

Health Infrastructure Remedial Action Plan

Mental Health Unit and Emergency Department

Broken Hill Hospital

Broken Hill, NSW

20 October 2023 63879/155,194 (Rev 0) JBS&G Australia Pty Ltd



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Abbreviations

Term	Definition		
AEC	Area of Environmental Concern		
AHD	Australian Height Datum		
ASRIS	Australian Soil Resource Information System		
ASS	Acid Sulfate Soil		
AST	Above-ground storage tank		
BHHR	Broken Hill Hospital Redevelopment		
Bgs	below ground surface		
BTEX	benzene, toluene, ethylbenzene and xylenes		
COPC	Contaminants of Potential Concern		
CLM Act	Contaminated Land Management Act 1997		
CSM	Conceptual site model		
DG	Dangerous Goods		
DP	Deposited Plan		
DSI	Detailed Site Investigation		
ED	Emergency Department		
EPA	Environment Protection Authority		
EPL	Environment Protection Licence		
ESA	Environmental Site Assessment		
FWLHD	Far West Local Health District		
GPR	Ground Penetrating Radar		
HBM	Hazardous Building Materials		
HI	Health Infrastructure		
JBS&G	JBS&G Australia Pty Ltd		
LEP	Local Environmental Plan		
MHU	Mental Health Unit		
NATA	National Association of Testing Authorities		
NEPC	National Environment Protection Council		
NEPM	National Environment Protection Measure		
OCPs	Organochlorine pesticides		
ODS	Ozone Depleting Substance		
PAHs	Polycyclic aromatic hydrocarbons		
PCB	Polychlorinated biphenyls		
PCE	Tetrachloroethene (also Perchloroethene or perchloroethylene)		
PFAS	Per- and Poly-fluoroalkyl Substances		
POEO Act	Protection of the Environment Operations Act 1997		
PSI	Preliminary Site Investigation		
R&H SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021		
RAP	Remedial Action Plan		
SMF	Synthetic Material Fibres		
SWA	Safe Work Australia		
SWNSW	Safe Work New South Wales		
TCE	Trichloroethene (also trichloroethylene)		
TRH	Total Recoverable Hydrocarbons		
VOC	Volatile Organic Compounds		



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 Broken Hill Hospital Redevelopment (BHHR, the site). The site is formally identified as part Lot 4376 in DP757298 and comprises an area of approximately 11, 000 m². The proposed redevelopment includes a new Mental Health Unit (MHU) including new courtyards/gardens and a new/expanded Emergency Department (ED) including a new ambulance drop off area as well as new car parking and associated landscaped areas. The site location and layout are shown on **Figures 1** and **2** respectively.

JBS&G previously carried out a Preliminary Site Investigation (PSI, JBS&G 2022²), which identified that the site was primarily vacant until being developed as a hospital in the 1880s. The PSI recommended to undertake a Detailed Site Investigation (DSI) to characterise potential contamination at the site and confirm the suitability of the site (from a contamination perspective) for the proposed redevelopment for ongoing hospital facility land use.

A DSI (JBS&G 2023a³) was completed to assess areas of environmental concern (AECs) and associated contaminants of potential concern (COPCs). JBS&G (2023a) completed a soil investigation comprising soil sampling from 19 locations, covering the MHU and ED footprints, and groundwater sampling comprising sampling from three groundwater wells. Concentrations of COPCs in soils were all below the adopted health-based assessment criteria, except for asbestos containing material (ACM) identified in surface soils at sample location MH-B10 in the south-western portion of the site. Groundwater was found to be impacted with heavy metals, total recoverable hydrocarbons (TRH), Per- and Polyfluoroalkyl Substances (PFAS), and volatile organic compounds (VOCs) across the site, however, based on concentrations of COPCs in site soils, the impacts to groundwater were inferred not to be an off-site source of impacted groundwater migrating through the site, and minor COPC exceedances do not affect the site suitability for the proposed use. However, a potential risk exists to ecological receptors in the event that groundwater discharges to a receiving surface water body occurs.

JBS&G (2023a) concluded that the MHU and ED footprints, including the proposed footprint expansions, can be made suitable for the proposed use as a hospital subject to implementation of an Asbestos Management Plan (AMP) and a RAP in accordance with the NSW Environment Protection Authority (EPA) and relevant Australian Standards. The AMP was prepared by JBS&G as documented in JBS&G (2023b⁴).

The RAP, documented herein, meets the requirements of Chapter 4 Remediation of Land of *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP). This report documents the procedures and standards to be followed in order to address the identified data gaps and asbestos impacted soils in such a manner as to make the site suitable for the proposed future uses.

1.2 Objectives

The objective of this RAP is to document the procedures and standards to be followed in order to address data gaps and 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 Preliminary Site Investigation, Mental Health Unit and Emergency Department Broken Hill, Hospital Broken Hill, NSW, JBS&G Australia Pty Ltd, 22 December 2022, 63879/148999 Rev 0 (JBS&G 2022)

³ Detailed Site Investigation, Mental Health Unit and Emergency Department Broken Hill, Hospital Broken Hill, NSW, JBS&G Australia Pty Ltd, 20 October 2023, 63879, 148999 Rev 1 (JBS&G 2023a).

⁴ Asbestos Management Plan, Mental Health Unit and Emergency Department Broken Hill, Hospital Broken Hill, NSW, JBS&G Australia Pty Ltd, 20 October 2023, 63879, 148999 Rev 1 (JBS&G 2023b).



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

Site Legal Identifier (as shown on Figure 2)	Lot 4376 in DP 757298	
Site Address	170-320 Thomas Street, Broken Hill, NSW 2880	
Site Area	11,000 m ²	
Local Government Authority	City of Broken Hill	
Approximate Coordinates	Easting: 542964.791	
(GDA 94 Map Grid of Australia (MGA) 54)	Northing: 6465282.82	
Registered Site Owner	Health Administration Corporation	
Current Zoning	Zone R1 – General Residential (<i>Broken Hill Local Environmental Plan 2013</i>)	
Previous Land Uses	Vacant Land	
Current Land Uses	Health Service	
Proposed Land Uses	Health Service	

2.2 Site Description

A detailed site inspection was completed in 2022 and reported in JBS&G (2023a). Key elements of the site inspection are detailed below.

The site, comprising the MHU and ED developable areas, were two approximately rectangular-shaped parcels of land, separately situated within the Broken Hill Hospital site boundary. A roadway within the hospital boundary, leading from Thomas Street to south and Morgan Street to the east, crossed through both the MHU and the ED sites.

The MHU was predominately sealed, comprising of a carpark to the west, the roadway in the central east, and part of the hospital complex to the east. An unsealed area with some trees was present to the southwest of the carpark within the MHU.

The ED was predominately sealed, comprising of the Ambulance Bay entrance and carport to south, and the roadway to the north. Two unsealed landscaped verges were present to the east and west of the ED boundary.

2.3 Surrounding Land-use

The proposed MHU and ED redevelopment areas were located within the broader Broken Hill Hospital. Land uses of adjacent properties or properties across adjacent roadways from the Hospital are summarised below.

- North the Hospital was bound to the north by Morgan Street and low-density residential dwellings beyond.
- West the Hospital was bound to the west by Bromide Street and low-density residential dwellings, a private clinic and a pre-school beyond.
- East the Hospital was bound to the east by Chloride Street and low-density residential dwellings beyond.
- South the Hospital was bound to the south by Thomas Street and low-density residential dwellings and a pathology laboratory beyond.

2.4 Environmental Setting

The environmental setting of the site has been detailed in a previous investigation (JBS&G 2023a). A summary has been provided in **Table 2.1**.



