Health Infrastructure NSW

The Multi-storey Car Park at The Children's Hospital at Westmead Stage 2 Redevelopment

Remedial Action Plan

Labyrinth Way,
Westmead NSW

9 February 2021
56200/131434 (Rev C)
JBS&G Australia Pty Ltd

www.jbsg.com.au

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Abbreviations

Term	Definition
ACM	Asbestos Containing Materials
AEC	Areas of Environmental Concern
AF	Asbestos Fibres
AHD	Australian Height Datum
AQA	Asbestos Quantification Assessment
ASS	Acid Sulfate Soils
bgs	Below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CHW	The Children's Hospital at Westmead
CLM Act	Contaminated Land Management Act
COC	Chain of Custody
COH	Certified Occupational Hygienist
COPC	Contaminants of Potential Concern
DBYD	Dial Before You Dig
DP	Deposited Plan
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DSI	Detailed Site Investigation
EIL	Ecological Investigation Levels
EPA	NSW Environment Protection Authority
ESLs	Ecological Screening Levels
FA	Fibrous Asbestos
HI	Health Infrastructure
HILs	Health Investigation Levels
HSLs	Health Screening Levels
JBS&G	JBS&G Australia Pty Ltd
LAA	Licenced Asbestos Assessor
LOR	Limit of Reporting
MSCP	Multi-Storey Car Park
NATA	National Accreditation Testing Authority
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
OCP	Organochlorine Pesticides
OPP	Organophosphate Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PASS	Potential Acid Sulfate Soil
PCB	Polychlorinated Biphenyls
PSH	Phase Separated Hydrocarbons
PID	Photo-ionisation Detector
POEO Act	Protection of Environment Operations Act
PSB	Paediatric Services Building
QA/QC	Quality Assurance/Quality Control
RAP	Remedial Action Plan
RPD	Relative Percentage Difference
SAQP	Sampling Analytical and Quality Plan
SEPP55	State Environmental Planning Policy No 55 – Remediation of Land
SSDA	State Significant Development Application
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
VOC	Volatile Organic Compounds
WSLHD	Western Sydney Local Health District

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Health Infrastructure NSW (HI, the Client) to prepare a Remedial Action Plan (RAP) for the proposed Multi-Storey Car Park (MSCP) development at The Children's Hospital at Westmead (CHW), part of the overall Westmead Precinct, located on Labyrinth Way, Westmead, NSW 2145 (the site). The site is formally identified as mainly Part Lot 101 in DP 1119583 and slightly encroaches onto Lot 1 in DP 1194390 and Lot 1 in DP 808447, and comprises an area of approximately 1.27 hectares (ha). **Figure 1** presents the site location and **Figure 2** presents the detailed site layout.

The proposed development under this State Significant Development Application (SSDA) is a Multi Storey Car Park (MSCP) initially accommodating staff and staff and visitor car parking once the PSB is operational. The MSCP to be located on Labyrinth Way, on the site of The Lodge.

The scope of proposed works includes:

- Demolition of The Lodge;
- Construction of a new MSCP, approximately 8 car parking storeys, which is equivalent to the height of 5 storeys of the hospital;
- Facilitating approximately 1,000 car parking spaces for staff and visitors;
- Vehicular access from Labyrinth Way and / or Redbank Road;
- A split-level approach to the MSCP to respond to the natural ground level;
- Ancillary retail facilities;
- Road works;
- Realignment of Redbank Road with vehicular access connection to the MSCP;
- Tree removal; and
- Associated landscape works.

The MSCP is being designed to be constructed in a single stage yet car parking will be staged operationally to come on-line with parking demand across the Precinct:

- The first stage of car parking operation would provide replacement car parking for the demolished P17 car park. There would be no net increase of parking on site under this stage.
- The second stage of car parking operation to serve the growth in hospital activity associated with the future Paediatric Services Building (PSB, subject to a separate SSDA) would only come on-line operationally with the PSB SSDA consent becoming operational, specifically at occupation. This would provide growth of around 280 additional spaces in line with hospital activity projections until 2031.

The proposed MSCP conceptual development plans are included in **Appendix B**. The proposed MSCP building footprint and associated road upgrade areas are shown on **Figure 3**.

The broader Westmead Hospital Precinct (of which the site is part of) has been subject to a range of previous investigations that have identified asbestos impacted fill across the site. A Detailed Site Investigation (DSI) (JBS&G 2020[1]) was subsequently completed within accessible areas of the

[1] *Detailed Site Investigation – The Lodge, Labyrinth Way, Westmead NSW,* JBS&G Australia Pty Ltd, 18 November 2020, Rev 2 (JBS&G 2020)

site and identified bonded and friable asbestos impacts in fill materials at multiple locations across the site, with all fill materials at the site considered to be impacted by asbestos.

JBS&G (2020) considered that the site could be made suitable for the proposed land use subject to development and implementation of a site-specific RAP in accordance with the relevant regulatory requirements made or approved by the NSW Environment Protection Authority (EPA) and relevant Australian Standards.

The RAP conducted for this site and this report meet the requirements of *State Environmental Planning Policy No 55 - Remediation of Land* (SEPP 55). This report documents the procedures and standards to be followed in order to address the identified asbestos impacted soils in such a manner as to make the site suitable for the proposed future uses.

This RAP has also been undertaken to address Item 20 of the Secretary's Environmental Assessment Requirements (SEARs) for State Significant Development Application (SSD-10434896) for the MSCP project.

1.2 Objectives

The objective of this RAP is to document the procedures and standards to be followed in order to address the contamination identified at the site, ensuring the protection of human health and the surrounding environment, such that the contamination is remediated / managed in such a manner as to make the site suitable for the proposed future uses.

2. Site Condition & Surrounding Environments

2.1 Site Identification

The location of the site is shown on **Figure 1**. The layout of the site is shown on **Figure 2**. The site details are summarised in **Table 2.1**.

Table 2.1 Summary Site Details

Lot/DP	Part Lot 101 in DP 1119583 – CHW Lot Part Lot 1 in DP 1194390 – Westmead Hospital Lot Part Lot 1 in DP 808447 – Cumberland West Hospital Lot
Site Address	Labyrinth Way, Westmead NSW
Local Government Authority	Parramatta City Council
Site Area/s (ha)	1.27 ha
Site Zoning	SP2 (Health Services Facility) under Parramatta City Council Local Environmental Plan (LEP) 2011
Previous Use	Agricultural land prior to 1970s
Current Use	The Lodge and grounds, CHW car parking, Redbank Road, public open spaces, children's playground and pedestrian pathways.

2.2 Site Description

The site comprises an open grassed area and paved pedestrian pathway, a portion of Redbank Road, and hardstand carparks in the north-western portion, an open grassed area in the north-eastern portion, a landscaped playground/community use area in the southern portion and The Lodge building footprint and landscaped grounds in the central portion. The site surfaces were a mixture of landscaped/grassed areas, asphalted Redbank Road and carparks, concreted and paved pedestrian pathways, a concreted vehicle access road connecting Labyrinth Way to the main CHW buildings and rubber matted surfaces across the children's playground portion. The Lodge building and surrounding landscaped gardens was fenced off from public use, with the remaining areas available for pedestrian/vehicle access.

The site topography was observed to be relatively flat across the southern portion (children's playground and associated open spaces) and across The Lodge building footprint and sloped in a north-eastern and north-western direction across the remainder of the site. Grass coverage across the site was observed to be in good condition, with minor areas of exposed soils present in The Lodge gardens and gardens surrounding the playground. Landscaped/garden bed areas were covered with mulch and/or leaf litter.

Multiple underground services were identified at the site including communications, gas, electricity, stormwater, irrigation/water and sewer lines, identified from publicly available dial before you dig plans and during underground service location across the site.

Redbank Road bounds the site to the north-west, with Labyrinth Way bounding the site to the north and west, with both roads comprising a two lane asphalt roadway.

2.3 Surrounding Land-use

The surrounding land-uses of the site are detailed below.

- North – Labyrinth Way, with Toongabbie Creek further beyond.
- East – Labyrinth Way and Ronald McDonald House.
- South – Public open space areas, CHW main buildings and Cumberland Hospital West campus to the south-east.
- West – CHW main buildings and Redbank Road.

2.4 Topography

Review of topographic information obtained from the Spatial Information Exchange Viewer (LPI 2018[2]) regional topographic map indicated the site varied in elevation from 14 m AHD in the northern portion to 20 m AHD in the southern, sloping to the north-east and north-west towards Toongabbie Creek.

The site appeared to be generally flat across the southern portion and across The Lodge building footprint and sloped to the north-east and north-west across the remainder of the site in line with the general topography of the area. The altered topography indicates historical localised cutting and filling activities may have occurred across the site.

2.5 Geology and Soil

According to the Penrith 1:100 000 Geological Sheet 9030 (1991), the site is underlain by Ashfield Shale of the Wianamatta Group, which comprises black to dark grey shale and laminite.

Review of eSPADE[3] indicated that the natural site soils comprise the Blacktown soil landscape which comprises residual soils that are shallow to moderately deep hardsetting mottled texture contrast soils, red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes in drainage lines.

The dominant fill material consisted of brown to dark brown heterogenous silty / gravelly clay with inclusions of asbestos to depths ranging from 0.8 to 4.0 m bgs. Natural silty clay and/or shale / sandstone bedrock were generally noted at varying depths beneath the fill profiles.

2.6 Acid Sulfate Soils

Review of the Prospect / Parramatta River 1:25 000 Acid Sulfate Soil Risk Map[4] indicates a low probability of acid sulfate soils being present at the site, within alluvial, creek and river sediment adjacent to Toongabbie Creek.

The Parramatta City Council LEP 2011 identifies the site as Class 5 on the Acid Sulfate Soils maps. For sites within this classification, an acid sulfate soil investigation and/or management plan is required prior to issue of a development consent to carry out works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres AHD and by which the water table is likely to be lowered below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land.

During site investigation works, no indicators of ASS or potential ASS (PASS) were observed in any sample locations.

Based on the above and with consideration to the identified site geology, no further assessment of acid sulfate soil is required with regard to future development of the site.

Review of the Prospect / Parramatta River 1:25 000 Acid Sulfate Soil Risk Map indicates a low probability of acid sulfate soils being present at the site, within alluvial, creek and river sediment adjacent to Toongabbie Creek.

[2] *'Spatial Information Exchange Viewer'*, NSW Land and Property Information, Accessed 15 October 2020, https://maps.six.nsw.gov.au/

[3] http://www.environment.nsw.gov.au/eSpadeWebapp/. Department of Environment and Heritage, NSW Government. Accessed on 15 October 2020

[4] *Prospect/Parramatta River 9130 N3 – Acid Sulfate Soil Risk Map – Edition Two*, Department of Land and Water Conservation, 1997 (DLWC 1997).

2.7 Salinity Potential

The *Salinity Potential in Western Sydney* map (DIPNR 2002[5]) indicates that the assessment area exists within an area of both 'very low salinity potential' and 'moderate salinity potential', coinciding with areas of the site in Hawkesbury Sandstone and Ashfield Shale geological settings respectively. Areas with the 'very low salinity potential' classification exhibit soils that are rapidly drained and underlaying Hawkesbury Sandstone strata are highly permeable, resulting in continual flushing and removal of salts in the landscape. No salinity has been observed in these areas and is not expected to occur. Areas with 'moderate salinity potential' occur on Wianamatta Group Shales (Ashfield Shale) and exhibit scattered scalding and indicator vegetation, but soil concentrations have not been mapped. Saline areas are identified as potentially existing within these zones.

A review of eSPADE[6] indicated that the site exists within the Prospect Hydrogeological Landscape (HGL). Relevant information from this landscape is summarised following:

- This HGL is characterised by deep storage of salts in relatively thick shale soil layers, forming gently undulating low hills and comprises predominantly sedimentary rocks from the Triassic Wianamatta Group (laminate, black and grey shales, lithic sandstone and rare coal).
- Minor to severe salt sites occur within this landscape. They are most comment within the foot slopes of the low hills and at the contact between the colluvial and alluvial plains however the severe salt damage also occurs on the upper slopes or crests of hills around the contact of picrite caps with underlying shales. Moderate levels of salt are exported from the deep shales, which means some of the creeks within the unit contain brackish water;
- The landscape has high levels of salinity occurrence with small salt sites commonly occurring along drainage depressions, on hill tops and within urban structures at both upper and mid slope positions within this HGL; and
- Landscape limitations and hazards on this HGL include salt store, with moderate depths of Ashfield Shale storing moderate quantities of mobile salt, picrite/basalt cap weathers to produce relatively impermeable clay layers high in landscape and lateral flow discharging high in landscape, and an undulating landscape where changes of slope predisposes landform to salinity discharge.

It is understood that the proposed works will be excavating through fill material, with no proposed disturbance/exposure to natural materials, therefore eliminating the potential for mobilisation of salt via erosion during rainfall events or groundwater seepage.

2.8 Hydrology

Surface water is anticipated to primarily enter the stormwater system with infiltration through unsealed soils, grassed areas and garden beds. Toongabbie Creek, located approximately 30 m to the north of the site is a major freshwater tributary of Parramatta River, which itself is approximately 200 m east of the site. Parramatta River varies from a freshwater environment (upstream of the Charles Street Weir) to a brackish/estuarine (downstream of the Charles Street Weir) environment and ultimately discharges to Sydney Harbour.

[5] *Salinity Potential in Western Sydney*. Department of Infrastructure, Planning and Natural Resources, March 2003, DIPNR 2002

[6] *ESPADE 2.0*. NSW Office of Environment and Heritage accessed 25 October 2020, (OEH 2020)

2.9 Hydrogeology

Multiple groundwater bores were located within 1.5 km of the site, with standing water levels ranging from 3.2 metres below ground surface (m bgs) to 10 m bgs. Recent groundwater investigations identified groundwater across the site from 3.34 m bgs to 4.40 m bgs. It was posited that the groundwater flow direction would be towards Toongabbie Creek to the north-east and north-west of the site.

2.10 Meteorology

A review of average climatic data for the nearest Bureau of Meteorology (BOM) monitoring location at Parramatta North (Masons Drive) Meteorological Station[7] indicates the site is located within the following meteorological setting:

- Average minimum temperatures vary from 6.2 ^{o}C in July to 17.7 ^{o}C in January;
- Average maximum temperatures vary from 17.5 ^{o}C in July to 28.6 ^{o}C in January;
- The average annual rainfall is approximately 967.1 mm with rainfall greater than 1 mm occurring on an average of 89.8 days per year; and
- Monthly rainfall varies from 44.5 mm in July to 120.7 mm in February with the wettest periods occurring on average between January and March.

Mean monthly temperature ranges from 17.4 degrees Celsius to 28.4 degrees Celsius. Mean monthly average rainfall ranges from 45.6 mm to 124.8 mm. Summer winds tend to be from the east, whereas winter winds tend to be from the west.

[7] http://www.bom.gov.au/climate/data/index.shtml. Accessed on 15 October 2020

3. Previous Site Investigations

Previous investigations have been completed for the site and broader Westmead Redevelopment. The following investigation reports were available for review as part of the preparation of the RAP:

- *Geotechnical Investigation, Proposed Labyrinth, Westmead Children's Hospital Westmead,* Douglas Partners, August 2006 (DP 2006).
- *Report on Contamination Risks, Westmead Hospital Redevelopment, Hawkesbury Road Westmead*, Douglas Partners, July 2014 (DP 2014).
- *Detailed Site Investigation for Contamination, Proposed New Ronald McDonald House, Redbank Road, Westmead 2145*, Douglas Partners, June 2015, ref: 87499.01.R.001 (DP 2015).
- *Detailed Site Investigation, The Children's Hospital at Westmead, Stage 2 Redevelopment, Redbank Road, Westmead NSW,* JBS&G Australia Pty Ltd, 3 October 2019, 56200/121980 Rev A (JBS&G 2019).
- *Detailed Site Investigation – The Lodge, Labyrinth Way, Westmead NSW,* JBS&G Australia Pty Ltd, 18 November 2020 Rev 2 (JBS&G 2020).

The following sections present a summary of relevant information included in each of the above reports.

3.1 Geotechnical Investigation, Proposed Labyrinth (DP 2006)

DP was engaged by CHW to undertake a geotechnical investigation of the proposed labyrinth, bordering the south-eastern boundary of the site. The investigation was required to provide information on subsurface conditions for the planning of site works and design of earthworks, foundations, retaining walls and the labyrinth slab. The investigation comprised the advancement of three test pits and dynamic cone penetrometer tests, with laboratory testing of selected soils.

The test pits identified brown/grey gravelly clay fill at depths up to 2.3 m bgs, with inclusions of significant amounts of asbestos containing material (ACM) sheeting in poor condition and other anthropogenic/construction material inclusions throughout the fill. It was recommended that a separate contamination assessment be carried out across the investigation area and surrounds to determine the extent of contamination, the risk posed to personnel in the area and appropriate remediation measures.

3.2 Report on Contamination Risks, Westmead Hospital Redevelopment, Hawkesbury Road, Westmead (DP 2014)

DP was engaged by HI to present the contamination risks associated with the proposed future development of the broader Westmead Hospital. The report identified known asbestos contaminated fill beneath the existing CHW buildings to the south-west of the site, including beneath the existing children's playground in the southern portion of the site.

3.3 Detailed Site Investigation for Contamination, Proposed New Ronald McDonald House, Redbank Road, Westmead (DP 2015)

DP was engaged by Arnold Tink House Inc to undertake a DSI for the proposed new Ronald McDonald House, located to the east of the site. The investigation comprised the advancement of 14 test pits to supplement the data from 12 previous test pits conducted across the site in 2012. Three groundwater monitoring wells were also installed across the investigation area.

The test pits identified brown silty clay fill at depths up to 2.2 m bgs, with inclusions of significant amounts of ACM sheeting and pipe fragments in poor condition at multiple locations across the investigation area, as well as other anthropogenic/construction material inclusions throughout the fill. Concentrations of ACM and friable asbestos also exceeded the adopted site criteria at multiple locations. No other significant soil or groundwater chemical exceedances were identified during the investigation.

It was recommended that a RAP should be prepared to detail the procedures for remediating the identified asbestos contamination across the investigation area, as well as the preparation of an environmental management plan or asbestos management plan for the site to manage the identified asbestos risks at the site.

3.4 CHW Stage 2 DSI (JBS&G 2019) – PSB Redevelopment

JBS&G was engaged by HI to conduct a DSI of the proposed Westmead Children's Hospital Stage 2 PSB Redevelopment (delivered under a separate SSDA), to the west of the site. The investigation works comprised a detailed site inspection and advancement of 42 soil sampling locations across the site, with three locations converted into monitoring wells. Soil and groundwater were subsequently analysed from these locations to characterise site conditions.

Based on the scope of work the following conclusions were made:

- Several types of fill materials were encountered across the area, however the dominant fill type consisted of brown to dark brown heterogenous sandy clay / silty sandy clay to depths ranging from 1.5 m bgs to 6.2 m bgs, with anthropogenic inclusions of asbestos, plastic, metal fragments, bricks, concrete fragments, igneous gravels, trace bitumen and glass. The vertical extent of fill was not determined at some locations due to refusal on concrete slab.
- Multiple chemical exceedances were reported above the adopted ecological criteria, however, these exceedances were not considered to be statistically significant or present unacceptable risks requiring remediation or management.
- Bonded ACM and friable fibrous asbestos/asbestos fines (FA/AF) exceeded the site assessment criteria at a number of sample locations across the lateral and vertical extent of the gravelly clay fill material across the investigation area. All fill materials at the site were considered to be impacted by asbestos in soils.
- No groundwater, chemical mixtures or significant offsite migration risks were identified.

On this basis, it was considered that subject to development and implementation of site-specific RAP, Asbestos Management Plan (AMP) and Construction Environmental Management Plan (CEMP) during future redevelopment works, the current site can be made suitable for the proposed hospital land use.

3.5 DSI, The Lodge, Labyrinth Way, Westmead NSW (JBS&G 2020) – MSCP Redevelopment

JBS&G was engaged by HI to conduct a DSI of The Lodge and surrounds as part of the proposed MSCP redevelopment across the site. This report forms the basis of this RAP and supports the MSCP Redevelopment SSDA.

The investigation works comprised a detailed site inspection and advancement of 32 soil sampling locations across the site, with four locations converted into monitoring wells, as shown on **Figure 3**. Soil and groundwater were subsequently analysed from these locations to characterise site conditions.

Based on the scope of work the following conclusions were made:

- Several types of fill materials were encountered across the site, however the dominant fill consisted of brown to dark brown heterogenous silty / gravelly clay to depths ranging from 0.8 to 4.0 m bgs. Inclusions of bonded ACM, road base gravels and slag were observed. No odours or staining were observed within fill across the site.
- Bonded ACM and friable FA/AF concentrations exceeded the site assessment criteria at a number of sample locations across the lateral and vertical extent of the gravelly clay fill material at the site, as shown on **Figures 4A and 4B**). All fill materials at the site are considered to be impacted by asbestos in soils.
- Elevated heavy metal concentrations were reported within groundwater across all wells. Based on the geology underlying the site, it is considered that the heavy metal concentrations are representative of a combination of regional background geo-chemistry and minor influences of the surrounding environment rather than specific point sources of contamination. Therefore, it is considered that the elevated heavy metal concentrations in groundwater do not pose an unacceptable risk, requiring remediation/management.
- No chemical mixtures or significant offsite migration risks were identified.

On this basis, it was considered that subject to development and implementation of site-specific RAP, AMP and CEMP during future redevelopment works, the current site can be made suitable for the proposed hospital land use.

4. Summary Site History

A summary of the site history as it relates to the site is presented below.

Table 3.1 Summary of Historical Aerial Imagery Review

Year	Observations
1943	The site and the surrounding lands appeared to be used for agricultural purposes. No residential or industrial development were apparent on site.
1951	The site and the surrounding lands remained unchanged from the 1941 aerial.
1961	The site still appeared to be vacant, with an earthen track observed through the central portion of the site. The land to the south west and south east appeared to be developed as part of the existing Westmead and Cumberland Hospital campuses. Land to the north of Toongabbie Creek appeared to be developed for residential use.
1972	The overall site appeared relatively unchanged from the previous (1961) aerial. To the north-east of the site, adjacent agricultural land appeared disturbed with multiple earthen tracks identified, and potential filling in the centre of these tracks indicated by disturbed ground.
1975	The majority of the site appeared relatively unchanged from the previous (1972) aerial, with the earthen track no longer visible. Extensive earthworks to the west of the site was observed and encroached onto the north-western portion of the site. No earthworks appeared across the remainder of the site.
1976	The majority of the site appeared relatively unchanged from the previous (1975) aerial, with earthworks continuing across the north-western portion and to the west of the site. The construction of Redbank Road was also visible in the north-western portion of the site.
1980	Earthen tracks and disturbed ground were apparent across the southern and eastern portions of the site, with similar observations to the north-east, indicating potential filling. The earthworks in the north-western portion and to the west of the site appeared to be complete, with developed hospital buildings and Redbank Road observed.
1986	The site and surrounds appeared relatively unchanged from the previous (1980) aerial, with the exception of an earthen track running through the site, adjoining Redbank Road.
1991	Significant earthworks were observed across the site and broader CHW campus area to the south and west. Smaller stockpiles, vehicle parking, storage areas and haul roads were observed across the site. To the north-east, disturbed ground indicating potential filling was observed and intersected the north-eastern portion of the site.
1998	The site appeared to be developed as The Lodge, as well as hardstand car parks in the north-western portion and open spaces associated with the broader CHW campus surrounding The Lodge. The disturbed area to the north-east appeared to be developed as a grassed oval. Labyrinth Way was constructed to the north of the site. The broader CHW campus was developed surrounding the site including associated carparks, pedestrian pathways and hospital buildings.
2005	The site generally remained relatively unchanged from the 1998 aerial with the exception of paved areas and a shade structure added to The Lodge grounds, as well as increased vegetation growth across the site.
2010	The children's playground was observed in the southern portion of the site, with the remainder of the site and surrounds appearing relatively unchanged from the 2005 aerial.
2020	The site appeared relatively unchanged from the 2010 aerial, with the exception of increased vegetation growth and a sealed driveway in the eastern portion linking Labyrinth Way to the broader CHW buildings. The new Ronald McDonald House buildings and carpark was observed to the east of the site, with the remainder of the surrounds appearing relatively unchanged.

5. Contamination Status

5.1 Summary of Known Contamination

Contamination of land is defined by the *Contaminated Land Management Act 1997* (CLM Act) as "the presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment."

5.1.1 Asbestos Contaminated Fill

JBS&G 2020 identified asbestos contaminated brown gravelly clay fill across the north-western and eastern portion of the site, with visible bonded (non-friable) ACM fragments as well as friable asbestos across these portions (refer **Figures 4A & 4B**). The extent of this fill type (and of asbestos contamination) beneath The Lodge building is currently unknown and will be addressed by the completion of a data gap assessment following demolition (refer **Figure 5**).

Fill materials across the south-western portion were more varied, with observations of similar brown gravelly clay fill as well as other potential reworked natural materials comprising clays of red, grey and light brown in colour. Although no asbestos was identified across this portion of the site during the DSI (JBS&G 2020), it is assumed the same brown gravelly clay fill material contains asbestos. As a conservative measure, the other fill types identified are also assumed to be asbestos containing, based on a review of the site development history and previous experience with differing fill types across other portions of the Westmead hospital campus. If these differing fill materials are surplus to site requirements and there is potential for segregation of these soils from the brown gravelly clay fill during redevelopment, additional asbestos assessments can be conducted to assess whether these soils could be re-used within the site.

The proposed redevelopment works of the site comprise an area of approximately 1.27 ha and will therefore disturb an aggregate area of contaminated soil of less than 3 ha.

5.2 Summary of Potential Contamination Data Gaps

Soils underlying The Lodge building footprint on the site have not been assessed due to access limitations. The extent of asbestos contaminated fill extending from the known impacts in the eastern portion has also not been delineated due to the presence of The Lodge footprint. It is presumed that the asbestos impacted fill will extend beneath the building footprint, with soils requiring further assessment as per the sampling regime in **Table 9.2**. Proposed sampling locations will be completed on a 20 m grid across the building footprint following demolition, with approximate locations detailed on **Figure 5**.

6. Remediation Options

6.1 Remediation Objectives

The remediation objectives are outlined as follows:

- Removal of unacceptable risks to human health and the environment from the identified asbestos contaminated fill such that the site is suitable for the proposed uses;
- Validate the remedial works in accordance with the relevant NSW EPA Guidelines and with reference to the adopted site criteria; and
- Document the validation process.

