fluoranthene	µg/L	0.1	<0.1	<0.1
	Fluorene	µg/L	0.1	<0.1	<0.1
	Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1
	Naphthalene	µg/L	0.1	<0.1	<0.1
	PAHs (Sum of total)	µg/L	1	<1	<1
	Phenanthrene	µg/L	0.1	<0.1	<0.1
	Pyrene	µg/L	0.1	<0.1	<0.1
	Isodrin	µg/L	0.1	<0.1	<0.1
	Mirex	µg/L	0.1	<0.1	<0.1
	Parathion	µg/L	0.2	<0.2	<0.2
Biphenyls	Arochlor 1016	µg/L	1	<1	<1
	Arochlor 1221	µg/L	1	<1	<1
	Arochlor 1232	µg/L	1	<1	<1
	Arochlor 1242	µg/L	1	<1	<1
	Arochlor 1248	µg/L	1	<1	<1
	Arochlor 1254	µg/L	1	<1	<1
	Arochlor 1260	µg/L	1	<1	<1
	Arochlor 1268	mg/L	0.001	<0.001	<0.001
	Aroclor 1262	µg/L	1	<1	<1

Appendix C

Site photographs

Photo 1: Site entrance driveway, facing east.

Photo 2: View of north-eastern area of the site, facing west.

Photo 3: View of north-eastern area of the site, facing north-west.

Photo 4: View of retaining wall in south-western corner of site area, facing west.

Photo 5: View of western area of site and site buildings, facing north.

Photo 6: View of site buildings in western and north-western area of site, facing west.

Photo 7: View of storage area in central part of site, facing north-east.

Photo 8: View of storage shed in northern area of site, facing north.

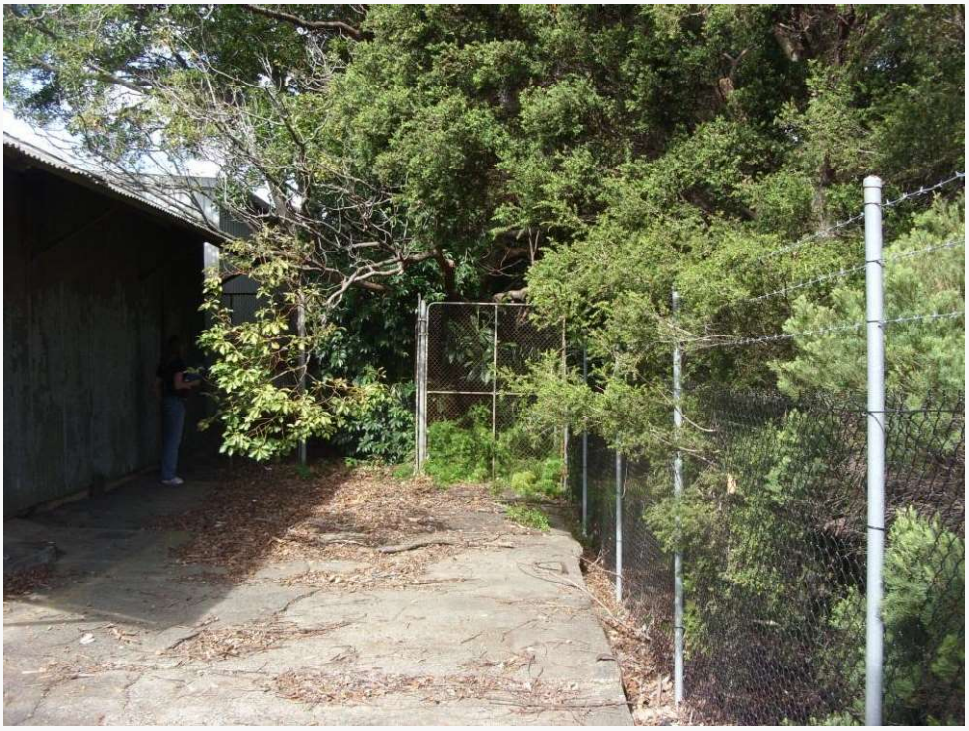


Photo 9: View of north-western area of site, behind site building, facing south.

Photo 10: View of north-western area of site, behind site building, facing north.

Photo 11: View of the vegetated western area of the site behind buildings, facing south.

Photo 12: Storage area in southern portion of the south-western site building.

Photo 13: Storage area in northern portion of the north-western site building.

Photo 14: View of western area of the site, with the remainder of the Sydney Water property (to be retained) beyond, facing south.

Photo 15: View of Sydney Water reservoir on area of property to be retained, facing north-east.

Photo 16: View of drainage area into the neighbouring park, in south-western corner of the Sydney Water property (in area to be retained), facing south-west.

Photo 17: Soil retained on >7 mm sieve from surface sample at location TP01.

Photo 18: Soil excavated from test pit location TP02 during investigation works.

Photo 19: Soil profile at test pit location TP03.

Photo 20: Soil profile at test pit location TP04.

Photo 21: Soil profile at test pit location TP05.

Photo 22: Soil profile at test pit location TP06.

Photo 23: Soil profile at test pit location TP07.

Photo 24: Soil profile at test pit location TP08.

Photo 25: Soil profile at test pit location TP09.

Photo 26: Soil profile at test pit location TP10.

Photo 27: Soil profile at test pit location TP11.

Photo 28: Soil profile at test pit location TP12.

Photo 29: Soil retained on >7 mm sieve from surface sample at location TP13.

Photo 30: Soil profile at test pit location TP14. ACM cement sheet fragment found in fill material at 0.5 mBGL.

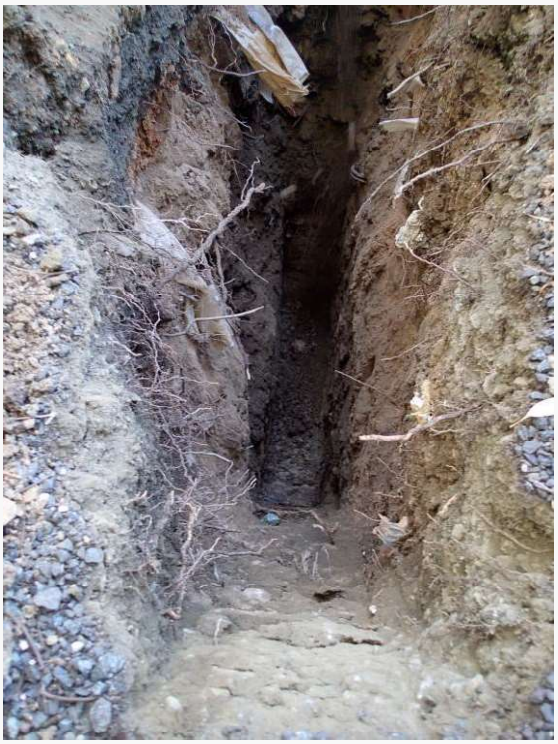


Photo 31: Soil profile at test pit location TP15.

Appendix D

Title search documentation

Database : SWC Property (Created 9/8/1999)

User : GEORGE JACKSON
Date/Time : 29/08/2001 9:42:18

LAND PARCEL SUMMARY

LAND PARCEL DETAILS

Holding Status: Current Property Holding **Property Ranking:** MKT

Land Parcel ID: 000913 **Land Parcel Name:** ASHFIELD RESERVOIR R3 (PT)

Street: HOLDEN STREET **Suburb:** HURLSTONE PARK **LGA :** Canterbury

Location Comments: OFF HOLDEN STREET

File No.: 10/103
System Service: Water
Main Property Use: Reservoir

FMIS Asset Number: 00005649
History Packet: 518/17
Deed Packet: 26/1
Asset/Book/Folio: A13-19

Potential Surplus Land Comments:

General Zoning: Special Uses 5 (A)
Comments:

General Comments: 30,36 . I.E.W. ADVISED 03/05/84 SITE REQUIRED FOR FUT. SURFACE & ELEV. RES'S. SYSTEM PLANNING ADVISE NO FUTURE PLANS FOR PROPD R4 RESERVOIR (15.4.94) * MARKET VALUE INCLUDED WITH LAND IN CTV.962 F.140(L900062701) RATEABLE LV INCLUDED IN PRO INCLUDED WITH ID 898

LOT DETAILS

Total Number of Lots: 1

Lot ID	Lot No.	DP	Portion	Section	Parish	Access Prop Number	Area(M2)
000758	1	115504	n/a		n/a	3797091	2,814.00

Total Area (M2): 2,814.00

RELATED INFORMATION

Master Site ID: 0015 **Master Site Name:** ASHFIELD RESERVOIR

Related Land Parcel(s):

ID	Name	Holding Status	Rank	Total Area
000898	ASHFIELD RESERVOIR R3 (PT) LGA: Canterbury	CPH	MKT	3,830.00
000899	ASHFIELD RESERVOIR R3 (PT) LGA: Canterbury	CPH	SYS	1,571.00
004555	ASHFIELD RESERVOIR R3 (PT) LGA: Canterbury	CPH	SYS	0.00

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 1/115504

SEARCH DATE	TIME	EDITION NO	DATE
29/8/2001	9:33AM	-	-

VOL 1942 FOL 152 IS THE CURRENT CERTIFICATE OF TITLE

LAND

LOT 1 IN DEPOSITED PLAN 115504
LOCAL GOVERNMENT AREA: CANTERBURY
PARISH OF PETERSHAM COUNTY OF CUMBERLAND
TITLE DIAGRAM: DP115504

FIRST SCHEDULE

BOARD OF WATER SUPPLY AND SEWERAGE

SECOND SCHEDULE (1 NOTIFICATION)

1. RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

SWC-GJ- PRINTED ON 29/8/2001

CERTIFICATE OF TITLE

(C.)

New South Wales.

[Appn No. 4523]
[Reference to last Certificate]
[Vol. 111 Folio 19.]

REGISTER BOOK,
Vol. 1942 Folio 152

Board of Water Supply and Sewerage Limited

of Transfer from The Australian Mutual Provident Society No. 15041 is —— now the proprietor of an Estate in Fee Simp subject nevertheless to the reservations and conditions, if any, contained in the Grant hereinafter referred to, and also subject to su encumbrances, liens, and interests as are notified hereon, in that piece of land situated ——
in the Municipality of Canterbury, Parish of Petersham, and County of Cumberland
containing two roods thirty one and one quarter perches ——, or thereabou as shown on the Plan hereon, and therein edged red, being part of Ten hundred acres delineated on the parish map of the said parish deposited in the Department of Lands originally granted to John Hepburn by Crown grant dated the eleventh day of November one thousand seven hundred and ninety four ——

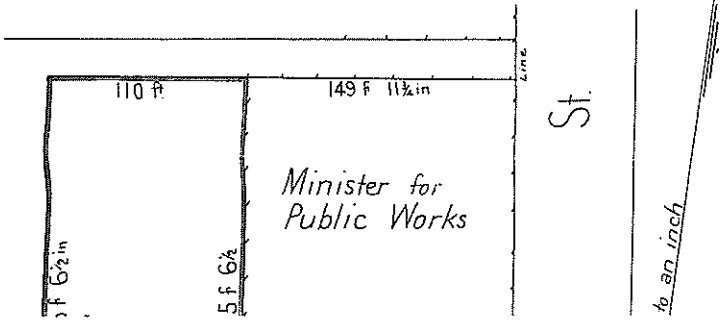
In witness whereof, I have hereunto signed my name and affixed my Seal, this Twentieth day of January one thousand nine hundred and ——

Signed the 20th day of January 190 ,

in the presence of

Deputy Registrar General.