Table 2.1: Summary of Environmental Characteristics for WHS

Environmental Aspect	Characteristics
	A search of elevation contours was completed by Lotsearch as reported in JBS&G
	(2023a), which indicates that the ED and MHU are relatively flat at an elevation of 330
	m Australian Height Datum (AHD), with a steep incline northwest of the MHU and
	within the Hospital boundary, to 320 m Australian Height Datum (AHD). The area in
	vicinity of the hospital generally slopes east to northeast from this elevated northwest
Topography	part of the hospital site, based on Lotsearch (2022) elevation contours. Some areas of
, , ,	the hospital site also appear to have been artificially raised for landscaping or building
	particularly in the vicinity of Kincumber House, external to the site.
	External to the northern site boundary, a steep descent from Morgan Street northwar
	to Morgan Lane and Sulphide Street is noted on Google Street View.
	Reference to JBS&G (2023a) indicates that site is underlain by Sundown Group
	Siliciclastic sedimentary rock, comprising interbedded pelite, psammopelitic and
	psammitic metasedimentary rocks.
	The soil classification order is tenosol, which occurs on hills with small valley plains.
Geology / Soil	Tenosols are described as shallow, dense loamy soils to shallow calcareous loamy soils
Geology / Soil	
	and sands occurring on hills.
	It is noted that studies have observed elevated background levels of heavy metals in soils, particularly lead, in the City of Broken Hill, which are associated with the town's
	historic and ongoing mining industry (Yang & Cattle 2015 ⁵ ; Kristensen & Taylor 2016 ⁶)
	Reference to JBS&G (2023a) indicates that the site has an extremely low probability o
	ASS. Review of the geographical and topographical location of the site has indicated
	that it is a significant distance away from tidal creeks or estuaries, and it is considered
Acid Sulfate Soils (ASS)	unlikely that ASS would exist at the site. Based on the identified geological and
	topographical setting no further consideration for the potential for ASS at the site is
	required.
	Reference to JBS&G (2023a) of dryland salinity indicates that there is no current
	National Assessment data available.
	Areas of high saline risk generally occur lower in the landscape, or at permeability
Salinity	contrasts, where saline groundwater may come within close proximity to the ground
	surface or where seepage causes waterlogged conditions, thereby concentrating soils
	Typically scattered saline indicator vegetation occurs in these areas.
	With consideration to the site topography (approximately 300 m AHD) and average
	depth to the groundwater in proximity to the site (approximately 25 m bgs), there is a
	low probably of salinity at the site.
	The closest water body is a drainage channel approximately 1.2 km east from the site,
	which joins a tributary of Willa Willyong Creek approximately 3.3 km northeast of the
	site and eventually enters the Stephen Creek reservoir, approximately 12 km northea
	from the site. Stephen Creek flows towards Tandou Lake in the Menindee Lakes
Hydrology	catchment and the Darling River, approximately 90-100 km south to southeast of the
	site. It is noted that the Menindee Lakes catchment supplies water to Broken Hill to
	meet irrigation, stock and domestic needs (WaterNSW 2022 ⁷).
	Stormwater drainage infrastructure withing the Broken Hill Hospital boundary may
	generate manmade preferential pathways. It is likely that the majority of surface runc
	would be captured onsite.
	As reported in JBS&G (2023a), review of the registered bore information identified
	several registered groundwater bores within a 2.0 km radius of the site.
	Local aquifers are generally of low productivity. With regard to the depth of
	groundwater in proximal wells to the site, potential onsite groundwater may be
Hydrogeology	encountered at relatively deep levels (approximately 10-20 m bgs).
	Based on the topography and hydrology discussed above, it is inferred that
	shallow/perched groundwater migration will occur in an east to northeast direction.

⁵ Google Earth Pro Topographic Elevation Tool accessed 26 July 2022

⁵ "Bioaccessibility of lead in urban soil of Broken Hill, Australia: a study based on in vitro digestion and the IEUBK model", Yang K and Cattle SR, Science of the Total Environment, 538, pp.922-1933, 2015 (Yang & Cattle 2015)

⁶ "Unravelling a 'miner's myth' that environmental contamination in mining towns is naturally occurring", Kristensen LJ and Taylor MP, Environmental Geochemistry and Health, 38(4), pp.1015-1027, 2016 (Kristensen & Taylor 2016)

⁷ Menindee Lakes, WaterNSW, https://www.waternsw.com.au/nsw-dams/regional-nsw-dams/menindee-

lakes#:~:text=Today%20the%20lakes%20supply%20water,supplement%20the%20River%20Murray%20system., accessed 22 December 2022



Environmental Aspect	Characteristics		
	A review of average climatic data for the nearest Bureau of Meteorology monitoring location (Broken Hill Patton Street ⁸) indicates the site is located within the following meteorological setting:		
	Average minimum temperatures vary from 5.4°C in July to 18.5°C in January;		
Meteorology	 Average maximum temperatures vary from 15.2°C in July to 32.8°C in January; 		
	 The average annual rainfall is approximately 259.8 mm with rainfall greater than 1 mm occurring on an average of 34.6 days per year; and 		
	 Monthly rainfall varies from 17.8 mm in April to 25.8 mm in February with the wettest periods occurring on average in January to March. 		

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⁸ http://www.bom.gov.au/climate/averages/tables/cw_047007.shtml, Commonwealth of Australia, 2013 Bureau of Meteorology, Product IDCJCM0028, accessed by JBS&G on 20 December 2022.



3. Summary Site History and Previous Site Investigations

3.1 Asbestos Register – Broken Hill Health Service (FWLHD 2015⁹) Asbestos Register

The client provided an Asbestos Register prepared in 2015. The audit included inspection of 22 buildings and related structures, identifying predominantly bonded asbestos cement building materials and some friable asbestos items, and the completion of eleven confirmatory samples.

With respect to asbestos contamination aspects, JBS&G note that damaged ACM in external building materials and friable asbestos such as used on pipe lagging in subfloor areas, could impact surface soils.

In addition, an inspection of Corindah Court car park, an area to the north of hospital, identified building and demolition waste within an earthen embankment, with the potential for ACM to be present.

Photographs included suggest there may also be lead-based paints, with some flaking paint visible, however lead-based paints were not assessed.

The conclusion of the audit report recommends a range of management actions to several of the buildings assessed, and within Corindah Court car park.

It is noted that the buildings assessed in the Register fall outside of the developable site extent subject to this investigation; however, building structures that may have been constructed with asbestos (and lead paint) were previously within the MHU and ED site boundaries. As such, asbestos impacts from demolition works may be present within the former building footprints, which are shown on **Figure 3**.

3.2 Broken Hill Hazardous Material Survey (GHD 2016¹⁰)

GHD Pty Ltd completed an intrusive (pre-demolition) Hazardous Building Material (HBM) Survey of Kincumber House, located in the north of the hospital area along Morgan Street, for the purpose of addressing HBM data gaps from the FWLHD (2015) investigation and to inform decisions related to the Kincumber House internal refurbishment.

The HBM further defined the extent of ACM, and investigated the presence of Synthetic Mineral Fibres (SMF), PCBs within light fittings, Ozone Depleting Substance (ODS) within air conditioning and refrigeration units, leaded paint systems and lead contaminated dust due to the presence of deteriorating lead paint, through the collection of representative samples for analysis at a National Association of Testing Authorities NATA accredited laboratory.

The laboratory and visual findings confirmed the presence of both friable and bonded asbestos and lead paint in the areas surveyed. The likelihood of SMF and PCBs were determined as highly likely, and no ODS were identified during the inspection. The Survey concludes with recommendations to safely manage the identified HBMs during the Kincumber House refurbishment.

It is noted that Kincumber House is external to the subject site, in the central northern portion of the hospital boundary (Figures 2 and 3).

3.3 Preliminary Site Investigation (PSI, JBS&G 2022)

JBS&G Australia Pty Ltd (JBS&G) was engaged by HI to complete a Preliminary Site Investigation (PSI) for the proposed Broken Hill Hospital Redevelopment. The PSI identified the following:

- The site was primarily vacant up until 1889, when it was acquired and developed as a public hospital, and has remained a hospital since;
- A SafeWork Dangerous Goods (DG) Search was completed and did not locate any records pertaining to the site. However, it is noted that not above or below ground DG storage (e.g. small heating oil or diesel tanks) is required to be registered. Further inspection as well as

⁹ Asbestos Register, Broken Hill Health Service, Far West Local Health District 2015, May 2015.

¹⁰ Broken Hill Hospital Kincumber House and Ambulatory Wing - Hazardous Building Materials Survey, GHD Pty Ltd, May 2016 (GHD 2016).



investigation via ground penetrating radar (GPR) survey is recommended within the vicinity of site structures;

- A range of AECs and COPCs based on historical and currents uses/activities at the site have been identified, and require more detailed investigation to assess associated potential contamination risks;
- It is unlikely that activities at the site will have contaminated the land to a degree that would prevent the redevelopment of the site for continued health services facility land use; and
- In the event that contamination is identified at the site, it is anticipated that the site can be made suitable for the proposed land-use.

Based on these conclusions, JBS&G recommend that a DSI inclusive of intrusive sampling is undertaken to characterise potential contamination at the site and confirm the suitability of the site (from a contamination perspective) for the proposed redevelopment for ongoing hospital facility land use.

3.4 Detailed Site Investigation (DSI, JBS&G 2023a)

JBS&G Australia Pty Ltd (JBS&G) was engaged by HI to complete a Detailed Site Investigation (DSI) for the proposed Broken Hill Hospital Redevelopment.