This RAP has been prepared with reference to the following guidelines and legislation:

- *Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land*; (DUAP 1998).
- *Contaminated Sites: Sampling Design Guidelines*, September 1995 (EPA 1995).
- *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*, NSW EPA, May 2020 (EPA 2020).
- *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme*, 3rd Edition, NSW EPA, October 2017 (EPA 2017).
- *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended 2013, National Environment Protection Council (NEPC 2013).
- *Work Health and Safety Act 2011* (WHS Act).
- *How to safely remove asbestos - Code of Practice,* Safe Work Australia, 2020 (SWA 2020a).
- *How to manage and control asbestos in the workplace - Code of Practice,* Safe Work Australia, 2020 (SWA 2020b).
- *Management of asbestos in the non-occupational environment*, enHealth Council, 2005 (enHealth 2005).
- *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, WA Department of Health, 2009 (WA DoH 2009).

6.2 Extent of Remediation

6.2.1 Asbestos Impacted Fill

The lateral extent of known asbestos contamination is shown in **Figure 6**, comprising locations of brown gravelly clay fill observed across the site, including locations where this fill material was identified across the western portion. Differing fill materials observed across the south-western portion have been assumed to be impacted with asbestos for the purposes of this RAP, with potential for further assessment if surplus to site requirements. Fill materials beneath The Lodge building footprint have also been assumed to be impacted with asbestos for the purposes of this RAP and will be further defined during the data gap assessment as noted in **Section 5.2**.

The vertical extent of remediation will be to the vertical depth of asbestos contaminated fill, with consideration to the specific design options for the site which may form permanent capping layers (such as permanent slabs underlying the MSCP, car park, access roadways etc.).

6.2.2 Data Gaps

The data gaps of the under building soils have been incorporated within the RAP and are to be addressed during the validation works and are shown on **Figure 5**.

6.3 Consideration of Possible Remediation Options

6.3.1 EPA (2017) Guidance

The approach adopted in this RAP is consistent with the preferred hierarchy of options for site clean-up and/or management provided in NEPC (2013) and referred to be EPA (2017), which are listed as follows:

- on-site treatment so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
- off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site; or

if the above are not practicable,

- consolidation and isolation of the soil on-site by containment within a properly designed barrier; and
- removal of contaminated soil to an approved site or facility, followed where necessary, by replacement with appropriate material;

or

- where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

In addition, it is also a requirement that remediation should not proceed in the event that it is likely to cause a greater adverse effect than leaving the site undisturbed. In addition, where there are large quantities of soil with low levels of contamination, alternative strategies are required to be considered or developed (EPA 2017). In addition, sustainability should be considered by the consultant when deciding which remediation option to choose, in terms of achieving an appropriate balance between the benefits and effects of undertaking the option. For example, where there are large quantities of soil with low levels of contamination, alternative strategies are required to be considered or developed (EPA 2017).

Consideration of each of the available options is presented in **Table 6.1**, considering the proposed development works at the site.

6.3.2 WA DoH 2009 Guidance

WA DoH 2009 provides specific guidance in the remediation and management of asbestos.

WA DoH 2009 note the following considerations as important when assessing the acceptability of any remediation:

- Minimisation of public risk;
- Minimisation of contaminated soil disturbance; and
- Minimisation of contaminated material/soil moved to landfill.

Consideration of each of the WA DOH 2009 guidance is presented in **Table 6.1**, taking into account the proposed development works at the site.

6.4 Possible Remedial Options

Table 6.1: Remedial Options Matrix

Option of Treatment	Discussion	Conclusion
Option 1: On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level.	FA / AF impacted soils FA / AF are typically heterogeneously distributed throughout impacted soils and are not readily visible to the naked eye. On this basis, there is no option considered appropriate to remove asbestos fibres from impacted soils on site. Furthermore, attempted removal of FA / AF from impacted soil would results in increased disturbance of FA / AF impacted soils.	Not a suitable option.
	ACM only impacted soils Bound ACM can be removed from impacted soils by hand-picking. Hand picking of ACM within fill material is labour intensive and can be costly and time consuming. The success of the remediation method is highly dependent upon the soil type and the amount of other building rubble present within the fill, and also on the adopted validation criterion. The more clayey the soil, or the more building rubble present, the harder it is to remove all ACM.	**The preferred option if areas of exclusively bonded ACM are identified and need to be segregated from friable impacted soils for beneficial re-use above the marker layer.**
Option 2: Off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site.	FA / AF impacted soils As with Option 1, treatment of these materials is not a viable option.	Not a suitable option.
	ACM only impacted soils As above (Option 1), however, there are reductions in noise and dust emissions on site in comparison to on-site treatment (Option 1), but these are offset by increased truck movements. Typically, the costs associated with returning the treated materials to site may be equivalent to the costs associated with disposal to landfill. Furthermore, there are currently no facilities licensed to accept asbestos impacted material for offsite treatment.	Not a suitable option.
Option 3: Consolidation and isolation of the soil on-site by containment within a properly designed barrier.	FA / AF impacted soils Given the extent of FA / AF impacted soils across the hospital campus portion of the site, a remediation objective was to minimise disturbance of FA / AF impacted soils where possible, which is in accordance with guidance provided by WA DoH 2009. It is considered that extensive remediation, removal and disposal of FA / AF heavily impacted soils would cause a greater adverse effect than if the impacted soils remain in-situ where possible and are contained and managed in the long term. It is noted that containment of contaminated soil would require the potential exposure to contamination to be managed by the implementation of a Long Term Asbestos Management Plan (LTAMP). There must be acceptance by the ultimate custodian of the land that future controls will be implemented, and that a notation will be made on the Title of the land. Implementation of a LTAMP is considered feasible for the site given the proposed long term uses as a health services facility.	**The preferred option.**

Option of Treatment	Discussion	Conclusion
	ACM only impacted soils Onsite containment is a suitable remedial option for areas where ACM impact is present above a threshold that renders it commercially unviable to remediate for onsite reuse. This may be due to an inability to effectively remove non-friable ACM due to soil type and building rubble concentration. The amount of material able to be contained onsite will be dependent upon final design levels and the total volumes of fill materials required.	A suitable option if unable to remediate onsite.
Option 4: Removal of contaminated soil to an approved site or facility, followed where necessary by replacement with clean fill.	FA / AF impacted soils There are currently suitably licensed waste facilities in the Sydney Metropolitan region capable of accepting asbestos contaminated soils. Offsite disposal of FA / AF impacted soils is likely the fastest method of remediation, but also involves significant disturbance of the FA / AF impacted materials and should be limited to excess material that cannot remain contained onsite. This option generates the highest quantity of waste, since the materials are disposed to landfill rather than treated and reused (i.e. Options 1 & 2) or retained on site (Option 3). This option also generates additional truck movements and associated fuel/emissions over Option 1 and Option 3, but less than Option 2, since materials are not returned to site	A suitable option if unable to contain onsite.
	ACM only impacted soils Offsite disposal is a suitable remedial option for areas where ACM impact is present above a threshold that renders it commercially unviable to remediate for onsite reuse. This may be due to an inability to effectively remove bound ACM due to soil type and building rubble concentration.	A suitable option if unable to remediate or contain onsite.

6.5 Preferred Remedial Strategy

A number of potential remedial options have been outlined in **Table 6.1**. The preferred remedial strategy for the site is:

- Containment of asbestos impacted soils onsite, subject to space constraints, with the installation of a marker layer, capping layer, implementation of a LTAMP and notation on the land Title.

Offsite disposal of asbestos impacted soils, if asbestos impacted soils are surplus to the development and cannot be contained on site due to space constraints, is also considered to be a suitable option if considered to be feasible as part of the development works.

6.6 Containment of Asbestos Impacted Soils Across the Westmead Precinct

The site (i.e., the MSCP SSDA footprint) has been defined as part of the overall Westmead Precinct and includes a number of redevelopment stages. Stages of the CHW Stage 2 at Westmead Redevelopment currently include the Early Works program, PSB Redevelopment and the MSCP Redevelopment including various refurbishment projects.

It is understood that Health Administration Corporation (HAC) owns or is in control of the CHW Lot (Lot 101 DP1119583), Westmead Hospital Lot (Lot 1 DP1194390), and Cumberland West Hospital Lot (Lot 1 in DP 808447). Future stages of the CHW Stage 2 at Westmead Redevelopment proposed to occur across these lots would be considered to be part of the overall Westmead Precinct.

On this basis, it is considered that asbestos contaminated materials can be re-located across specific stages of the CHW Stage 2 at Westmead Redevelopment on the basis this is occurring within the overall Westmead Precinct site. To this extent, there is no requirement for an Environment Protection Licence (EPL) to be held to accept the material or to assign a waste classification to the materials, because the material is not considered to be surplus to site requirements and not leaving the Westmead Precinct site.

Materials destined for re-use across the Westmead Precinct as part of the overall remedial and design strategy are not considered to be waste materials. These materials may be temporarily stored within designated locations prior to permanent containment across the Precinct as part of the overall CHW Stage 2 at Westmead Redevelopment remedial strategy. Transportation of these materials via internal roads or directly adjacent public roads is considered appropriate if conducted with appropriate controls including wetted materials, leakproof trucks and covered loads.

6.7 Remediation Principles

The following remedial principles must be implemented during remedial works:

- Minimise the area and extent of disturbance of asbestos impacted fill; and
- Minimise off-site disposal of asbestos impacted fill.

7. Remediation Plan

7.1 Approvals, licences and notifications

Based on the findings of previous investigations, the total volume of known contaminated material is anticipated to be less than 30 000 m^3. The total area of the site is approximately 1.27 ha, therefore less than 3 aggregate hectares of contaminated material will be disturbed during the remedial process, with disturbances restricted to the extent of design requirements, as shown in **Appendix B**.

To this extent, the works are considered to be Category 2 remediation works in accordance with SEPP 55. SEPP 55 requires the consent authority to be notified 30 days before the commencement of Category 2 remediation works.

An appropriately experienced and licensed Remediation Contractor is required to undertake the works, under the supervision of an appropriately qualified and experienced Remediation Consultant. Large quantities of identified asbestos impacted soils are friable, as per the definitions in relevant regulatory guidance. As such, the works must be conducted by a Class A (friable) licensed contractor who has obtained a site specific permit approving the asbestos works from SafeWork NSW. This permit application must be made at least seven working days before removal work is commenced.

Remediation works shall not commence until all required approvals, licences and notifications have been granted and/or received.

Furthermore, all required environmental and health and safety documentations must be completed prior to the commencement of remedial works, and should as a minimum include the Construction Environmental Management Plan (CEMP) and Work Health and Safety Plan (WHSP), as detailed in **Section 11**.

7.2 Site Establishment

The boundary of the extent of remediation will be defined by the Remediation Consultant. The Contractor shall secure these areas to ensure that all safety and environmental controls are implemented. These controls will include, but not be limited to:

- Locate and isolate all required utilities in the proximity of the works;
- Assess need for and implement any necessary traffic controls;
- Work area security fencing;
- Site signage and contact numbers;
- Stabilised site entry gate;
- Appropriate decontamination areas for personnel and plant;
- Sediment fencing (attached to security fencing) where necessary; and
- Stormwater runoff and sediment controls (e.g. silt fences and hay bales) where necessary.

7.3 Buildings and Structures Demolition

Existing structures (including The Lodge) on the site require demolition and removal from the site. The key processes are briefly summarised below:

- Removal and disposal of hazardous materials in accordance with relevant regulatory guidance and Waste Classification Guidelines 2014 (EPA 2014);

- Conduct hazardous materials clearance inspection (where required);
- Demolish remainder of buildings;
- Beneficial reuse of environmentally validated material onsite where possible (i.e., reuse of crushed recycled concrete) or lawfully remove all materials off-site; and
- Expose underlying soils for validation sampling by Remediation Consultant.

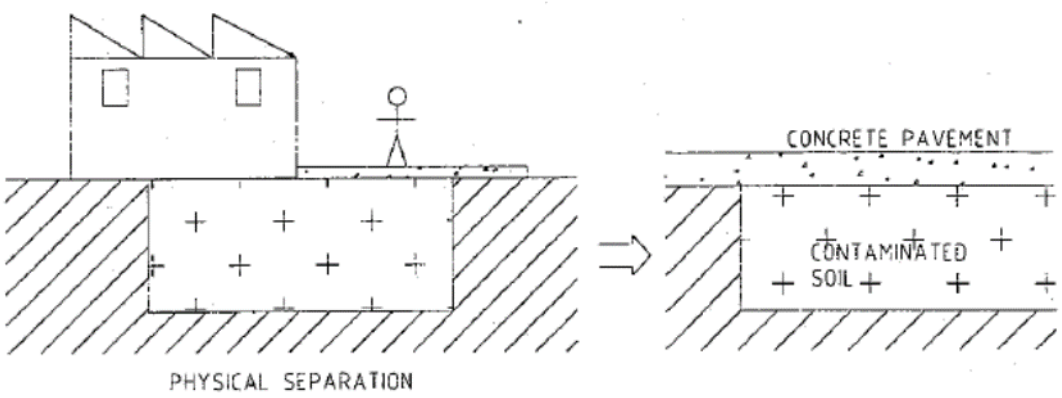
It is noted that there is a potential beneficial reuse of environmentally validated crushed recycled concrete from The Lodge as a capping layer across the asbestos impacted areas of the site.

7.4 Containment of Impacted Fill Option

Asbestos impacted fill can be managed via containment and the implementation of physical separation or within a "Containment Cell", which eliminates the inhalation exposure pathway for airborne asbestos fibres. The minimum requirements for the physical separation to be adopted in the remediation of the site include:

- A minimum soil cover thickness of 0.3 m in turfed areas, 0.5 m in mass planting/shallow landscaped areas and 0.6 m in tree pit zones which is underlain by a "marker layer" in unpaved areas, i.e., parks, gardens and green open spaces etc.; or
- Permanent concrete floor/ground/wall slabs or asphaltic concrete surfaced pavements and underlain by a "marker layer", i.e., underlying buildings, roads, pathways; or
- Top (concrete) of pile foundations (no marker layer required for below pile foundations).

A conceptual sketch, sourced from ANZECC 1999[8], is shown following:



The marker layer shall consist of a bright orange coloured non-woven polyester continuous filament or PET (such as nonwoven geotextiles) or similar with a minimum density of approximately 150 grams per square metre (or equivalent). The marker layer must:

- Be easily recognisable within soils (i.e., bright orange in colour);
- Be durable as a long term marker layer (i.e., > 150 grams per square metre); and
- Maintain integrity during remedial/civil works such as capping layer insulation and road/building construction.

Additionally, the marker layer must meet geotechnical and civil specifications where required, i.e., underlying roads.

[8] *Guidelines for the Assessment of On-site Containment of Contaminated Soil,* Australian and New Zealand Environment and Conservation Council, September 1999. (ANZECC 1999).

The marker layer should be installed flush with the exterior of all pile foundations. A marker layer is not required below pile foundations.

Typically at least 0.5 m depth capping layer in vegetated areas is required for containment of asbestos impacted soils (ANZECC 1999). However, Westmead Hospital Campus, which is currently managed by Western Sydney Local Health District (WSLHD) is considered to have effective institutional management controls in place such as contractor inductions, an Asbestos Management Plan and a Ground Disturbance Procedure which minimise the risk of containment failure. Therefore, a reduced cover of 0.3 m depth capping in turfed areas is considered appropriate. Deeper capping layers have been specified in mass planting and tree pit zones to accommodate for the increased root depths of native tall grasses, shrubs and trees, and to minimise potential containment failure during future landscaping works in these areas. Furthermore, this enables the proposed finished ground surface levels of the redevelopment to be commensurate with the current ground surface levels of the hospital campus, thus eliminating additional unnecessary disturbance of asbestos impacted materials.

The specific details of the marker layer are required to be included in the site validation report and LTAMP documents in addition to surveyed plans showing the extent of capped area within the site.

7.4.1 Interim Capping Arrangements During Construction Works

To manage the potential contamination exposure risks to site construction workers, including but not limited to airborne asbestos fibres, an interim impermeable capping profile installed at the completion of the excavation works within areas of the site where asbestos impacted fill is present, may be preferred. This capping layer will comprise a either a minimum 150 mm robust material capping layer or concrete blinding slab (or similar subject to Site Auditor endorsement) and includes the concreted surface of pile foundations, that will extend across the ground, to the boundary of the impacted area. The material must be able to withstand construction based activities, such as moving excavators and other plant. Example of suitable materials include validated crushed recycled concrete, crushed rock or similar hard materials.

It is proposed to undertake the piling works as part of the remediation works as the top of pile foundations will form part of the capping layer on the site. Furthermore, completion of piling works during remediation will avoid unnecessary duplicated disturbance of asbestos impacted material on the site if piling works were to be completed subsequent to the installation of the marker and capping layer. In additional, completing the piling works whilst Class A Licensed Asbestos removalists, Licensed Asbestos Assessor(s) and a full suite of appropriate asbestos related controls (as per **Section 10**) are being implemented on the site will enhance the safety of the work environment during piling works.

The interim capping approach is considered appropriate to complete (in the interim) the requirements of the RAP as the material or pavement will form a durable physical barrier such that there is/are:

- No complete exposure pathways (inhalation of asbestos fibres) between the asbestos impacted fill material and future site workers; and
- No significant potential risk of contaminant migration via airborne movement and dust generation etc. into surrounding areas of the site (occupational receptors) or offsite (sensitive receptors).

Where a marker layer is required to be placed underlying the capping as indicated above, this marker layer will be installed prior to construction of the interim capping layer so as to meet the requirements of the RAP.

Once the interim capping arrangements have been installed, the CEMP will address interim management requirements for all site works that may result in penetration of and/or removal of the interim cap. The CEMP will remain applicable until such time as the final capping arrangements are completed at the site, following which the LTAMP, in conjunction with the existing Western Sydney Local Health District Asbestos Management Plan (at handover of the site) will replace the interim requirements. It is envisaged that this will occur in conjunction with the completion of construction works such that the CEMP will address primarily construction related activities under the direction of the Contractor, whilst the LTAMP will address primarily site maintenance related activities to be completed under the direction of the future land operators (i.e. WSLHD).

Validation of the interim and permanent capping arrangements will be required as outlined in **Section 9,** including inspections by the Remediation Consultant, a survey plan prepared by a registered surveyor showing the level and lateral extent of the marker layer, interim capping and permanent capping in relation to the site boundaries.

7.4.2 Permanent Capping Arrangements

The following general capping procedures will be applied to appropriate scenarios across the site, prior to completion of construction works:

- Beneath permanent parking ground floor/basement structures – installation of a marker layer over contaminated fill material and permanent concrete slab as the physical barrier.
- Permanent hardstand structures (i.e., concrete slabs, pile caps or asphaltic concrete or similar, but not bricks or pavers) – installation of a marker layer overlying potentially contaminated material followed by sub-grade material validated as environmentally suitable materials for human exposure and then the permanent structure (e.g., exterior concrete footpaths, asphaltic roads, etc.).
- Turfed areas – installation of the marker layer at a minimum depth of 300 mm below final finished site levels, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure.
- Mass planting / shallow landscaping areas – installation of the marker layer at a minimum depth of 500 mm below the final finished site levels, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure.
- New tree pit zones – installation of the marker layer at a minimum depth of 600 mm below the final finished site levels, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure.
- Existing tree zones – installation of the marker layer consistent with immediately adjacent marker layer depths (e.g., 300 mm in turfed areas and 500 mm in mass planting areas) to the extent practicable, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure.
- Within underground services trenches / services – service infrastructure will require remediation to 150 mm below the depth of services, with a marker layer and capping layer installed consisting of environmentally suitable materials for potential human and/or ecological exposure.
- Within road reserves – the entire width of newly constructed road reserves, in conjunction with service infrastructure will be required to a depth 150 mm below the depth of the services, with a marker layer and capping layer installed consisting of environmentally suitable materials for potential human and/or ecological exposure.

Preliminary locations and extents of finished site surfaces, i.e., permanent hardstand structures and landscaped areas are detailed in the draft Development Plans, provided in **Appendix B**.

Where a marker layer has been installed and validated as part of the interim capping arrangements, a new marker layer is not required beneath the final capping layer, subject to all capping materials placed over the marker layer having been validated as environmentally suitable.

Material above the marker layer extending to the final finished ground level will be required to be environmentally suitable material for human and/or ecological exposure (as appropriate). This may include: virgin excavated natural material (VENM) sourced from on-site, imported VENM, excavated natural material (ENM) or similar material certified in accordance with an exemption issued by the NSW EPA that also meets site suitability criteria; or imported road making materials comprising fresh quarried material or material covered by a beneficial reuse exemption issued by the NSW EPA.

Additionally, material underlying load bearing structures such as roads, should be geo-technically suitable, in accordance previously prepared geo-technical reports.

In the interface of remediated and non-remediated areas, the extent of the marker and capping layer should be extended a minimum of 300 mm laterally outside the extent of remediated area, where practicable. This may include battering of the marker/capping layer to tie-in with existing site levels within the 300mm outside of the remediated area, where practicable.

Validation of the interim and permanent capping arrangements will be required as outlined in **Section 9,** including inspections by the Remediation Consultant, a survey plan prepared by a registered surveyor showing the level and lateral extent of the marker layer, interim capping and permanent capping in relation to the site boundaries.

7.5 Off-Site Disposal Option

Where management of impacted soils will be completed via excavation and off-site disposal, procedures as documented following will require to be implemented to ensure all environmental/health objectives are addressed.

7.5.1 Excavation of Impacted Soils

The impacted soils shall be 'chased out' under the direction and supervision of the Remediation Consultant. The procedure for undertaking this excavation activity will be:

- Excavation of impacted soils to nominated lateral and vertical extent until the soils meet the adopted validation criteria (**Section 9.5**);
- Excavated soils shall be stockpiled on a hardstand or plastic liner pending offsite disposal or loaded directly into the back of a truck for disposal; and
- Any unexpected finds will be managed as per **Section 8.1**.

7.5.2 Offsite Disposal of Material

Any material requiring disposal shall be classified prior to removal by the Remediation Consultant in accordance with *Waste Classification Guidelines Part 1: Classifying Waste,* NSW EPA (2014) and relevant waste regulations. Disposal of waste to licensed waste facilities in accordance with relevant waste regulations will be undertaken by the Contractor. All waste tracking documentation including disposal dockets must be maintained by the Contractor and must be provided to the Principal and the Remediation Consultant for inclusion in the validation report.

Any asbestos waste exceeding 100 kilograms or more than 10 m^2 of bonded ACM in one load disposed off-site must be tracked using the NSW EPA online system WasteLocate.

7.6 Validation

Validation of the remedial works will be conducted by the Remediation Consultant to demonstrate the remediation objectives have been achieved. Details of the validation program are provided in **Section 9**.

7.7 Backfilling of Excavations and Imported Fill Materials

Upon confirmation of soil validation by the Remediation Consultant, or application of marker layer, excavations that require reinstating, will be backfilled using on-site validated material and/or validated imported material where required.

7.8 Waste Classification and Offsite Disposal of Material

Classification of ACM and other waste materials/soil will be completed in accordance with *Waste Classification Guidelines Part 1: Classifying Waste,* NSW EPA (2014) and relevant waste regulations by the Remediation Consultant. Disposal of waste to licensed waste facilities in accordance with relevant waste regulations will be undertaken by the Contractor. All waste tracking documentation including disposal dockets must be maintained by the Contractor and must be provided to the Principal and the Remediation Consultant (JBS&G) for inclusion in the validation report.

Unless specified above, soils requiring off-site disposal will be sampled by the Remediation Consultant as per the sampling density for stockpiled materials in NEPC (2013) for chemicals of concern.

It is a requirement under the *Protection of the Environment Operations (Waste) Regulation 2014* (POEO Waste Regulation) to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m^2 of asbestos sheeting. Each load will be assigned a unique consignment code to allow NSW EPA to monitor their movement from site of generation to disposal.

In addition, the *proximity principle*, under the POEO Waste Regulation, makes it an offence to transport waste generated in NSW by motor vehicle for disposal more than 150 kilometres from the place of generation, unless the is waste is transported to one of the two nearest lawful disposal facilities to the place of generation.

The Contractor must be aware of and conduct all waste disposal in accordance with all relevant regulations.

7.9 Site Disestablishment

On completion of the remediation works all plant / equipment and safety / environmental controls shall be removed from the site by the Contractor. All equipment used during asbestos remediation works will need to be appropriately decontaminated or disposed of as asbestos waste by the Contractor, in accordance with SWA and SafeWork NSW guidance, EPA 2014 and relevant waste regulations.

8. Contingency Plan

A review of remediation works has been undertaken to identify potential risks to meeting the specified site validation criteria. A number of potential risks have been identified. These are listed following with contingencies that will be implemented to ensure that validation criteria are met.

Additionally, the associated remedial works health and environmental risks/hazards and their minimisation/mitigation are further discussed in **Sections 10** and **11**.