NOTIFICATION REFERRED TO.



RG 2/18

PLAN OF LAND IN TSFR. No. 515011.

D. P. 115504

Mun./~~Shire~~ ~~City~~ : CANTERBURY

Locality: ASHFIELD

Parish: PETERSHAM

County: CUMBERLAND

Reduction Ratio 1: 800

Lengths are in metres

Registered: 28-7-83

C.A.: ———————

Title System: TORRENS

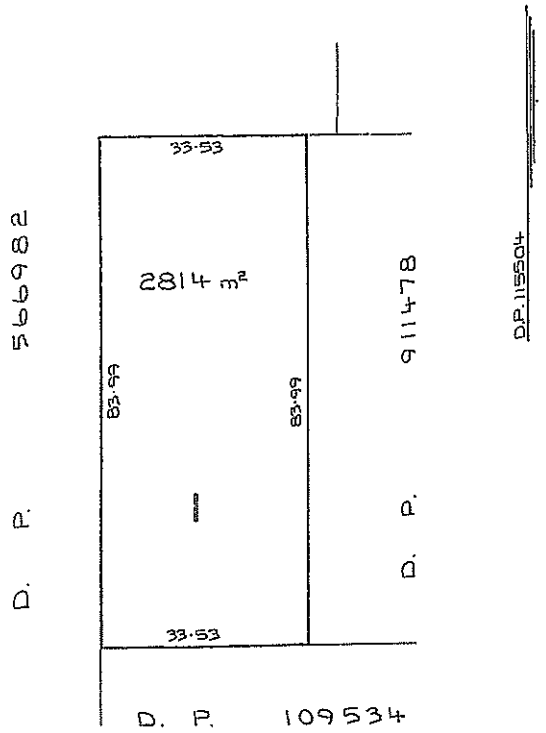
Purpose: DEPARTMENTAL

Ref. Map: U0945 - 444

Last Plan: D.P. 54533

Prepared in Registrar General's Office B.GRAY 28/7/83

Exmd.: 28-7-83



10 | 50 | 100 Table of mm 140 | 180 | 220

S.O. 2478 D. West, Government Printer

I, Bruce Richard Davies, Under Secretary for Lands and Registrar General for New South Wales, certify that this negative is a photograph made as a permanent record of a document in my custody this day.

1st August, 1983

20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 Table of mm 100 | 110 | 120 | 130 | 140

Last Certificate
Folio 189.

VOL. 1942 FOLIO 152

1/115504

d of Water Supply and Sewerage Transferee under Trust

om The Australian Mutual Provident Society of No. 515011 is now the proprietor of an Estate in Fee S

ess to the reservations and conditions, if any, contained in the Grant hereinafter referred to, and also subject to

ns, and interests as are notified hereon, in that piece of land situated

ipality of Canterbury, Parish of Petersham, and County of Cumberland

roods thirty one and one quarter perches, or theres

Plan hereon, and therein edged red, being part of One hundred acres delineated in the public

Parish deposited in the Department of Lands originally granted to John Elphaum by Crow

the eleventh day of November one thousand seven hundred and ninety four

ess whereof, I have hereunto signed my name and affixed my Seal, this Twentieth

January one thousand nine hundred and nine

20th day of January 190 9,

sence of

Deputy Registrar General.

NOTIFICATION REFERRED TO.

In witness whereof, I have hereunto signed my name and affixed my Seal, this Twenty

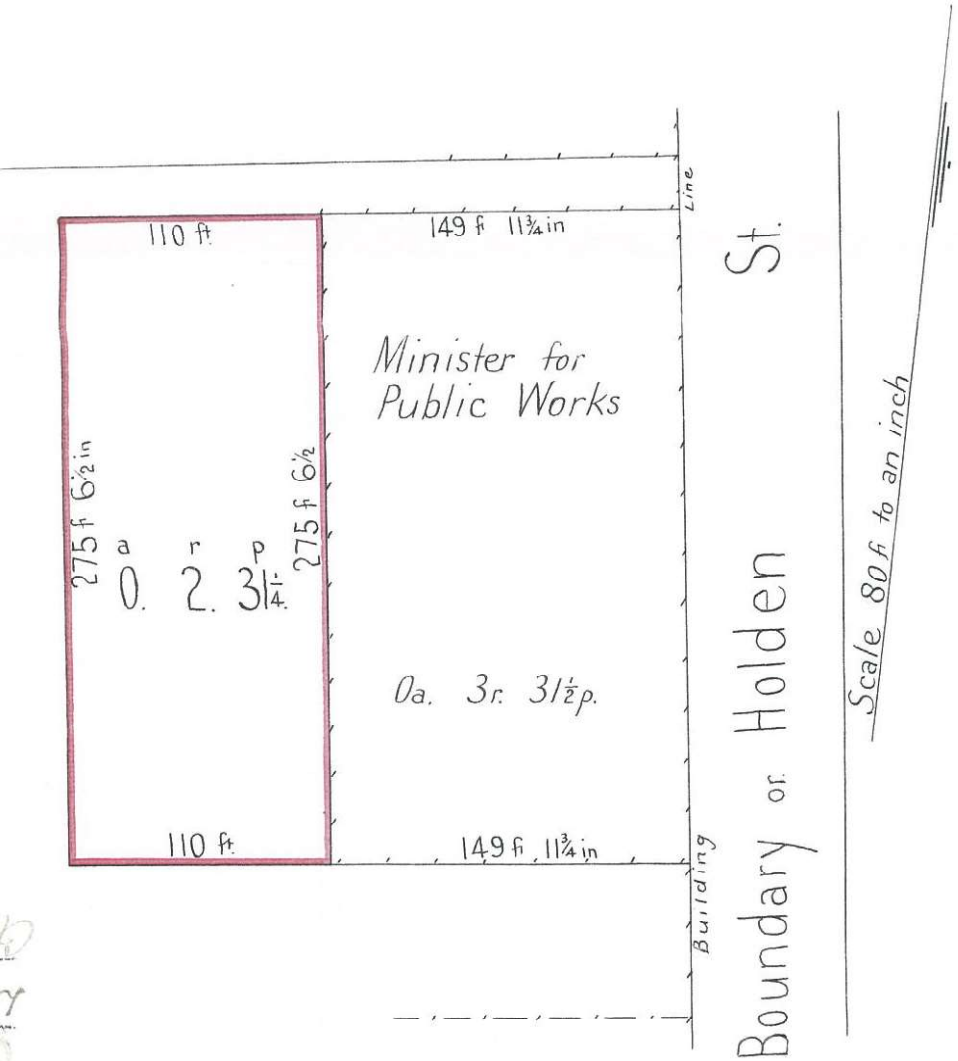
January one thousand nine hundred and nine

Signed the 20th day of January 190 ,

in the presence of

Deputy Registrar General.

NOTIFICATION REFERR



Database : SWC Property (Created 9/8/1999)

User : GEORGE JACKSON
Date/Time : 29/08/2001 9:46:51

LAND PARCEL SUMMARY

LAND PARCEL DETAILS

Holding Status: Current Property Holding **Property Ranking:** SYS

Land Parcel ID: 000899 **Land Parcel Name:** ASHFIELD RESERVOIR R3 (PT)

Street: HOLDEN STREET **Suburb:** HURLSTONE PARK **LGA :** Canterbury

Location Comments:

File No.: 123/2696
System Service: Water
Main Property Use: Reservoir

FMIS Asset Number: 00048918
History Packet: 3467/17
Deed Packet: 26/1
Asset/Book/Folio: A13-19

Potential Surplus Land N
Comments:

General Zoning: No record
Comments:

General Comments: 2,20 . SYSTEM PLANNING ADVISE NO FUTURE PLANS FOR PROPD R4 RESERVOIR (15.4.94) LOT 2 DP 711077 WAS SOLD TO S.ELAZZI FOR $1000 ON 6/7/88. PROP.VALUE ADJUSTED ACCORDINGLY. * MARKET VALUE INCLUDED WITH LAND IN V.962 F.140 (L900062701). LAND CO INCLUDED WITH ID 898

LOT DETAILS

Total Number of Lots: 1

Lot ID	Lot No.	DP	Portion	Section	Parish	Access Prop Number	Area(M2)
000746	1	711077	n/a		n/a	3797092	1,571.00

Total Area (M2): 1,571.00

RELATED INFORMATION

Master Site ID: 0015 **Master Site Name:** ASHFIELD RESERVOIR

Related Land Parcel(s):

ID	Name	Holding Status	Rank	Total Area
000898	ASHFIELD RESERVOIR R3 (PT) LGA: Canterbury	CPH	MKT	3,830.00
000913	ASHFIELD RESERVOIR R3 (PT) LGA: Canterbury	CPH	MKT	2,815.00
004555	ASHFIELD RESERVOIR R3 (PT) LGA: Canterbury	CPH	SYS	0.00

(DP711077)

New South Wales

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1900

TORRENS TITLE

REFERENCE TO FOLIO OF THE REGISTER	
IDENTIFIER	1/711077
EDITION	DATE OF ISSUE
1	19. 2.1985

I certify that the person described in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set forth in that Schedule) in the land within described subject to such exceptions, encumbrances, interests and entries as appear in the Second Schedule and to any additional entries in the Folio of the Register.

Registrar General

REGISTRAR GENERAL NEW SOUTH WALES

LAND

LOT 1 IN DEPOSITED PLAN 711077
AT ASHBURY
LOCAL GOVERNMENT AREA OF CANTERBURY
PARISH OF PETERSHAM COUNTY OF CUMBERLAND
TITLE DIAGRAM: DP711077

FIRST SCHEDULE

THE METROPOLITAN WATER SEWERAGE AND DRAINAGE BOARD

SECOND SCHEDULE

1. RESERVATIONS AND CONDITIONS IN THE CROWN GRANT
2. P901930 EASEMENT APPURTENANT TO THE LAND ABOVE DESCRIBED AFFECTING THE LAND SHOWN SO BURDENED IN DP109534
3. P901933 COVENANT