The objectives of the DSI were to assess the potential for historical contaminating activities at the site and provide a preliminary assessment of the suitability of the site for the proposed use, or to make recommendations to enable such assessments to be made in the future.

The completed scope of work comprised: review of site conditions and readily available site history records to identify areas of environmental concern (AECs) and associated contaminants of potential concern (COPCs); completion of a detailed site inspection; development of a conceptual site model (CSM); a soil investigation comprising soil sampling from 19 locations; sampling of three groundwater monitoring wells; laboratory analysis program for representative samples of each media for COPCs; data evaluation against NSW Environment Protection Authority (EPA) endorsed guideline values; and preparation of this report documenting the methods and results of the investigation. The findings of the DSI included the following:

- The site was primarily vacant up until 1889, when it was acquired and developed as a public hospital, and has remained a hospital since;
- A SafeWork Dangerous Goods (DG) Search was completed and did not locate any records pertaining to the site.
- A range of AECs and COPCs based on historical and currents uses/activities at the site have been identified, which require more detailed investigation to assess associated potential contamination risks;
- Concentrations of COPCs in soils were all below health-based assessment criteria, therefore, soils do not pose a potential unacceptable risk to potential future site receptors.
- ACM was visually identified at one location MH-B10 in near surface soil (0-0.2 m) during
 intrusive investigations. The presence of asbestos in the top 0.1 m of soil and is considered a
 potential aesthetic issue.
- Elevated heavy metals, volatile organic compounds (VOCs) and per- and polyfluoroalkyl substances (PFAS) were detected in groundwater at all three monitoring well locations.
 Although dichlorobenzene in one sample and TRH and Sum of PFHxS and PFOS in groundwater sampled from all wells exceeded the drinking water criterion, noting the presence of reticulated drinking water in the area, the site groundwater is not considered to be a drinking water source. Therefore, PFAS in groundwater marginally exceeding the drinking water criteria does not affect site suitability for the proposed use.



- Metals and PFAS concentrations in groundwater in all wells and two dichlorobenzenes and anthracene in GW03 exceed adopted ecological screening criteria and pose a potential risk to ecological receptors in the event that groundwater discharges to a receiving surface water body.
- Groundwater impacted with heavy metals, TRH, PFAS and VOCs were recorded across the site, however, based on concentrations of COPCs in site soils, the impacts to groundwater are inferred not be due to an off-site source of impacted groundwater migrating through the site.

JBS&G (2023a) concluded that the MHU and ED footprints, including the proposed footprint expansions, can be made suitable for the proposed use as a hospital subject to implementation of an Asbestos Management Plan (AMP) and a RAP in accordance with the NSW Environment Protection Authority (EPA) and relevant Australian Standards. The AMP was prepared by JBS&G as documented in JBS&G (2023b).

Analytical summary tables, including soil and groundwater results, and bore logs are provided in **Appendices B** and **C**, respectively.



4. Contamination Status

Contamination of land is defined by the CLM Act¹² 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".

JBS&G (2023a) reported that bonded ACM was encountered within soil at test pit location MH-B10 between 0-1.0 m below ground surface (bgs). While asbestos concentrations in subsurface soils were below the adopted assessment criteria, ACM in surface exceeded the adopted health-based site criteria 'no visible asbestos in surface soils'. No friable asbestos was detected above the LOR/site assessment criteria in all soil samples and concentrations of other COPCs were not identified at levels posing an unacceptable risk to human receptors relating to the proposed redevelopment of the site.

Groundwater was found to be impacted with heavy metals, TRH, PFAS, and VOCs across the site, however, based on concentrations of COPCs in site soils, the impacts to groundwater were inferred not to be an off-site source of impacted groundwater migrating through the site, and minor COPC exceedances do not affect the site suitability for the proposed development of on grade single storey buildings (no basement car park) and are therefore not considered a contamination issue.

In September 2023, the proposed redevelopment footprint expanded beyond the original MHU and ED footprints as shown on **Figure 3**. These areas of the site have not been previously assessed for contamination and are therefore considered potentially contaminated with COPCs likely limited to bonded ACM and/or lead from historical building footprints. These new redevelopment areas are subject to data gap validation sampling to inform their suitability for the proposed land use.

On this basis, the extent of known contamination within the site is limited to surficial soils in the area shown on **Figure 5**. Areas not previously assessed, as shown in **Figure 5**, are subject to pre-remediation data gap validation sampling to inform potential contamination in this portion of the site.

¹² Contaminated Land Management Act 1997 (CLM Act).



5. Remediation Options

5.1 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:

- Chapter 4 Remediation of Land of State Environmental Planning Policy (Resilience and Hazards) 2021 (R&H SEPP).
- Contaminated Land Guidelines: Sampling Design Part 1 application, NSW EPA, 2022 (EPA 2022).
- 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).
- Work Health and Safety Regulation 2017 (WHS Regulation).
- 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).

5.2 Extent of Remediation

The lateral extent of known asbestos contamination at MH-B10 is detailed in **Figure 5**. Areas of the site that have not been previously assessed, comprising the expanded redevelopment footprint beyond MHU and EDU, are considered potentially contaminated with COPCs. These new redevelopment areas are subject to data gap validation sampling during pre-remediation works to confirm their suitability for the proposed land use.

The vertical extent of known remediation at MH-B10 is limited to the vertical depth of surficial asbestos contaminated fill to a maximum of 100 mm (surface soils), with consideration to the specific design options for the site which may form permanent capping layers (such as permanent slabs underlying the proposed building footprint, car park access roadways etc.). The vertical extent of unknown contamination associated with the new redevelopment areas is to be determined via data gap validation sampling during pre-remediation works.



5.3 Consideration of Possible Remediation Options

5.3.1 EPA (2017) Guidance

The approach adopted in this RAP is consistent with the preferred hierarchy of options for site cleanup and/or management provided in NEPC (2013) and referred to by 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 5.1**, taking into account the proposed development works at the site.

5.3.2 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 5.1**, taking into account the proposed development works at the site



5.4 Possible Remedial Options

Table 5.1: Remedial Options Matrix

Option of Treatment	Discussion	Conclusion
Option 1: On-site treatment of the soil	ACM impacted soils	The preferred
so that the contaminant is either	As per EPA's current draft position statement (Section 5.3.3), bonded ACM can be removed from impacted soils by hand-	option if ACM
destroyed or the associated hazard is	picking.	is exclusively
reduced to an acceptable level.	Hand picking of ACM from the ground surface, within surface soils or from spread pads can be labour intensive and costly	
	and time consuming where there is a large extent of ACM or where ACM is embedded in soil and difficult to 'pick', but can	
	substantially reduce the volume of soil disposed to landfill where emu picking is feasible and as such is a suitable approach	
	to removing ACM impacts from ground surfaces and surface soils.	
Option 2: Off-site treatment of	ACM impacted soils	
excavated soil so that the contaminant	As above (Option 1), however, there are reductions in noise and dust emissions on site in comparison to on-site treatment	Not a suitable
is either destroyed or the associated	(Option 1), but these are offset by increased truck movements. Typically, the costs associated with returning the treated	option.
hazard is reduced to an acceptable	materials to site may be equivalent to the costs associated with disposal to landfill. Furthermore, there are currently no	
level, after which the soil is returned to	facilities licensed to accept asbestos impacted material for offsite treatment.	
the site.		
Option 3: Consolidation and isolation of	ACM impacted soils	A suitable
the soil on-site by containment within a	Onsite containment is a suitable remedial option for areas where ACM impact is present above a threshold that renders it	option if
properly designed barrier.	commercially unviable to remediate for onsite reuse. This may be due to an inability to effectively remove non-friable ACM	Option 1 is
	due to soil type and building rubble concentration. This approach is more consistent with ESD and waste minimisation	not feasible.
	principles than Option 4.	
	The amount of material able to be contained onsite will be dependent upon final design levels and the total volumes of fill	
	materials required.	
	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	
	and that the remaining WHS beyond the development/remediation site will require an AMP to manage asbestos on/in soil that will not be remediated as part of the current redevelopment.	
Option 4: Removal of contaminated soil	ACM impacted soils	
to an approved site or facility, followed	Offsite disposal is a suitable remedial option for areas where ACM impact is present above a threshold that renders it	A suitable option if
where necessary by replacement with	commercially unviable to remediate for onsite reuse. This may be due to an inability to effectively remove bonded ACM	Option 1 or Option 3
clean fill.	due to soil type and building rubble concentration.	are not feasible.
ocui iii.	This option generates the highest quantity of waste, since the materials are disposed to landfill rather than treated and	are not reasible.
	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.	