8.1 Unexpected Finds Protocol

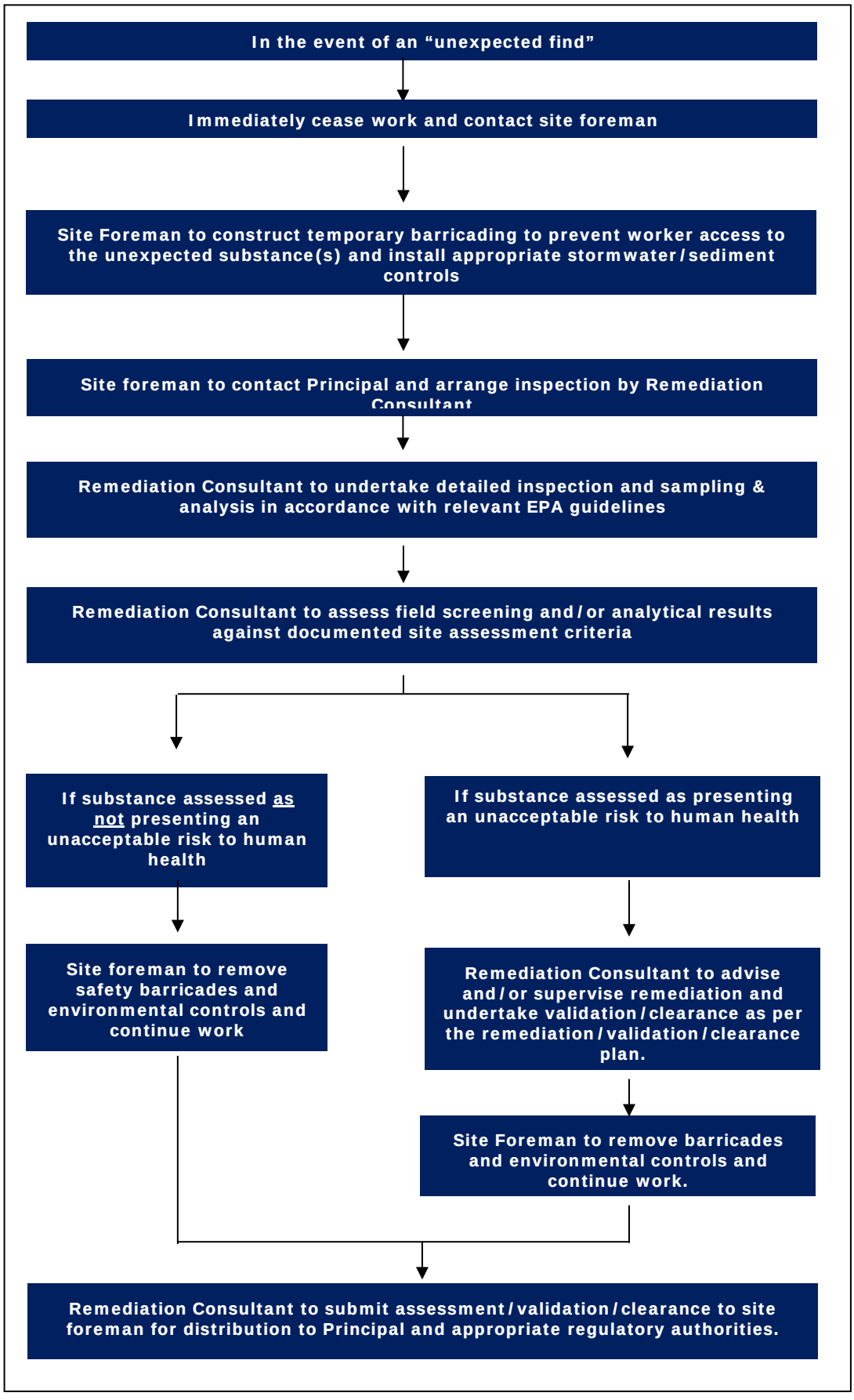
It is acknowledged that previous investigations of the site have been undertaken to assess the identified contaminants of potential concern in selected parts of the site. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations during remediation. The nature of any residual hazards which may be present at the site are generally detectable through visual or olfactory means, for example (presented in **Appendix C** for use onsite):

- Bottles / containers of chemicals (visible);
- Construction / demolition waste (visible);
- Ash and/or slag contaminated soils / fill materials (visible);
- Petroleum contaminated soils (odorous, staining / discolouration visible) beyond the identified impact, or at levels that prevent off-site disposal without treatment; and
- Volatile organic compound contaminated soils (odorous).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances be identified (or any other unexpected potentially hazardous substance), the procedure summarised in **Flowchart 8.1** is to be followed.

An enlarged version of the unexpected finds protocol, suitable for use on-site, should be posted in the Site Office and referred to during the site specific induction by the Contractor.

Flowchart 8.1 – Unexpected Finds Protocol



8.2 Contingency Scenarios

8.2.1 Remedial Strategy Constraints

In the event that the proposed remedial works do not meet the validation criteria, or if the selected remedial strategy is not able to proceed, the following actions will be considered to ensure, firstly, the safety and health of people and the environment and, secondly, that the overall project objectives are achieved:

- Reassessment of remedial and validation options for ACM, AF and FA contaminated soils; and
- Continued controlled excavation of potential impacted soils.

8.2.2 Material Storage Breach

In the event any stockpiled or capped materials escape (or have the potential to escape), then the management controls shall be rectified and investigations undertaken to review the adequacy of the controls and any improvements implemented.

8.2.3 Complaints

Due to the nature of the activities and type of contaminants identified at the site there is a potential for complaints to be received from members of the public, patients and staff members relating to environmental emissions including:

- Dust emissions arising from asbestos contaminated soil excavation, material handling, transport, placement and capping; and
- Noise and vibration from excavation.

Monitoring of all environmental emissions shall be undertaken as detailed in **Section 10** and appropriate actions taken to further control emissions following receipt of a complaint. Such additional controls may include the following actions:

- Disturbance of soils during meteorologically favourable periods only; and/or
- Increasing environmental controls including covering and/or wetting down soils which are generating dust.

8.2.4 Lack of Available Space

Works will be scheduled so that new remedial areas will not be opened up until previously excavated areas are capped. This has the benefit of separating asbestos earth works and regular earth works, thus minimising the extent of asbestos earth works occurring at any one stage. Should room availability for unexpected finds become a concern, laboratory-turn-around times for validation samples will be decreased in an attempt to clear open areas. If room onsite does become an issue remedial works will stop until areas can be validated.

8.2.5 Severe Weather

Weather will be monitored on a daily basis via checking an internet based weather service provider. Should severe weather be forecast, especially strong winds, works will stop until safe to re-commence. All site management controls will be implemented to the extent practicable as outlined in **Section 10** prior to any severe weather events.

8.2.6 Odours from Works

Based on the nature of the identified contaminants, off-site odour complaints are considered unlikely. Where complaints occur, the following will be undertaken:

- Installation of an odour screening / masking system at the remediation area boundaries; and/or
- Disturbance of soils during meteorologically favourable periods only; and/or
- The use of odour suppressant additives to water used to keep impact soils/ stockpiles moist; and or
- Covering of impacted soils.

9. Validation Plan

9.1 Overview

Validation data are required to be collected to verify the effectiveness of the remediation works and document the condition of the site as being suitable for the proposed future uses.

Validation activities will be required for the following areas:

- Documentation of installation of containment measures if chosen as the remedial option (both interim and final);
- Validation of imported fill material to demonstrate its suitability for use as a capping layer or in trenching works;
- Validation of soils underlying current structures on the site;
- Movement of all soil and fill material onsite; and
- Waste materials requiring offsite disposal.

9.2 Data Quality Objectives

Data Quality Objectives (DQOs) were developed for the validation program, as discussed in the following sections.

9.2.1 State the Problem

The site is proposed to be redeveloped for use as a multi-storey car park with associated ancillary retail facilities, road and landscaping upgrades. Previous investigations, as detailed in **Section 3**, have identified areas requiring remediation in order to make the site suitable for the proposed redevelopment. Specifically, asbestos in soil have been observed and detected above the adopted criteria within the site.

9.2.2 Identify the Decision

The following decisions are required to be made during the validation works:

- Are fill material or natural soils underlying existing structures (The Lodge) environmentally suitable?
- Is there potential for fill materials that are not impacted by asbestos above the site criteria to be separated and re-used on site?
- Have marker and capping layers (where required) been installed appropriately and in accordance with RAP requirements?
- Are imported materials environmentally suitable for their proposed use?
- Have waste materials been suitability classified and lawfully disposed?
- Have the works been completed in accordance with the RAP, or where variations to the works were required, have these met the objectives of the RAP?
- Are analytical data generated by the validation works reliable?
- Is the site suitable for the proposed use?

9.2.3 Identify Inputs to the Decision

The inputs to the decision are:

- Detailed development plans to be provided by HI;

- Previous investigation data;
- Observation and photographic log of marker and capping layer installation (if required);
- Survey of marker and capping layer vertical and lateral extents (if required);
- Field observations and analytical data for soils beneath structures;
- Field observations, sampling and analytical data for imported materials;
- Field observations, sampling and analytical data for reused materials;
- Field observations, sampling and analytical data for off-site disposal of waste materials;
- Field observations, sampling and analytical data of any unexpected finds;
- Physical observations, including visual, olfactory and photoionisation detector (PID), where appropriate, screening results;
- Documentation of appropriate classification of imported materials;
- Environmental monitoring data to demonstrate that potential airborne pollutants as generated by the handling of environmentally impacted materials on the site has not impacted off-site locations;
- Assessment criteria for soils; and
- Data quality indicators as assessed by quality assurance/quality control (QA/QC).

9.2.4 Define the Study Boundaries

The study boundaries of the site are defined as follows:

- The lateral extent of the works relevant to this RAP as defined by the proposed extent of the MSCP redevelopment at the site, as shown on **Figure 2**;
- The vertical extent of the works is defined as:
    - 0.5 m into natural materials; or
    - the maximum depth of where potentially impacted fill materials is to be retained.

9.2.5 Decision Rules

The decision rules adopted to answer the decisions identified in **Section 9.2.2** are discussed below.

Are fill materials or natural soils underlying structures environmentally suitable?

To successfully validate fill material or natural soils underlying structures, analytical validation data will be required to meet the assessment criteria and environmental quality goals for asbestos in soils established in **Sections 9.3.3** and **9.4** below.

Where a valid data set can be generated as based on assessment of the soils underlying structures, the following statistical criteria may be applied:

- The 95% UCL average concentrations shall be below the soil criteria;
- The standard deviation of the generated data set shall be below 50% of the soil criteria; and
- The maximum concentration shall be below 250% of the soil criteria.

Existing data, as summarised in **Table A,** for chemical constituents (not asbestos) from materials remaining at the site shall be included in analytical data sets created for the soils.

Is there potential for fill materials to be assessed for on-site re-use?

To successfully assess the suitability of fill materials to be re-used or retained on site, additional asbestos assessment is required to obtain analytical validation data to meet the assessment criteria and environmental quality goals for asbestos in soils established in **Sections 9.3.3** and **9.4** below.

Existing asbestos data, as summarised in **Table B,** for asbestos from materials remaining at the site shall be included in analytical data sets created for the soils.

Have marking and capping layers (where required) been installed appropriately and in accordance with RAP requirements?

The marker and capping layers must be installed across the extent of the remedial area, as shown in **Figure 6.** The marker layer must be installed to the RAP requirements, as well as the manufacturer's installation requirements. The vertical and lateral extents of the marker layer and position of piles should be surveyed, along with consistent and comprehensive photographic evidence.

Where soil based material is to be used as a capping layer, placed above the marker layer and readily accessible to human users, this material is required to be validated as meeting the health and ecological validation requirements for the site in addition to aesthetic requirements.

All imported materials to be used as the capping layer must be environmentally suitable, as defined below.

Are imported soils environmentally suitable for their proposed use?

Material required to be imported onto the site as capping, trench backfill or road building purposes (or any other purpose) are required to be demonstrated to be VENM, ENM or material considered suitable for beneficial reuse in accordance with a resource recovery exemption issued by NSW EPA under clauses 51 and 51A of the POEO Waste Regulation.

All imported material must not be classified as containing asbestos as per the definition in SWA SWA (2020a).

All imported materials will be assessed to ensure the entirety of the capping layer from surface to the marker layer is validated upon conclusion of remedial works.

VENM

Laboratory analysis results will be compared to published background levels (metals) and nominated laboratory LORs (for all man-made chemical constituents) for VENM. The Remediation Consultant will conduct a site inspection of all VENM source sites and approve any VENM Certificates prior to importation of material. If either the source site or supporting documentation is unsatisfactory in regard to certainty of the material comprising VENM, the Remediation Consultant will undertake additional sampling to confirm chemical characterisation of VENM material and prepare any required documentation.

ENM

ENM will be assessed in accordance with the "Excavated Natural Material Exemption 2014". The Remediation Consultant will conduct a site inspection of all ENM source sites and approve any ENM material characterisations prior to importation of material. If either the source site or supporting documentation is unsatisfactory in regard to certainty of the material comprising ENM, the Remediation Consultant will undertake additional sampling to confirm chemical characterisation of ENM material and prepare any required documentation.

Resource Recovery Exemptions

Any materials falling under this category will be assessed in accordance with the relevant resource recovery exemption. The Remediation Consultant will undertake additional assessment and reporting if required to ensure compliance with the relevant resource recovery exemption.

Have waste materials been suitability classified and lawfully disposed?

All waste requiring off-site disposal must be suitability characterised and classified in accordance with *Waste Classification Guidelines* (EPA 2014) or relevant exemptions (such as VENM and ENM).

Fill materials present across the extent of the site are considered to be Special Waste – Asbestos, unless assessment proves otherwise. Additional chemical analysis is required for off-site disposal unless sufficient historical data can be used for waste classification purposes.

Natural soils underlying fill materials across the site may be encountered during excavations and may be suitable for characterisation as VENM, if appropriate care is taken not to mix waste streams, no visual or olfactory signs of contamination are present, and the material meets VENM chemical criteria (if required).

Is the data generated by the validation works reliable?

If the analytical data meets the Data Quality Indicators established in **Section 9.2.11,** then the analytical data are considered to be reliable.

All other data, such as visual observations, photographic logs and surveys will be qualitatively assessed to ensure they contain sufficient information to inform the validation report.

Is a Long Term Asbestos Management Plan Required?

A suitable LTAMP is required at the site if the containment management strategy of asbestos impacted fill materials is conducted. The LTAMP will detail the management strategies required to ensure the long term integrity of the marker and capping layers, such as inspection timetables, accidental penetrations of the marker layer and required controls for scheduled works below the marker layer.

Is the site suitable for the proposed use?

The site will be considered suitable for the proposed use if the following conditions are met:

- Fill materials or natural soils across the site meet the adopted site criteria;
- Marker and capping layers have been appropriate installed and documented;
- Imported soils are considered to be environmentally suitable;
- Waste materials have been suitably characterised and lawfully disposed;
- Analytical data generated is considered reliable; and
- A suitable LTAMP will be implemented at the site.

9.2.6 Specify Limits of Decision Error

A qualitative assessment shall be undertaken of potential decision errors associated with the data, in accordance with the provisions in NEPC 2013.

9.2.7 Optimise the Design for Obtaining Data

The validation sampling design for each specific type of validation works anticipated is discussed in detail in **Section 9.3**. The general sampling methodologies are discussed below.

9.2.8 Soil Sampling Methodology

Soil sampling will be conducted by the Remediation Consultant as required to achieve remedial objectives. The soil sampling method shall be determined by the Remediation Consultant as consistent with the observations of the site sub-surface and appropriate to generate representative samples. The soil sampling method shall be consistent with the data quality indicators in **Section 9.2.11**.

Where sample locations are placed by boreholes, undisturbed samples, as collected by push tube or SPT sampler, are preferred where able to be effectively implemented. Otherwise samples may be recovered from solid flight augers or via test pitting. All asbestos quantifications will be recovered from a solid flight auger with a diameter of at least 150 mm or via test pitting. Re-usable equipment shall require to be decontaminated between sampling locations.

9.2.9 Soil Sample Containers

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination shall be noted on field reporting sheets / field logs.

Collected soil samples shall be immediately transferred to sample containers of appropriate composition (glass jars) fitted with Teflon sealed lids. 500 mL samples shall be additionally collected and placed in new zip lock bags where asbestos analysis is required. Sample labels shall record sample identification number and date and time of sampling. Sample containers shall be transferred to a chilled ice box for sample preservation prior to and during shipment to the testing laboratory. A chain-of-custody form shall be completed and forwarded with the samples to the testing laboratory, containing the following information:

- Sample identification;
- Signature of sampler;
- Date of collection;
- Type of sample;
- Number and type of container;
- Inclusive dates of possession; and
- Signature of receiver.

9.2.10 PID Screening

Soil samples will be screened during field works using a photo-ionisation detector (PID) to assess the potential presence of VOCs including petroleum hydrocarbons. Samples obtained for PID screening will be placed in a sealed plastic bag for approximately 5 minutes to equilibrate, prior to a PID being attached to the bag. Readings will then be monitored for a period of approximately 30 seconds or until values stabilise and the stabilise/highest reading will be recorded on the field sample forms. The PID will be calibrated prior to the commencement of field works and then check readings will be completed on a daily basis during the field program using suitable calibration gas. If required, the PID will be re-calibrated during the field program in accordance with manufacturer's instructions.

9.2.11 Quality Assurance/Quality Control

The objective of the project is to remediate the site to a standard suitable for the prosed uses. To demonstrate the effectiveness of the remedial works, validation sampling, inspections and analysis will be conducted. The quality of the validation data must be sufficient to draw conclusions regarding the suitability of the site. Hence, the quality assurance / quality control

(QA/QC) program employed as part of the remediation works will involve pre-determined data quality indicators (DQIs).

The DQIs are summarised following and in **Table 9.1:**

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is normally assessed by calculating the Relative Percent Difference (RPD) [9] of duplicate samples. However, this calculation is not applicable due to the presence / absence nature of asbestos, and as such, the agreement between the sample pairs will be assessed instead.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples, ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** - expresses the appropriateness of the chosen field and laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted site assessment criteria.

Table 9.1: Summary of QA/QC Control Program

Data Quality Indicator	Frequency	Data Quality Acceptance Criteria
Precision		
Blind duplicates (intra laboratory)	1 / 20 samples	<50% RPD or agreement between asbestos presence/absence
Blind duplicates (inter laboratory)	1 / 20 samples	<50% RPD or agreement between asbestos presence/absence
Accuracy		
Surrogate spikes	All organic samples	70-130%
Matrix spikes	NA for asbestos analysis. Otherwise 1 per lab batch.	70-130%
Laboratory control samples	1 per lab batch	70-130%
Representativeness		
Sampling appropriate for media and analytes	All samples	All samples

[9] $RPD(\%) = \frac{|C_o - C_d|}{C_o + C_d} \times 200$

Where C_o is the analyte concentration of the original sample

C_d is the analyte concentration of the duplicate sample

Data Quality Indicator	Frequency	Data Quality Acceptance Criteria
Samples extracted and analysed within holding times.	-	NA for asbestos, organics (14 days), inorganics (6 months)
Laboratory Blanks	1 per lab batch	<LOR
Trip spike	1 per sampling event targeting volatiles	70-130% recovery
Trip blank	1 per sampling event targeting volatiles	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Limits of reporting appropriate and consistent	All samples	All samples
Completeness		
Soil description and COCs completed and appropriate	All samples	All samples
Appropriate documentation	All samples	All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Field and analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	All samples	At least 10L per field AQ sample. LOR < Site assessment criteria (where possible)

If the RPD between duplicates is greater than the pre-determined DQI, a judgement will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field. For asbestos agreement, the highest concentration of the primary, duplicate or triplicate samples will be recorded as the result for that sample location, thus eliminating any non-conformance between primary, duplicate and triplicate samples.

9.3 Validation Inspections, Sampling and Analyses

9.3.1 Overview of Validation Sampling

The proposed soil validation sampling, quantification and analytical program is outlined in **Table 9.2.**

Table 9.2: Validation Sampling and Analytical Plan

Validation Area	Sampling Frequency	Analytes
Data Gaps including under The Lodge building footprint	1 sample location per 20 m grid	Heavy metals TRH/BTEX PAHs OCPs/PCBs Asbestos (500mL) Minimum of 10L Asbestos Quantification per metre interval of fill
Further assessment of differing fill material types that may be encountered during civil earthworks (if segregation and on-site re-use above the marker layer is required)	1 per 70m^3 (historical samples able to be included), as per WA DoH 2009 stockpile materials sampling density	Asbestos (500mL) Minimum of 10L Asbestos Quantification per 70m^3

Excavations formed by removal of localised asbestos impact (if required to segregate impacted fill from non-impacted soils)	Floor: 1 per 25m^2. Wall: 1 sample per 5 linear metre. 1 sample per vertical metre.	Asbestos (500mL) 10L Asbestos Quantification per metre interval of fill (where appropriate)
Residual soils underneath stockpiles where contaminated material has been stored	1 sample per 10 m grid	Asbestos (500mL) or relevant contaminants
Excavations formed by Unexpected Finds	Base: 1 sample / 10 m grid, minimum of 2 per base Walls: 1 sample per 10 lineal metres per 1 m depth	Relevant contaminants of concern
Imported Materials of VENM, if required	Minimum of 5 samples per source site	As a minimum: Heavy metals TPH/BTEX PAHs OCPs/PCBs Asbestos (500mL)
Quarry VENM Materials (e.g. blue metal, sandstone, shale)	Confirmation that the material is quarried rock (VENM) prior to importation, and visual confirmation.	Site Inspection required.
Imported Materials of ENM, if required	As per ENM exemption 2014	Heavy metals TPH/BTEX PAHs pH EC RTA 276 (foreign materials) Asbestos (500mL)
Waste Classification, stockpiles	1 per 25m^3 up to 100 m^3, minimum of 3. Reduced sampling density for volumes >100 m^3.	Heavy metals TPH/BTEX OCPs/PCBs PAHs Phenols Asbestos TCLP Metals and PAHs (if required)
Recycled/Recovered Products	As per relevant exemption	As per exemption Plus Asbestos (500mL)

9.3.2 Validation Sampling Under Buildings

Soil validation sampling for asbestos and chemical constituents will be conducted by the Remediation Consultant under The Lodge footprint. An approximate 20 m grid sampling density will be applied (refer **Figure 5**), with sample locations targeting identified areas of concern. The sample locations will comprise both chemical constituent sampling and asbestos quantification sampling. If gross soil contamination observed following the removal of the slab or during boreholes, consideration to additional sample locations will be given. All results will be compared to the adopted site soil validation criteria as presented in **Table 9.3**.

9.3.3 Marker Layer Inspection (if required)

Visual inspection will be undertaken by the Remediation Consultant to verify the installation of the marker layer across all required areas of the site, (i.e., across all areas of gravelly clay fill observed, detected or assumed to contain asbestos, as per **Figure 6**). Photographic records and a survey of the marker layer installation, including vertical and lateral extents by the Contractor will be retained for inclusion in the validation report. The marker layer will be inspected where present adjacent to pile foundations to ensure the marker layer has been placed flush with the exterior of the pile.

9.3.4 Capping Layer Validation (if required)

Material to be used as a capping layer must be validated by the Remediation Consultant to be environmentally suitable, consisting of VENM, ENM, suitable on-site materials (i.e. VENM from southern portion of the site) or material considered suitable for beneficial reuse via a resource recovery exemption issued by NSW EPA. Additionally, any capping layer material must not exceed the adopted site validation criteria for soils.

The capping layer must be placed at the thicknesses specified for each capping scenario as detailed in **Section 7.4** and presented schematically in **Figure 8.** Photographic records and a survey of the capping layer installation, which details the final thicknesses of the capping layer, including the vertical and lateral extents by the Contractor will be retained for inclusion in the validation report.

9.3.5 Imported Material Validation

Imported material source sites will be visited by the Remediation Consultant. Supporting documentation must be provided by the Contractor for imported materials to be assessed against the validation plan, relevant guidelines/exemptions and adopted site criteria. The Remediation Consultant will collect additional samples and prepare appropriate documentation for imported materials in lieu of adequate information provided by the Contractor to ensure all material imported to site is validated.

Sampling requirements are detailed in **Table 9.2.**

An electronic database (Imported Material Spreadsheet) will be maintained by the Remediation Consultant and Contractor to keep a record of imported materials.

9.3.6 Waste Disposal Off-Site

All wastes requiring off-site disposal must be classified in accordance with *Waste Classification Guidelines* (EPA 2014). The Contractor is responsible for the lawful disposal of the classified waste to a licensed waste disposal facility lawfully able to accept the waste.

Disposal dockets for each individual off-site waste disposal load must be provided to the Principal and to the Remediation Consultant by the Contractor to demonstrate appropriate off-site disposal of waste occurred for site validation purposes.

As detailed in **Section 6.6** above, if asbestos contaminated materials are to be re-located across other stages of the CHW Stage 2 redevelopment, the materials will be relocated within the overall Westmead Precinct site and the material is not considered to be surplus to site requirements (as it is not leaving the Westmead Precinct). Materials destined for re-use across the Westmead Precinct as part of the overall remedial and design strategy are not considered to be waste materials. Thus, there is no need to assign a waste classification to these materials.

9.4 Environmental Quality Goals for Asbestos in Soils

Environmental Quality Goals (EQGs) for asbestos in soils establish the minimum criteria for the remediation of asbestos via the preferred cap and contain strategy at the site.

The EQGs for the site are discussed below:

- Capping Depth - Capping depths must be commensurate with the proposed environmental controls for each of the capping scenarios established in **Section 7.4.2**. A minimum of 95% of surveyed depths must comply with the proposed capping depths for each capping scenario in each distinct capping area (i.e., 95% of surveyed depths complying with a single mass planting area).

- Lateral Extent of Capping - The lateral extent of capping must be consistent with the conceptual model of the distribution of asbestos in fill at the site. That is, capping must extend laterally across the extent of identified asbestos impacted gravelly clay fill or other asbestos impacted fill on the site.
- Long Term Integrity of Marker/Capping System – the marker layer must be a bright orange coloured non-woven polyester continuous filament or PET (such as nonwoven geotextiles) or similar with a minimum density of approximately 150 grams per square metre (or equivalent). The marker layer must also be easily recognisable within soils (i.e., bright orange in colour), durable as a long term marker layer (i.e., > 150 grams per square metre) and maintain integrity during remedial/civil works such as capping layer installation and road/building construction. The depths proposed for each capping scenario in **Section 7.4.2** allow for root growth, as consistent with the Preliminary Development Plans presented in **Appendix B**, namely, 0.3 m for turf, 0.5 m for mass planting areas and 0.6 m for trees. Site management controls, such as inductions, ground disturbance procedures and the asbestos register will make future contractors/workers aware of the presence and meaning of the marker layer. The LTEMP, which will form part on-going site management will include the procedures for future workers conducting works below the marker layer including the safe removal and re-instatement of the marker layer.
- Capping material - Material above the marker layer extending to the final finished ground level will be required to be environmentally suitable material for human and/or ecological exposure (as appropriate). This may include: VENM sourced from on-site, imported VENM, ENM or similar material certified in accordance with an exemption issued by the NSW EPA that also meets site suitability criteria; or imported road making materials comprising fresh quarried material or material covered by a beneficial reuse exemption issued by the NSW EPA.

9.5 Validation Criteria Selection

The hospital land use represents a scenario that does not fall under the standard health investigation land use scenarios presented in NEPM (2013). Schedule B7 of NEPM (2013) states "the HILs developed for the commercial/industrial land use scenario are not applicable to a site used frequently by more sensitive groups such as children (within childcare centres, hospitals and hotels) and the elderly (within hospitals, aged care facilities and hospices)." Given that children, elderly and other sensitive sub-populations (such as patients with immunosuppression and pre-existing illness) are frequents users of the site, a more sensitive land use scenario is required to be adopted. To this extent, the HIL B – standard residential land use scenario with minimal opportunities for soil access has been adopted as one of the validation criteria for all COPCs except asbestos for the site. In addition, given the potential for landscaped and public open spaces in the eastern portion of the site, consideration has also been given to HIL C – Recreational and Public Open Space.