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

PLAN FORM 2

Plan Drawing only to appear in this space

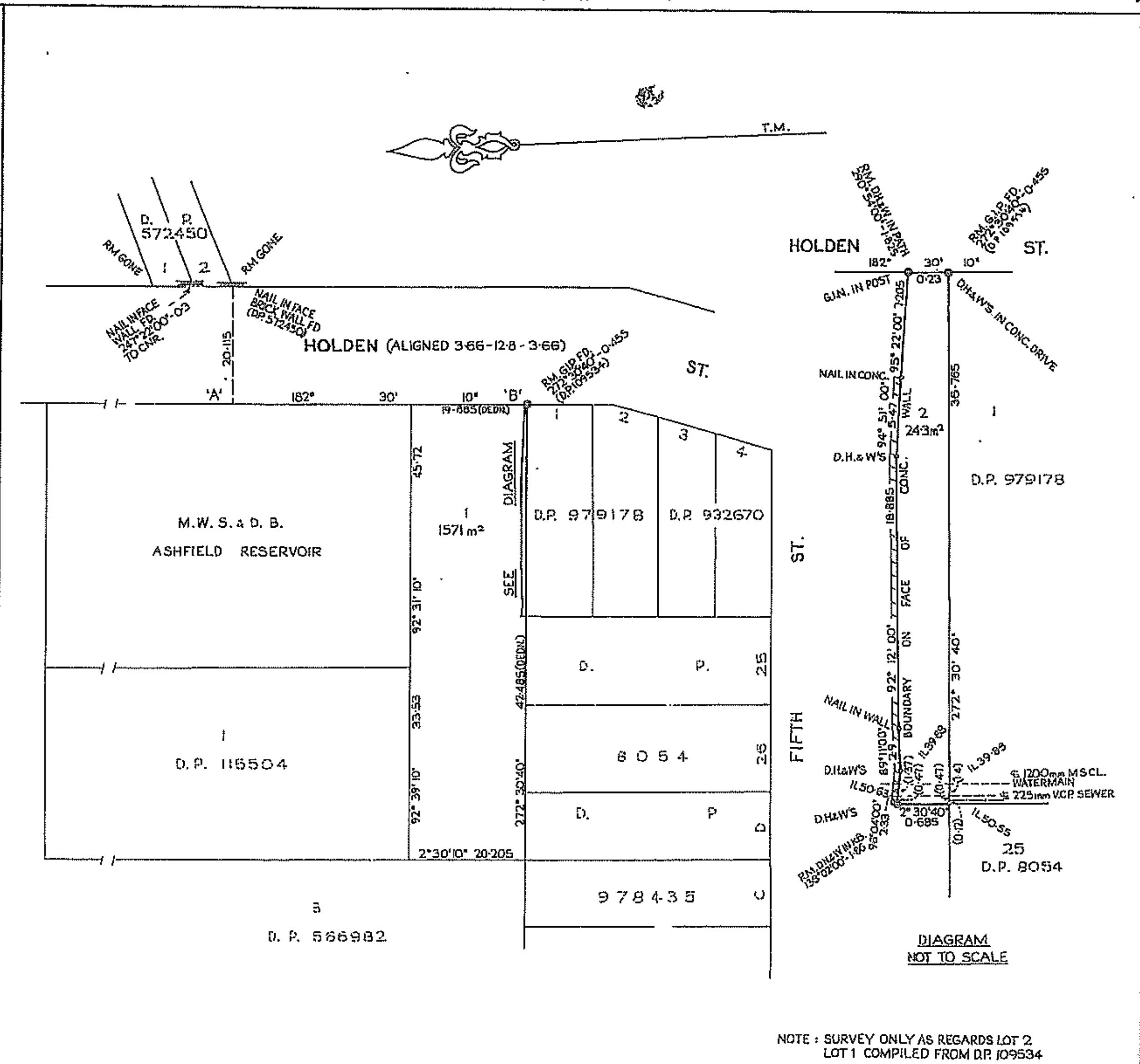
*OFFICE USE ONLY

Signatures and seals only.

THE METROPOLITAN WATER, SEWERAGE AND DRAINAGE BOARD BY ITS ATTORNEY WHO HEREBY STATES THAT AT THE TIME OF HIS EXECUTING THIS INSTRUMENT HE HAS NO NOTICE OF THE REVOCATION OF THE POWER OF ATTORNEY REGISTERED Nº 123 BOOK 3465 UNDER THE AUTHORITY OF WHICH HE HAS EXECUTED THIS INSTRUMENT.

SOLICITOR FOR THE BOARD.

SIGNED FOR AND ON BEHALF OF THE METROPOLITAN WATER, SEWERAGE AND DRAINAGE BOARD BY ROBERT DAVID JAMES GUTHRIE ITS DULY CONSTITUTED ATTORNEY WHO IS PERSONALLY KNOWN TO ME.



NOTE : SURVEY ONLY AS REGARDS LOT 2
LOT 1 COMPILED FROM D.P. 109534

D.P. 711077.

Registered: 18-2-1985

C.A.:

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U0945-444

Last Plan: D.P. 109534.

PLAN OF SUBDIVISION OF LOT A, D.P. 109534

Reduction Ratio 1: 500
Lengths are in metres.

Mun./Shire City: CANTERBURY

Locality: ASHBURY

Parish: PETERSHAM

County: CUMBERLAND

(Delete if inapplicable).

I, GREGORY PHILLIP SMITH of M.W.S. & D. BOARD, SYDNEY a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan is accurate and has been made *(1) by me (2) ... in accordance with the Survey Practice Regulations, 1933, and was completed on † 6-12-1984.

Signature

Surveyor registered under Surveyors Act, 1929, as amended.
Datum Line of Azimuth 'A'-'B'
*Strike out either (1) or (2). †Insert date of survey.

Panel for use only for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements or restrictions as to user.

Council Clerk's Certificate

I hereby certify that—
(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and
*(b) the requirements of section 31B of the Metropolitan Water, Sewerage and Drainage Act, 1924, as amended, (Hunter District Water, Sewerage, and Drainage Act, 1938, as amended)
have been complied with by the applicant in relation to the proposed (Insert "new road", "subdivision" or "consolidated lot") set out hereon.
Subdivision No. ....
Date ....
(Signature) ....
Council Clerk
*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the area of operations of the Metropolitan Water Sewerage and Drainage Board and the Hunter District Water Board.
†Delete if inapplicable.

Table of mm

M.P.D. R.V. - R.5

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

SURVEYOR'S REFERENCE 346723 84/1035

FB. 6590 RE.

123/2696 P.2

D.P. 711077

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day.

BOX 354L
(DP1141436)

TORRENS TITLE REFERENCE	
1/711077	
EDITION	DATE OF ISSUE
2	11/11/2010
CERTIFICATE AUTHENTICATION CODE	
FMHQ-QV-7K65	

NEW SOUTH WALES

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1900

I certify that the person described in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set forth in that Schedule) in the land within described subject to such exceptions, encumbrances, interests and entries as appear in the Second Schedule and to any additional entries in the Folio of the Register.

REGISTRAR GENERAL

LAND

LOT 1 IN DEPOSITED PLAN 711077
AT ASHBURY.
LOCAL GOVERNMENT AREA: CANTERBURY.
PARISH OF PETERSHAM COUNTY OF CUMBERLAND
TITLE DIAGRAM: DP711077

FIRST SCHEDULE

THE METROPOLITAN WATER SEWERAGE AND DRAINAGE BOARD

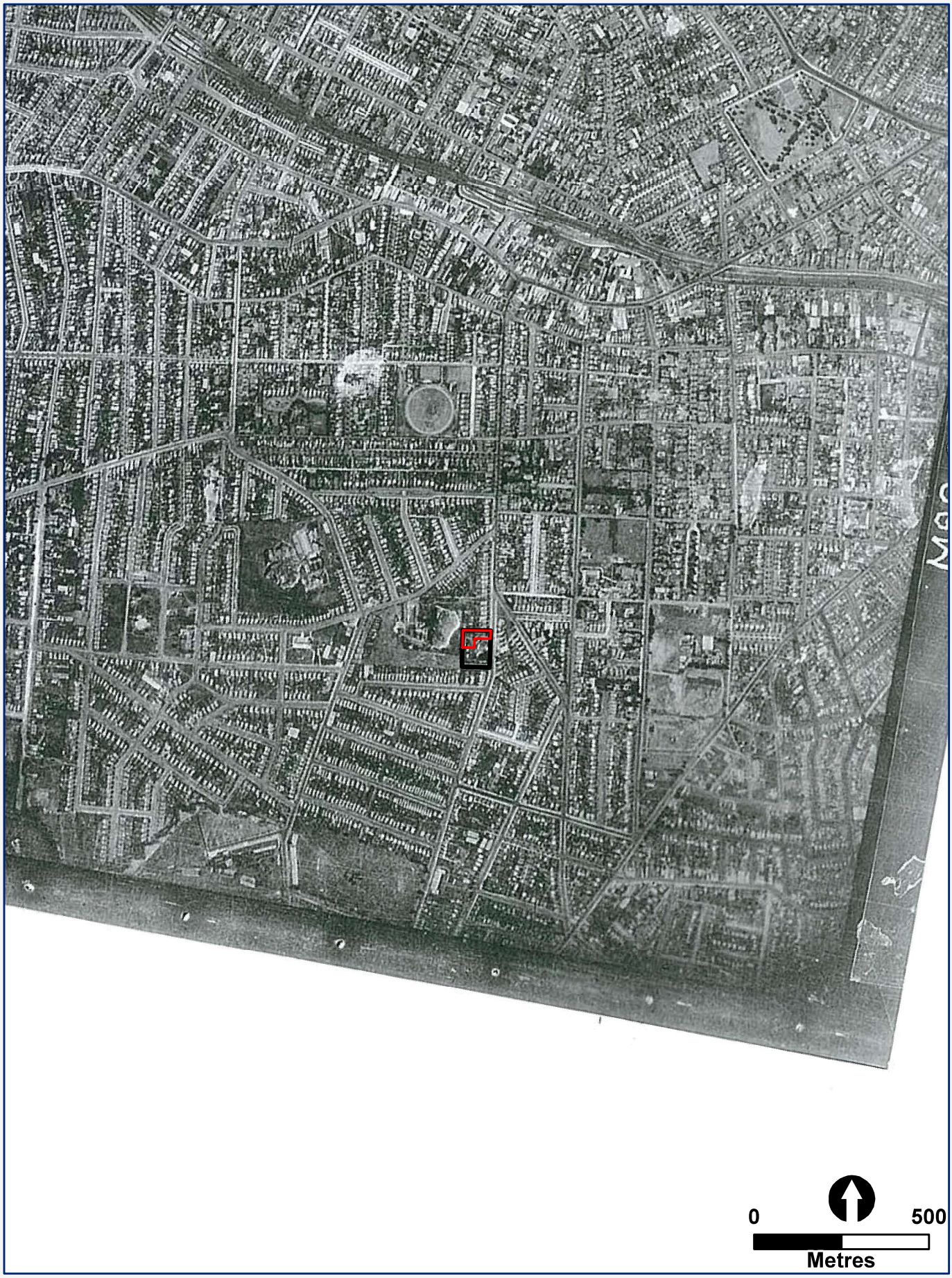
SECOND SCHEDULE
----

1. RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2. D801930 EASEMENT APPURTENANT TO THE LAND ABOVE DESCRIBED AFFECTING THE LAND SHOWN SO BURDENED IN DP109534
3. D801930 COVENANT
4. DP1141436 EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 5.3 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1141436