5.5 Preferred Remedial Strategy

A number of potential remedial options have been outlined in **Table 5.1**. The preferred remedial strategy for the site is on-site treatment of bonded asbestos contaminated soils.

Containment of asbestos contaminated soils is considered to be a suitable/feasible contingency option as part of the development works, given that additional contamination may be encountered during pre-remediation validation sampling at the expanded MHU and ED areas.

Offsite disposal of asbestos contaminated soils, if unable to be remediated on site or contained, is considered to be a suitable/feasible contingency option as part of the development works. The need for a LTAMP for the site would be negated where all asbestos risks are removed off site under this contingency scenario.

A combination of the preferred on-site containment option and contingency disposal option could be implemented where some but not all contaminated soil can be contained on site, requiring off-site disposal of some surplus impacted soil.

5.6 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.



6. Remediation Plan

6.1 Approvals, licences and notifications

Protection of the Environment Operations Act 1997 (POEO 1997)

The proposed remediation/validation activities are not required to be licensed under POEO Act as detailed in **Section 11.2**.

Containment Cell

Prior to implementing containment as part of the remedial approach, an agreement must be reached between Council and HI to comply with the general terms of agreement in support of the establishment of containment cells.

State Environment Planning Policy (Resilience and Hazards) 2021 (R&H SEPP)

The works are considered to be Category 2 remediation works in accordance with Resilience and Hazards SEPP. Further discussion is provided in **Section 11.1.**

The notification requirements of the Resilience and Hazards SEPP require the consent authority to be notified 30 days before Category 2 remediation works commence

Notice is also required to be provided to Council within 30 days after completion of remediation, as per the R&H SEPP.

Asbestos Works

The updated EPA (2023) draft position statement on the management of asbestos contaminates sites allows for non-friable asbestos contaminated soils to be handpicked to reduce ACM concentrations to below HSLs for both surface and subsurface soil. This opportunity has been taken into account when designing the remedial approach for the site.

An appropriately experienced and licensed Remediation Contractor is required to undertake the works under the supervision of an appropriately qualified and experienced Remediation Consultant. Asbestos impacted soils observed during the DSI were bonded, as per the definitions in relevant regulatory guidance. Based on the current site conditions, the remedial works must be conducted by a Class B (non-friable) licensed contractor who has obtained a site-specific permit approving the asbestos works from SafeWork NSW (SWNSW). This permit application must be made at least seven working days before removal work commences.

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) detailed in **Section 10**.

6.2 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.

6.3 Buildings and Structures Demolition

Review of the proposed development plan (**Appendix A**) indicates that some existing structures within the site are scheduled for demolition (e.g. roadways, parking lots, northern structure of the Sub Acute Building, and part of the ED). Demolition should be completed in a manner that avoids new contamination of soils in vicinity and beneath buildings. Although demolition is not strictly part of the remediation works, the key processes for their demolition 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 structures;
- Beneficial reuse of environmentally validated material onsite where possible or lawfully remove all materials off-site; and
- Expose underlying soils for pre-remedial validation sampling (Section 8.3).

6.4 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.

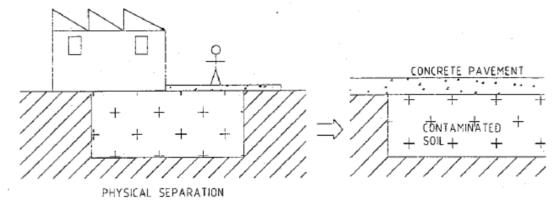
It is noted that larger areas capped in situ will result in a greater management area for the LTAMP.

The minimum typical requirements for the physical separation to be adopted in the remediation of the site include:

- A minimum soil cover thickness of 0.5 m in turfed areas, 0.5 m in mass planting/shallow landscaped areas, and 1.0 m in tree pit zones and on the raised levee, 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 directly underlain by a "marker layer", i.e., underlying buildings, suspended slabs, roads, pathways; or
- Top (concrete) of pile foundations (no marker layer required for below pile foundations).



A conceptual sketch, sourced from ANZECC 1999¹¹⁴, 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.

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

At least 0.5 m depth capping layer in vegetated areas is required for containment of asbestos impacted soils (ANZECC 1999). 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.

It is noted that where typical capping thickness in unsealed areas are constrained by final development levels, thinner capping may be feasible with use of geogrid providing greater resistance to accidental penetration below capping material and marker layer.

6.4.1 Interim Capping Arrangements During Construction Works

It is noted that the bonded asbestos impacted materials subject to excavation to achieve design levels may be capped and contained onsite. With consideration to the likely staged construction works, it is recommended that the impacted asbestos materials be temporarily stockpiled in an onsite location unlikely to be disturbed. A stockpile management plan is recommended, including guidance on dust suppression and the maintenance of the stockpile covering, including a geofabric cover or the seeding of the stockpile surface, if long- term, so to mitigate any dust borne particle migration.

It may be beneficial to undertake any piling works (if required) as part of the remediation works as the top of pile foundations will form part of the capping layer on the site. Furthermore, completion

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



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. Any piling spoil that is generated onto the capping will require removal (and either onsite containment or waste classification and off-site disposal) via a surface scrape of a nominal depth and subsequent visual and laboratory validation as per the requirements of **Table 8.2**. Any failures of the piling pad validation process will require repeating of this process until such time that the piling pad is validated.

In addition, completing the piling works whilst Class B Licensed Asbestos removalists, SafeWork NSW Competent Person (s) or Licensed Asbestos Assessor(s) and a full suite of appropriate asbestos related controls (as per **Section 9**) 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 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. the FWLHD).

Validation of the interim and permanent capping arrangements will be required as outlined in **Section 8,** 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.

6.4.2 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, suspended slab, 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 500 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 1000 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., 500 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.

Reduced minimum capping layers (e.g. 300 mm) may be possible in turfed or mass planting areas with the addition of geogrid providing greater resistance to accidental penetration below capping and marker layers, where development levels constrain the 500 mm capping indicated above. Any reduced capping thickness will also be subject to approval from landscape architects and/or arborists with respect to plant/tree root depth requirements.

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

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, imported quarried natural soils/rocks, 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 300 mm outside of the remediated area, where practicable.

Validation of the interim and permanent capping arrangements will be required as outlined in **Section 8,** 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.

6.5 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 plan are provided in **Section 8**.



6.6 Waste Classification and Offsite Disposal of Material

If ACM, ACM impacted soil or other soil is surplus and requires removal for offsite disposal, waste classification will be completed in accordance with *Waste Classification Guidelines Part 1: Classifying Waste*, NSW EPA (2014) and relevant waste regulations by the Remediation Consultant. Surplus materials may alternately be assessed against EPA Resource Recovery Orders/Exemptions by the Remediation Consultant, where appropriate.

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.

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) Regulations 2014* (POEO Waste Regulation) to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m² 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 all relevant regulations.

6.7 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 SWNSW guidance, EPA 2014 and relevant waste regulations.



7. 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 9** and **10**.

7.1 Unexpected Finds Protocol

It is acknowledged that previous site investigations have been undertaken to assess the identified contaminants of potential concern in across 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:

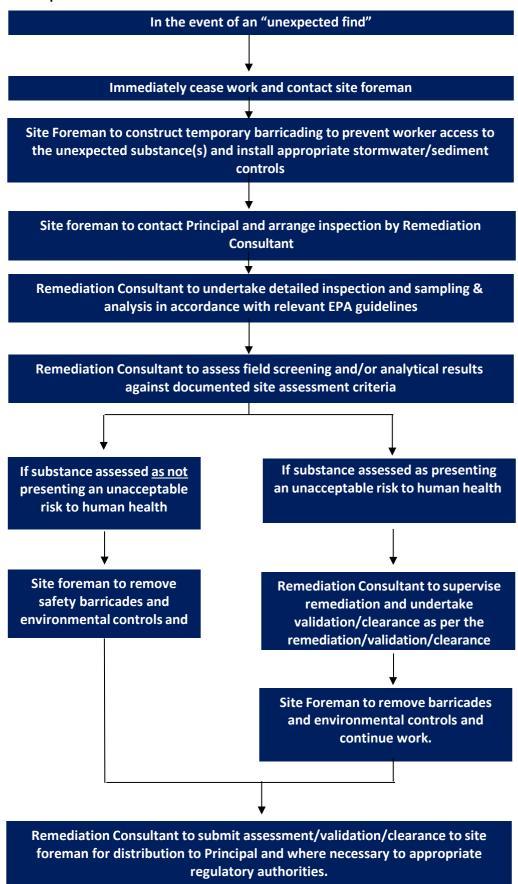
- asbestos in soils (visible);
- bottles / containers of chemicals (visible);
- construction / demolition waste (visible);
- ash and/or slag contaminated soils / fill materials (visible);
- petroleum contaminated soils (odorous, staining / discolouration visible) beyond the identified impact, or at levels 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 7.1** 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 7.1: Unexpected Finds Protocol





7.2 Remedial Strategy Constraints

In the event that the proposed remedial works do not meet the validation criteria, or if the selected remedial strategy (i.e. on-site remediation via handpicking non-friable ACM) is not feasible or is unable to be applied to all impacted fill, the remedial and validation options shall be reassessed and alternative remedial strategies as discussed in **Table 5.1** shall be considered.