9.5.1 Soil Validation Criteria

The site is proposed to be redeveloped for ongoing use as a health services facility. As such, based on the proposed land use and in accordance with the decision process for assessment of urban redevelopment sites (EPA 2017), concentrations in the soil will be compared against published levels as presented in **Tables 9.3**, sourced from the following:

- Health Investigation Levels (HILs) for residential with minimum opportunities for soil access – NEPC 2013, HIL-B;

- Health Investigation Levels (HILs) for public open space / recreational areas – NEPC 2013, HIL-C;
- Health Screening Levels (HSLs) for petroleum hydrocarbons considering potential for vapour intrusion, clay for low – high density residential (NEPC 2013);
- HSLs for asbestos contamination in soil for high density residential and recreational open space land use (HSL B and HSL C) – NEPC (2013);
- Management limits for hydrocarbons for urban residential and public open space land use – fine soil (NEPC 2013);
- Generic and derived ecological investigation levels (EILs) based on NEPC (2013) for urban residential and public open space; and
- Ecological Screening Levels (ESLs) for TPH fractions, BTEX and benzo(a)pyrene in fine soil for urban residential and public open space land use (NEPC 2013).

Given the typically clay based fill materials / soils, fine soil criteria will be used in the HSLs/ESLs and the Management Limits.

Where there are no NSW EPA endorsed thresholds the laboratory limit of reporting (LOR) has been adopted as an initial screening value for the purposes of this assessment.

Where required, results will be statistically assessed in accordance with the method summarised in **Section 9.5.2.**

Table 9.3: Adopted Soil Validation Criteria

Constituent	Limit of Reporting (mg/kg)	Laboratory Method	Health Investigation / Screening Levels: HIL B (mg/kg, %w/w for asbestos)	Health Investigation / Screening Levels: HIL C (mg/kg, %w/w for asbestos)	Ecological Investigation / Screening Levels: (mg/kg)	Management Limits TRH (mg/kg)
Asbestos						
Bonded ACM	0.01	AS4964-2004	0.04	0.02	-	-
AF/FA	0.001	AS4964-2004	0.001	0.001	-	-
Heavy Metals						
Arsenic	2	ICP-AES (USEPA 200.7)	500	300	100	-
Cadmium	0.4	ICP-AES (USEPA 200.7)	150	90	-	-
Chromium	5	ICP-AES (USEPA 200.7)	500 (Cr VI)	300 (Cr VI)	410 (Cr III)	-
Copper	5	ICP-AES (USEPA 200.7)	30 000	17 000	110	-
Lead	5	ICP-AES (USEPA 200.7)	1200	600	1,480	-
Mercury (inorganic)	0.05	ICP-AES (USEPA 200.7)	120	80	-	-
Nickel	5	ICP-AES (USEPA 200.7)	1200	1200	200	-
Zinc	5	ICP-AES (USEPA 200.7)	60 000	30 000	310	-
Polycyclic Aromatic Hydrocarbons (PAHs)						
Carcinogenic PAHs (as B(a)P TEQ)	-	-	4	3	-	-
Total PAHs	0.5	-	400	300	-	-
B(a)P	0.5	GCMS (USEPA8270)	-	-	0.7	-

Constituent	Limit of Reporting (mg/kg)	Laboratory Method	Health Investigation / Screening Levels: HIL B (mg/kg, %w/w for asbestos)	Health Investigation / Screening Levels: HIL C (mg/kg, %w/w for asbestos)	Ecological Investigation / Screening Levels: (mg/kg)	Management Limits TRH (mg/kg)
BTEX						
Benzene	0.1	Purge Trap-GCMS (USEPA8260)	0.7 (<1 m) 1 (1 to < 2 m) 2 (2 to < 4 m) 3 (4 m +)	Not Limiting (NL)	65	-
Toluene	0.1	Purge Trap-GCMS (USEPA8260)	480 (<1 m)	NL	105	-
Ethyl benzene	0.1	Purge Trap-GCMS (USEPA8260)	-	NL	125	-
Xylenes (Total)	0.3	Purge Trap-GCMS (USEPA8260)	110 (<1 m) 310 (1 to < 2 m)	NL	45	-
Naphthalene	0.5	Purge Trap-GCMS (USEPA8260)	5 (<1 m)	NL	170	-
Total Recoverable Hydrocarbons (TRH)						
F1 C_6-C_{10}	20	Purge Trap-GCMS (USEPA8260)	50 (<1 m) 90 (1 to < 2 m) 150 (2 to < 4 m) 290 (4 m +)	NL	180	800
F2 >C_{10}-C_{16}	50	Purge Trap-GCMS (USEPA8260)	280 (<1 m)	NL	120	1000
F3 >C_{16}-C_{34}	100	Purge Trap-GCMS (USEPA8260)	-	-	1300	3500
F4 >C_{34}-C_{40}	100	Purge Trap-GCMS (USEPA8260)	-	-	5600	10 000
Organochlorine Pesticides (OCPs)						
DDT+DDE+DDD	0.015	GCECD (USEPA8140,8080)	600	400	180	-
Aldrin and dieldrin	0.01	GCECD (USEPA8140,8080)	10	10	-	-
Chlordanes – Total	0.1	GCECD (USEPA8140,8080)	90	70	-	-
Endosulfan I + II	0.01	GCECD (USEPA8140,8080)	400	340	-	-
Endrin	0.05	GCECD (USEPA8140,8080)	20	20	-	-
Heptachlor	0.05	GCECD (USEPA8140,8080)	10	10	-	-
HCB	0.05	GCECD (USEPA8140,8080)	15	10	-	-
Methoxychlor	0.2	GCECD (USEPA8140,8080)	500	400	-	-
Mirex		GCECD (USEPA8140,8080)	20	20	-	-
Toxaphene	1	GCECD (USEPA8140,8080)	30	30	-	-
PCBs						
Total PCBs	0.5	GCECD (USEPA8140,8080)	1	1	-	-

Notes: EILs derived from the Ambient Background Concentrations (ABCs) for an Old Suburb with High Traffic from Olszowy et al 1995[10] plus Added Contaminant Limits (ACLs) based on JBS&G 2015e soil characteristic data for the gravelly clay fill material present on the Westmead Hospital Campus.

9.5.2 Application of Soil Criteria

For soil to be considered as validated (i.e., not posing an unacceptable risk) all reported concentrations should ideally be below the site validation criteria. For chemical analysis the following statistical criteria shall be adopted with respect to the health based criteria:

- The upper 95% confidence limit on the average concentration for each analyte (calculated for samples collected from consistent soil horizons, stratigraphy or material types) must be below the adopted criterion;
- No single analyte concentration shall exceed 250% of the adopted criterion; and
- The standard deviation of the results must be less than 50% of the criterion.

Where the soil validation criteria are exceeded, further remediation and validation, or evaluation of risk, will be required.

In addition to the numerical criteria, consideration shall be given to the presence of soils that are odorous or discoloured as a result of contamination.

9.6 Material Tracking Plan

The movement of all earth based materials on the site, to the site and from the site and within the Westmead Precinct is required to be subject to a Material Tracking Plan (MTP). The MTP shall be administered by the Remediation Consultant with the provision of all required information by the Contractor.

Material tracking shall be required for all materials that are moved / excavated from a location on the site and not wholly replaced in the same locations within 12 hours of material movement (i.e., soils excavated for test pitting / assessment do not require material tracking, however all other material will require tracking).

9.6.1 Material Tracking Data

To this extent, all excavation and filling works as undertaken for the purposes of site remediation require the following information to be recorded by the Contractor on Material Tracking Forms (MTFs) and in an electronic Material Tracking Spreadsheet (MTS) and verified by the Remediation Consultant, with respect to material placement activities:

- Date (yyyy/mm/dd);
- Unique MTF identification (starting at 001);
- Site figure showing source (cut) and placement (fill);
- Estimated volume (cubic metres);
- Type of material (refer to classification scheme in **Section 9.6.2**);
- Depth of source (RL)
- Depth of placement (RL);

[10] Olszowy, H, Torr, H & Imray, P 1995, *Trace element concentrations in soils from rural and urban areas of Australia*, Contaminated sites monograph series no. 4, South Australian Health Commission, Adelaide Australia (Olszowy et al 1995).

- Source (from) information in terms of MGA56 co-ordinates as established by site GPS and/or survey;
- Placement (to) information in terms of MGA56 co-ordinates as established by site GPS and/or survey;
- Source (from) information in terms of site feature (i.e., The Lodge footprint);
- Placement (to) information in terms of site feature;
- Source (from) information in terms of Separable Portion;
- Placement (to) information in terms of Separable Portion;
- Source (from) information from off-site source site (e.g. Quarry A);
- Placement (to) information for off-site disposal (e.g., tip, EPA tracking number, docket reference);
- Reference document (where necessary, i.e. virgin excavated natural material / excavated natural material classification);
- Purpose of placement (i.e. containment, surplus to site requirements etc); and
- Comments (when required).

For material which has been removed for the purposes of environmental remediation, and is proposed to be moved again subsequent to the completion / validation of environmental remediation works, MTFs for the replacement of the material shall make reference to the initial MTFs generated by the excavation of the materials for remediation. As part of the validation of the material tracking forms, mass / material balances shall be assessed at each stage where additional material tracking forms are generated for particular site material.

It is the responsibility of the Contractor to ensure the MTF(s) are completed and submitted to the Remediation Consultant at the end of each day's work. The Remediation Consultant has ownership of the MTFs on receipt of all the necessary information from the Contractor.

The Remediation Consultant is required to review the submitted MTFs and to investigate/resolve any discrepancies. Following this review, a copy of the MTFs will be forwarded to the Principal. Ideally this would occur within two days of the Remediation Consultant verifying the MTFs from the Contractor.

The MTP is considered an active process and revisions of the MTP will be undertaken to improve the MTFs and MTS to ensure comprehensive and efficient material tracking.

9.6.2 Material Tracking Classifications

Material to be moved on the site shall generally be tracked as per one of the following classifications:

- Asbestos impacted fill moved on-site (i.e., below site criteria) to temporary stockpiles with unique stockpile identifier labels prior to final placement under the marker layer;
- Asbestos impacted fill moved on-site (i.e., below site criteria) from excavations or temporary stockpiles and placed under the marker layer;
- Validated soils moved on-site;
- Relocation of fill/natural materials across the Westmead Precinct to temporary stockpiles or direct placement under the marker layer;

- Off-site disposal of waste material (with classification);
- Surplus soils as ENM;
- Surplus soils as VENM;
- Imported soils as VENM;
- Imported soils as ENM; and
- Imported soils under exemption.

Review of these general classification will be undertaken throughout the remedial works to ensure the classification remain appropriate.

9.7 Validation Reporting

9.7.1 Validation Report

The validation report shall be prepared by the Remediation Consultant written in general accordance with *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*, NSW EPA (EPA 2020).

The validation report should contain information including:

- Results of previous investigations conducted at the site;
- Details of the remediation works conducted;
- Information demonstrating that the objectives of the RAP have been achieved, in particular the validation sample results and assessment of the data against both the pre-defined data quality objectives and the remediation acceptance (validation) criteria;
- Information demonstrating compliance with appropriate regulations and guidelines;
- All material tracking data;
- Any variations to the strategy undertaken during the implementation of the remedial works;
- Details of any environmental incidents occurring during the course of the remedial works and the actions undertaken in response to these incidents; and
- Other information as appropriate, including any requirements for ongoing monitoring / management.

9.7.2 Long Term Asbestos Management Plan – Onsite Containment Option

In addition to the requirements of the validation plan, if the proposed remediation strategy is for on-site containment, this will require long term management following completion of the redevelopment.

To this end, a LTAMP will be prepared by the Remediation Consultant to detail the ongoing management and monitoring requirements for the site, however the precise nature and extent of management requirements will not be known until remediation/management works are conducted and validation data obtained. The LTAMP will be prepared following the completion of the Validation Report for the site such that the requirements may be reviewed by the appointed site auditor in preparation of the Site Audit Report and Site Audit Statement.

The LTAMP is required to document the following elements:

- A statement of the objectives of the LTAMP – i.e., to ensure continued suitability of the site following remediation;

- Identification of residual environmental contamination issues at the site that require ongoing management/monitoring to meet the LTAMP objectives, including the type of contamination and location within the site (including a survey plan prepared by a registered surveyor);
- Documentation of environmental management measures which have been implemented to address the identified environmental issues at the site;
- Description of management controls to limit the exposure of site users to known areas of contamination to acceptable levels;
- Description of responsibilities for implementing various elements of the provisions contained in the LTAMP;
- Timeframes for implementing the various control/monitoring, etc. elements outlined in the LTAMP;
- Environmental monitoring and reporting requirements (if required) for the future management of environmental impact underlying the site including:
    - Appropriate monitoring locations and depth within and down-gradient of any residual contamination;
    - Relevant assessment criteria to be used in evaluating monitoring results;
    - Frequency of monitoring and reporting;
    - Process for reviewing monitoring data and how decisions will be made regarding the ongoing management strategy;
    - The length of time for which monitoring is expected to continue; and
    - The regulatory authorities involved and the management inputs required from each;
    - the integration of environmental management and monitoring measures for soil and groundwater;
    - Health and safety requirements for particular activities;
    - A program of review and audits;
    - The provisions in the LTAMP are feasible (i.e., able to be implemented) and able to be legally enforceable (i.e., a mechanism exists, such as development consent conditions, to give the plan a basis in law);
    - The relevant consent authority is satisfied that the inclusion of a development consent condition relating to the implementation of the LTAMP is acceptable; and
- Corrective action procedures to be implemented where LTAMP assessment criteria are breached.

10. Site Management Plan

The site management plan is largely based on the Parramatta City Council (PCC) *Contaminated Land Policy*, *Version 1* (PCC 2017). This section contains procedures and requirements that are to be implemented as a minimum requirement during the remedial works at the site.

10.1 Hours of Operation

It is understood that the hours of operation for remedial work may vary from PCC 2017 typical hours of operation and is subject to approval.

PCC 2017 typical hours of operation for remedial works are:

- Monday to Saturday: 7am to 6pm.
- Sunday and public holidays: No work permitted.

10.2 Soil and Water Management

All works shall be conducted in general accordance with the NSW Department of Housing Blue Book – *Managing Urban Stormwater – Landcom*, 2004, which outlines the general requirements for the preparation of a soil and water management plan.

All remedial works shall be conducted in accordance with a soil and water management plan, which is to be kept onsite and made available to Council Officers on request. All erosion and sediment measures must be maintained in a functional condition through the remediation works by the Contractor.

To prevent the migration of impacted soil off site, silt fences shall be constructed at the down-gradient site boundaries by the Contractor. Any material which is collected behind the sediment control structures shall be treated by one of the following options:

- Placement under the capping layer if appropriate; or
- Removal off site to a licensed waste facility subsequent to waste classification.

In storm or extended rainfall event, the structures located on site for sediment control shall be monitored and replaced or altered if necessary by the contractor. Collected material shall be managed in accordance with remediation works by the contractor.

10.3 Stockpile Management

All materials stockpiled onsite will be managed by the Contractor. Unique numbers will be provided for each stockpile, the source of the stockpile, its estimated volume, material characterisation and its location onsite (via GPS) will also be recorded consistent with the Material Tracking Plan provided as **Section 9.6**.

The following procedures will be implemented by the Contractor:

- No stockpiles of soil or other materials shall be placed on footpaths or nature strips unless prior Council approval has been obtained;
- All stockpiles of soil or other materials shall be placed away from drainage lines gutters or stormwater pits or inlets;
- All stockpiles of soil or other materials likely to generate dust or odours shall be covered (where practical);
- All stockpiles of chemically contaminated soil shall be stored in a secure area and be covered if remaining more than 24 hours (where practical); and

- All stockpiles of asbestos contaminated soils shall be kept damp and covered to minimise potential fibre release, and if left for more than 24 hours, be stored in a secure area (where practical).

10.4 Site Access

All vehicle access to the site shall be stabilised to prevent the tracking of sediment onto the roads and footpaths. All materials must be removed from the roadway on a daily or as required basis. Soil washings from wheels shall be collected and disposed of in a manner that does not pollute waters. Any personnel, equipment, plant or vehicles that enter an asbestos works zone must be appropriately decontaminated prior to exiting.

10.5 Excavation Pump-out

Any excavation pump out water shall be sampled by the consultant for analysis for total suspended solid concentrations, turbidity, pH and the identified contaminants of concern prior to release to stormwater with permission from Council, sewer (only if trade waste permit obtained) or licensed liquid waste Contractor.

Excavation pump out from trenches is not anticipated with the general remediation works given the general remedial plan of minimising ground disturbance and groundwater being at a depth of approximately 5 m bgs. Pump out following accumulation of surface water is the most likely scenario for water disposal.

10.6 Landscaping / Rehabilitation

All exposed soils shall be progressively stabilised and revegetated or resealed on the completion of remedial works.

10.7 Noise

Remediation work shall not give rise to 'offensive noise' as defined in the *Protection of the Environment Operations* (POEO) *Act 1997*. All equipment and machinery associated with the remediation work shall be operated by the Contractor in accordance with the POEO Act 1997 and its *Noise Control Regulations 2000*.

The remediation works shall comply with the NSW EPA's *Environmental Noise Control Manual* for the control of noise from construction sites which specifies that:

- For a cumulative period of up to 4 weeks, the noise level as measured by the LA10 (15 minute) emitted by the works to specific residences should not exceed the background noise level, LA 90 (15 minute), by more than 20dB(A).

All machinery and equipment used on site will be in good working order and with the fitted with appropriate silencers when necessary.

10.8 Vibration

The use of plant and machinery by the Contractor shall not cause vibrations to be felt or capable to be measured at any premises.

10.9 Air Quality

During remedial works, dust emissions and any odours will be confined within the site boundary. This will be assessed by a program of air monitoring undertaken by the consultant for all remediation works and implemented by air emission controls as required by the Contractor. Air monitoring requirements are summarised in this section.

10.9.1 Air Monitoring

Real-time Exposure Monitoring

Preference is given for all environmental monitoring to be undertaken using real time methods. To this extent, the Remediation Consultant shall monitor works on the site by the use of a Dusttrak real-time aerosol monitor. A minimum of five locations will be monitored continuously throughout the remediation works.

The consultant will advise the Principal and Contractor when the time averaged Dusttrak particulate measurement exceeds 0.05 mg/m^3. WA DoH (2009) reports that this level is protective of potential asbestos fibre exposures. Further, this level is well below the inspirable dust inhalation standard, and is further protective of potential respirable dust impacts at the site boundary. The remediation works shall not comprise excavation / handling of silica rich materials, and maintenance of particulates at this level is considered to be similarly protective of potential silica exposures.

If dust levels exceed the adopted criteria of 0.05 mg/m^3, the Principal and Contractor will be notified, and works will require to be modified to reduce dust emissions to below the adopted criteria. All exceedances will be required to be "closed-out" by re-sampling at the exceedance location subsequent to implementation of modified work routines (such as increased dust controls).

Occupational Asbestos Monitoring

Airborne asbestos fibre monitoring will be conducted by the Certified Occupational Hygienist (COH) whom also must be a Licensed Asbestos Assessor (LAA, as per SafeWork NSW requirements) in accordance with the requirements of the National Occupational Health and Safety Commission (NOHSC*) Asbestos Code of Practice and Guidance Notes*, in particular the Guidance note for the estimation of airborne asbestos dust [NOHSC 3002:2005]. The COH shall undertake airborne asbestos fibres monitoring at a minimum of five static locations daily during remediation works that will disturb asbestos impacted or contaminated materials. Monitoring locations will include site perimeter locations and downwind locations. Wind information available from the Bureau of Meteorology (BOM) for the nearest weather stations will be used to determine common prevailing winds in the area. Additionally, personal monitoring of up to three potentially impacted workers as nominated by the Contactor must be undertaken by the COH.

Air filters shall be analysed by a NATA accredited laboratory and results shall be required to be below 0.01 fibres/mL. All detections of fibres shall be further analysed by scanning electron microscope (SEM) to confirm the fibres are asbestos.

If respirable asbestos fibres are confirmed and present between 0.01 and 0.02 fibres/mL, the following controls must be implemented by the licensed asbestos removalist, in accordance with *Code of Practice: How to Safely Remove Asbestos,* SafeWork NSW (SWNSW 2019a);

- Review control measures;
- Investigate the cause; and
- Implement controls to eliminate or minimise exposure and prevent further release.

If respirable asbestos fibres are confirmed and present above 0.02 fibres/ml, the following controls must be implemented by the licensed asbestos removalist, in accordance with SWNSW 2019a;

- Stop removal work;
- Notify SafeWork NSW by phone, then by fax or written statement that work has ceased;

- Investigate the cause;
- Implement controls to eliminate or minimise exposure and prevent further release; and
- Do not recommence removal work until further air monitoring is conducted and fibre levels are detected below 0.01 fibres/mL.

A daily report air monitoring report will be prepared documenting the previous/same days airborne asbestos fibre air monitoring results. This report will be made available to all relevant stakeholders, including but not limited to:

- Site workers;
- Hospital staff;
- Neighbouring facilities; and
- Unions.

10.10 Dust Control

During the remedial works, as necessary, excavation areas will be wetted down using a water spray to minimise the potential for dust to be generated by the Contractor. A wetting or bonding agent may be used to further bind the soil to minimise asbestos fibre release.

All asbestos impacted soils must be wetted (but not flooded) prior to and during excavation and movement of the soils. To control dust in significant areas of exposed asbestos contaminated fill, industrial misting fans, placed at the outer extents of remedial/excavation areas, must be utilised by the Contractor.

Dust shall also be controlled by ensuring vehicles leave via the designated (stabilised) site access and all equipment have dust suppressors fitted by the Contractor.

During all remedial works, dust screens will be erected around the perimeter of the site by the Contractor. Where significant fugitive emissions are observed from asbestos inspection / treatment pads, or bioremediation areas, these areas shall be wetted and/or covered by the Contractor.

Meteorological conditions will be monitored by the Remediation Consultant and Contractor. Remedial work will be stopped or modified where meteorological conditions are adverse (i.e., dry conditions and strong winds towards sensitive receptors).

Plant and vehicles should limit their speed when working within asbestos exclusion zones and only traverse wetted haul roads. Only essential vehicles are permitted to traverse the asbestos exclusion zone.

10.11 Staging of Asbestos Disturbance Works

Where practicable, asbestos disturbance works will be conducted exclusively (i.e., with no other dust generating earthworks occurring simultaneously) with the application of a marker layer and interim capping layers as soon as practicable subsequent to site levels being achieved.

The objective of this is to separate all potential asbestos and non-asbestos dust generating activities so appropriate levels of control can implemented for each type of activity.

10.12 Odour / Volatile Emissions Control

No odours should be detectable at the site boundary and volatile emissions of other potentially volatile substances shall be controlled. Appropriate actions will be taken by the Contractor to reduce the odours, which may include: increasing the amount of covering of excavations / stockpiles; mist sprays; odour suppressants; and maintenance of equipment.

Records of volatile emissions and odours shall be kept by the Contractor. Equipment and machinery will be adequately maintained to minimise exhaust emissions. No materials shall be burnt on the site.

10.13 Transport of Material Offsite/Across the Westmead Precinct

Trucks will be loaded in a designated areas. The Contractor shall ensure that there is no material tracked out onto the street and that the load is securely covered. In addition, all site vehicles must leave the site in a forward direction.

The Contractor shall also log truck movements and approximate volume, via registration number and consignment number (where applicable), into and out of the site including material relocated across the Westmead Precinct.

All appropriate road rules shall be observed, and state roads will be selected as far as practicable over local roads when deciding on the transport route to the off-site material disposal location.

Plant and vehicles should limit their speed when working within asbestos exclusion zones and only traverse wetted haul roads.

10.14 Hazardous Materials

Hazardous and / or intractable wastes arising from the remediation work shall be removed and disposed of in accordance with the requirements of NSW EPA, SafeWork NSW and the relevant regulations by the Contractor.

In particular, any hazardous wastes will be transported by a NSW EPA licensed transporter.

10.15 Offsite Disposal of Contaminated Soil

All soils will be classified, managed and disposed in accordance with the *Waste Classification Guidelines* (EPA 2014). Documentary evidence for all soil disposal shall be kept for inclusion in the Validation Report/s.

It is a requirement under the POEO Waste Regulation to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m^2 of asbestos sheeting. Each load will be assigned a unique consignment code to allow NSW EPA to monitor their movement from site of generation to disposal.

In addition, the *proximity principle*, under the POEO Regulation, makes it an offence to transport waste generated in NSW by motor vehicle for disposal more than 150 kilometres from the place of generation, unless the waste is transported to one of the two nearest lawfully disposal facilities to the place of generation.

10.16 Imported Fill

Any materials imported on site by the Contractor to re-establish ground levels or to be applied as a capping layer must be validated, environmentally suitable material (i.e. VENM, ENM or other, as described in **Section 9.2.5**). Additionally, the imported fill should also be compatible with required geotechnical constraints and the existing soils characteristic for site drainage purposes.

10.17 Groundwater

It is anticipated no dewatering will be required for the remediation works. If dewatering is required as part of the remediation works, a licence shall be applied for from Water NSW for approval to extract groundwater. Details on the analyses and disposal of dewatering water is provided in **Section 10.5.**

10.18 Site Signage and Contact Numbers

A sign/s shall be displayed adjacent to the site access point/s throughout the duration of the works with the contact details of the Contractor and project manager as provided and maintained by the Contractor.

10.19 Site Security

The remedial areas shall be secured against unauthorised access by means of an appropriate fence or barricade by the Contractor. All persons working in asbestos remedial areas must be inducted, have undertaken required training and don appropriate PPE. The access gates will be locked at all times when remedial works are not occurring.

10.20 Community Consultation

Owners and / or occupants of adjacent premises and across the road from the site will be notified at least seven days prior to the commencement of preparation for the remediation works. As a minimum the notification shall include the details of an appropriate contact person.

Hospital staff and contractors will be notified at least seven days prior to the commencement of preparation for the remediation works via communications notices by Westmead Hospital.

11. Environmental and Health and Safety Management

11.1 Environmental Management

11.1.1 Construction Environmental Management Plan

Prior to commencement of remediation works on the site, a Construction Environmental Management Plan (CEMP) shall be prepared by the Contractor, which documents the environmental monitoring and management measures required to be implemented during the remediation and construction related activities associated with the construction of the site.

The CEMP shall address each of the nominated items in **Section 11.1.2** and shall include the contingency plan, referred to in **Section 8** above.

11.1.2 Required Elements/Procedures

An assessment of the proposed activities and the associated elements required to be incorporated into the CEMP is provided in **Table 11.1**. The CEMP is required to address each of the required elements and procedures in full detail and to include detailed monitoring processes and procedures, corrective actions and reporting requirements.