**** END OF CERTIFICATE ****

Appendix E

Historical aerial photographs

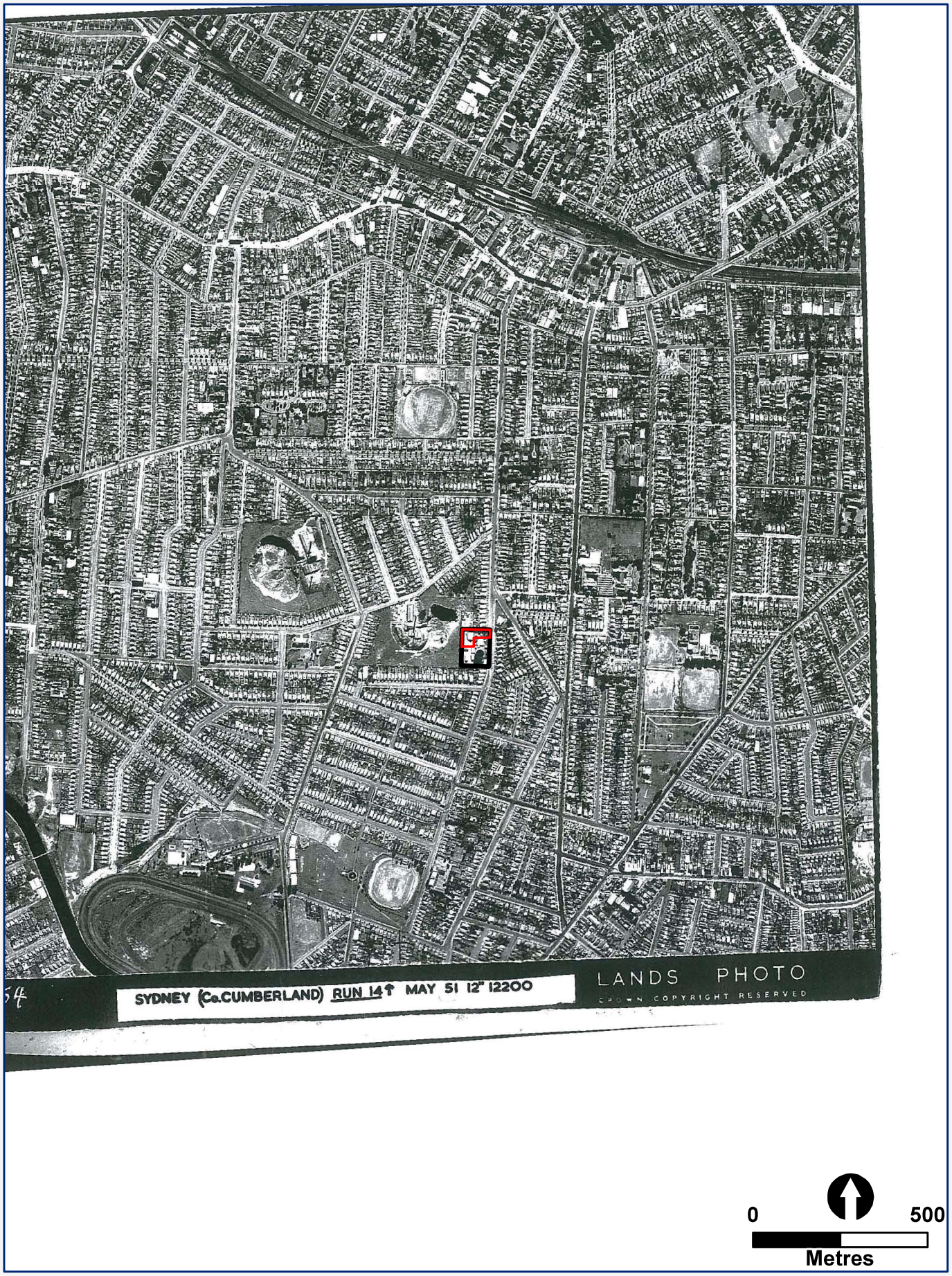


Aerial source: ©SKM2010 (GoogleEarth)

\\APSYDFIL03\proj\SIS\SYD_WAT_COR_GRO\220167\9ACLM_NSW_SW_DSI_PROGRAM_A_2015\10_GIS\Projects\Maps\Historical_Aerials\AshfieldAshfield_1930.mxd // PT / PottsR // 12/05/2015

Historic Aerial Photographs - 1930
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW

Site extent
Sydney Water property

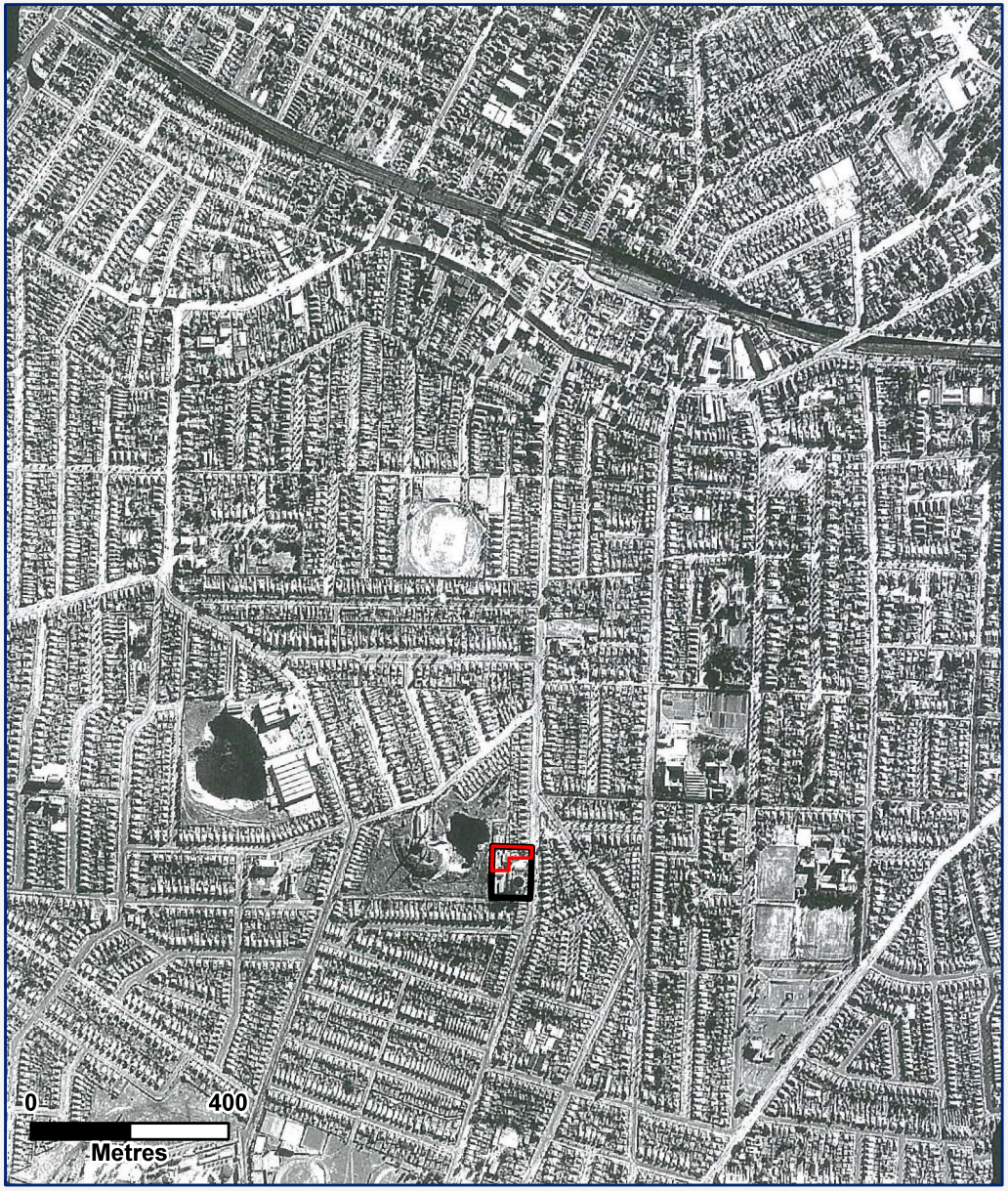


Aerial source: ©SKM2010 (GoogleEarth)

\\APSYDFIL03\proj\SISYD_WAT_COR_GRO\220167\9ACLM_NSW_SW_DSI_PROGRAM_A_2015\10_GIS\Projects\Maps\Historical_Aerials\AshfieldAshfield_1951.mxd // PT / PottsR // 12/05/2015

Historic Aerial Photographs - 1951
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW

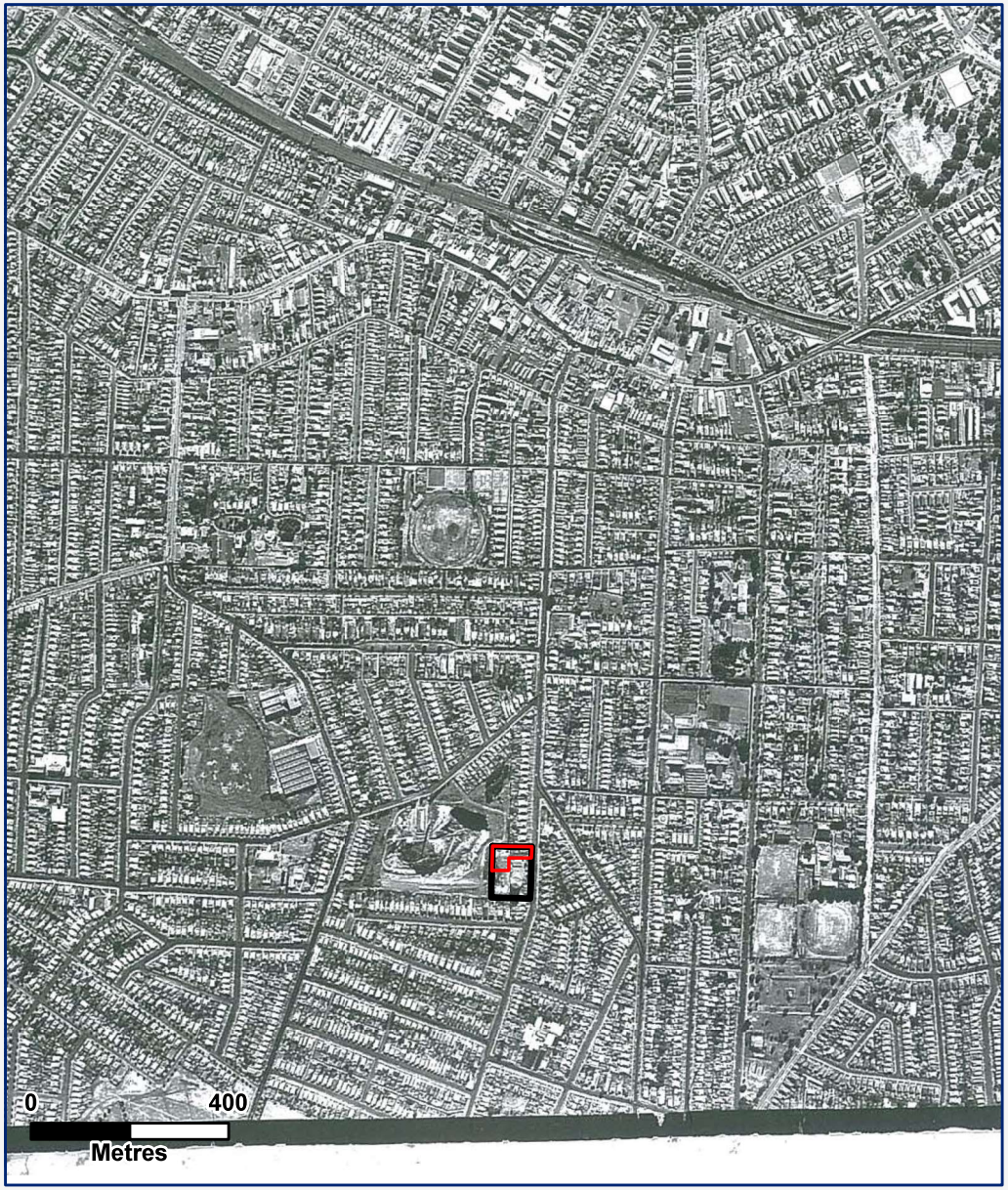
Site extent
Sydney Water property



Site extent

Sydney Water property

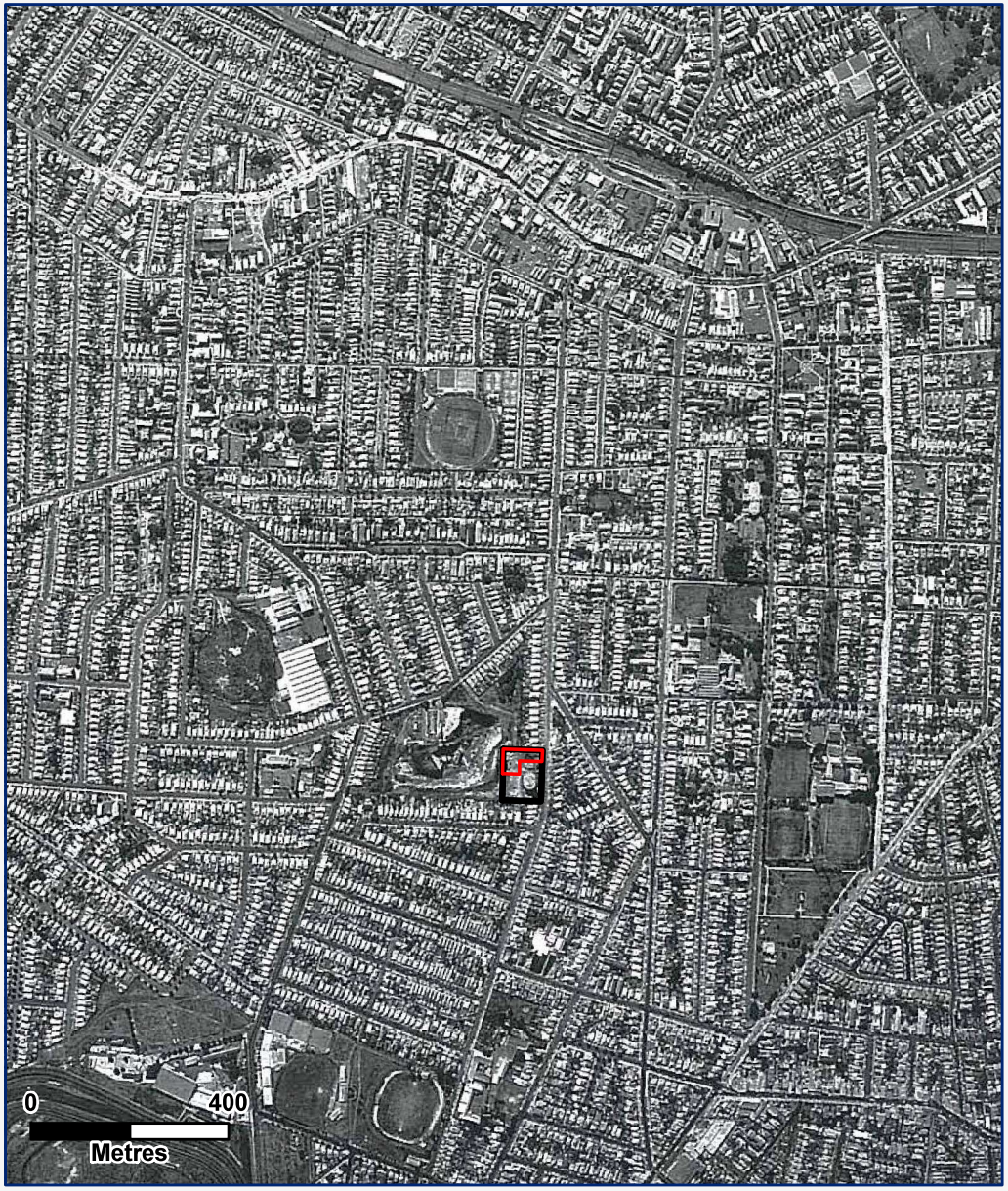
Historical Aerial Photographs - 1961
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW



Site extent

Sydney Water property

Historical Aerial Photographs - 1970
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW



Site extent

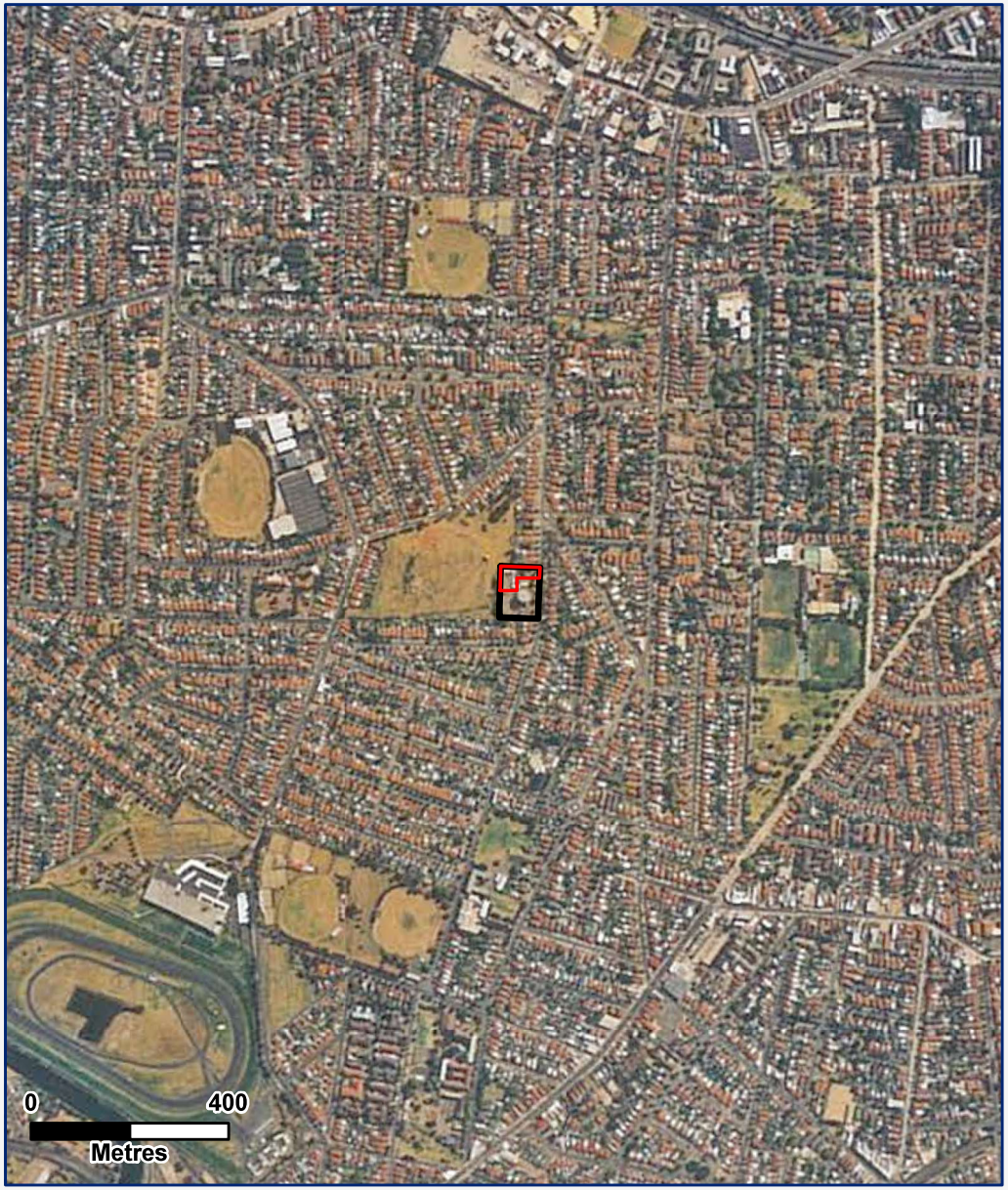
Sydney Water property

Historical Aerial Photographs - 1978
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW

Site extent

Sydney Water property

Historical Aerial Photographs - 1986
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW



Site extent

Sydney Water property

Historical Aerial Photographs - 1994
Sydney Water Ashfield Reservoir
Holden St, Ashbury, NSW

Appendix F

Section 149 certificate

City of Canterbury
City of Cultural Diversity

Administration Centre, 137 Beamish Street,
CAMPSIE N.S.W. 2194
DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

Kellie Lynch
GPO Box 5394
SYDNEY NSW 2001

PLANNING CERTIFICATE

Section 149 of the Environmental Planning and Assessment Act, 1979.

Certificate No: 33391
14 May 2015

Land which Certificate is issued for:

Lot 1 DP 115504

165-169 Holden Street, ASHBURY NSW 2193

City of Canterbury
City of Cultural Diversity

Administration Centre, 137 Beamish Street,
CAMPSIE N.S.W. 2194
DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

INFORMATION PROVIDED UNDER SECTION 149 (2) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

Land which Certificate is issued for:

Lot 1 DP 115504

165-169 Holden Street, ASHBURY NSW 2193

PART 1:
ENVIRONMENTAL PLANNING INSTRUMENTS

1.1 Principal Environmental Planning Instrument

Canterbury Local Environmental Plan 2012

Date effective from

1 January 2013

Land Use Zone

ZONE SP2 INFRASTRUCTURE

1. Permitted without consent
Roads

2. Permitted with consent
The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose.

3. Prohibited
Any development not specified in item 1 or 2

Administration Centre, 137 Beamish Street,
CAMPSIE N.S.W. 2194
DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

1.2 State Environmental Planning Policies

Note:

The following information indicates those State Environmental Planning Policies (SEPP) which may apply to the subject land. A summary explanation of each SEPP can be sourced from the Department of Planning (DoP) website at www.planning.nsw.gov.au . The full wording of each SEPP can also be accessed via the DoP website.

State Environmental Planning Policies:

No. 19 - Bushland in Urban Areas
No. 21 - Caravan Parks
No. 30 - Intensive Agriculture
No. 32 - Urban Consolidation (Redevelopment of Urban Land)
No. 33 - Hazardous and Offensive Development
No. 50 - Canal Estates
No. 55 - Remediation of Land
No. 64 - Advertising and Signage
No. 65 - Design Quality of Residential Flat Development
No. 71 - Coastal Protection
State Environmental Planning Policy - (Housing for Seniors or People with a Disability) 2004
State Environmental Planning Policy - Building Sustainability Index: BASIX 2004
State Environmental Planning Policy - (Repeal of Concurrence and Referral Provisions) 2004.
State Environmental Planning Policy - (Major Projects) 2005
State Environmental Planning Policy - (Mining, Petroleum Production and Extractive Industries) 2007
State Environmental Planning Policy - (Temporary Structures and Places of Public Entertainment) 2007
State Environmental Planning Policy - (Infrastructure) 2007
State Environmental Planning Policy (Repeal of Concurrence and Referral Provisions) 2008
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
State Environmental Planning Policy (Affordable Rental Housing) 2009

Proposed State Environmental Planning Policies

State Environmental Planning Policy (Competition) 2010

1.3 Proposed Environmental Planning Instruments (including any Planning Proposals) that are or have been the subject of community consultation or on public exhibition under the Act

Not applicable.