7.3 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.

7.4 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 9** 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.

7.5 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.

7.6 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 recommence. All site management controls will be implemented to the extent practicable as outlined in **Section 9** prior to any severe weather events.

7.7 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.



8. Validation Plan

8.1 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, including:

- Validation activities will be required for the areas outlined in **Table 8.2**.
- Documentation of installation of containment measures if chosen as the remedial option (both interim and final);
- Validation of site-won or imported fill material to demonstrate its suitability for use as a capping layer or in trenching works;
- Tracking the movement of all soil and fill material onsite; and
- Classification of surplus materials requiring offsite disposal.

8.2 Data Quality Objectives

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

8.2.1 State the Problem

The site is proposed to be redeveloped to include a new MHU including new courtyards/gardens and a new/expanded ED including a new ambulance drop off area. Previous investigations, as detailed in **Section 3**, have identified non-friable asbestos impacts in areas requiring remediation and/or management in order to make the site suitable for the proposed redevelopment. In September 2023, the proposed redevelopment footprint expanded beyond MHU and ED as shown in **Figure 3**. These expanded footprints require further assessment to characterise potential contamination within these areas.

8.2.2 Identify the Decision

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

- Are there any unacceptable risks to onsite or offsite receptors from any residual soil contamination?
- Are there any aesthetic issues remaining following remediation works?
- Are there any materials removed from the site that have not been characterised and disposed of during remediation works?
- Where impacted materials are to remain at the site, are there any outstanding issues identified in relation to the adoption of a cap and containment strategy based on physical separation?
- Is there any potential migration of contaminants from the site?
- Where materials have been used for backfilling excavations/installation of the capping layer, are there any outstanding issues identified in relation to documentation of the materials suitability for use?
- Have all remediation works been completed in accordance with the requirements of the RAP, or where variations were required, have these been appropriate to meet the RAP objectives?
- Is the site suitable for the proposed land use?

8.2.3 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) screening results (where appropriate);
- 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).

8.2.4 Define the Study Boundaries

The study boundaries of the site are defined as follows:

- The lateral extent of the works relevant to this RAP are defined by the extent of the site, as shown on **Figure 5**, including the expanded footprints beyond MHU and ED;
- 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 are to be retained.

8.2.5 Decision Rules

The decision rules adopted to answer the decisions identified in **Section 8.2.2** are discussed in **Table 8.1**.

Table 8.1 Decision Rules

Decision Required to be Made	Decision Rule
1. Are there any unacceptable risks to onsite or offsite	Soil analytical data will be compared EPA endorsed criteria.
receptors from any residual soil contamination?	Statistical analyses of the data in accordance with relevant
	guidance documents will be undertaken, if appropriate, to
	facilitate the decisions. The following statistical criteria will
	be adopted with respect to soils:
	Either: the reported concentrations are all below the site
	criteria;
	Or: the average site concentration for each analyte must be
	below the adopted site criterion; no single analyte
	concentration exceeds 250% of the adopted site criterion;
	and the standard deviation of the results must be less than
	50% of the site criteria.
	And: the 95% upper confidence limit (UCL) of the average
	concentration for each analyte must be below the adopted
	site criterion.
	If the statistical criteria stated above are satisfied, the
	decision is No .
	If the statistical criteria are not satisfied, the decision is Yes .



Decision Required to be Made	Decision Rule	
2. Are there any aesthetic issues remaining following	If there were any remaining unacceptable inclusions or soil	
remediation works?	discolouration, the answer to the decision will be Yes.	
	Otherwise, the answer to the decision will be No .	
3.Are there any materials removed from the site that have	A qualitative assessment of material disposal records will be	
not been characterised and disposed of during the	undertaken following completion of remediation works with	
remediation works?	respect to the waste classification provided during	
	remediation works.	
	Terriculation works.	
	Are there any inconsistencies within the off-site disposal	
	records provided by the remediation contractor with respect	
	to the material classifications (VENM, General Solid Waste	
	(GSW), Special, etc) provided as part of the remediation	
	works?	
	If the documentation is complete and appropriate, the	
	answer to the decision is No .	
4. Where imported metavials are to remain at the site, are	Otherwise, the answer to the decision is Yes .	
4. Where impacted materials are to remain at the site, are	Validation sample and fill characterisation contaminant data	
there any outstanding issues identified in relation to the	for materials within the capped area of the site will be	
adoption of a cap and containment strategy based on	assessed by comparison with the contaminant property	
physical separation?	requirements ANZECC (1999 ²⁵) and EPA endorsed	
	documents as appropriate.	
	If the contaminants identified as remaining at the site are	
	considered to be appropriately managed via installation of a	
	capping system based on physical separation, the answer to	
	the decision is No .	
	If the contaminants are considered to still represent a	
	potential risk in relation to future site users following	
	installation of a physical separation layer, then the answer to	
	the decision is Yes .	
5. Is there any potential migration of contaminants from the	Should concentrations of contaminants remain at the site	
site?	following validation, which could pose an unacceptable risk	
	from migration (or should off-site sources pose a potentially	
	unacceptable risk to the site), the answer is Yes , and further	
	investigation or management may be required. Otherwise,	
	the answer is No .	
C. Milhaus materials have been used for healtfilling	Documentation of visual inspection results will be reviewed	
6. Where materials have been used for backfilling	in addition to comparison of soil analytical data against	
excavations/installation of the capping layer, are there any	adopted validation criteria.	
outstanding issues identified in relation to documentation of		
the materials suitability for use?	If concentrations are all less than the relevant adopted	
	criterion, the answer to the decision is No .	
	If the concentrations exceed the adopted criterion for one or	
	more analytes, the answer to the decision is Yes .	
7. Have all remediation works been completed in accordance	Evaluation of the RAP requirements and completed scope of	
with the requirements of the RAP, or where variations were	works will be completed on a qualitative basis. If the	
required, have these been appropriate to meed the RAP	completed works are inconsistent with the RAP objectives,	
objectives?	the answer will be No. In this instance, evaluation of the	
	works will be undertaken with consideration to the RAP	
	objectives. If the works are inconsistent with the stated	
	objectives, the answer is No . Otherwise, the answer to the	
	decision is Yes .	
8. Is the site suitable for the proposed land uses?	Was the answer to any of the above decisions Yes?	
o. is the site suitable for the proposed falla uses:		
	If yes, are the outstanding issues appropriately addressed by	
	implementation of an LTAMP?	
	If the issues are appropriately addressed by the LTAMP, the	
	answer to the decision is Yes .	
	Otherwise, the decision is No and the requirements for	
	further remediation of the Site are required to be	
	documented.	

²⁵ ANZECC (1999) *Guidelines for the Assessment of On-site Containment of Contaminated Soil*. Australian and New Zealand Environment and Conservation Council, September 1999



8.2.6 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.

8.2.7 Optimise the Design for Obtaining Data

The validation sampling design for each specific type of validation works anticipated is discussed in detail in **Section 8.3**. The general sampling methodologies are discussed below.

8.2.8 Soil Sampling Methodology

Soil sampling will be conducted by the Remediation Consultant. The soil sampling method shall be determined by the Remediation Consultant as consistent with the observations of the site subsurface and appropriate to generate representative samples. The soil sampling method shall be consistent with the data quality indicators in **Section 8.2**.

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.

8.2.9 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.

8.2.10 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.

8.2.11 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 8.2**:

- 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) 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 8.2 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			
Samples extracted and analysed within	-	NA for asbestos, organics (14 days),			
holding times.		inorganics (6 months)			
Laboratory Blanks	1 per lab batch	<lor< td=""></lor<>			
Trip spike	1 per sampling event targeting volatiles	70-130% recovery			
Trip blank	1 per sampling event targeting volatiles	<lor< td=""></lor<>			
Comparability					
Standard operating procedures for sample collection & handling	All samples	All samples			
Standard analytical methods used for all analyses	All samples	All samples			



Data Quality Indicator	Frequency	Data Quality Acceptance Criteria		
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 that 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.