Table 11.1: Required Elements of the CEMP

Element	Specific Minimum Requirements to be included in CEMP
1. Dust and Airborne Hazard Control	Real time airborne dust analyser monitoring. Asbestos air monitoring. Provisions for dust control based on monitoring results. Staging of asbestos works. Notification of surrounding buildings and implementation of control measures (e.g., closure of air vents or additional monitoring for asbestos fibres).
2. Flora and Fauna	As appropriate and advised by flora and flora consultant.
3. Heritage/Archaeological	In accordance with relevant heritage/archaeological studies.
4. Visual Impacts	Visual monitoring at site boundary Specific colour requirements for various controls/measures, including PPE (e.g., navy coveralls may be a suitable option in cooler conditions)
5. Emergency Response	As appropriate. Procedures required for spill incident response including material storage breach.
6. Noise Control	Hours of operation, consistent with the consent conditions. Boundary monitoring at commencement of work site activities with potential for environmental noise emissions. Potential noise monitoring at nearest receptors. Procedures for control and management of noise emissions, as appropriate (e.g., restricted hours).
7. Traffic	Controls on vehicle movements on public roads/internal Westmead Precinct roads. Controls on transport in asbestos exclusion zones
8. Protection of Adjoining Structures	As appropriate and advised by structural engineer.
9. Odour Control	Procedures for management of potentially odorous works.
10. Handling of Contaminated Soil and Groundwater	Soil and water management (stockpiling, site access, excavation pump out, reinstatement).
11. Soil Storage/Placement Areas	Soil and water management (stockpiling, site access, excavation pump out, reinstatement). Bunding. Heavy vehicle/personnel decontamination. Interim storage requirements for materials requiring later treatment. Site drainage requirements, incorporating clean/dirty areas and modifications to existing surface water and drainage controls beneath retained pavements.

Element	Specific Minimum Requirements to be included in CEMP
	Monitoring as required.
12. Sediment Control	Bunding. Collection/treatment/handling impacted sediments.
13. Operation of Site Office	As appropriate.
14. Asbestos Works	Required notifications, permits, signage and exclusion zones. Required personal (e.g. Class A removalist, licences asbestos assessor). PPE and decontamination. Staging of asbestos and non-asbestos works.
15. Environmental Monitoring	Monitoring of dusts, noise, odour and fibres. Monitoring as required for vibration and water releases. Inspection checklists and field forms.
16. Environmental Criteria	Soil and water criteria as sourced from RAP.
17. Material Classification	As detailed in this RAP. Materials tracking, including QA/QC inspection and sampling.
18. Community Relations Plan	Refer to CHW Stage 2 project specific communication protocols, incorporating nomination of specific contact persons & details and requirements for communications/response register.
19. Incident Reporting	As appropriate, including standard form/checklist.
20. Security and Signage	Secure site perimeter. Site boundary signage. Asbestos exclusion zone signage.
21. EMP Review	As appropriate.
22. Training	As appropriate. Asbestos awareness training for all workers.
23. Contact Details	Company/personnel details, including names/phone numbers for: - Principal Contractor - Site Auditor - Remediation Consultant - Remediation Contractor - OH&S Compliance - Environmental Compliance

11.2 Health and Safety Management

A Work Health & Safety Management Plan (WHSP) shall be prepared by the Contractor prior to commencement of remediation works on the site. The Plan shall contain procedures and requirements that are to be implemented as a minimum during the works.

The objectives of the WHSP are:

- Ensure all regulatory requirements for the proposed works are satisfied;
- To apply standard procedures that minimises risks resulting from the works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.

These objectives will be achieved by:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards, mandatory safety practices and procedures;
- Monitoring of potential hazards and implementation of corrective measures; and

- Provision for contingencies that may arise while operations are being conducted at the site.

12. Regulatory Approvals / Licensing

12.1 State Environment Planning Policy Number 55 (SEPP55) Remediation of Land

The proposed remediation works are considered to be classified as 'Category 2' Remediation Works – i.e., not requiring consent. The notification requirements of SEPP 55 require the consent authority to be notified 30 days before Category 2 remediation works commence, providing the consent authority with the information needed to verify the work is not Category 1 by reference to the following criteria:

- The work is not designated development under schedule 3 of the *Environmental Planning and Assessment Regulation 2000* (EPA&A Regulation) or under a planning instrument;
- The work proposed is not on land identified as critical habitat under the *Biodiversity Conservation Act 2016*;
- The remediation work is not likely to have a significant effect on threatened species, populations, ecological communities or their habitats;
- The work is not proposed in an area or zone identified in a planning instrument as being an area of environmental significance such as scenic areas or wetlands; and/or
- The work does not require consent under another SEPP or regional environmental plan.

In addition, the notification will also include relevant contact details and a proposed remediation schedule. Notice is also required to be given to the consent authority within 30 days of remediation works completion.

12.2 Protection of the Environment Operations Act 1997

The proposed remediation/validation activities are not required to be licensed under the POEO Act since the works do not involve:

- Treatment otherwise than by incineration and storage of more than 30 000 cubic metres of contaminated soil originating exclusively from the site, or
- Disturbance of more than an aggregate area of 3 hectares of contaminated soil originating exclusively from the site.

12.3 Protection of The Environment Operations (Waste) Regulation 2014

The regulations make requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site will not require to be licensed.

Section 42 of the Regulation stipulates special transportation, reporting, re-use and recycling requirements relating to asbestos waste and must be complied with regardless whether the activity is licensed.

The requirements for the transportation of asbestos waste include:

- Bonded asbestos material must be securely packaged at all times;
- Friable asbestos material must be kept in a sealed container;
- Asbestos-contaminated soils must be wetted down; and
- All asbestos waste must be transported in a covered, leak-proof vehicle.

The transporter of asbestos waste must cause the following information to be given to the EPA prior to the transportation of asbestos waste loads:

- Source site details including address, name and contact details;
- Date of proposed transportation commencement;
- Name, address and contact details of disposal site; and
- Approximate weight of each class of asbestos in each load;

The transporter of asbestos waste must ensure the following information is given to the disposal site before or at delivery:

- Unique consignment code issued by EPA in relation to that load; and
- Any other information specified in the Asbestos and Waste Tyres Guidelines.

The requirements relating to the off-site disposal of asbestos waste are as follows:

- Asbestos waste in any form must be disposed of only at a landfill site that may lawfully receive the waste;
- When asbestos waste is delivered to a landfill site, the occupier of the landfill site must be informed by the person delivering the waste that the waste contains asbestos;
- When unloading and disposing of asbestos waste at a landfill site, the waste must be unloaded and disposed of in such a manner as to prevent the generation of dust or the stirring up of dust; and
- Asbestos waste disposed of at a landfill site must be covered with virgin excavated natural material or other material as approved in the facility's environment protection licence.

Section 48 of the Regulation requires that wastes are stored in an environmentally safe manner. It also stipulates that vehicles used to transport waste must be covered when loaded.

It is noted that the above requirements of the waste regulatory framework apply when waste materials leave a site. As detailed in **Section 6.6**, material movement across the Westmead Precinct are not considered to be waste materials because the material is not considered to be surplus to site requirements and is not leaving the Westmead Precinct. Thus, there is no need to assign a waste classification to the materials.

12.4 Waste Classification Guidelines (EPA 2014)

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with this guideline. Where wastes require immobilisation prior to off-site disposal (to reduce waste classifications) an immobilisation approval shall be sought in accordance with Part 2 of this guideline. Immobilisations are only anticipated to be required with unexpected finds that cannot be retained on site and cannot be disposed directly offsite to a licensed facility.

12.5 Parramatta City Council Contaminated Land Policy (PCC 2017)

The Parramatta City Council Contaminated Land Policy details the requirements of the council in regards to contaminated lands. The requirements provided in **Section 10** are largely based on the guidance provided in PCC 2017.

12.6 Asbestos Removal Regulations and Codes of Practice

The remediation of fill containing asbestos will be managed in accordance with the Work Health and Safety Act (2011), WHS Regulation, SafeWork NSW guidelines, '*Code of Practice: How to Safely Remove Asbestos* (SWA 2020a), '*Code of Practice: How to Manage and Control Asbestos in the Workplace'* (SWA2020b) and the NSW EPA (2014) Waste Classification Guidelines.

Excavation, onsite remediation and removal of friable asbestos contaminated soils are required to be conducted by a Class A Asbestos Removal licensed contractor.

All airborne asbestos fibre monitoring works must be undertaken by a COH / LAA, in accordance with SafeWork NSW requirements.

Before starting the affected works, the Contractor is required to obtain a site-specific permit approving the asbestos works from SafeWork NSW. A permit will not be granted without a current licence and the permit application must be made at least seven days before the work is due to commence.

12.7 Guidelines of the Duty to Report Contamination under the Contaminated Land Management Act 1997 (EPA 2015)

The EPA 2015 guidelines now present notification triggers specific to asbestos in, or on, soil. The site is considered to have friable asbestos present in or on soil on the land and to have a level of asbestos (% w/w) above the HSL for FA/AF in NEPC 2013 in a number of samples in the eastern portion of the site. However, it is understood that there have been no detections of airborne asbestos fibres above 0.01 fibres/mL during airborne asbestos fibre monitoring conducted by or known to, the remediation consultant. Based on the current data, it is considered that there is not a requirement for notification of the site to the EPA for asbestos contamination.

13. Communication with Stakeholders

Communication will be maintained in accordance with Health Infrastructure and the Children's Hospital Redevelopment Stage 2 related communication plans throughout the work with key stakeholders of the project.

Communication will also be maintained throughout the work via:

- Daily pre-starts;
- Weekly toolbox talks;
- Information and training awareness sessions as required;
- Daily airborne asbestos fibre monitoring reports; and
- Community consultation.

14. Conclusions and Recommendations

With reference to the limitations in **Section 15**, the following conclusions and recommendations are provided.

14.1 Conclusions

Overall, it is considered that the proposed actions outlined in this RAP conform to the requirements of the *Contaminated Sites Guidelines for the NSW Site Auditor Scheme (3rd Edition)* (EPA 2017) because they are: technically feasible; environmentally justifiable; and consistent with relevant laws, policies and guidelines endorsed by NSW EPA.

Subject to the successful implementation of the measures described in this RAP and the recommendations below, it is concluded that the risks posed by contamination can be managed in such a way as to be adequately protective of human health and the environment, such that the site can be made suitable for the proposed hospital use.

14.2 Recommendations

It is recommended that the processes outlined in this RAP be implemented and that the following documentation be developed and implemented to ensure the risks and impacts during remediation works are controlled in an appropriate manner:

- A Construction Environmental Management Plan (CEMP), to document the monitoring and management measures required to control the environmental impacts of the works and ensure the validation protocols are being addressed; and
- A Work Health and Safety Management Plan (WHSP) to document the procedures to be followed to manage the risks posed to the health of the remediation workforce.

The CEMP and WHSP will require to be cognisant of the potential occurrence and storage / handling of asbestos contaminated soils on the site.

Upon completion of the remediation works, if containment is considered the most suitable option, the Validation Report and LTAMP for materials retained beneath the marker and capping layer are required to be submitted by the Remediation Consultant to the Site Auditor for certification that the site is suitable for the proposed uses, subject to implementation of the LTAMP. If offsite disposal is considered the most suitable option, the Validation Report will document the remediation and validation of the site, with no requirement for an LTAMP.

15. Limitations

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

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

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

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

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

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

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

Figures

Legend:

Proposed MSCP Site Boundary

JBS&G

Job No: 56200	
Client: Health Infrastructure	
Version: R06 Rev A	Date 16/11/2020
Drawn By: RH	Checked By: JS
Scale 1:8,000	

0 100 200

metres

Coord. Sys. GDA 1994 MGA Zone 56

MSCP Redevelopment, Labyrinth Way, Westmead NSW

SITE LOCATION

FIGURE 1

File Name: \\JBSG-NSW-FS01\Company Data\Projects\Health Infrastructure\56200 - Westmead Kids Hospital Stage 2\GIS\Maps\R06 Rev A\56200_01_SiteLocation.mxd

Legend:

Proposed MSCP Site Boundary

JBS&G

Job No: 56200	
Client: Health Infrastructure	
Version: R06 Rev A	Date 27/11/2020
Drawn By: RH	Checked By: JS
Scale 1:1,000	

0 10 20
metres

Coord. Sys. GDA 1994 MGA Zone 56

MSCP Redevelopment, Labyrinth Way, Westmead NSW

SITE LAYOUT

FIGURE 2

File Name: \\JBSG-NSW-FS01\Company Data\Projects\Health Infrastructure\56200 - Westmead Kids Hospital Stage 2\GIS\Maps\R06 Rev A\56200_02_SiteLayout.mxd
Reference: www.nearmap.com - Imagery 06-06-2020

Legend:

- Proposed MSCP Site Boundary

Sampling Locations (JBS&G, 2020)

- Soil Bore
- Soil Bore/Monitoring Well
- MSCP Building Footprint
- Proposed Road Upgrade

JBS&G

Job No: 56200	
Client: Health Infrastructure	
Version: R06 Rev A	Date 18/11/2020
Drawn By: RH	Checked By: JS

Scale 1:1,000

0 10 20
metres

Coord. Sys. GDA 1994 MGA Zone 56

MSCP Redevelopment, Labyrinth Way, Westmead NSW

SAMPLING LOCATIONS

FIGURE 3

File Name: N:\Projects\Health Infrastructure\56200 - Westmead Kids Hospital Stage 2\GIS\Maps\R06 Rev A\56200_03_SamplingLoc.mxd
Reference:

Legend:

- Proposed MSCP Site Boundary

Sampling Locations (JBS&G, 2020)

- Soil Bore
- Soil Bore/Monitoring Well

Asbestos Detected

- ACM & FA/AF
- FA/AF

JBS&G

Job No: 56200	
Client: Health Infrastructure	
Version: R06 Rev A	Date 27/11/2020
Drawn By: RH	Checked By: JS
Scale 1:1,000	

0 10 20
metres

Coord. Sys. GDA 1994 MGA Zone 56

Old Ronald McDonald House Westmead, NSW

ASBESTOS DETECTS

FIGURE 4A

File Name: \\JBSG-NSW-FS01\Company Data\Projects\Health Infrastructure\56200 - Westmead Kids Hospital Stage 2\GIS\Maps\R06 Rev A\56200_4A_AsbestosDetect.mxd
Reference:

BH31	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	0.3-0.8	0.0325	FA & AF
ACM		0.060736	ACM

BH01	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	1.0-1.7	0.0208	FA & AF
	2.1-3.0	0.0013	

BH02	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	1.5-2.0	0.0032	FA & AF

BH05	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	0.5-1.5	0.005	FA & AF
ACM		0.0115	ACM
FA/AF	1.5-2.5	0.0371	FA & AF
ACM		0.0773	ACM
FA/AF	2.5-3.5	0.0143	FA & AF
ACM		0.1127	ACM

BH30	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	0.3-1.3	0.0012	FA & AF
	1.3-2.3	0.0049	
ACM		0.18773	ACM

BH03	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	1.0-2.0	0.0012	FA & AF

BH32	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	0.3-1.3	0.0049	FA & AF
	1.3-2.3	0.0151	
	3.3-3.6	0.0012	
	3.6-4.6	0.0824	

BH28	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	0.9-1.9	0.0241	FA & AF

BH07	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
ACM	0.8-0.9	0.11365	ACM
FA/AF	1.0-2.0	0.0338	FA & AF
FA/AF	2.0-3.0	0.119	
ACM		0.3692	ACM

BH08	Depth (m)	Concentration (%w/w)	Criteria Exceeded (HSL - NEPM 2013)
Analyte			
FA/AF	0.0-1.0	0.0151	FA & AF
	1.0-1.7	0.0054	
	1.7-2.0	0.0197	

Legend:

Proposed MSCP Site Boundary

Sampling Locations (JBS&G, 2020)

Soil Bore

Soil Bore/Monitoring Well

JBS&G

Job No: 56200

Client: Health Infrastructure

Version: R06 Rev A | Date 27/11/2020

Drawn By: RH | Checked By: JS

Scale 1:1,500

0 20 40

metres

Coord. Sys. GDA 1994 MGA Zone 56

Old Ronald McDonald House Westmead, NSW

ASBESTOS EXCEEDANCES

FIGURE 4B

File Name: \\JBSG-NSW-FS01\Company Data\Projects\Health Infrastructure\56200 - Westmead Kids Hospital Stage 2\GIS\Maps\R06 Rev A\56200_4B_AsbestosExceed.mxd
Reference: Nearmap, 06-06-2020

Legend:

- Proposed MSCP Site Boundary
- The Lodge Building Footprint
- Proposed Data Gap Soil Sampling Locations – 20 m grid

JBS&G

Job No: 56200	
Client: Health Infrastructure	
Version: R06 Rev A	Date 16/11/2020
Drawn By: RH	Checked By: JS
Scale 1:1,000	

0 10 20
metres

Coord. Sys. GDA 1994 MGA Zone 56

MSCP Redevelopment, Labyrinth Way, Westmead NSW

DATA GAP ASSESSMENT

FIGURE 5

File Name: \\JBSG-NSW-FS01\Company Data\Projects\Health Infrastructure\56200 - Westmead Kids Hospital Stage 2\GIS\Maps\R06 Rev A\56200_05_DataGapsUnderlyingExistingBuildingsStructures.mxd
Reference: www.nearmap.com - Imagery 06-06-2020

Legend:

- Proposed MSCP Site Boundary
- **Approximate Extent of Remediation**
- Approximate Extent of Asbestos Contaminated Fill

JBS&G

Job No: 56200	
Client: Health Infrastructure	
Version: R06 Rev A	Date 16/11/2020
Drawn By: RH	Checked By: JS
Scale 1:1,000	

0 10 20
metres

Coord. Sys. GDA 1994 MGA Zone 56

MSCP Redevelopment, Labyrinth Way, Westmead NSW

EXTENT OF REMEDIATION

FIGURE 6

File Name: \\JBSG-NSW-FS01\Company Data\Projects\Health Infrastructure\56200 - Westmead Kids Hospital Stage 2\GIS\Maps\R06 Rev A\56200_06_ApproximateExtentofRemediation.mxd
Reference: www.nearmap.com - Imagery 06-06-2020

Appendix A: Summary Tables

Table A: Chemical Analytical Results
Project Number: 56200
Project Name: ORMDH Westmead

	Metals & Metalloids								TPHs (NEPC 1999)					TRHs (NEPC 2013)							BTEXN							Polycyclic Aromatic Hydrocarbons																			
	Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Total)	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Total)	>C10-C16 less Naphthalene (F2)	C6-C10 Fraction	C6-C10 less BTEX (F1)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)	Naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (lower bound)*	Benzo(a)pyrene TEQ (medium bound)	Benzo(a)pyrene TEQ (upper bound)*	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Carcinogenic PAHs as B(a)P TEQ	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	PAHs (Total)	Pyrene	Total Positive PAHs
	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	2	0.4	1	1	1	0.1	1	1	20	20	50	50	50	50	100	100	50	50	20	20	0.1	0.1	0.1	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.05	0.5	0.5	0.5	0.5	0.1	0.5	0.1	0.1		0.1	0.1	0.1	0.1	0.5	0.1	
Site Specific EIL - Urban Residential and Public Open Space, Aged Soils[#4]	100		490[#5]	240	1100		280	590																			170																			
NEPM 2013 ESL Urban Residential and Public Open Space, Fine Soil															1300	5600		120		180	65	125	105			45						0.7														
NEPM 2013 Mgnt Limits - Residential, Parkland and Public Open Space, Fine														1000	3500	10000			800																												
NEPM 2013 Soil HIL B	500	150	500[#5]	30000	1200	120	1200	60000																									4	4	4						4					400		
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 0 to <1m																		280		50	0.7	NL	480			110	5																				
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 1 to <2m																		NL		90	1	NL	NL			310	NL																				
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 2 to <4m																		NL		150	2	NL	NL			NL	NL																				

Field ID	Sample Date	Report Number																																														
BH01_0.0-0.1	4/07/2020	730118	2.7	<0.4	10	18	15	0.1	9.9	68	<20	<20	62	280	342	<50	250	150	400	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH02_1.9-2.0	4/07/2020	730118	10	1.1	19	42	31	<0.1	29	160	<20	22	51	<50	73	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH03_0.0-0.1	4/07/2020	730118	6	<0.4	18	27	20	<0.1	31	55	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH04_0.4-0.5	4/07/2020	730118	3	<0.4	15	23	9.7	<0.1	34	47	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH05_0.9-1.0	4/07/2020	730118	9.4	0.7	22	28	37	<0.1	24	110	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH06_0.4-0.5	4/07/2020	730118	5.4	<0.4	17	21	19	0.1	22	53	<20	<20	<50	53	53	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH07_2.0-2.1	4/07/2020	730118	8.9	58	25	34	51	<0.1	42	1900	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH08_0.0-0.1	4/07/2020	730118	2.7	<0.4	10	14	23	<0.1	9.4	45	<20	<20	180	290	470	<50	390	170	560	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH08_1.7-1.8	4/07/2020	730118	15	0.8	30	23	52	<0.1	22	90	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH09_0.0-0.1	4/07/2020	730118	2.2	<0.4	8.4	9.2	35	<0.1	10	38	<20	<20	<50	79	79	<50	<100	100	100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH10_0.4-0.5	4/07/2020	730118	7.9	<0.4	14	15	14	<0.1	11	40	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH11_0.0-0.1	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11_0.4-0.5	4/07/2020	730118	11	<0.4	37	11	20	0.1	8.9	14	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH13_0.4-0.5	5/07/2020	730118	11	<0.4	19	18	73	0.1	7.6	50	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
QA01	5/07/2020	246568	13	<0.4	32	11	37	<0.1	5	22	<25	<50	<100	<100	-	<50	<100	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<1	<2	<3	<0.1	<0.1	<0.1	<0.1	0.1	0.2	<0.5	<0.5	<0.5	-	0.1	-	0.1	<0.1	0.267[#1]	0.2	<0.1	<0.1	<0.1	-	0.2	1.2
QC01	5/07/2020	730118	15	<0.4	27	12	35	<0.1	<5	14	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH14_0.0-0.1	5/07/2020	730118	2.2	<0.4	6	7.2	13	<0.1	<5	32	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH15_0.4-0.5	5/07/2020	730118	<2	<0.4	9	15	14	0.1	5.8	45	<20	<20	250	400	650	<50	520	300	820	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	0.7	2.1	2.7	2.9	3.2	2	<0.5	2.1	1	<0.5	2.903[#2]	0.9	<0.5	0.6	<0.5	10.7	1.3	-
BH17_0.0-0.1	5/07/2020	730118	4.5	<0.4	11	24	13	<0.1	7.9	48	<20	43	260	270	573	55	390	220	665	55	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH17_1.5-1.6	5/07/2020	730118	22	<0.4	45	23	58	<0.1	8	38	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH18_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.9-1.0	5/07/2020	730118	13	<0.4	26	23	33	<0.1	17	74	<20	<20	340	470	810	87	610	250	947	87	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH19_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_0.9-1.0	5/07/2020	730118	21	<0.4	41	21	250	0.4	8.9	42	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	0.8	0.8	1	1.2	1.6	<0.5	<0.5	<0.5	0.6	0.7	<0.5	1.25[#2]	0.9	<0.5	<0.5	<0.5	4.9	1.1	-
QA02	5/07/2020	246568	10	<0.4	27	16	140	0.3	6	35	<25	<50	<100	<100	-	<50	<100	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<1	<2	<3	<0.1	<0.1	0.2	0.5	1.5	2.1	2.7	2.7	2.7	-	1.1	-	1.8	0.2	2.549[#1]	3.2	0.1	0.7	1.6	-	3.6	19
QC02	5/07/2020	730118	18	<0.4	34	23	250	0.3	7.6	46	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	0.8	0.6	0.7	1	1.3	<0.5	<0.5	<0.5	0.5	0.6	<0.5	1.039[#2]	0.9	<0.5	<0.5	<0.5	4.4	1	-
BH19_3.5-3.6	5/07/2020	730118	12	<0.4	13	21	16	<0.1	13	31	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH20_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_1.7-1.8	5/07/2020	730118	15	<0.4	33	24	25	<0.1	11	49	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH21_0.4-0.5	5/07/2020	730118	13	<0.4	30	38	32	<0.1	40	110	<20	<20	<50	<50	<50	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH22_0.4-0.5	5/07/2020	730118	9.2	<0.4	23	29	24	0.1	36	96	<20	<20	<50	51	51	<50	<100	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH23_0.0-0.1	5/07/2020	730118	2.5	<0.4	10	9.3	13	<0.1	5.7	46	<20	<20	79	100	179	<50	160	<100	160	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#3]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-

Data Comments
#1 ESDAT Combined with Non-Detect Multiplier of 0.5. Some Analytes are missing from this Combined Compound.
#2 ESDAT Combined with Non-Detect Multiplier of 0.5.
#3 ESDAT Combined.
#4 Derived and Site Specific EILs generated from physical parameters collected during the investigation (Table 6.1)
#5 TV for Total Chromium adopted from Chromium (VI) values as an initial screening tool

Table A: Chemical Analytical Results
Project Number: 56200
Project Name: ORMDH Westmead

			Organochlorine Pesticides																							
			4,4-DDE	Aldrin	Aldrin + Dieldrin (Sum of Total)	alpha-BHC	alpha-Chlordane	beta-BHC	Chlordane	DDD	DDT	Dieldrin	DDT+DDE+DDD (Sum of Total)	delta-BHC	Endosulfan alpha	Endosulfan beta	Endosulfan sulphate	Endrin	Endrin aldehyde	gamma-Chlordane	Endrin ketone	Heptachlor	Heptachlor Epoxide	Lindane	Methoxychlor	Toxaphene
			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
EQL			0.05	0.05	0.05	0.05		0.05	0.1	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	1
Site Specific EIL - Urban Residential and Public Open Space, Aged Soils[#4]											180															
NEPM 2013 ESL Urban Residential and Public Open Space, Fine Soil																										
NEPM 2013 Mgnt Limits - Residential, Parkland and Public Open Space, Fine																										
NEPM 2013 Soil HIL B					10				90				600					20				10			500	30
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 0 to <1m																										
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 1 to <2m																										
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 2 to <4m																										
Field ID	**Sample Date**	**Report Number**																								
BH01_0.0-0.1	4/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH02_1.9-2.0	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03_0.0-0.1	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04_0.4-0.5	4/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH05_0.9-1.0	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH06_0.4-0.5	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH07_2.0-2.1	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH08_0.0-0.1	4/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH08_1.7-1.8	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH09_0.0-0.1	4/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH10_0.4-0.5	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11_0.0-0.1	4/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH11_0.4-0.5	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13_0.4-0.5	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA01	5/07/2020	246568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14_0.0-0.1	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH15_0.4-0.5	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17_0.0-0.1	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH17_1.5-1.6	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.0-0.1	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH18_0.9-1.0	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_0.0-0.1	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH19_0.9-1.0	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
QA02	5/07/2020	246568	<0.1	<0.1	<0.2[#3]	<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	-
QC02	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH19_3.5-3.6	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_0.0-0.1	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH20_1.7-1.8	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21_0.4-0.5	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH22_0.4-0.5	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1
BH23_0.0-0.1	5/07/2020	730118	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.1	<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	<1