1.4 Development Control Plans.

Canterbury Development Control Plan 2012

Contains detailed design guidelines and development standards for development in Canterbury City.

1.5 Contribution Plans.

Council has in place a Development Contributions Plan prepared and adopted under the Environmental Planning and Assessment Act, 1979.

Administration Centre, 137 Beamish Street,
CAMPSIE N.S.W. 2194
DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

PART 2:
RESTRICTIONS ON DEVELOPMENT

2.1 Heritage

Ashbury Heritage Conservation Area
The subject property is located within the Ashbury Heritage Conservation Area and as such is subject to specific provisions in the principal environmental planning instrument and relevant development control plan. Please contact Council's City Planning Division for further details.

Ashfield Reservoir-State Significant Heritage Item
The Ashfield Reservoir is listed as a State Significant Heritage Item.

2.2 Coastal Protection

There is no notification that the subject property is affected by the provisions of Section 38 or 39 of the Coastal Protection Act, 1979.

2.3 Mine Subsidence

The subject land is not within a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act, 1961.

2.4 Road Widening and Road Realignment

Whether or not the land is affected by a road widening or road realignment proposal under Division 2 or Part 3 of the Roads Act 1993 or an environmental planning instrument;

The land is not affected by a road widening or road realignment proposal under Division 2 or Part 3 of the Roads Act 1993, or an environmental planning instrument.

Whether or not the land is affected by a road widening or road realignment proposal under any resolution of Council.

The land is not affected by a road widening or road realignment proposal under any resolution of Council.

2.5 Council and Other Public Authority Policies on Hazard Risk Restrictions

Whether or not the land is affected by a policy adopted by Council or adopted by any other public authority (and notified to the Council for the express purpose of its adoption by that authority being referred to) that restricts the development of the land because of the likelihood of:

- **Land Slip**
  The land is not affected by a policy restriction relating to landslip
- **Bushfire**
  The land is not bushfire prone land (as defined in the Act).
- **Tidal Inundation**
  The land is not affected by a policy restriction relating to tidal inundation
- **Subsidence**
  The land is not affected by a policy restriction relating to subsidence
- **Acid Sulfate Soils**
  The land is not affected by a policy restriction relating to acid sulfate soils.
- **Unhealthy Building Land**
  The land is not affected by a policy restriction relating to Unhealthy Building Land.
- **Any Other Risk**
  Not applicable.

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2.6 Flooding

Development on the land, or part of the land, for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is not subject to any flood related development controls.

Development on the land, or part of the land, for any other purpose is not subject to flood related development controls.

2.7 Matters arising under the Contaminated Land Management Act, 1997.

Not applicable.

2.8 Land Reserved For Acquisition

There is no environmental planning instrument, or proposed environmental planning instrument, applying to the land that makes provision for the acquisition of the land (or any part thereof) by a public authority, as referred to in Section 27 of the Act.

2.9 Property Vegetation Plans

Not applicable

2.10 Orders under Trees (Disputes Between Neighbours) Act 2006

Not applicable

2.11 Directions under Part 3A

Not applicable

2.12 Site Compatibility Certificates and Conditions for Seniors Housing

Not applicable

2.13 Site Compatibility Certificates for Infrastructure

Not applicable

2.14 Site Compatibility Certificates and Conditions for Affordable Rental Housing

Not applicable

2.15 Certain Information Relating to Beaches and Coasts

Not applicable

2.16 Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works

Not applicable

2.17 Biodiversity Certified Land

Not applicable

2.18 Paper Subdivision Information

Not applicable

2.19 Site Verification Certificates

Not applicable

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Telephone: (02) 9789 9300
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2.20 Complying Development

Whether or not the land is land on which complying development may be carried out under each of the Codes for complying development because of the provisions of clauses 1.17A (c) and (d) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 and, if no complying development may be carried out on that land under that Policy, the reasons why complying development may not be carried out on that land.

General Housing Code (if in a residential zone) No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Housing Alterations Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

General Development Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Commercial and Industrial (New Buildings and Additions) Code) No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Commercial and Industrial Alterations Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Demolition Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Subdivision Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Fire Safety Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Important Disclaimer: This clause of the Certificate only contains information in respect of that required by clause 3 of Schedule 4 of the Environmental Planning and Assessment Regulation 2000, in relation to Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008. Other provisions contained in the SEPP, including but not limited to, minimum allotment size requirements, specified development standards or any other general exclusions, may preclude Complying Development under the SEPP from being able to be carried out. You will need to refer to the SEPP for complete details. It is your responsibility to ensure that you comply with all other general requirements of the SEPP. Failure to comply with these provisions may mean that any Complying Development Certificate issued under the provisions of the SEPP is invalid.

City of Canterbury
City of Cultural Diversity

Administration Centre, 137 Beamish Street,
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PART 3

INFORMATION PROVIDED UNDER SECTION 149 (5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

Note: *When information pursuant to Section 149(5) is requested the Council is under no obligation to furnish any of the information supplied herein pursuant to that Section. Council draws your attention to Section 149(6), which states that a Council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this Certificate.*

3.1 Amending Local Environmental Plans

Site specific and, where relevant, general amendments to the principal planning instrument are identified below:

Not applicable

3.2 Tree Preservation Order

A tree preservation order applies to the whole of the City of Canterbury.

3.3 Council Policy on Contaminated Land

On the 10 June 1999 Council adopted a policy on contaminated land. This policy will restrict development of land:

a) which is affected by contamination;
a) which has been used for certain purposes;
b) in respect of which there is not sufficient information about contamination;
c) which is proposed to be used for certain purposes;
d) in other circumstances contained in the policy.

3.4 General Advice Regarding Use of Property

Persons considering commencing a use of or purchasing a property are advised to seek confirmation that the current, or intended, use (as the case may be) has been approved by Council, or does not require Council approval. It is pointed out that the question of "existing use rights" within the meaning of the Environmental Planning and Assessment Act, 1979, is a complex matter, and that the commencement of a use without Council approval (where required) is unlawful and may be subject to enforcement action.

3.5 Other Matters

Not applicable.

per **JIM MONTAGUE PSM**
GENERAL MANAGER

City of Canterbury
City of Cultural Diversity

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Kellie Lynch
GPO Box 5394
SYDNEY NSW 2001

PLANNING CERTIFICATE

Section 149 of the Environmental Planning and Assessment Act, 1979.

Certificate No: 33392
14 May 2015

Land which Certificate is issued for:

Lot 1 DP 711077

165-169 Holden Street, ASHBURY NSW 2193

City of Canterbury
City of Cultural Diversity

Administration Centre, 137 Beamish Street,
CAMPSIE N.S.W. 2194
DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

INFORMATION PROVIDED UNDER SECTION 149 (2) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

Land which Certificate is issued for:

Lot 1 DP 711077

165-169 Holden Street, ASHBURY NSW 2193

PART 1:
ENVIRONMENTAL PLANNING INSTRUMENTS

1.1 Principal Environmental Planning Instrument

Canterbury Local Environmental Plan 2012

Date effective from

1 January 2013

Land Use Zone

ZONE SP2 INFRASTRUCTURE

1. Permitted without consent
Roads

2. Permitted with consent
The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose.

3. Prohibited
Any development not specified in item 1 or 2

Administration Centre, 137 Beamish Street,
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1.2 State Environmental Planning Policies

Note:

The following information indicates those State Environmental Planning Policies (SEPP) which may apply to the subject land. A summary explanation of each SEPP can be sourced from the Department of Planning (DoP) website at www.planning.nsw.gov.au . The full wording of each SEPP can also be accessed via the DoP website.

State Environmental Planning Policies:

No. 19 - Bushland in Urban Areas
No. 21 - Caravan Parks
No. 30 - Intensive Agriculture
No. 32 - Urban Consolidation (Redevelopment of Urban Land)
No. 33 - Hazardous and Offensive Development
No. 50 - Canal Estates
No. 55 - Remediation of Land
No. 64 - Advertising and Signage
No. 65 - Design Quality of Residential Flat Development
No. 71 - Coastal Protection
State Environmental Planning Policy - (Housing for Seniors or People with a Disability) 2004
State Environmental Planning Policy - Building Sustainability Index: BASIX 2004
State Environmental Planning Policy - (Repeal of Concurrence and Referral Provisions) 2004.
State Environmental Planning Policy - (Major Projects) 2005
State Environmental Planning Policy - (Mining, Petroleum Production and Extractive Industries) 2007
State Environmental Planning Policy - (Temporary Structures and Places of Public Entertainment) 2007
State Environmental Planning Policy - (Infrastructure) 2007
State Environmental Planning Policy (Repeal of Concurrence and Referral Provisions) 2008
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
State Environmental Planning Policy (Affordable Rental Housing) 2009

Proposed State Environmental Planning Policies

State Environmental Planning Policy (Competition) 2010

1.3 Proposed Environmental Planning Instruments (including any Planning Proposals) that are or have been the subject of community consultation or on public exhibition under the Act

Not applicable.

1.4 Development Control Plans.

Canterbury Development Control Plan 2012
Contains detailed design guidelines and development standards for development in Canterbury City.

1.5 Contribution Plans.

Council has in place a Development Contributions Plan prepared and adopted under the Environmental Planning and Assessment Act, 1979.

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PART 2:
RESTRICTIONS ON DEVELOPMENT

2.1 Heritage

Ashbury Heritage Conservation Area
The subject property is located within the Ashbury Heritage Conservation Area and as such is subject to specific provisions in the principal environmental planning instrument and relevant development control plan. Please contact Council's City Planning Division for further details.

Ashfield Reservoir-State Significant Heritage Item
The Ashfield Reservoir is listed as a State Significant Heritage Item.

2.2 Coastal Protection

There is no notification that the subject property is affected by the provisions of Section 38 or 39 of the Coastal Protection Act, 1979.

2.3 Mine Subsidence

The subject land is not within a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act, 1961.

2.4 Road Widening and Road Realignment

Whether or not the land is affected by a road widening or road realignment proposal under Division 2 or Part 3 of the Roads Act 1993 or an environmental planning instrument;

The land is not affected by a road widening or road realignment proposal under Division 2 or Part 3 of the Roads Act 1993, or an environmental planning instrument.

Whether or not the land is affected by a road widening or road realignment proposal under any resolution of Council.

The land is not affected by a road widening or road realignment proposal under any resolution of Council.

2.5 Council and Other Public Authority Policies on Hazard Risk Restrictions

Whether or not the land is affected by a policy adopted by Council or adopted by any other public authority (and notified to the Council for the express purpose of its adoption by that authority being referred to) that restricts the development of the land because of the likelihood of:

- **Land Slip**
  The land is not affected by a policy restriction relating to landslip
- **Bushfire**
  The land is not bushfire prone land (as defined in the Act).
- **Tidal Inundation**
  The land is not affected by a policy restriction relating to tidal inundation
- **Subsidence**
  The land is not affected by a policy restriction relating to subsidence
- **Acid Sulfate Soils**
  The land is not affected by a policy restriction relating to acid sulfate soils.
- **Unhealthy Building Land**
  The land is not affected by a policy restriction relating to Unhealthy Building Land.
- **Any Other Risk**
  Not applicable.

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2.6 Flooding

Development on the land, or part of the land, for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is not subject to any flood related development controls.

Development on the land, or part of the land, for any other purpose is not subject to flood related development controls.