8.3 Validation Inspections, Sampling and Analyses

8.3.1 Overview of Validation Sampling

The proposed soil validation sampling, quantification and analytical program is outlined in **Table 8.3.**

Table 8.3 Validation Sampling and Analytical Plan

Validation Area	Sampling Frequency	Analytes		
Pre-Remediation Validation Sampling				
Expanded footprint beyond MHU and ED	As per EPA (2022) sampling guidelines	Heavy metals TRH/BTEX PAHs OCPs/PCBs Asbestos (500mL) 10L Asbestos Quantification per metre interval of fill (where appropriate) or per fill strata (if less than 1 metre)		
Remediation Sampling Requiremen				
Further assessment of differing fill material types that may be encountered during civil earthworks (if segregation and onsite 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	Heavy metals TRH/BTEX PAHs OCPs/PCBs 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 Visual inspection.	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 3 samples per source site	As a minimum: Heavy metals TPH/BTEX PAHs OCPs/PCBs Asbestos (500mL)		



Validation Area	Sampling Frequency	Analytes		
Pre-Remediation Validation Sampling				
Quarried Natural Materials (e.g. blue metal, sandstone, shale)	Confirmation that the material is quarried natural rock/soil (consistent with VENM) prior to importation, visual confirmation and minimum of 3 samples per source site.	As a minimum: Heavy metals TPH/BTEX PAHs OCPs/PCBs Asbestos (500mL)		
Imported Materials of ENM, if required	As per ENM exemption 2014	Heavy metals TPH/BTEX PAHs OCPs/PCBs pH EC RTA 276 (foreign materials) Asbestos (500mL)		
Waste Classification, stockpiles	1 per 25m³ up to 200 m³, minimum of 3. Reduced sampling density for volumes >200 m³. Density to consider heterogeneity of the material.	Heavy metals TPH/BTEX OCPs/PCBs PAHs Phenols Asbestos TCLP Metals and PAHs (if required)		
Recycled/Recovered Products	As per relevant exemption (supplier) Minimum of 3 samples per source site.	Heavy metals TPH/BTEX PAHs OCPs/PCBs Plus Asbestos (500mL)		
All imported materials	Visual inspection upon arrival at site and regular visual inspections during importation.	Visual inspection only.		
On-site check sampling of imported materials	1 sample per material per month of importation	As per relevant analytes detailed per material type.		

8.3.2 Marker Layer Inspection

Where capping requirements in **Section 6.4** involve installation of a marker layer, visual inspection will be undertaken by the Remediation Consultant including photographic records, to verify the installation of the marker layer across all required areas of the site, (i.e., across all areas observed, detected or assumed to contain asbestos). 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.

8.3.3 Capping Layer Validation

Where capping requirements in **Section 6.4** involve installation of a capping layer, 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 on-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 6.4.** 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.



8.3.4 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 8.3.**

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

8.3.5 Waste Disposal Off-Site

All wastes requiring off-site disposal from the WHS 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 5.6** above, if asbestos contaminated materials are to be re-located across the site, the material is not considered to be surplus to site requirements (as it is not leaving the Broken Hill Health Facility). Materials destined for re-use across the site 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.

8.4 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 frequent 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. In addition, given the potential for landscaped spaces in portions of the site, consideration has also been given to HIL C – Recreational and Public Open Space.

8.4.1 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 8.4**, sourced from the following:

- Health Investigation Levels (HILs) for residential with minimum opportunities for soil access
 NEPC 2013, HIL-B;
- 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 land use (HSL B) 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 8.5.2**.

Table 8.4 Adopted Soil Validation Criteria

			Health Investigation	Ecological	
Constituent	Limit of Reporting (mg/kg)	Laboratory Method	/ Screening Levels: HIL B (mg/kg, %w/w for asbestos)	Investigation / Screening Levels:	Management Limits TRH (mg/kg)
Asbestos	, ,		for aspestos)	(mg/kg)	
Bonded ACM	0.01	AC40C4 2004	0.04	-	T_
	0.01	AS4964-2004	0.04	- -	-
AF/FA Heavy Metals	0.001	AS4964-2004	0.001	-	-
		ICD AEC/LICEDA	500	100	
Arsenic	2	ICP-AES (USEPA 200.7)	500	100	-
Cadmium	0.4	ICP-AES (USEPA 200.7)	150	-	-
Chromium	5	ICP-AES (USEPA 200.7)	500 (Cr VI)	400 (Cr III)	-
Copper	5	ICP-AES (USEPA 200.7)	30 000	230	-
Lead	5	ICP-AES (USEPA 200.7)	1200	1,200	-
Mercury (inorganic)	0.05	ICP-AES (USEPA 200.7)	120	-	-
Nickel	5	ICP-AES (USEPA 200.7)	1200	330	-
Zinc	5	ICP-AES (USEPA 200.7)	60 000	960	-
Polycyclic Arom	atic Hydrocark	oons (PAHs)	-	•	1
Carcinogenic PAHs (as B(a)P TEQ)	-	-	4	-	-
Total PAHs	0.5		400		
B(a)P	0.5	GCMS (USEPA8270)	-	0.7	-
BTEX		(U3LFA6270)			
Benzene	0.1	Purge Trap-GCMS (USEPA8260)	0.7 (<1 m) 1 (1 to < 2 m) 2 (2 to < 4 m) 3 (4 m +)	65	-
Toluene	0.1	Purge Trap-GCMS (USEPA8260)	480 (<1 m)	105	-
Ethyl benzene	0.1	Purge Trap-GCMS (USEPA8260)	-	125	-
Xylenes (Total)	0.3	Purge Trap-GCMS (USEPA8260)	110 (<1 m) 310 (1 to < 2 m)	45	-



Constituent	Limit of Reporting (mg/kg)	Laboratory Method	Health Investigation / Screening Levels: HIL B (mg/kg, %w/w for asbestos)	Ecological Investigation / Screening Levels: (mg/kg)	Management Limits TRH (mg/kg)
Naphthalene	0.5	Purge Trap-GCMS (USEPA8260)	5 (<1 m)	170	-
Total Recoverab	le Hydrocarbo			_	
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 +)	180	800
F2 >C ₁₀ -C ₁₆	50	Purge Trap-GCMS (USEPA8260)	280 (<1 m)	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 (OC	Ps)			
DDT+DDE+DDD	0.015	GCECD (USEPA8140,8080)	600	180	-
Aldrin and dieldrin	0.01	GCECD (USEPA8140,8080)	10	-	-
Chlordanes – Total	0.1	GCECD (USEPA8140,8080)	90	-	-
Endosulfan I + II	0.01	GCECD (USEPA8140,8080)	400	-	-
Endrin	0.05	GCECD (USEPA8140,8080)	20	-	-
Heptachlor	0.05	GCECD (USEPA8140,8080)	10	-	-
НСВ	0.05	GCECD (USEPA8140,8080)	15	-	-
Methoxychlor	0.2	GCECD (USEPA8140,8080)	500	-	-
Mirex		GCECD (USEPA8140,8080)	20	-	-
Toxaphene	1	GCECD (USEPA8140,8080)	30	-	-
PCBs					
Total PCBs	0.5	GCECD (USEPA8140,8080)	1	-	-

8.4.2 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.

8.5 Material Tracking Plan

The movement of all earth-based materials on the site, to the site and from the site 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 testpitting / assessment do not require material tracking, however all other material will require tracking).

8.5.1 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 Table 8.2);
- Depth of source (RL)
- Depth of placement (RL);
- 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;
- Placement (to) information in terms of site feature;
- 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.

8.5.2 Material Tracking Classifications

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

- Asbestos contaminated fill (i.e., above site criteria) or asbestos impacted fill (i.e., below site criteria) moved on-site that may be temporarily stockpiled with a unique stockpile identifier prior to final placement under the marker layer;
- Validated soils moved on-site;
- Relocation of fill/natural materials across the site 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.

8.6 Validation Reporting

8.6.1 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.

8.6.2 Long Term Asbestos Management Plan

In addition to the requirements of the Validation Report and subject to the implementation of the cap and contain remediation strategy (Section 5.3), on-site containment of asbestos contaminated/impacted material will require long term management following completion of the redevelopment. A LTAMP is not required if contaminated materials are treated onsite or disposed to landfill.

To this end, a LTAMP will be prepared by the Remediation Consultant to detail the ongoing asbestos management and monitoring requirements for the site consistent with the remediation/management works conducted. The LTAMP will be prepared following the completion of the Validation Report for the site such that the requirements may be reviewed and approved by HI.

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.