	Chlorinated Alkanes																	
	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane	Dichlorodifluoromethane	Dichloromethane	Trichlorofluoromethane
	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	0.5	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
Site Specific EIL - Urban Residential and Public Open Space, Aged Soils[#4]																		
NEPM 2013 ESL Urban Residential and Public Open Space, Fine Soil																		
NEPM 2013 Mgnt Limits - Residential, Parkland and Public Open Space, Fine																		
NEPM 2013 Soil HIL B																		
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 0 to <1m																		
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 1 to <2m																		
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 2 to <4m																		
Field ID																		
BH01_0.0-0.1	<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
BH02_1.9-2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH05_0.9-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH06_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH07_2.0-2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH08_0.0-0.1	<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
BH08_1.7-1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH09_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15_0.4-0.5	<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
BH17_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17_1.5-1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.9-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_0.9-1.0	<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
QA02	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1
QC02	<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
BH19_3.5-3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_1.7-1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH22_0.4-0.5	<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
BH23_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Chlorinated Alkenes												
	1,1-dichloroethene	1,1-dichloropropene	1,3-dichloropropene	2-chlorotoluene	3-chloropropene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride
	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	0.5				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Site Specific EIL - Urban Residential and Public Open Space, Aged Soils[#4]													
NEPM 2013 ESL Urban Residential and Public Open Space, Fine Soil													
NEPM 2013 Mgnt Limits - Residential, Parkland and Public Open Space, Fine													
NEPM 2013 Soil HIL B													
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 0 to <1m													
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 1 to <2m													
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 2 to <4m													
Field ID													
BH01_0.0-0.1	<0.5	-	<1[#3]	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH02_1.9-2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
BH05_0.9-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-
BH06_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
BH07_2.0-2.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH08_0.0-0.1	<0.5	-	<1[#3]	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH08_1.7-1.8	-	-	-	-	-	-	-	-	-	-	-	-	-
BH09_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
QA01	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15_0.4-0.5	<0.5	-	<1[#3]	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH17_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17_1.5-1.6	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.9-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_0.9-1.0	<0.5	-	<1[#3]	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QA02	<1	<1	<2[#3]	<1	-	<1	<1	<1	<1	<1	<1	<1	<1
QC02	<0.5	-	<1[#3]	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH19_3.5-3.6	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_1.7-1.8	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21_0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
BH22_0.4-0.5	<0.5	-	<1[#3]	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH23_0.0-0.1	-	-	-	-	-	-	-	-	-	-	-	-	-

Data Comments
#1 ESDAT Combined with Non-Detect Multiplier of 0.5. Some Analytes are missing frc
#2 ESDAT Combined with Non-Detect Multiplier of 0.5.
#3 ESDAT Combined.
#4 Derived and Site Specific EILs generated from physical parameters collected during
#5 TV for Total Chromium adopted from Chromium (VI) values as an initial screening t

Table A: Chemical Analytical Results
Project Number: 56200
Project Name: ORMDH Westmead

	Solvents	Polychlorinated Biphenyls								Monocyclic Aromatic Hydrocarbons											Miscellaneous Hydrocarbons							Chlorinated Benzenes							Trihalomethanes				Organic Sulfur Compounds
	2- Propanone (Acetone)	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	PCBs (Total)	1,2,4-trimethyl benzene	1,3,5- trimethyl benzene	4-isopropyl toluene	Bromobenzene	Isopropylbenzene	n-butyl benzene	n-propyl benzene	sec-butyl benzene	Styrene	Tert-butyl benzene	Total MAH *	1,2-dibromoethane	2- Butanone (MEK)	4-Methyl-2 pentanone (MIBK)	Bromomethane	Cyclohexane	Dibromomethane	Iodomethane	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Hexachlorobenzene	Bromodichloromethane	Chloroform	Dibromochloromethane	Tribromomethane	Carbon disulfide
	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
EQL	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	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	0.05	0.5	0.5	0.5	0.5	0.5
Site Specific EIL - Urban Residential and Public Open Space, Aged Soils[#4]																																						
NEPM 2013 ESL Urban Residential and Public Open Space, Fine Soil																																						
NEPM 2013 Mgnt Limits - Residential, Parkland and Public Open Space, Fine																																						
NEPM 2013 Soil HIL B									1																									15					
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 0 to <1m																																						
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 1 to <2m																																						
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Clay 2 to <4m																																						

Field ID	Sample Date	Report Number																																					
BH01_0.0-0.1	4/07/2020	730118	<0.5	<0.5	<0.1	<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	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
BH02_1.9-2.0	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03_0.0-0.1	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04_0.4-0.5	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH05_0.9-1.0	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH06_0.4-0.5	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH07_2.0-2.1	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH08_0.0-0.1	4/07/2020	730118	<0.5	<0.5	<0.1	<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	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
BH08_1.7-1.8	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH09_0.0-0.1	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH10_0.4-0.5	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11_0.0-0.1	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH11_0.4-0.5	4/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13_0.4-0.5	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA01	5/07/2020	246568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH15_0.4-0.5	5/07/2020	730118	<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	<0.5	<0.5
BH17_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH17_1.5-1.6	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH18_0.9-1.0	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH19_0.9-1.0	5/07/2020	730118	<0.5	<0.5	<0.1	<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	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
QA02	5/07/2020	246568	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<0.1	<1	<1	<1	<1	-
QC02	5/07/2020	730118	<0.5	<0.5	<0.1	<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	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
BH19_3.5-3.6	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH20_1.7-1.8	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21_0.4-0.5	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-
BH22_0.4-0.5	5/07/2020	730118	<0.5	<0.5	<0.1	<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	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
BH23_0.0-0.1	5/07/2020	730118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-

Data Comments
#1 ESDAT Combined with Non-Detect Multiplier of 0.5. Some Analytes are missing fro
#2 ESDAT Combined with Non-Detect Multiplier of 0.5.
#3 ESDAT Combined.
#4 Derived and Site Specific EILs generated from physical parameters collected during
#5 TV for Total Chromium adopted from Chromium (VI) values as an initial screening te

Table B: Asbestos Results
Job Number: 56200
Job Name: ORMDH Westmead

Health Screening Level Asbestos Concentration in Soil (% w/w)	
Category	HSL B
Bonded ACM in soils	0.04
FA and AF in soils	0.001
ACM detected in soil	

Sample Information				Field Asbestos Quantification					Laboratory Analysis											
Sample ID	Date	Lab Report Number	Fill Type	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)*	Asbestos from ACM in soil (%w/w)	Sample Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	Asbestos from ACM in soil (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	Asbestos from FA in soil (%w/w)	Mass AF (g)	Mass Asbestos in AF (g)	Asbestos from AF in soil (%w/w)	Asbestos from FA & AF in soil (%w/w)	Comment
BH01/MW01 0-1.0	4/07/2020	730118	Gravelly silty clay, brown	20	34000	0.0	0	0.0000	837	0	0	0	0	0	0	0	0	0	0	
BH01/MW01 1.0-1.7	4/07/2020	730118	Gravelly silty clay, brown	20	34000	0.0	0	0.0000	567	0	0	0	0.291	0.1164	0	0.0012	0.0012	0	0.0208	FA: Chrysotile asbestos detected in weathered fibre cement fragments. AF:Chrysotile asbestos detected in the form of loose fibre bundles.
BH01/MW01 1.7-2.1	4/07/2020	730118	Silty gravelly clay, dark brown	20	34000	9.0	1.35	0.0040	-	-	-	-	-	-	-	-	-	-	-	
BH01/MW01 AQ 2.1-3.0	4/07/2020	730118	Silty clay, dark brown	20	34000	9.0	1.35	0.0040	720	0	0	0	0	0	0	0.0865	0.0095	0	0.0013	AF: Chrysotile asbestos detected in fibre cement fragments and in the form of loose fibre bundles
BH01/MW01 AQ 3.0-4.0	4/07/2020	730118	Silty clay, dark brown	20	34000	4.0	0.6	0.0018	716	0	0	0	0	0	0	0.0009	0.0009	0	0.0001	FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile asbestos detected in the form of loose fibre bundles.
BH01/MW01 4.0-5.0	4/07/2020	730118	Silty clay, dark brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH01/MW01 5.0-5.5	4/07/2020	730118	Clay, light brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH02 0-1.0	4/07/2020	730118	Silty clay, brown	20	34000	0.0	0	0.0000	671	0	0	0	0	0	0	0	0	0	0	
BH02 1.0-1.5	4/07/2020	730118	Silty clay, brown	20	34000	0.0	0	0.0000	723	0	0	0	0.0038	0.0011	0	0.0005	0.0005	0	0.0002	FA: Chrysotile, amosite and crocidolite asbestos detected in weatheredfibre cement fragments. AF: Chrysotile asbestos detected in the form of loose fibre bundles.
BH02 AQ 1.5-2.0	4/07/2020	730118	Gravelly silty clay, brown	20	34000	53.0	7.95	0.0234	819	0	0	0	0.0205	0.0082	0	0.1641	0.0181	0	0.0032	FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments. Chrysotile and amosite asbestos detected in the form of loose fibre bundles.
BH03 0-1.0	4/07/2020	730118	Gravelly silty clay, brown	20	34000	0.0	0	0.0000	723	0	0	0	0	0	0	0	0	0	0	
BH03 1.0-2.0	4/07/2020	730118	Gravelly silty clay, brown	20	34000	5.0	0.75	0.0022	754	0	0	0	0.0088	0.0035	0	0.0492	0.0059	0	0.0012	FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH04 0.1-0.8	4/07/2020	730118	Silty clay, brown	20	34000	0.0	0	0.0000	617	0	0	0	0	0	0	0	0	0	0	
BH04 0.8-1.8	4/07/2020	730118	Gravelly silty clay, brown	20	34000	0.0	0	0.0000	683	0	0	0	0	0	0	0	0	0	0	
BH04 1.8-2.8	4/07/2020	730118	Gravelly clay, dark brown	20	34000	0.0	0	0.0000	689	0	0	0	0	0	0	0.0027	0.0027	0	0.0004	AF: Chrysotile asbestos detected in the form of loose fibre bundles.
BH05 0.5-1.5	4/07/2020	730118	Gravelly silty clay, brown	20	34000	25.0	3.75	0.0110	660	0	0	0	0.0741	0.0296	0	0.0096	0.0035	0	0.005	FA: Chrysotile and amosite asbestos detected in weathered fibre cement fragments. AF: Chrysotile and amosite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH05 1.5-2.5	4/07/2020	730118	Gravelly silty clay, brown	20	34000	168.0	25.2	0.0741	418	0.8656	0.0866	0.0207	0.2651	0.106	0	0.4464	0.0491	0	0.0371	ACM: Chrysotile, amosite and crocidolite asbestos detected in fibre bundles. FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH05 2.5-3.5	4/07/2020	730118	Gravelly silty clay, brown	20	34000	81.0	12.15	0.0357	616	6.946	0.6946	0.1127	0.2088	0.0835	0	0.0158	0.0044	0	0.0143	ACM: Chrysotile, amosite and crocidolite asbestos detected in fibre bundles. FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH06 0.1-0.5	4/07/2020	730118	Gravelly clay, greyish brown	20	34000	0.0	0	0.0000	564	0	0	0	0	0	0	0	0	0	0	
BH06 0.5-1.5	4/07/2020	730118	Gravelly clay, greyish brown	20	34000	10.0	1.5	0.0044	680	0	0	0	0	0	0	0	0	0	0	
BH06 1.5-2.5	4/07/2020	730118	Clay, brown	20	34000	0.0	0	0.0000	768	0.7446	0.0745	0.0097	0	0	0	0.0282	0.0048	0	0.0006	ACM: Chrysotile asbestos detected in fibre cement fragments. AF: Chrysotile asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH07 0-0.8	4/07/2020	730118	Gravelly clay, dark brown	20	34000	0.0	0	0.0000	582	0	0	0	0	0	0	0.0039	0.0039	0	0.0007	AF: Chrysotile asbestos detected in the form of loose fibre bundles.
BH07 0.8-0.9	4/07/2020	730118	Layer of ACM fragments	20	34000	247.0	37.05	0.1090	-	-	-	-	-	-	-	-	-	-	-	
BH07 1.0-2.0 Frag	4/07/2020	730058	-	-	-	-	-	-	77	Positive	-	-	-	-	-	-	-	-	-	Chrysotile asbestos detected.
BH07 1.0-2.0	4/07/2020	730118	Gravelly clay, dark brown	20	34000	0.0	0	0.0000	551	1.406	0.1406	0.0255	0.2162	0.1297	0	0.5121	0.0563	0	0.0338	ACM: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments. FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH07 2.0-3.0	4/07/2020	730118	Gravelly clay, dark brown	20	34000	76.0	11.4	0.0335	569	20.99	2.099	0.3692	0.6863	0.4118	0	2.208	0.265	0	0.119	ACM: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments. FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH08 0.0-1.0	4/07/2020	730118	Gravelly clay, brown	20	34000	31.0	4.65	0.0137	685	0	0	0	0	0	0	0.9382	0.1032	0	0.0151	AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH08 1.0-1.7	4/07/2020	730118	Gravelly clay, brown	20	34000	0.0	0	0.0000	735	0	0	0	0.0235	0.0141	0	0.2127	0.0255	0	0.0054	FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH08 1.7-2.0	4/07/2020	730118	Gravel, grey	20	34000	0.0	0	0.0000	622	0	0	0	0.184	0.1104	0	0.0868	0.0122	0	0.0197	FA: Chrysotile, amosite and crocidolite asbestos detected in weathered fibre cement fragments. AF: Chrysotile, amosite and crocidolite asbestos detected in fibre cement fragments and in the form of loose fibre bundles.
BH08 2.0-3.0	4/07/2020	730118	Gravelly clay, brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH09 0.1-1.0	4/07/2020	730118	Sandy silty clay, brown	20	34000	0.0	0	0.0000	640	0	0	0	0	0	0	0.0008	0.0008	0	0.0001	AF: Crocidolite asbestos detected in the form of loose fibre bundles.
BH09 1.8-2.5	4/07/2020	730118	Silty clay, red	20	34000	0.0	0	0.0000	644	0	0	0	0	0	0	0	0	0	0	
BH09 2.5-3.0	4/07/2020	730118	Silty clay, red	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH09 3.0-4.0	4/07/2020	730118	Clay, greyish brown	20	34000	0.0	0	0.0000	870	0	0	0	0	0	0	0	0	0	0	
BH10 0.0-1.0	4/07/2020	730118	Clayey silt, black	20	34000	0.0	0	0.0000	679	0	0	0	0	0	0	0	0	0	0	
BH10 1.0-1.6	4/07/2020	730118	Clayey silt, black	20	34000	0.0	0	0.0000	671	0	0	0	0	0	0	0	0	0	0	
BH10 1.6-1.8	4/07/2020	730118	Clay, orange	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH10 1.8-2.3	4/07/2020	730118	Clay, greyish brown	20	34000	0.0	0	0.0000	575	0	0	0	0	0	0	0	0	0	0	
BH10 2.3-3.0	4/07/2020	730118	Clay, greyish brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	

Table B: Asbestos Results
Job Number: 56200
Job Name: ORMDH Westmead

Health Screening Level Asbestos Concentration in Soil (% w/w)	
Category	HSL B
Bonded ACM in soils	0.04
FA and AF in soils	0.001
ACM detected in soil	

Sample Information				Field Asbestos Quantification					Laboratory Analysis											
Sample ID	Date	Lab Report Number	Fill Type	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)*	Asbestos from ACM in soil (%w/w)	Sample Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	Asbestos from ACM in soil (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	Asbestos from FA in soil (%w/w)	Mass AF (g)	Mass Asbestos in AF (g)	Asbestos from AF in soil (%w/w)	Asbestos from FA & AF in soil (%w/w)	Comment
BH11/MW02 0.3-1.0	4/07/2020	730118	Clay, orange	20	34000	0.0	0	0.0000	754	0	0	0	0	0	0	0	0	0	0	
BH11/MW02 1.3-2.3	4/07/2020	730118	Clay, light brown/grey	20	34000	0.0	0	0.0000	779	0	0	0	0	0	0	0	0	0	0	
BH11/MW02 2.4-3.4	4/07/2020	730118	Clay, brown	20	34000	0.0	0	0.0000	780	0	0	0	0	0	0	0	0	0	0	
BH11/MW02 3.4-4.4	4/07/2020	730118	Clay, brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH12 0.3-1.1	4/07/2020	730118	Clay, orange	20	34000	0.0	0	0.0000	726	0	0	0	0	0	0	0	0	0	0	
BH12 1.1-2.1	4/07/2020	730118	Clay, light brown/grey	20	34000	0.0	0	0.0000	943	0	0	0	0	0	0	0	0	0	0	
BH12 2.1-3.1	4/07/2020	730118	Clay, brown	20	34000	0.0	0	0.0000	993	0	0	0	0	0	0	0	0	0	0	
BH12 3.1-4.1	4/07/2020	730118	Clay, brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH13 0-0.5	5/07/2020	730118	Sandy silt, black	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH13 0.5-1.0	5/07/2020	730118	Silty clay, brown	20	34000	0.0	0	0.0000	558	0	0	0	0	0	0	0	0	0	0	
BH13 1.5-2.0	5/07/2020	730118	Sandy clay, light brown	20	34000	0.0	0	0.0000	533	0	0	0	0	0	0	0	0	0	0	
BH13 2.0-3.0	5/07/2020	730118	Sandy clay, light brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH14 0-0.9	5/07/2020	730118	Sandy silt, black	20	34000	0.0	0	0.0000	525	0	0	0	0	0	0	0	0	0	0	
BH14 0.9-1.5	5/07/2020	730118	Gravelly clay, brown	20	34000	0.0	0	0.0000	661	0	0	0	0	0	0	0	0	0	0	
BH14 1.5-2.5	5/07/2020	730118	Clayey gravelly silt, brown	20	34000	0.0	0	0.0000	695	0	0	0	0	0	0	0	0	0	0	
BH14 2.5-3.0	5/07/2020	730118	Clayey gravelly silt, brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH15 0-0.3	5/07/2020	730118	Sandy silt, black	20	34000	0.0	0	0.0000	120	0	0	0	0	0	0	0	0	0	0	
BH15 0.4-0.9	5/07/2020	730118	Gravelly clayey sand, brown	20	34000	0.0	0	0.0000	664	0	0	0	0	0	0	0	0	0	0	
BH15 0.9-1.4	5/07/2020	730118	Sandy gravelly clay, black	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH15 1.7-2.0	5/07/2020	730118	Clay, brown	20	34000	0.0	0	0.0000	452	0	0	0	0	0	0	0	0	0	0	
BH15 2.0-2.8	5/07/2020	730118	Gravelly clay, light brown/grey	20	34000	0.0	0	0.0000	631	0	0	0	0	0	0	0	0	0	0	
BH16 0.1-0.6	5/07/2020	730118	Sand, light brown	20	34000	0.0	0	0.0000	661	0	0	0	0	0	0	0	0	0	0	
BH17 0-0.5	5/07/2020	730118	Sandy silt, black	20	34000	0.0	0	0.0000	583	0	0	0	0	0	0	0	0	0	0	
BH17 0.6-1.3	5/07/2020	730118	Gravelly silt, brown	20	34000	0.0	0	0.0000	581	0	0	0	0	0	0	0	0	0	0	
BH17 1.3-2.3	5/07/2020	730118	Gravelly clay, orange	20	34000	0.0	0	0.0000	683	0	0	0	0	0	0	0	0	0	0	
BH18 0-1.0	5/07/2020	730118	Gravelly silt, dark brown	20	34000	0.0	0	0.0000	499	0	0	0	0	0	0	0	0	0	0	
AQ QA01	5/07/2020	246568	Gravelly silt, dark brown	20	34000	0.0	0	0.0000	404	0	0	0	0	0	0	0	0	0	0	
AQ QC01	4/07/2020	730118	Gravelly silt, dark brown	20	34000	0.0	0	0.0000	650	0	0	0	0	0	0	0	0	0	**0**	
BH18 1.0-1.3	5/07/2020	730118	Gravelly silt, dark brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH19/MW03 0.1-1.0	5/07/2020	730118	Gravelly clay, brown	20	34000	0.0	0	0.0000	601	0	0	0	0	0	0	0	0	0	0	
AQ QA02	5/07/2020	246568	Gravelly clay, brown	20	34000	0.0	0	0.0000	392	0	0	0	0	0	0	0	0	0	0	
AQ QC02	5/07/2020	730118	Gravelly clay, brown	20	34000	0.0	0	0.0000	554	0	0	0	0	0	0	0	0	0	**0**	
BH19/MW03 1.5-2.3	5/07/2020	730118	Clay, red	20	34000	0.0	0	0.0000	671	0	0	0	0	0	0	0	0	0	0	
BH19/MW03 2.3-3.3	5/07/2020	730118	Clay, light brown/white	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH20 0-0.8	5/07/2020	730118	Sandy silt, black	20	34000	0.0	0	0.0000	333	0	0	0	0	0	0	0	0	0	0	
BH20 0.8-1.5	5/07/2020	730118	Gravelly clay, dark brown/grey	20	34000	0.0	0	0.0000	631	0	0	0	0	0	0	0	0	0	0	
BH20 1.5-2.0	5/07/2020	730118	Silty clay, brown	20	34000	0.0	0	0.0000	407	0	0	0	0	0	0	0	0	0	0	
BH21 0.1-0.8	5/07/2020	730118	Sandy gravelly clay, brown	20	34000	0.0	0	0.0000	391	0	0	0	0	0	0	0	0	0	0	
AQ QA03	5/07/2020	246568	Sandy gravelly clay, brown	20	34000	0.0	0	0.0000	243	0	0	0	0	0	0	0	0	0	0	
AQ QC03	5/07/2020	730118	Sandy gravelly clay, brown	20	34000	0.0	0	0.0000	309	0	0	0	0	0	0	0	0	0	**0**	
BH21 0.8-1.8	5/07/2020	730118	Gravelly clay, grey	20	34000	0.0	0	0.0000	604	0	0	0	0	0	0	0	0	0	0	
BH21 1.8-2.5	5/07/2020	730118	Clay, orange/brown	20	34000	0.0	0	0.0000	730	0	0	0	0	0	0	0	0	0	0	
BH22 0.1-0.9	5/07/2020	730118	Sandy gravelly silt, brown	20	34000	0.0	0	0.0000	647	0	0	0	0	0	0	0	0	0	0	
BH22 0.9-1.9	5/07/2020	730118	Gravelly clay, grey	20	34000	0.0	0	0.0000	535	0	0	0	0	0	0	0	0	0	0	
BH23 0-0.8	5/07/2020	730118	Sandy silt, brown	20	34000	0.0	0	0.0000	688	0	0	0	0	0	0	0	0	0	0	
BH23 0.8-1.8	5/07/2020	730118	Gravelly silty clay, dark brown	20	34000	0.0	0	0.0000	714	0	0	0	0	0	0	0.0017	0.0017	0	0.0002	AF: Chrysotile and crocidolite asbestos detected in the form of loose fibre bundles.
BH23 1.8-2.4	5/07/2020	730118	Gravelly silty clay, orange	20	34000	0.0	0	0.0000	795	0	0	0	0	0	0	0	0	0	0	
BH23 2.4-3.4	5/07/2020	730118	Gravelly clay, brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	
BH23 3.4-4.3	5/07/2020	730118	Gravelly clay, brown	20	34000	0.0	0	0.0000	-	-	-	-	-	-	-	-	-	-	-	

Table E: Groundwater Results
Project Number: 56200
Project Name: ORMDH Westmead

	Heavy Metals								TPHs (NEPC 1999)					TRHs (NEPC 2013)							BTEXN							Polycyclic Aromatic Hydrocarbons																					
	Arsenic (Total) (Filtered)	Cadmium (Filtered)	Chromium (Total) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Inorganic) (Filtered)	Nickel (Filtered)	Zinc (Filtered)	>C6-C9 Fraction	>C10-C14 Fraction	>C15-C28 Fraction	>C29-C36 Fraction	>C10-C36 Fraction (Total)	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Total)	>C10-C16 less Naphthalene (F2)	>C16-C34 Fraction	>C34-C40 Fraction	>C6-C10 less BTEX (F1)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)	Naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (WHO)	Benzo(b,j)fluoranthene	Benzo[g,h,i]perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	PAHs (Total)	Pyrene	Total Positive PAHs
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.001	0.0001	0.001	0.001	0.001	0.00005	0.001	0.001	0.01	0.05	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.05	0.01	0.01	0.001	0.001	0.001	0.001	0.002	0.003	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001		0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
ANZAST 2018 Fresh Water 95%		0.0002	0.001	0.0014	0.0034	0.0006	0.011	0.008													0.95			0.35			0.016																				
ANZAST 2018 Fresh Water 95% (low reliability PAH values)																														0.0004		0.0002								0.0014			0.002			
NEPM 2013 Table 1A(4) Res HSL A and B GW for Vapour Intrusion, Clay 2-8 m																		NL		NL	5	NL	NL			NL	NL																				

Field ID	Sample Date	Report Number																																														
MW01	11/07/2020	731481	<0.001	<0.0002	<0.001	0.003	<0.001	<0.0001	0.003	0.092	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
QA01_W	11/07/2020	246879	<0.001	<0.0001	<0.001	0.003	<0.001	<0.00005	0.003	0.092	<0.01	<0.05	<0.1	<0.1	-	<0.05	<0.1	<0.1	-	<0.05	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.002	-	<0.001	0.0007	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	-	<0.0001	-	<0.0001	<0.0001	0.0002	0.0009	<0.0001	0.0003	-	0.0003	0.0039
QC01_W	11/07/2020	731481	<0.001	<0.0002	<0.001	0.003	<0.001	<0.0001	0.003	0.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
MW02	11/07/2020	731481	0.004	<0.0002	0.008	0.012	<0.001	<0.0001	0.006	0.028	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
MW03	11/07/2020	731481	0.011	<0.0002	<0.001	0.002	<0.001	<0.0001	0.013	0.04	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-

Metals adjusted using hardness as per Table 3.4.4 of ANZAST 2018.