2.7 Matters arising under the Contaminated Land Management Act, 1997.

Not applicable.

2.8 Land Reserved For Acquisition

There is no environmental planning instrument, or proposed environmental planning instrument, applying to the land that makes provision for the acquisition of the land (or any part thereof) by a public authority, as referred to in Section 27 of the Act.

2.9 Property Vegetation Plans

Not applicable

2.10 Orders under Trees (Disputes Between Neighbours) Act 2006

Not applicable

2.11 Directions under Part 3A

Not applicable

2.12 Site Compatibility Certificates and Conditions for Seniors Housing

Not applicable

2.13 Site Compatibility Certificates for Infrastructure

Not applicable

2.14 Site Compatibility Certificates and Conditions for Affordable Rental Housing

Not applicable

2.15 Certain Information Relating to Beaches and Coasts

Not applicable

2.16 Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works

Not applicable

2.17 Biodiversity Certified Land

Not applicable

2.18 Paper Subdivision Information

Not applicable

2.19 Site Verification Certificates

Not applicable

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2.20 Complying Development

Whether or not the land is land on which complying development may be carried out under each of the Codes for complying development because of the provisions of clauses 1.17A (c) and (d) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 and, if no complying development may be carried out on that land under that Policy, the reasons why complying development may not be carried out on that land.

General Housing Code (if in a residential zone) No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Housing Alterations Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

General Development Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Commercial and Industrial (New Buildings and Additions) Code) No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Commercial and Industrial Alterations Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Demolition Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Subdivision Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Fire Safety Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Important Disclaimer: This clause of the Certificate only contains information in respect of that required by clause 3 of Schedule 4 of the Environmental Planning and Assessment Regulation 2000, in relation to Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008. Other provisions contained in the SEPP, including but not limited to, minimum allotment size requirements, specified development standards or any other general exclusions, may preclude Complying Development under the SEPP from being able to be carried out. You will need to refer to the SEPP for complete details. It is your responsibility to ensure that you comply with all other general requirements of the SEPP. Failure to comply with these provisions may mean that any Complying Development Certificate issued under the provisions of the SEPP is invalid.

City of Canterbury
City of Cultural Diversity

Administration Centre, 137 Beamish Street,
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PART 3

INFORMATION PROVIDED UNDER SECTION 149 (5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

Note: *When information pursuant to Section 149(5) is requested the Council is under no obligation to furnish any of the information supplied herein pursuant to that Section. Council draws your attention to Section 149(6), which states that a Council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this Certificate.*

3.1 Amending Local Environmental Plans

Site specific and, where relevant, general amendments to the principal planning instrument are identified below:

Not applicable

3.2 Tree Preservation Order

A tree preservation order applies to the whole of the City of Canterbury.

3.3 Council Policy on Contaminated Land

On the 10 June 1999 Council adopted a policy on contaminated land. This policy will restrict development of land:

a) which is affected by contamination;
a) which has been used for certain purposes;
b) in respect of which there is not sufficient information about contamination;
c) which is proposed to be used for certain purposes;
d) in other circumstances contained in the policy.

3.4 General Advice Regarding Use of Property

Persons considering commencing a use of or purchasing a property are advised to seek confirmation that the current, or intended, use (as the case may be) has been approved by Council, or does not require Council approval. It is pointed out that the question of "existing use rights" within the meaning of the Environmental Planning and Assessment Act, 1979, is a complex matter, and that the commencement of a use without Council approval (where required) is unlawful and may be subject to enforcement action.

3.5 Other Matters

Not applicable.

per **JIM MONTAGUE PSM**
GENERAL MANAGER

City of Canterbury
City of Cultural Diversity

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DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

Kellie Lynch
GPO Box 5394
SYDNEY NSW 2001

PLANNING CERTIFICATE

Section 149 of the Environmental Planning and Assessment Act, 1979.

Certificate No: 33390
14 May 2015

Land which Certificate is issued for:

Lot 1 DP 911478

165-169 Holden Street, ASHBURY NSW 2193

City of Canterbury
City of Cultural Diversity

Administration Centre, 137 Beamish Street,
CAMPSIE N.S.W. 2194
DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

INFORMATION PROVIDED UNDER SECTION 149 (2) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

Land which Certificate is issued for:

Lot 1 DP 911478

165-169 Holden Street, ASHBURY NSW 2193

PART 1:
ENVIRONMENTAL PLANNING INSTRUMENTS

1.1 Principal Environmental Planning Instrument

Canterbury Local Environmental Plan 2012

Date effective from

1 January 2013

Land Use Zone

ZONE SP2 INFRASTRUCTURE

1. Permitted without consent
Roads

2. Permitted with consent
The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose.

3. Prohibited
Any development not specified in item 1 or 2

Administration Centre, 137 Beamish Street,
CAMPSIE N.S.W. 2194
DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

1.2 State Environmental Planning Policies

Note:

The following information indicates those State Environmental Planning Policies (SEPP) which may apply to the subject land. A summary explanation of each SEPP can be sourced from the Department of Planning (DoP) website at www.planning.nsw.gov.au . The full wording of each SEPP can also be accessed via the DoP website.

State Environmental Planning Policies:

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No. 21 - Caravan Parks
No. 30 - Intensive Agriculture
No. 32 - Urban Consolidation (Redevelopment of Urban Land)
No. 33 - Hazardous and Offensive Development
No. 50 - Canal Estates
No. 55 - Remediation of Land
No. 64 - Advertising and Signage
No. 65 - Design Quality of Residential Flat Development
No. 71 - Coastal Protection
State Environmental Planning Policy - (Housing for Seniors or People with a Disability) 2004
State Environmental Planning Policy - Building Sustainability Index: BASIX 2004
State Environmental Planning Policy - (Repeal of Concurrence and Referral Provisions) 2004.
State Environmental Planning Policy - (Major Projects) 2005
State Environmental Planning Policy - (Mining, Petroleum Production and Extractive Industries) 2007
State Environmental Planning Policy - (Temporary Structures and Places of Public Entertainment) 2007
State Environmental Planning Policy - (Infrastructure) 2007
State Environmental Planning Policy (Repeal of Concurrence and Referral Provisions) 2008
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
State Environmental Planning Policy (Affordable Rental Housing) 2009

Proposed State Environmental Planning Policies

State Environmental Planning Policy (Competition) 2010

1.3 Proposed Environmental Planning Instruments (including any Planning Proposals) that are or have been the subject of community consultation or on public exhibition under the Act

Not applicable.

1.4 Development Control Plans.

Canterbury Development Control Plan 2012
Contains detailed design guidelines and development standards for development in Canterbury City.

1.5 Contribution Plans.

Council has in place a Development Contributions Plan prepared and adopted under the Environmental Planning and Assessment Act, 1979.

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PART 2:
RESTRICTIONS ON DEVELOPMENT

2.1 Heritage

Ashbury Heritage Conservation Area
The subject property is located within the Ashbury Heritage Conservation Area and as such is subject to specific provisions in the principal environmental planning instrument and relevant development control plan. Please contact Council's City Planning Division for further details.

Ashfield Reservoir-State Significant Heritage Item
The Ashfield Reservoir is listed as a State Significant Heritage Item.

2.2 Coastal Protection

There is no notification that the subject property is affected by the provisions of Section 38 or 39 of the Coastal Protection Act, 1979.

2.3 Mine Subsidence

The subject land is not within a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act, 1961.

2.4 Road Widening and Road Realignment

Whether or not the land is affected by a road widening or road realignment proposal under Division 2 or Part 3 of the Roads Act 1993 or an environmental planning instrument;

The land is not affected by a road widening or road realignment proposal under Division 2 or Part 3 of the Roads Act 1993, or an environmental planning instrument.

Whether or not the land is affected by a road widening or road realignment proposal under any resolution of Council.

The land is not affected by a road widening or road realignment proposal under any resolution of Council.

2.5 Council and Other Public Authority Policies on Hazard Risk Restrictions

Whether or not the land is affected by a policy adopted by Council or adopted by any other public authority (and notified to the Council for the express purpose of its adoption by that authority being referred to) that restricts the development of the land because of the likelihood of:

- **Land Slip**
  The land is not affected by a policy restriction relating to landslip
- **Bushfire**
  The land is not bushfire prone land (as defined in the Act).
- **Tidal Inundation**
  The land is not affected by a policy restriction relating to tidal inundation
- **Subsidence**
  The land is not affected by a policy restriction relating to subsidence
- **Acid Sulfate Soils**
  The land is not affected by a policy restriction relating to acid sulfate soils.
- **Unhealthy Building Land**
  The land is not affected by a policy restriction relating to Unhealthy Building Land.
- **Any Other Risk**
  Not applicable.

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2.6 Flooding

Development on the land, or part of the land, for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is not subject to any flood related development controls.

Development on the land, or part of the land, for any other purpose is not subject to flood related development controls.

2.7 Matters arising under the Contaminated Land Management Act, 1997.

Not applicable.

2.8 Land Reserved For Acquisition

There is no environmental planning instrument, or proposed environmental planning instrument, applying to the land that makes provision for the acquisition of the land (or any part thereof) by a public authority, as referred to in Section 27 of the Act.

2.9 Property Vegetation Plans

Not applicable

2.10 Orders under Trees (Disputes Between Neighbours) Act 2006

Not applicable

2.11 Directions under Part 3A

Not applicable

2.12 Site Compatibility Certificates and Conditions for Seniors Housing

Not applicable

2.13 Site Compatibility Certificates for Infrastructure

Not applicable

2.14 Site Compatibility Certificates and Conditions for Affordable Rental Housing

Not applicable

2.15 Certain Information Relating to Beaches and Coasts

Not applicable

2.16 Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works

Not applicable

2.17 Biodiversity Certified Land

Not applicable

2.18 Paper Subdivision Information

Not applicable

2.19 Site Verification Certificates

Not applicable

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2.20 Complying Development

Whether or not the land is land on which complying development may be carried out under each of the Codes for complying development because of the provisions of clauses 1.17A (c) and (d) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 and, if no complying development may be carried out on that land under that Policy, the reasons why complying development may not be carried out on that land.

General Housing Code (if in a residential zone) No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Housing Alterations Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

General Development Code No.
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Commercial and Industrial (New Buildings and Additions) Code) No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Commercial and Industrial Alterations Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Demolition Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Subdivision Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Fire Safety Code No.
The land is excluded for the following reason(s): Ashfield Reservoir-State Significant Heritage Item

Important Disclaimer: This clause of the Certificate only contains information in respect of that required by clause 3 of Schedule 4 of the Environmental Planning and Assessment Regulation 2000, in relation to Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008. Other provisions contained in the SEPP, including but not limited to, minimum allotment size requirements, specified development standards or any other general exclusions, may preclude Complying Development under the SEPP from being able to be carried out. You will need to refer to the SEPP for complete details. It is your responsibility to ensure that you comply with all other general requirements of the SEPP. Failure to comply with these provisions may mean that any Complying Development Certificate issued under the provisions of the SEPP is invalid.

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DX: 3813 Campsie
Telephone: (02) 9789 9300
Fax: (02) 9789 1542

PART 3

INFORMATION PROVIDED UNDER SECTION 149 (5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

Note: *When information pursuant to Section 149(5) is requested the Council is under no obligation to furnish any of the information supplied herein pursuant to that Section. Council draws your attention to Section 149(6), which states that a Council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this Certificate.*

3.1 Amending Local Environmental Plans

Site specific and, where relevant, general amendments to the principal planning instrument are identified below:

Not applicable

3.2 Tree Preservation Order

A tree preservation order applies to the whole of the City of Canterbury.