9. Site Management Plan

This section contains procedures and requirements that are to be implemented as a minimum requirement during the remedial works at the site.

9.1 Hours of Operation

Typical hours of operation for remedial works are:

- Monday to Saturday: 7am to 5pm.
- Sunday and public holidays: No work permitted.

Or as defined within the consent conditions.

9.2 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.

9.3 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 8.5**.

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 or impacted 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).



9.4 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.

9.5 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 4 m bgs. Pump out following accumulation of surface water is the most likely scenario for water disposal.

9.6 Landscaping / Rehabilitation

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

9.7 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.

9.8 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.

9.9 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.

9.9.1 Air Monitoring

Real-time Exposure Monitoring (Dust)

Preference is given for all environmental monitoring to be undertaken using real time methods. To this extent, the Remediation Consultant shall remediation monitor works on the site by the use of a Dusttrak real-



time aerosol monitors. A minimum of five locations will be monitored throughout periods of remediation.

The consultant will advise the Principal and Contractor when the time averaged Dusttrak particulate measurement (PM10) exceeds 0.05 mg/m³. 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/m³, 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).

9.9.2 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 2020a);

- 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 2020a;
- 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.

9.10 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.

9.11 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.

9.12 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.



9.13 Transport of Material Offsite/Across the Site

Trucks will be loaded in a designated area. 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 site.

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.

9.14 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.

9.15 Offsite Disposal of Contaminated Soil

All soils to be removed from the WHS for disposal will be classified, managed and disposed in accordance with the *Waste Classification Guidelines* (EPA 2014) or other appropriate EPA-issued waste RRO/RRE. Documentary evidence for all soil disposal shall be kept for inclusion in the Validation Report.

It is a requirement under the *Protection of the Environment Operations (Waste) Regulations 2014* (POEO Waste Regulation) to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m² 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.

9.16 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 **Table 8.2**). Additionally, the imported fill should also be compatible with required geotechnical constraints and the existing soils characteristic for site drainage purposes.

9.17 Groundwater Dewatering

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 will be provided in a Construction Environmental Management Plan (CEMP) (see **Section 10**).

9.18 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.



9.19 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.

9.20 Community Consultation

Owners and / or occupants of adjacent premises and 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 the FWLHD.



10. Environmental and Health and Safety Management

10.1 Environmental Management

10.1.1 Construction Environmental Management Plan

Prior to commencement of remediation works on the site, a 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 10.1.2** and shall include the contingency plan, referred to in **Section 8** above.

10.1.2 Required Elements / Procedures

An assessment of the proposed activities and the associated elements required to be incorporated into the CEMP is provided in **Table 10.1**. 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 10.1: 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 WHS 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.
	Monitoring as required.
12. Sediment Control	Bunding.
12 Occupation of City Office	Collection/treatment/handling impacted sediments.
13. Operation of Site Office	As appropriate.



Element	Specific Minimum Requirements to be included in CEMP
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 - Remediation Consultant - Remediation Contractor - OH&S Compliance - Environmental Compliance

10.2 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.



11. Regulatory Approvals / Licensing

11.1 Resilience and Hazards State Environment Planning Policy – Chapter 4 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 the Resilience and Hazards SEPP 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.

11.2

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 m³ 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.

11.3 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 WHS are not considered to be waste materials because the material is not considered to be surplus to site requirements and is not leaving the WHS. Thus, there is no need to assign a waste classification to the materials.

11.4 Waste Classification Guidelines (EPA 2014)

All wastes generated and proposed to be disposed from the 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.

11.5 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', (SWA 2020b) 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. Communications with Stakeholders

Communication will be maintained in accordance with Health Infrastructure and the FWLHD 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.



13. Conclusions and Recommendations

With reference to the limitations in **Section 14**, the following conclusions and recommendations are provided.

13.1 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.

13.2 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:

- Implementation of the AMP (JBS&G 2023b) for the redevelopment footprint, which
 details the safe implementation of the RAP in undertaking asbestos removal, as guided
 by the WH&S regulatory framework (SafeWork NSW);
- A 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.



14. 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.

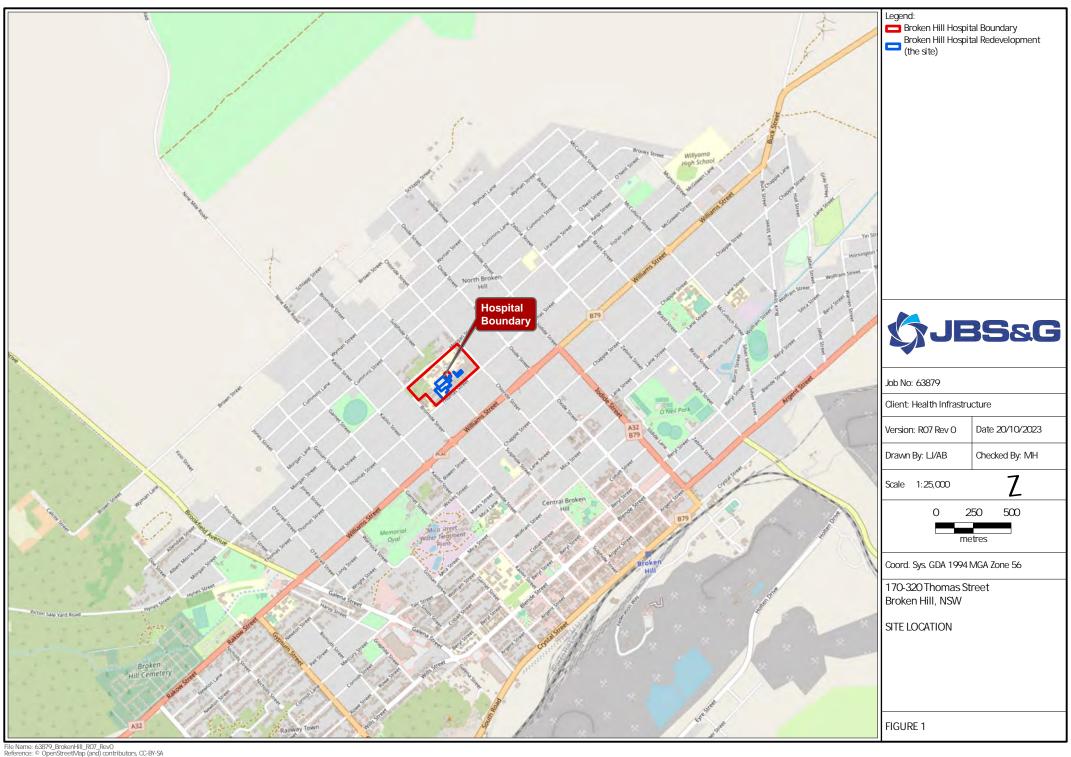
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the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

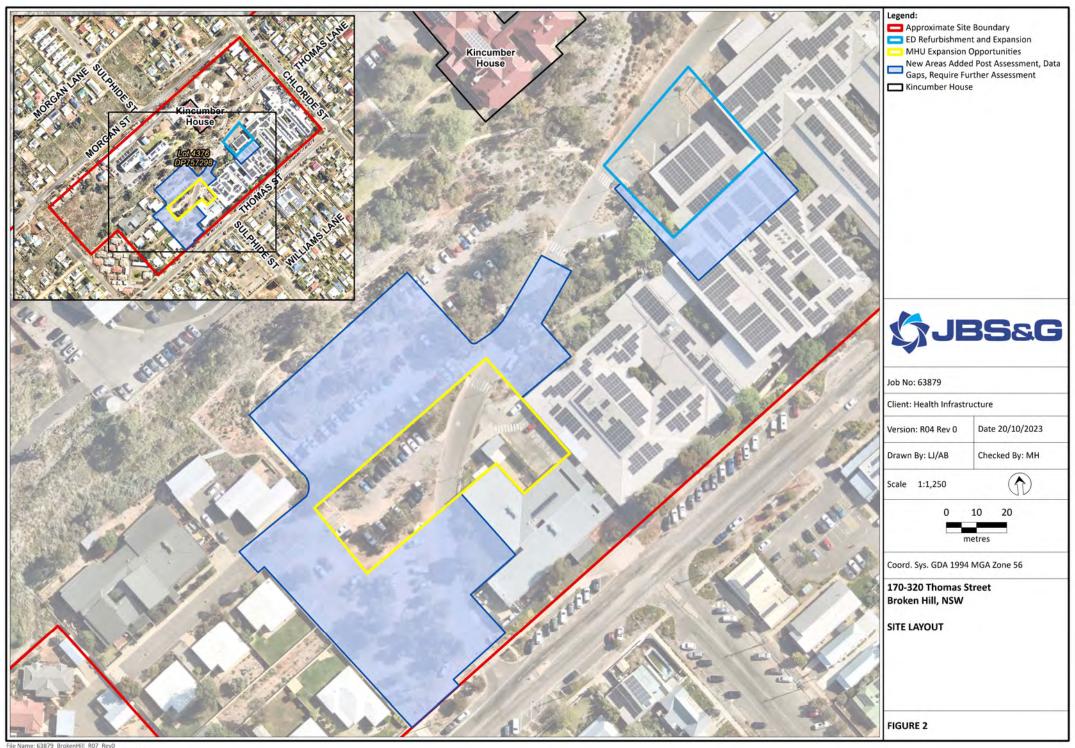
Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information 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.