Table E: Groundwater Results
Project Number: 56200
Project Name: ORMDH Westmead

	Chlorinated Alkanes																		Chlorinated Alkenes											Solvents	Monocyclic Aromatic Hydrocarbons									
	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane	Dichlorodifluoromethane	Dichloromethane	Trichlorofluoromethane	1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	3-chloropropene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride	2-Propanone (Acetone)	1,2,4-trimethyl benzene	1,3,5-trimethyl benzene	4-isopropyl toluene	Bromobenzene	Isopropylbenzene	n-butyl benzene	n-propyl benzene	sec-butyl benzene	Styrene	Tert-butyl benzene
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001				0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	1	0.001	0.001		0.001	0.001				0.001	
ANZAST 2018 Fresh Water 95%				6.5																																			
ANZAST 2018 Fresh Water 95% (low reliability PAH values)																																							
NEPM 2013 Table 1A(4) Res HSL A and B GW for Vapour Intrusion, Clay 2-8 m																																							
Field ID	**Sample Date**	**Report Number**																																					
MW01	11/07/2020	731481	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	-	<0.001	<0.001	-	-	-	<0.001	-
QA01_W	11/07/2020	246879	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	-	<0.01	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
QC01_W	11/07/2020	731481	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	-	<0.001	<0.001	-	-	-	<0.001	-
MW02	11/07/2020	731481	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	-	<0.001	<0.001	-	-	-	<0.001	-
MW03	11/07/2020	731481	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<1	<0.001	<0.001	-	<0.001	<0.001	-	-	-	<0.001	-

Metals adjusted using hardness as per Table 3.4.4 of ANZAST 2018.

Table E: Groundwater Results
Project Number: 56200
Project Name: ORMDH Westmead

	Miscellaneous Hydrocarbons							Chlorinated Benzenes						Trihalomethanes				Miscellaneous Industrial Chemicals	Organic Sulfur Compounds	Major Cations	
	1,2-dibromoethane	2-Butanone (MEK)	4-Methyl-2-pentanone (MIBK)	Bromomethane	Cyclohexane	Dibromomethane	Iodomethane	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Bromodichloromethane	Chloroform	Dibromochloromethane	Tribromomethane	Hexachlorobutadiene	Carbon disulfide	Calcium	Magnesium
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.001	0.001	0.001	0.001		0.001	0.001			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.5	0.5
ANZAST 2018 Fresh Water 95%								0.01	0.17	0.16	0.26	0.06									
ANZAST 2018 Fresh Water 95% (low reliability PAH values)																					
NEPM 2013 Table 1A(4) Res HSL A and B GW for Vapour Intrusion, Clay 2-8 m																					
Field ID	**Sample Date**	**Report Number**																			
MW01	11/07/2020	731481	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	-	<0.001	32	14
QA01_W	11/07/2020	246879	<0.001	-	-	<0.01	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	30	12
QC01_W	11/07/2020	731481	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	-	<0.001	33	15
MW02	11/07/2020	731481	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	-	<0.001	14	5.1
MW03	11/07/2020	731481	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	-	<0.001	51	37

Metals adjusted using hardness as per Table 3.4.4 of ANZAST 2018.

Appendix B: Development Plans for the MSCP SSD Application

The Children's Hospital at Westmead Stage 2 Redevelopment

HAWKESBURY ROAD, WESTMEAD, NSW, 2145

FOR INFORMATION

APPLICATION SSD-10434896

0 20 40 60 80 100m
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LEGEND:

PERSPECTIVE VIEWPOINT LOCATION

SITE OF WORKS

SHEET LIST - DEVELOPMENT APPLICATION

SHEET NO.	SHEET NAME	Issue Date
CHW-AR-DG-MCP-DA000	COVER SHEET AND DRAWING LIST	15/01/21
CHW-AR-DG-MCP-DA003	SITE ANALYSIS PLAN - EXISTING TOPOGRAPHY	21/12/20
CHW-AR-DG-MCP-DA004	SITE ANALYSIS PLAN - EXISTING TREES	21/12/20
CHW-AR-DG-MCP-DA005	SITE ANALYSIS PLAN - CIRCULATION	21/12/20
CHW-AR-DG-MCP-DA006	SITE ANALYSIS PLAN - SOLAR STUDY	21/12/20
CHW-AR-DG-MCP-DA007	SITE PLAN - EXISTING	21/12/20
CHW-AR-DG-MCP-DA008	SITE PLAN - DEMOLITION	21/12/20
CHW-AR-DG-MCP-DA009	SITE PLAN - PROPOSED ROOF LEVEL	21/12/20
CHW-AR-DG-MCP-DA010	SITE PLAN - SOLAR STUDY - SHEET 01	21/12/20
CHW-AR-DG-MCP-DA011	SITE PLAN - SOLAR STUDY - SHEET 02	21/12/20
CHW-AR-DG-MCP-DA012	SITE SECTIONS AND ELEVATIONS	21/12/20
CHW-AR-DG-MCP-DA031	PROPOSED PARKING LEVEL - P1 PLAN	21/12/20
CHW-AR-DG-MCP-DA032	PROPOSED PARKING LEVEL - TYPICAL PLAN	21/12/20
CHW-AR-DG-MCP-DA039	PROPOSED PARKING LEVEL - ROOF PLAN	21/12/20
CHW-AR-DG-MCP-DA040	PROPOSED ELEVATIONS - SHEET 01	15/01/21
CHW-AR-DG-MCP-DA041	PROPOSED ELEVATIONS - SHEET 02	21/12/20
CHW-AR-DG-MCP-DA050	PROPOSED SECTIONS - SHEET 01	15/01/21
CHW-AR-DG-MCP-DA051	PROPOSED SECTIONS- SHEET 02	15/01/21
CHW-AR-DG-MCP-DA060	FACADE TYPES	21/12/20
CHW-AR-DG-MCP-DA095	PERSPECTIVE VIEWS - SHEET 01	21/12/20
CHW-AR-DG-MCP-DA096	PERSPECTIVE VIEWS - SHEET 02	21/12/20
CHW-AR-DG-MCP-DA097	PERSPECTIVE VIEWS - SHEET 03	21/12/20
CHW-AR-RT-MCP-DA098	ARCHITECTURAL DESIGN REPORT	21/12/20
CHW-AR-SC-MCP-DA092	SCHEDULE - MATERIAL	21/12/20

REV		
D	SSDA For Information	15/01/21
C	SSDA For Information	21/12/20
B	SSDA For Information	27/11/20
A	Draft SSDA Issue	16/11/20

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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
COVER SHEET AND DRAWING LIST

Scale	Date
1:2000@A1	15/01/21
Drawn By: PH	Checked By: SC
Revision: D	
Project No: 19038	
Drawing No: **CHW-AR-DG-MCP-DA000**	

FOR INFORMATION

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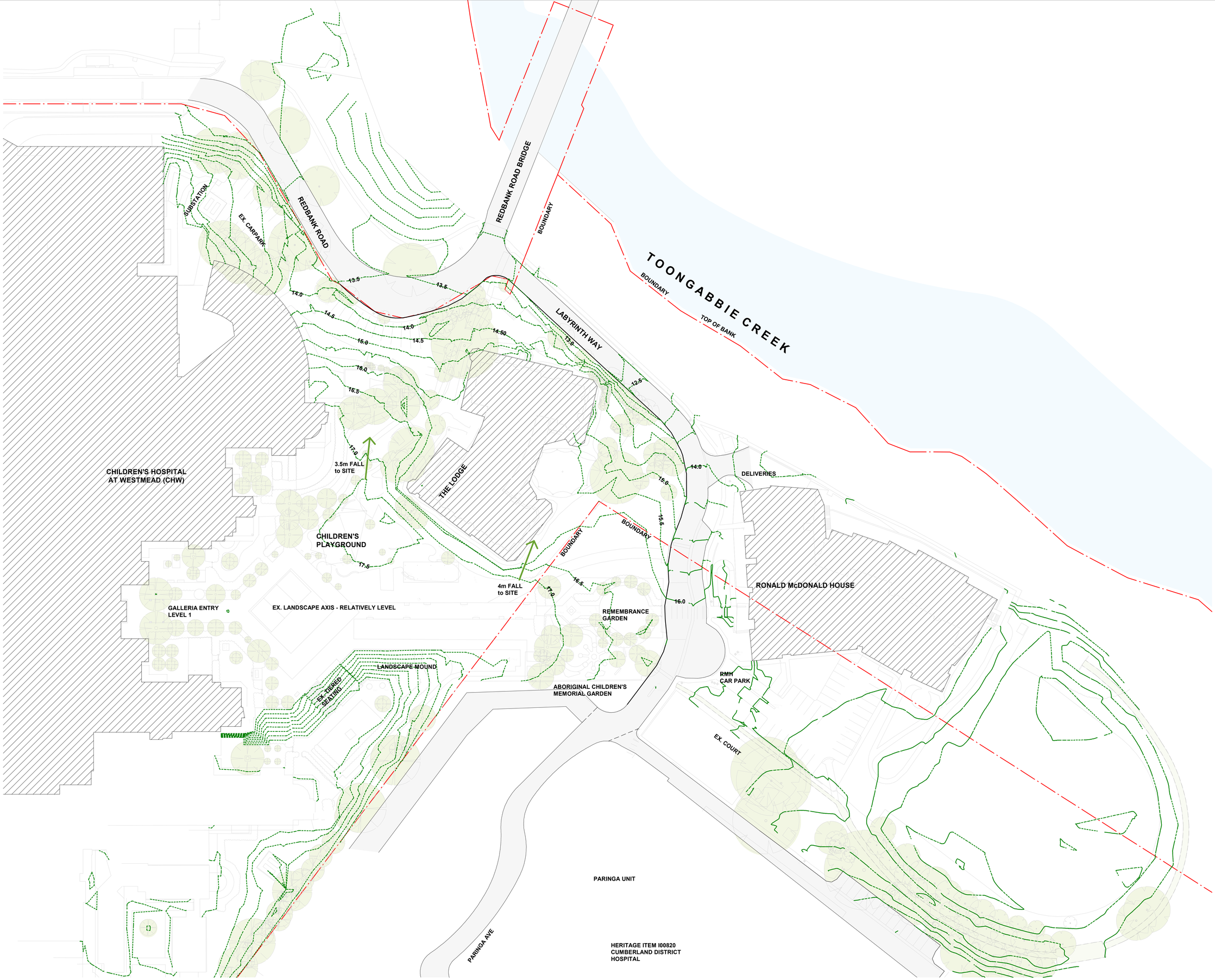

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C	SSDA For Information	21/12/20
B	SSDA For Information	27/11/20
A	Draft SSDA Issue	16/11/20
REV		

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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
SITE ANALYSIS PLAN - EXISTING TOPOGRAPHY

Scale		Date
1 : 500@A1		21/12/20
Drawn By	Checked By	Revision
PH	SC	C
Project No		19038
Drawing No		
CHW-AR-DG-MCP-DA003		

FOR INFORMATION

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REV		
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B	SSDA For Information	27/11/20
A	Draft SSDA Issue	16/11/20

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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
SITE ANALYSIS PLAN - EXISTING TREES

Scale		Date
1 : 500@A1		21/12/20
Drawn By	Checked By	Revision
PH	SC	C
Project No		19038
Drawing No		
CHW-AR-DG-MCP-DA004		

FOR INFORMATION

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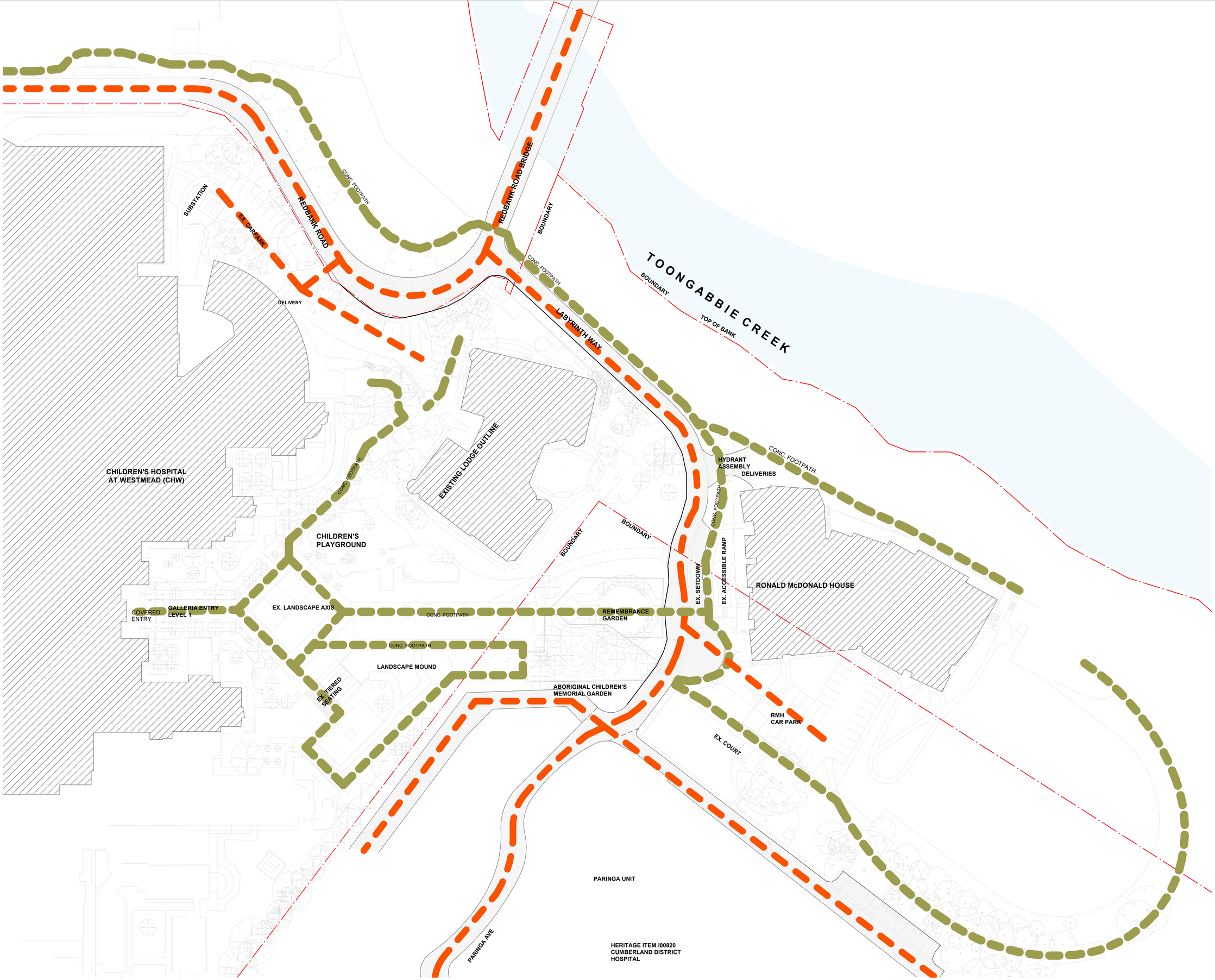

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LEGEND:

- EXISTING
- PEDESTRIAN CIRCULATION
- VEHICULAR CIRCULATION

REV		
C	SSDA For Information	21/12/20
B	SSDA For Information	27/11/20
A	Draft SSDA Issue	16/11/20

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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
SITE ANALYSIS PLAN - CIRCULATION

Scale 1:500@A1		Date 21/12/20
Drawn By PH	Checked By SC	Revision C
Project No		19038
Drawing No		CHW-AR-DG-MCP-DA005

FOR INFORMATION

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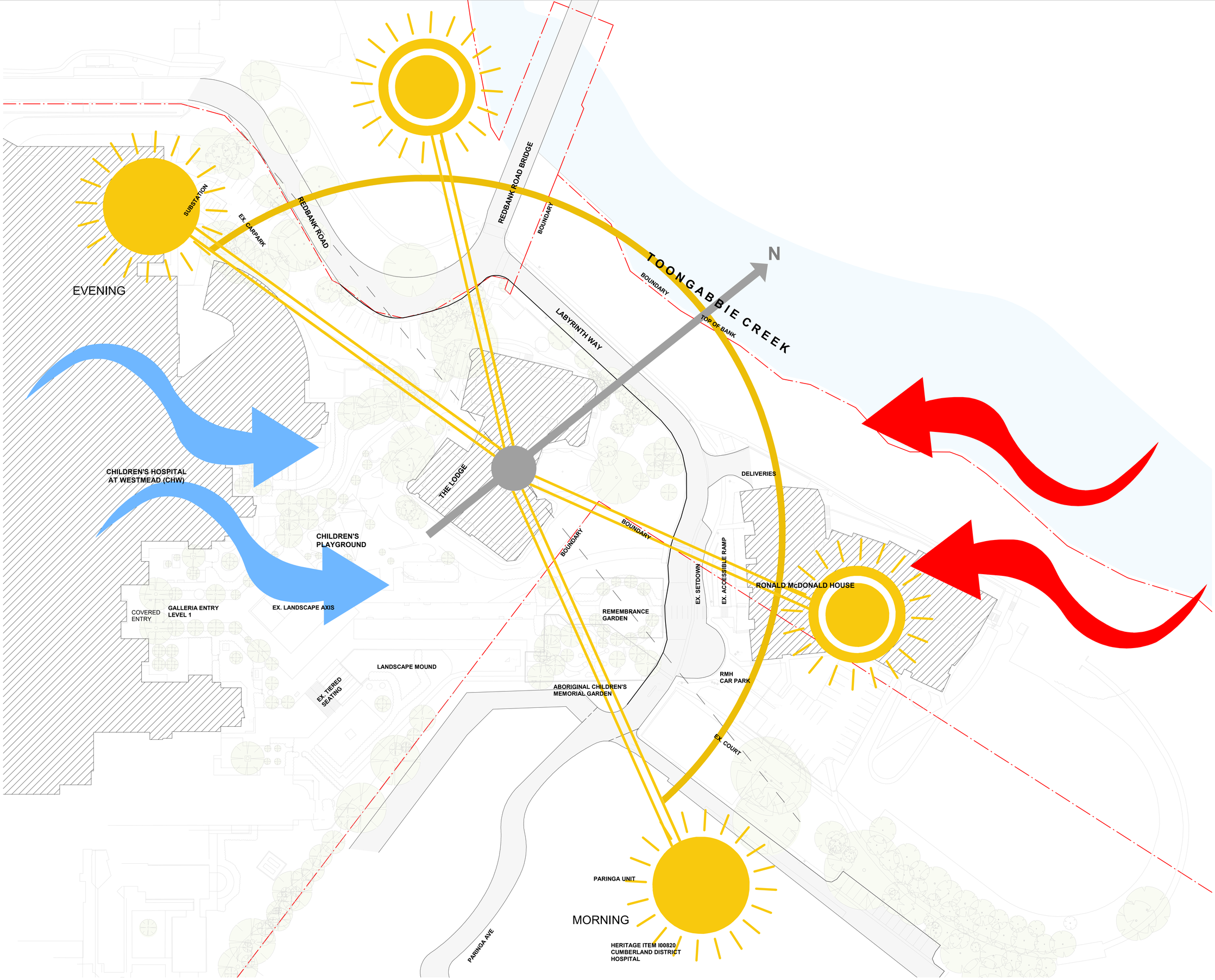

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LEGEND:

- CAMPUS PRECINCT BOUNDARY
- SUN PATH - SUMMER
- SUN PATH - WINTER
- WARM NORTH-EAST SUMMER WINDS
- COOL SOUTH-WEST WINTER WINDS

REV		
C	SSDA For Information	21/12/20
B	SSDA For Information	27/11/20
A	Draft SSDA Issue	16/11/20

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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
SITE ANALYSIS PLAN - SOLAR STUDY

Scale: As indicated@A1		Date: 21/12/20
Drawn By: PH	Checked By: SC	Revision: C
Project No: 19038		
Drawing No: **CHW-AR-DG-MCP-DA006**		

FOR INFORMATION

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LEGEND:

- EXISTING
- EXISTING TO BE PROTECTED
- EXISTING PLAYGROUND

REFER TO THE DETAIL SURVEY PLANS FOR FURTHER EXISTING DETAIL

EXISTING

REV		
C	SSDA For Information	21/12/20
B	SSDA For Information	27/11/20
A	Draft SSDA Issue	16/11/20

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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
SITE PLAN - EXISTING

Scale		Date
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Drawn By	Checked By	Revision
PH	SC	C
Project No		19038
Drawing No		
CHW-AR-DG-MCP-DA007		

FOR INFORMATION

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DEMOLITION NOTES:

NOTE 1. DEMOLISH EXISTING BUILDING.

NOTE 2. REMOVE EXISTING TREES (TYPICAL).

NOTE 3. PART DEMOLISH EXISTING CAR PARK.

NOTE 4. REMOVAL OF PLAYGROUND EQUIPMENT AS EXEMPT DEVELOPMENT.

NOTE 5. EXTENT OF PART EXISTING ROAD DEMOLITION.

NOTE 6. PART DEMOLISH EXISTING FOOTPATH AND ADJACENT LANDSCAPE FOR PROPOSED ROAD ALTERATION WORKS.

LEGEND:

- TO BE DEMOLISHED
- EXISTING / RETAINED
- INDICATIVE HOARDING LINE
- EXISTING TO BE PROTECTED

REFER TO THE DETAIL SURVEY PLANS FOR FURTHER EXISTING DETAIL

DEMOLITION

REDBANK ROAD
REDBANK ROAD BRIDGE
SUBSTATION
EX. CARPARK
FENCE
NOTE 6.
NOTE 5.
BOUNDARY
TOONGABBIE CREEK
BOUNDARY
TOP OF BANK
DELIVERY
NOTE 3.
SHED
FENCE
LABYRINTH WAY
NOTE 2.
GAZEBO
GARDEN
NOTE 3.
FENCE
NOTE 1.
NOTE 2.
GRASS
SOFT FALL SURFACE
THE LODGE
PROPOSED MSCP OUTLINE
HYDRANT ASSEMBLY
DELIVERIES
NOTE 2.
EX. TREE
CHILDREN'S HOSPITAL AT WESTMEAD (CHW)
SHADE FABRIC
CHILDREN'S / PLAYGROUND
NOTE 4.
GARDEN
SHADE STRUCTURE
GRASS
EASEMENT BOUNDARY
BOUNDARY
EXISTING DRIVEWAY
GATES
EX. SETDOWN
EX. ACCESSIBLE RAMP
RONALD McDONALD HOUSE
3 m
5 m
COVERED ENTRY
GALLERIA ENTRY LEVEL 1
SHADE FABRIC STRUCTURE
GRASS
REMEMBRANCE GARDEN
GRASS
LANDSCAPE MOUND
GATE
ABORIGINAL CHILDREN'S MEMORIAL GARDEN
RMH CAR PARK
STORMWATER EASEMENT
EX. TIERED SEATING
PARINGA UNIT
PARINGA AVE
HERITAGE ITEM I00820
CUMBERLAND DISTRICT HOSPITAL

REV		
C	SSDA For Information	21/12/20
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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
SITE PLAN - DEMOLITION

Scale		Date
1:500@A1		21/12/20
Drawn By	Checked By	Revision
PH	SC	C
Project No		19038
Drawing No		
CHW-AR-DG-MCP-DA008		

FOR INFORMATION

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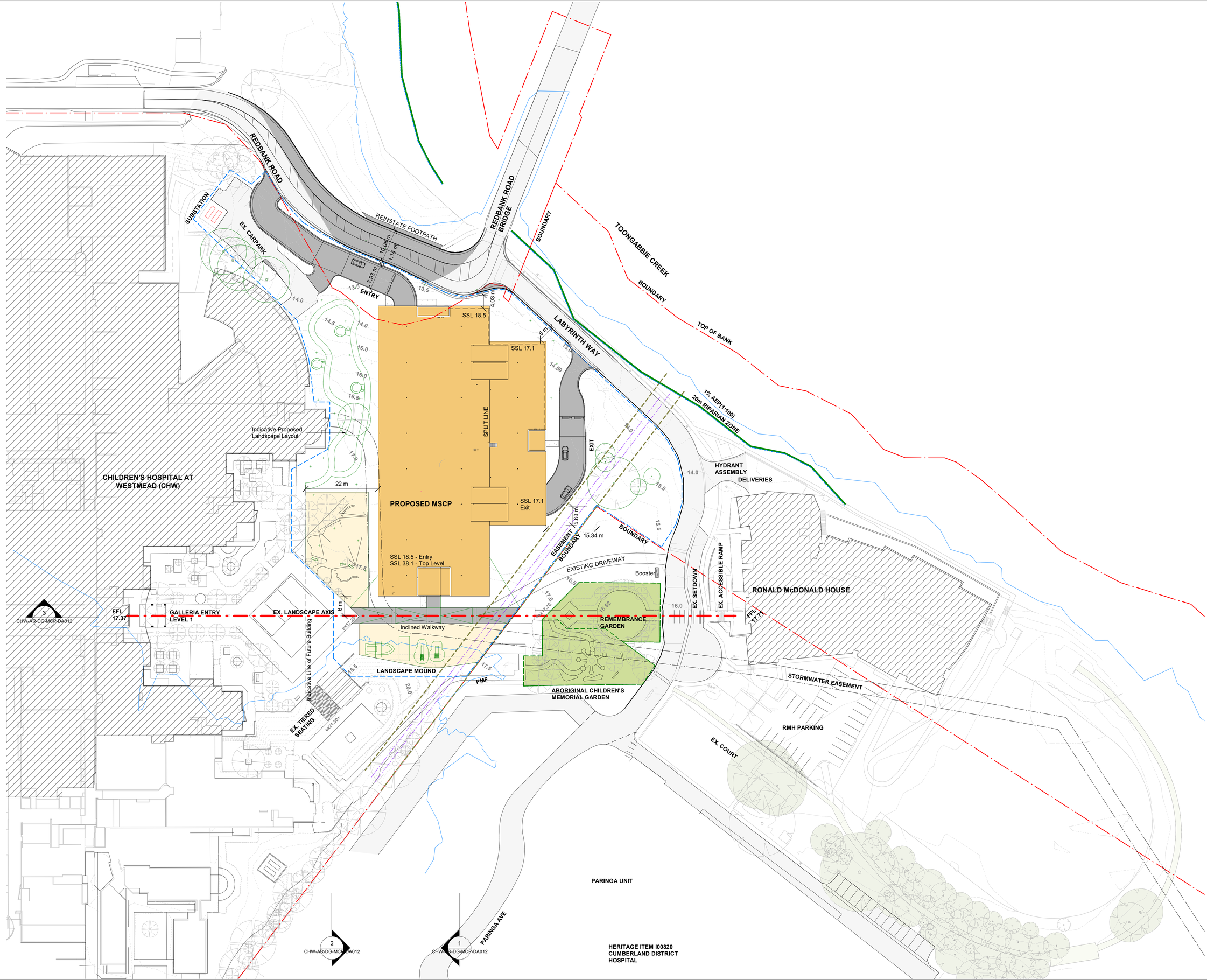

0 5 10 15 20 25m
1:500

N

LEGEND:

- EXISTING / RETAINED
- INDICATIVE LINE OF PROPOSED WORKS
- EXISTING TO BE PROTECTED

REFER TO THE DETAIL SURVEY PLANS FOR FURTHER EXISTING DETAIL

- PROPOSED AND ALTERATION ROAD / RAMP WORKS. REFER TO THE CIVIL ENGINEER'S DRAWINGS.
- PLAYGROUND RELOCATED AS EXEMPT DEVELOPMENT.