3.3 Council Policy on Contaminated Land

On the 10 June 1999 Council adopted a policy on contaminated land. This policy will restrict development of land:

a) which is affected by contamination;
a) which has been used for certain purposes;
b) in respect of which there is not sufficient information about contamination;
c) which is proposed to be used for certain purposes;
d) in other circumstances contained in the policy.

3.4 General Advice Regarding Use of Property

Persons considering commencing a use of or purchasing a property are advised to seek confirmation that the current, or intended, use (as the case may be) has been approved by Council, or does not require Council approval. It is pointed out that the question of "existing use rights" within the meaning of the Environmental Planning and Assessment Act, 1979, is a complex matter, and that the commencement of a use without Council approval (where required) is unlawful and may be subject to enforcement action.

3.5 Other Matters

Not applicable.

per **JIM MONTAGUE PSM**
GENERAL MANAGER

Appendix G

NSW WorkCover dangerous goods search results

NSW GOVERNMENT
WorkCover

WorkCover NSW
92–100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
Customer Service Centre 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D15/057745
Your Ref: Kellie Lynch

24th April 2015

Attention Kellie Lynch
Parsons Brinckerhoff Australia Pty Ltd
GPO Box 5394
SYDNEY NSW 2001

Dear Ms Lynch,

RE SITE: 165 Holden Street, Ashfield NSW

I refer to your site search request received by WorkCover NSW on 16 April 2015 requesting information on licences to keep dangerous goods for the above site.

Enclosed are copies of the documents that WorkCover NSW holds on Dangerous Goods Licence 35/028815 relating to the storage of dangerous goods at the above-mentioned premises, as listed on the Stored Chemical Information Database (SCID). If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Diana Hayes
Customer Service Officer - Operations
Dangerous Goods Notification Team

Reference

WORKCOVER AUTHORITY

APPLICATION FOR RENEWAL
OF LICENCE TO KEEP DANGEROUS GOODS

ISSUED UNDER AND SUBJECT TO THE PROVISIONS OF THE DANGEROUS GOODS ACT, 1975 AND REGULATION THEREUNDER

DECLARATION: *Please renew licence number 35/028815 to 1996. I confirm that all the licence details shown below are correct (amend if necessary).*

John Patterson — John Patterson — 12-7-95

(Signature) *(Please print name)* *(Date signed)*

for: SYDNEY WATER CORP LTD

*THIS **SIGNED** DECLARATION SHOULD BE RETURNED TO:*

WorkCover Authority
Dangerous Goods Licensing Section (Level 3)
Locked Bag 10
P O CLARENCE STREET 2000

Details of licence on 29 June 1995

Licence Number 35/028815 **Expiry Date** 31/08/95

Licensee SYDNEY WATER CORP LTD ACN 063 279 649

Postal Address ~~86 BELLINGARA RD, MIRANDA 2228~~ P.O. Box 555, Rockdale 2216
Licensee Contact ~~Susan~~ Wright ~~Ph. 522 1471 Fax. 522 7962~~ ph 6618247 fax 661 9084
Premises Licensed to Keep Dangerous Goods
HOLDEN ST
ASHFIELD 2131

Nature of Site Water Supply **Major Supplier of Dangerous Goods** UNKNOWN OR OTHER

Emergency Contact for this Site Wayne Stewart AH 551 4600 ph. 797 0765

Site staffing 8 Hrs 5 Days

Details of Depots

Depot No.	Depot Type	Goods Stored in Depot	Qty
01	FLAMMABLE LIQUID CABINET	Class 3 UN 1203 MOTOR SPIRIT	160 L 160 L

WorkCover New South Wales, 400 Kent Street, Sydney 2000, Telephone (02) 370 5000 ALL MAIL TO LOCKED BAG 10, CLARENCE STREET SYDNEY 2000

Reference

WORKCOVER
NEW SOUTH WALES

APPLICATION FOR RENEWAL
OF LICENCE TO KEEP DANGEROUS GOODS

ISSUED UNDER AND SUBJECT TO THE PROVISIONS OF THE DANGEROUS GOODS ACT, 1975 AND REGULATION THEREUNDER

DECLARATION: *Please renew licence number 35/028815 to 1997. I confirm that all the licence details shown below are correct (amend if necessary).*

..... G. Berriman ..... 16/8/96 .....

(Signature) *(Please print name)* *(Date signed)*

for: SYDNEY WATER CORP LTD

*THIS **SIGNED** DECLARATION SHOULD BE **RETURNED TO:***

WorkCover New South Wales
Dangerous Goods Licensing Section (Level 3)
Locked Bag 10
P O CLARENCE STREET 2000

Details of licence on 13 August 1996

Licence Number 35/028815 **Expiry Date** 31/08/96

Licensee SYDNEY WATER CORP LTD ACN 063 279 649

Postal Address BOX 555 P O, ROCKDALE 2216
Licensee Contact Susan Wright Ph. 661 8247 Fax. 661 9084
Premises Licensed to Keep Dangerous Goods
HOLDEN ST
ASHFIELD 2131

Nature of Site Water Supply **Major Supplier of Dangerous Goods** UNKNOWN OR OTHER

Emergency Contact for this Site Wayne Stewart AH 551 4600 ph. 797 0765

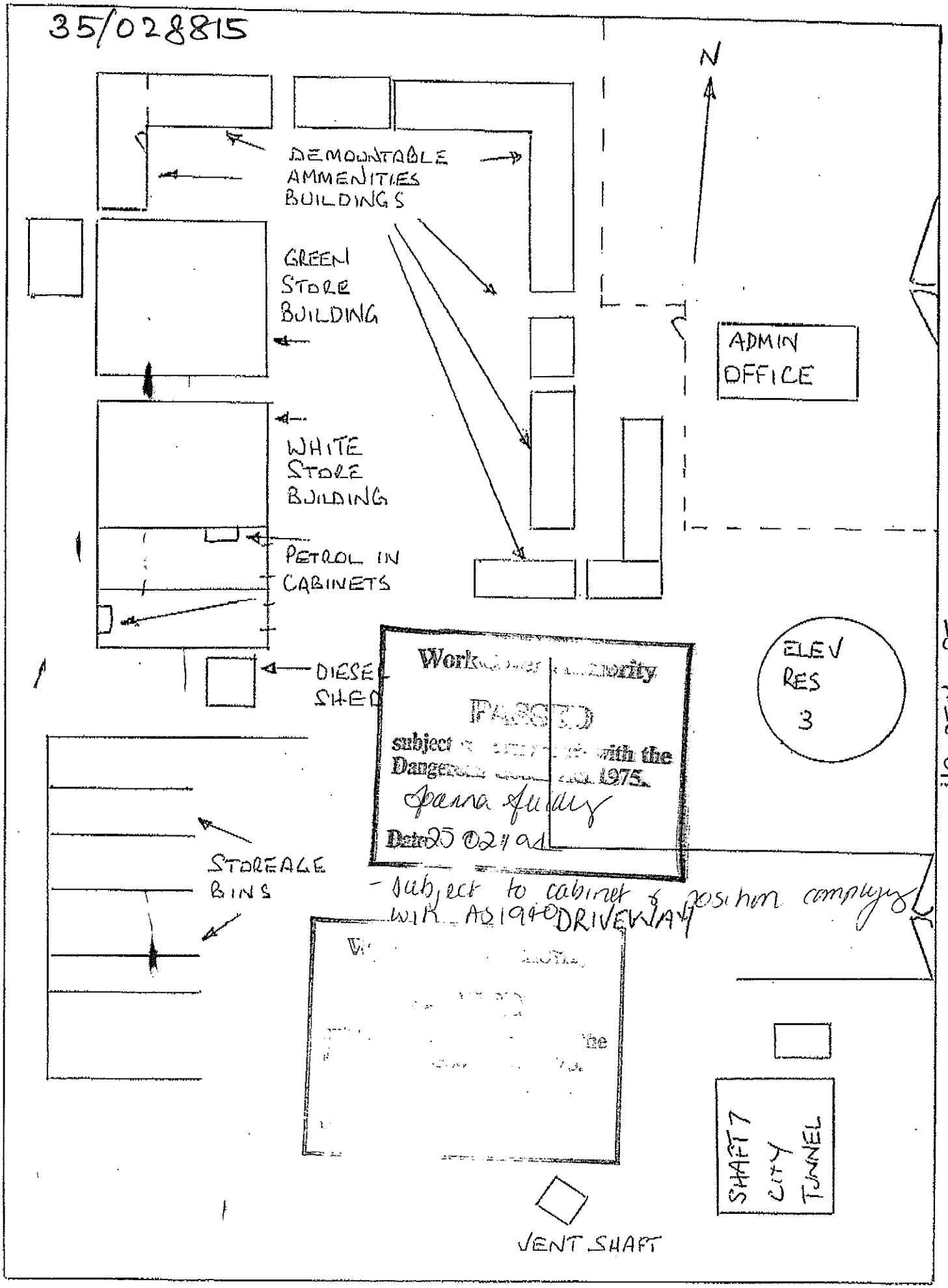
Site staffing 8 Hrs 5 Days

Details of Depots

Depot No.	Depot Type	Goods Stored in Depot	Qty
01	FLAMMABLE LIQUID CABINET	Class 3	160 L
		UN 1203 MOTOR SPIRIT	160 L

LAYOUT OF ASHFIELD DEPOT 165-183 HOLDEN ST NOT TO SCALE

35/028815



Work... PASSED subject ... with the Dangerous ... 1975.
Date 25/02/93

DANGEROUS GOODS – CENTRAL REGION

Applications for 'Licences to Keep Dangerous Goods' have been submitted to Workcover for the following sites:

NAME/ADDRESS	CONTACT NAME	PHONE NO	FAX NO	CLASS	TYPE	QUANTITY	LICENCE	RENEW
Dover Heights Reservoir (no 1 & 2) Portland Road, Dover Heights	Ian Nisbet	6616130	3113500	2.3	Chlorine	only 420 Kg 840 Kg	Unlicensed	Submitted 6.8.93
Maroubra Reservoir Johnson Parade off Byrne Ave, Maroubra	Ian Nisbet	6616130	3113500	2.3	Chlorine	574 Kg	35–0272–67	Submitted 6.8.93
Enfield Water Maintenance Depot Hill Street, Enfield	Geoff Vickers Shane Tindall	7425399	7425152	3PG11 2.3	Fuel Chlorine	120 Ltrs 219 Kg	~~35–0272–66~~	Re–Submitted 8.9.93
Penshurst Reservoir 12c Laycock Street, Penshurst	Rod Meres Colin Ryan	5795688	5808716	3PG11 2.3	Fuel Chlorine	160 Ltrs 102 Kg	35–0272–68	Re–Submitted 26.8.93
Petersham C12 Dosing Plant Cnr Chester & Albert Sts, Petersham	Wayne Stewart	7970765	7998892	2.3	Chlorine	200 Kg	35–0272–69	Submitted 6.8.93
City Water Depot Holden St, Ashfield	Wayne Stewart	7970765	7998892	3PG11	Fuel	200 Ltrs	Unlicensed	Submitted 26.8.93

Plan