PROPOSED

REV		
C	SSDA For Information	21/12/20
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A	Draft SSDA Issue	16/11/20

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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
SITE PLAN - PROPOSED ROOF LEVEL

Scale 1:500@A1		Date 21/12/20
Drawn By PH	Checked By SC	Revision C
Project No		19038
Drawing No		CHW-AR-DG-MCP-DA009

FOR INFORMATION

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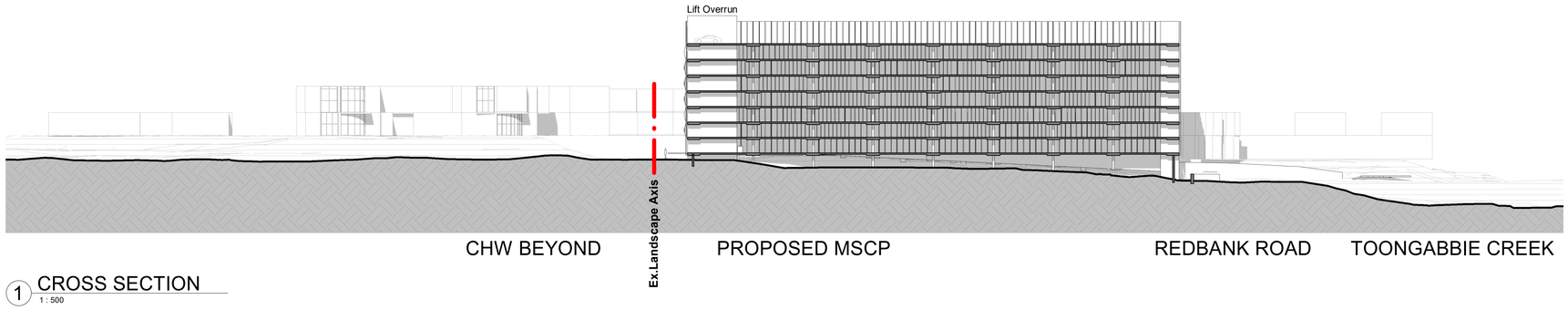
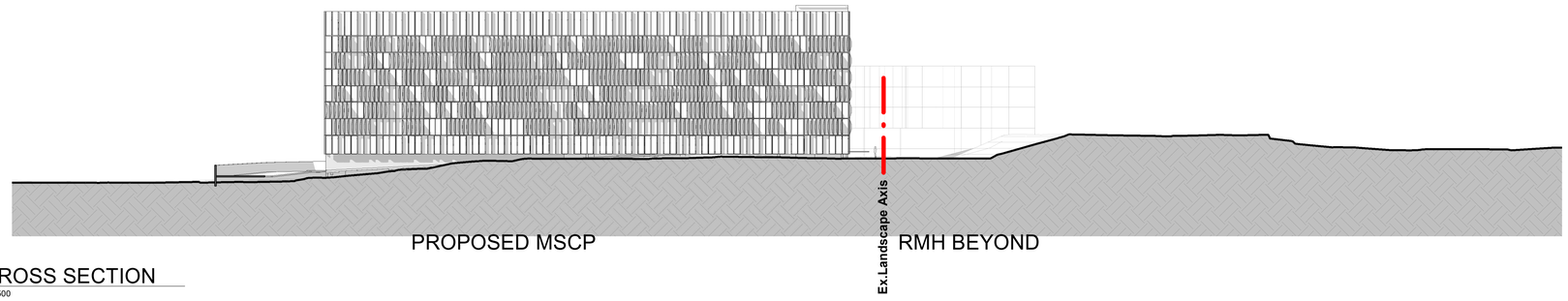


1 CROSS SECTION
1 : 500



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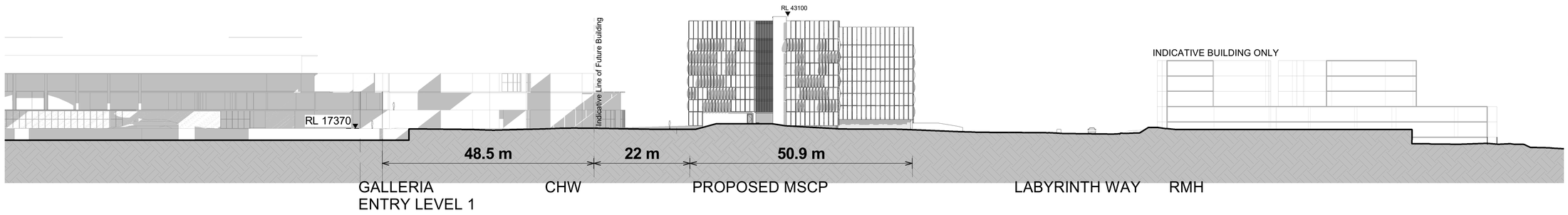
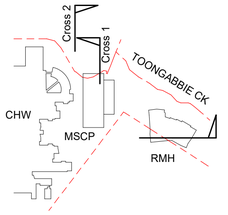
1 : 500



3 SITE SECTION THROUGH LANDSCAPE AXIS
1 : 500

0 5 10 15 20 25m
1:500



SITE SECTIONS

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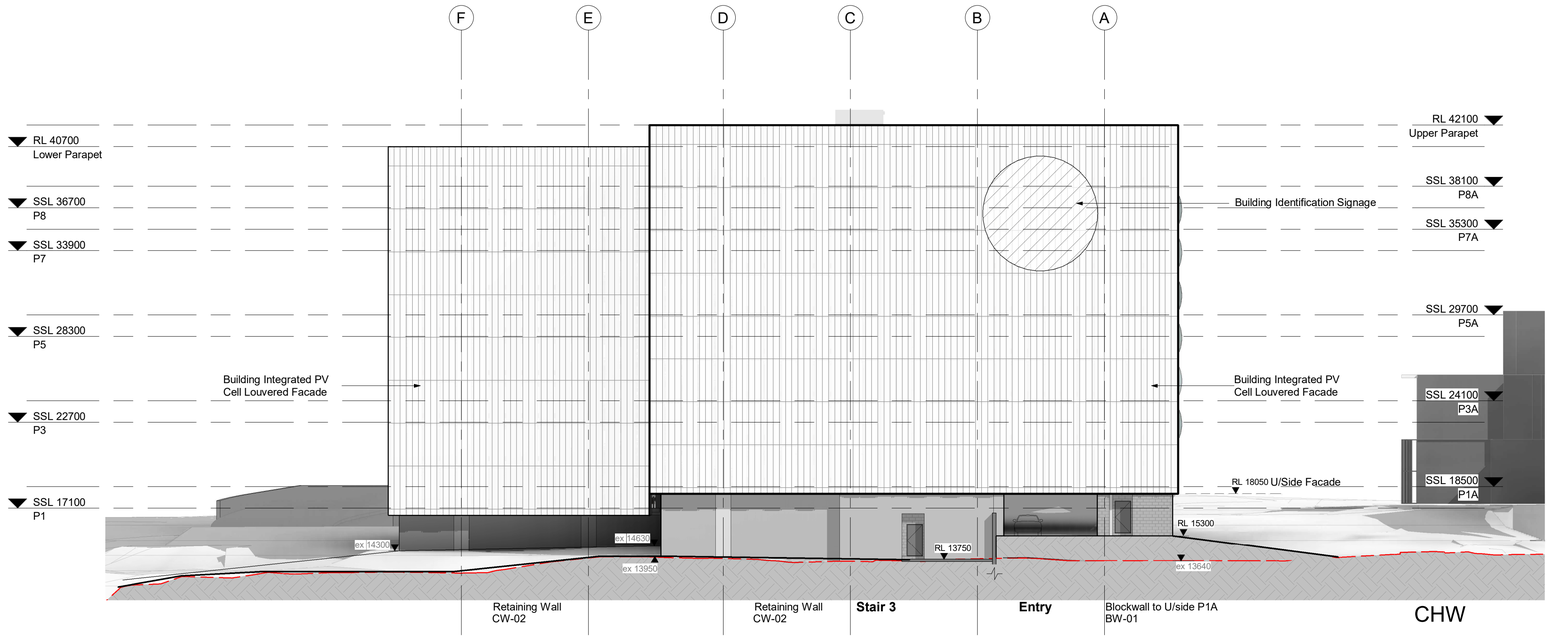
PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
SITE SECTIONS AND ELEVATIONS

Scale 1:500@A1		Date 21/12/20
Drawn By PH	Checked By SC	Revision C
Project No		19038

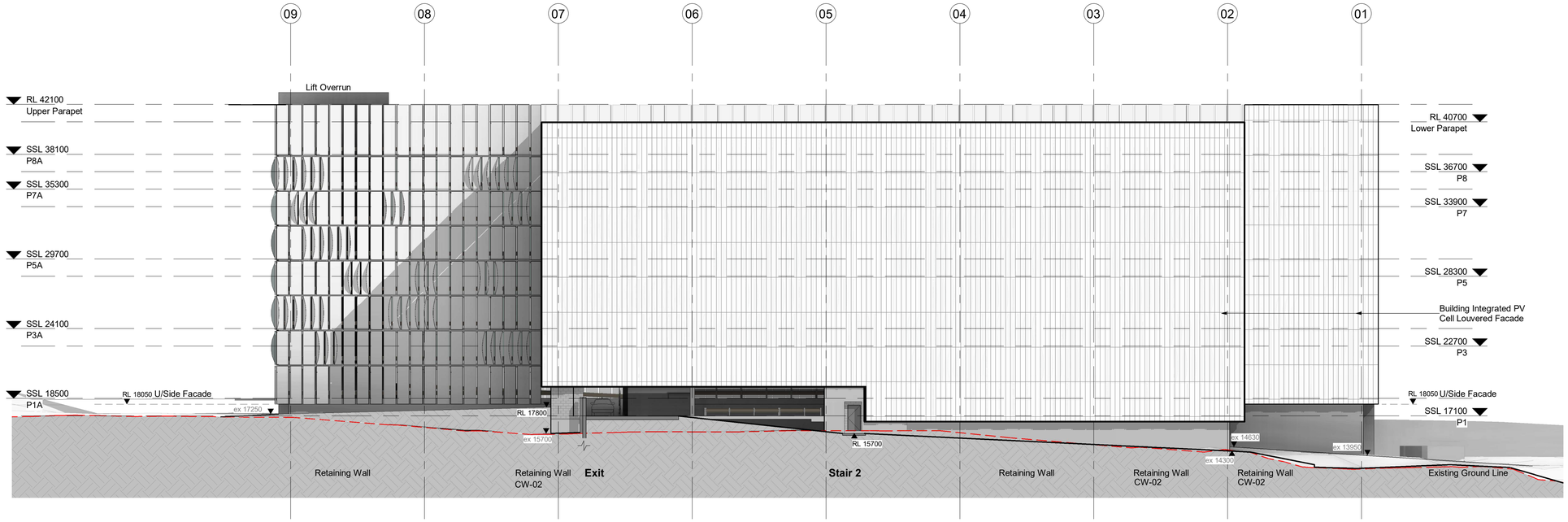
Drawing No
CHW-AR-DG-MCP-DA012

FOR INFORMATION



1 PROPOSED ELEVATION - NORTH

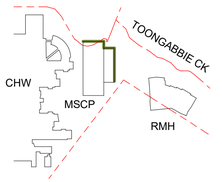
North



2 PROPOSED ELEVATION - EAST

East

0 2 4 6 8 10m
1:200



GENERAL NOTE:

TO BE READ IN CONJUNCTION WITH FACADE TYPES DRAWING DA060. SCHEDULE - MATERIAL DA092.

KEY:

AS MARKED IN GREEN ON THE KEY PLAN ABOVE, BIPV CELL LOUVRED FACADE APPLIED TO THE NORTH AND EAST ELEVATIONS.

REV		
F	SSDA For Information	15/01/21
E	SSDA For Information	21/12/20
D	SSDA For Information	27/11/20
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B	FOR INFORMATION	23/10/20
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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
PROPOSED ELEVATIONS - SHEET 01

Scale		Date
1 : 200@A1		15/01/21
Drawn By	Checked By	Revision
PH	SC	F

Project No 19038

Drawing No
CHW-AR-DG-MCP-DA040

FOR INFORMATION

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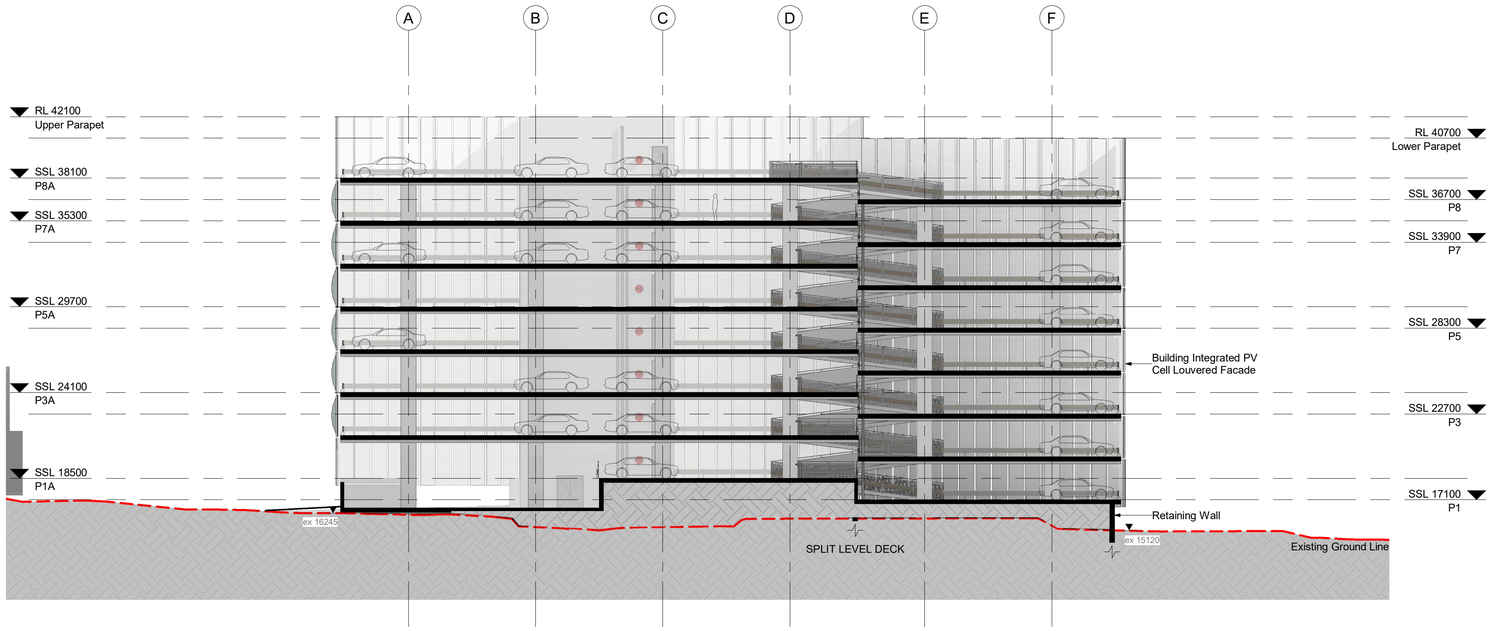
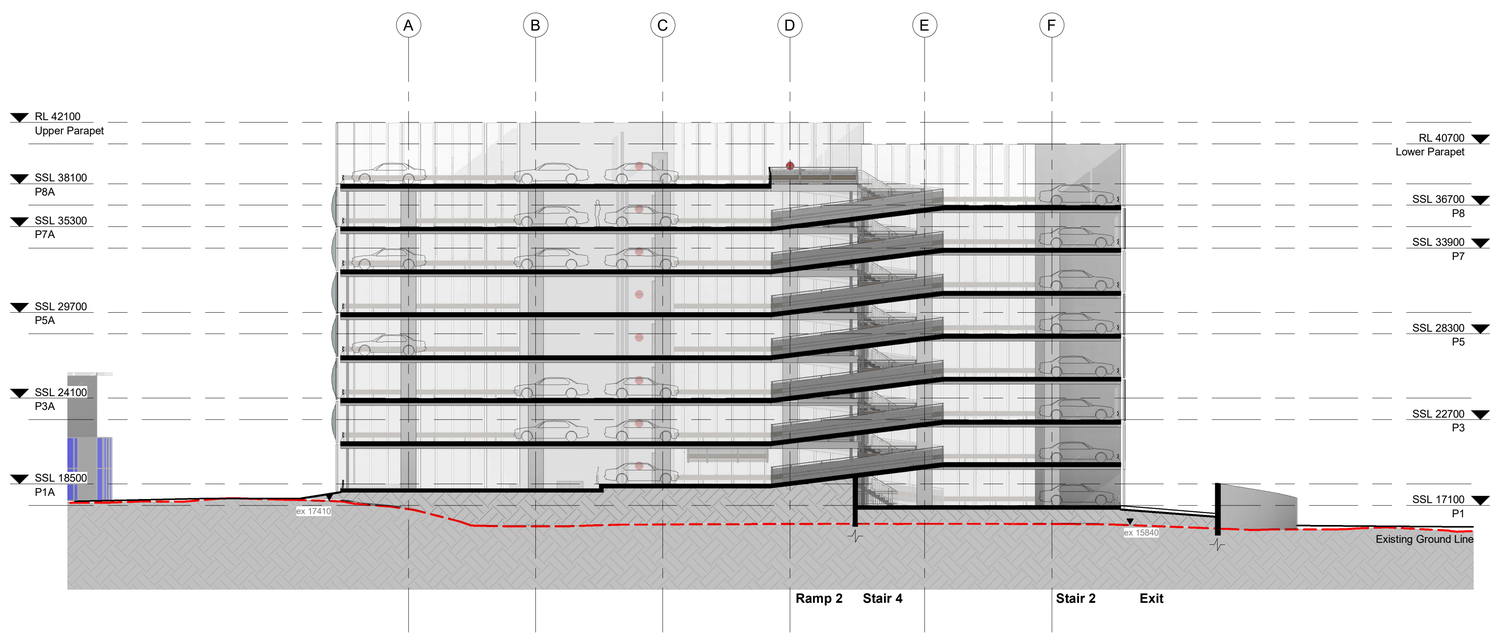


1 SECTION

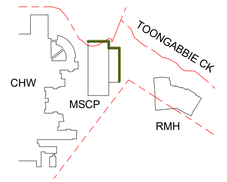
Section 1



2 SECTION

Section 2

0 2 4 6 8 10m
1:200



GENERAL NOTE:

TO BE READ IN CONJUNCTION WITH FACADE TYPES DRAWING DA060. SCHEDULE - MATERIAL DA092.

KEY:

AS MARKED IN GREEN ON THE KEY PLAN ABOVE, BIPV CELL LOUVRED FACADE APPLIED TO THE NORTH AND EAST ELEVATIONS.

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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
PROPOSED SECTIONS - SHEET 01

Scale	Date
1 : 200@A1	15/01/21
Drawn By: PH	Checked By: SC
Revision: F	
Project No: 19038	
Drawing No: **CHW-AR-DG-MCP-DA050**	

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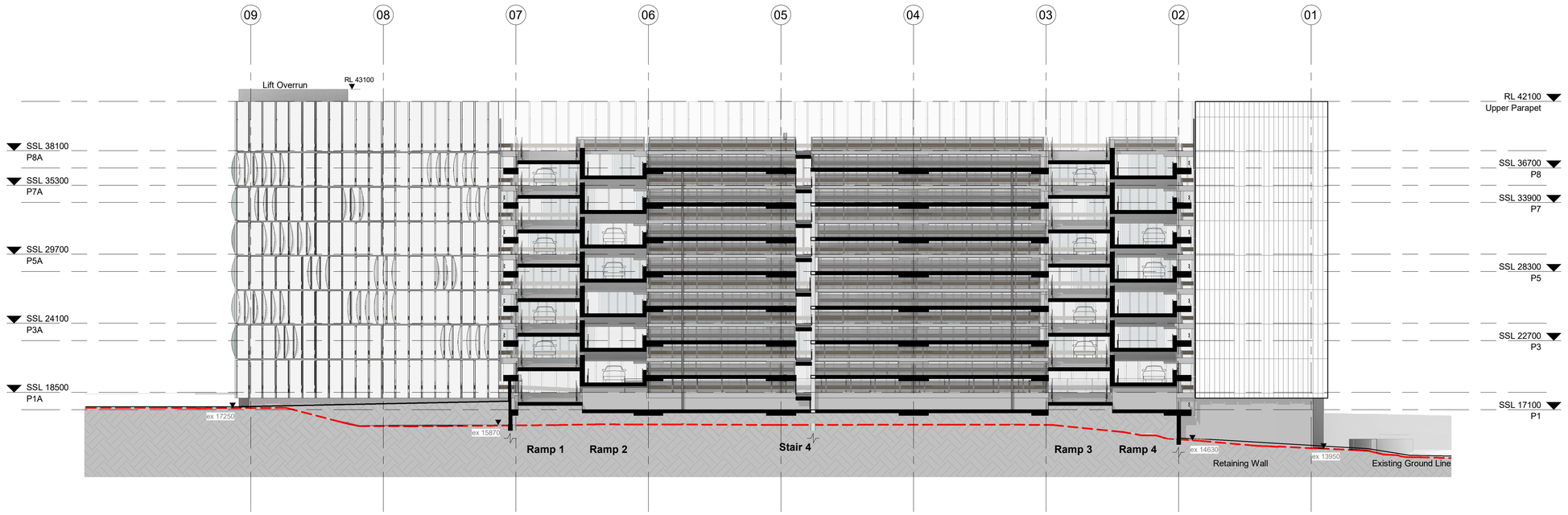
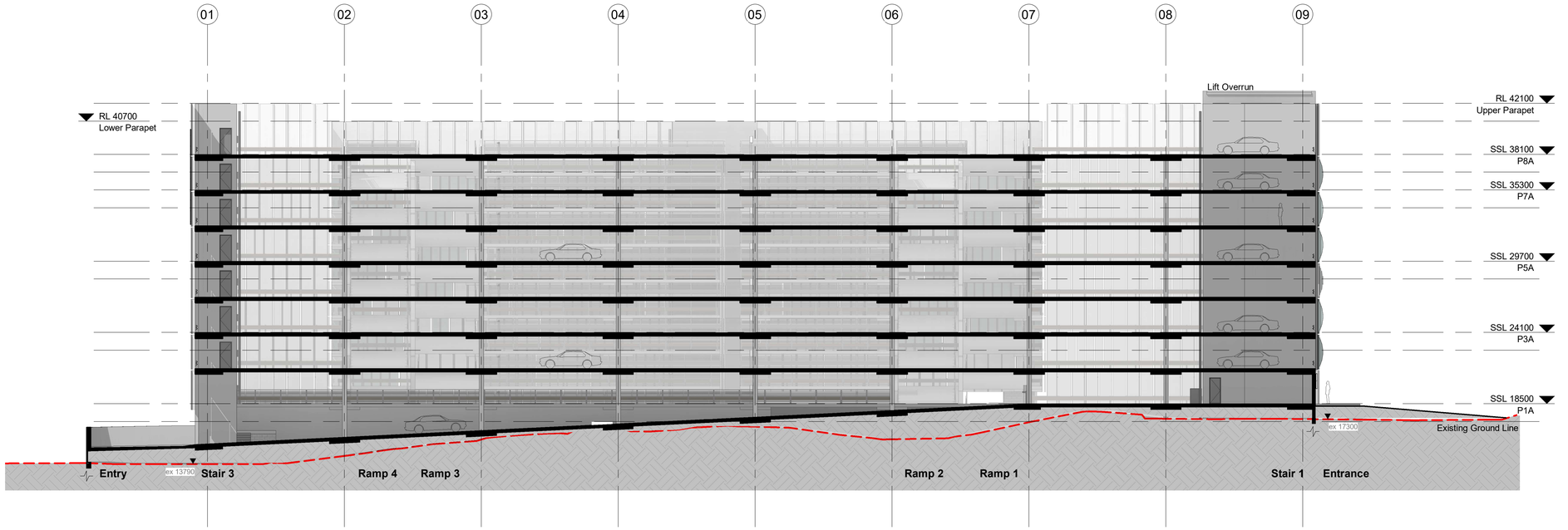


3 SECTION

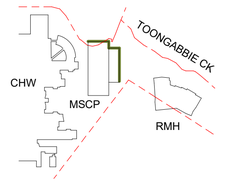
Section 3



4 SECTION

Section 4

0 2 4 6 8 10m
1:200



GENERAL NOTE:

TO BE READ IN CONJUNCTION WITH FACADE TYPES DRAWING DA060. SCHEDULE - MATERIAL DA092.

KEY:

AS MARKED IN GREEN ON THE KEY PLAN ABOVE, BIPV CELL LOUVRED FACADE APPLIED TO THE NORTH AND EAST ELEVATIONS.

REV		
F	SSDA For Information	15/01/21
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PROJECT
The Children's Hospital at Westmead Stage 2 Redevelopment

Sheet Name
PROPOSED SECTIONS- SHEET 02

Scale	Date
1 : 200@A1	15/01/21
Drawn By: PH	Checked By: SC
Revision: F	
Project No: 19038	

Drawing No
CHW-AR-DG-MCP-DA051

FOR INFORMATION

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Appendix C: Unexpected Finds Protocol

BE AWARE
UNEXPECTED HAZARDS MAY BE PRESENT

drums

asbestos

chemical bottles

odour

ash / slag

demolition waste

if you <u>SEE</u> or <u>SMELL</u> anything unusual

<u>STOP WORK</u> & contact the Site Foreman

do not restart working before the area has been investigated and cleared by an Environmental Consultant

Document Distribution

Rev No.	Copies	Recipient	Date:
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B	3 x electronic	Mary Sakr – PWC Hanan Husaini - PWC Caleb Teh – Health Infrastructure	28/1/2021
C	3 x electronic	Mary Sakr – PWC Hanan Husaini - PWC Caleb Teh – Health Infrastructure	9/2/2021

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
A	Jessica Staehli	Matthew Bennett	Matthew Bennett	Draft for Client Review	1/12/2020
B	Jessica Staehli	Matthew Bennett	Matthew Bennett	Draft for Auditor Review	28/1/2021
C	Jessica Staehli	Matthew Bennett	Matthew Bennett	Draft for Auditor Review	9/2/2021

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