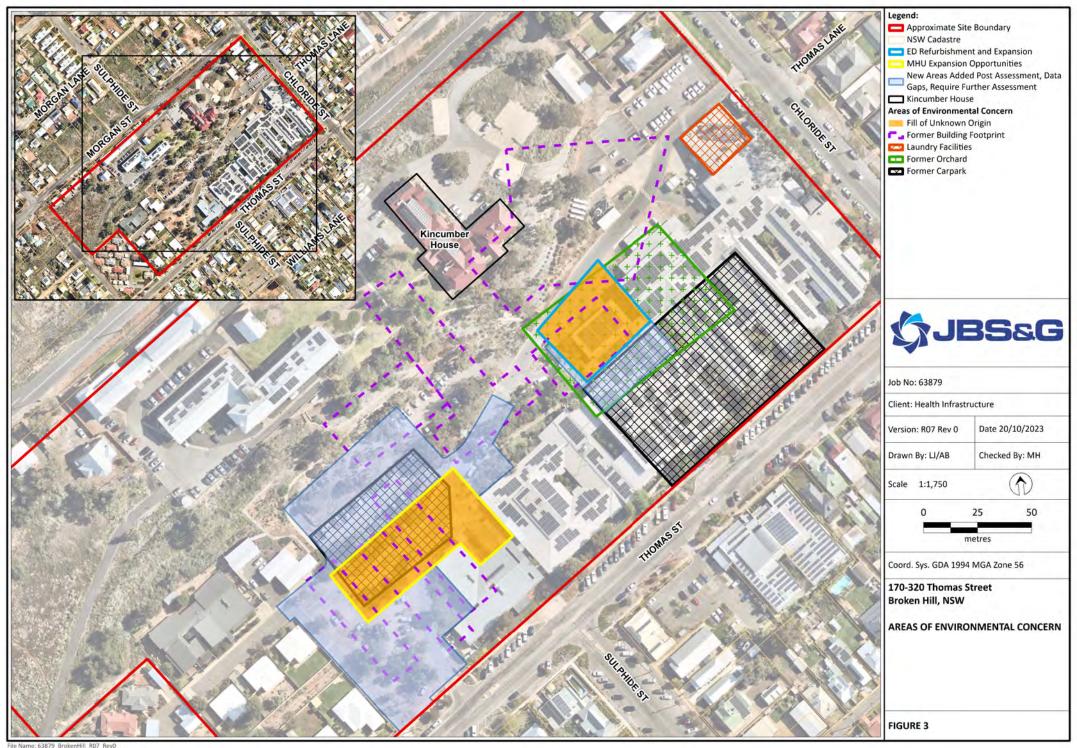
Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of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

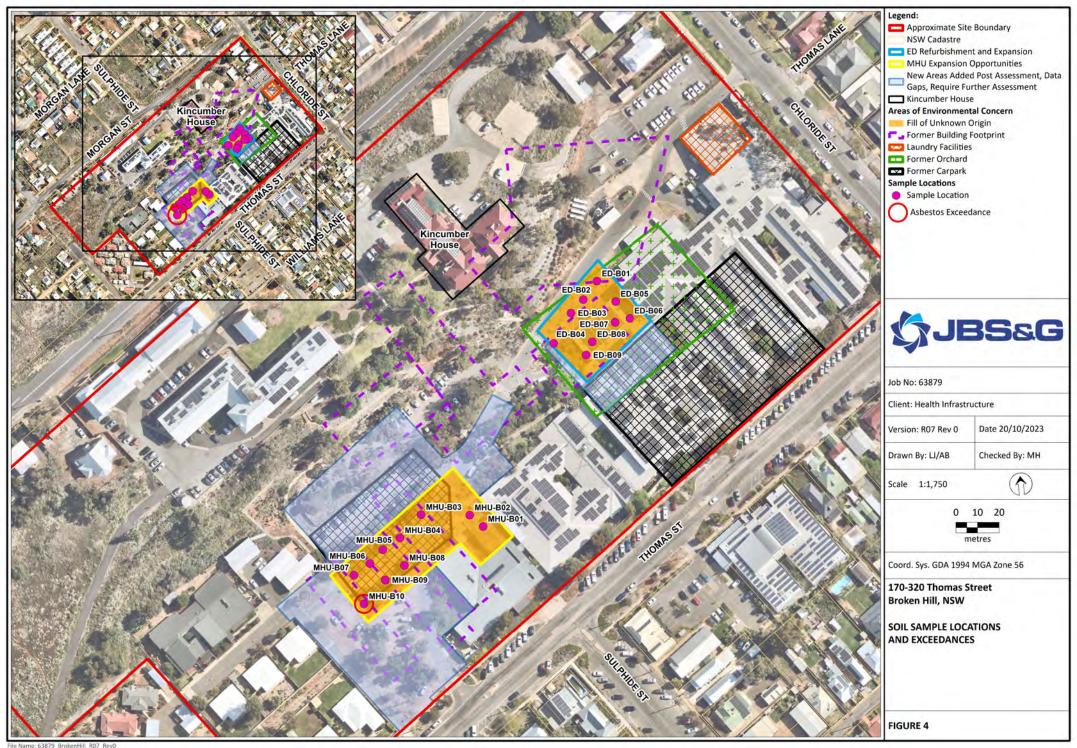
This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the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

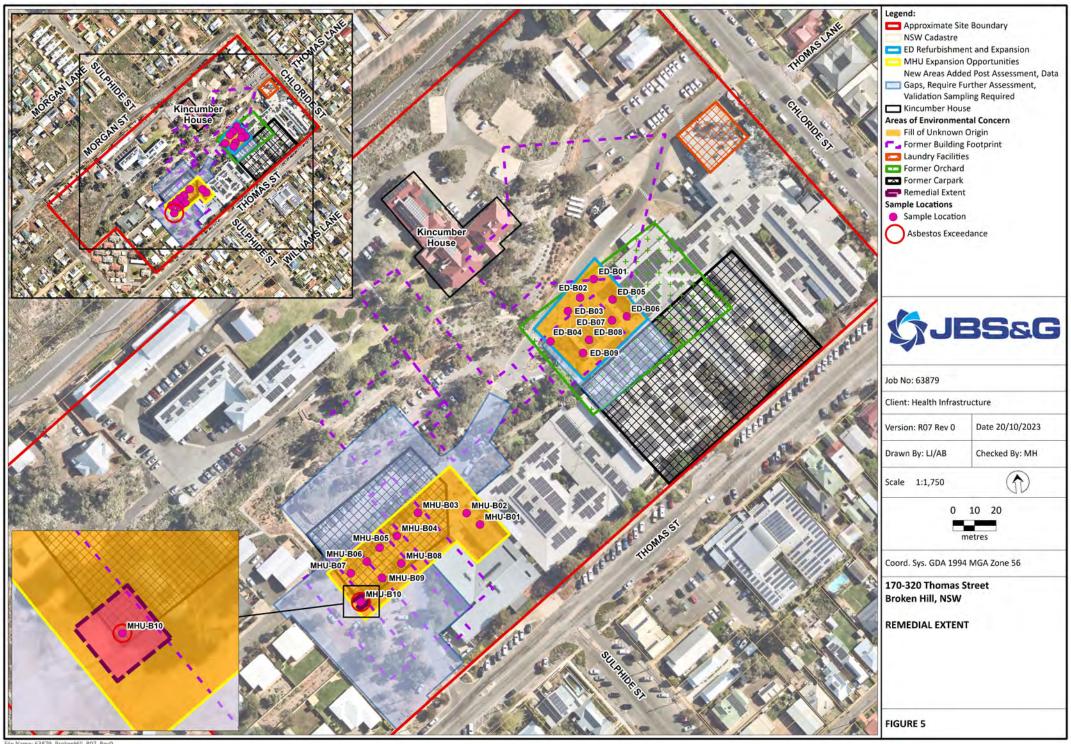
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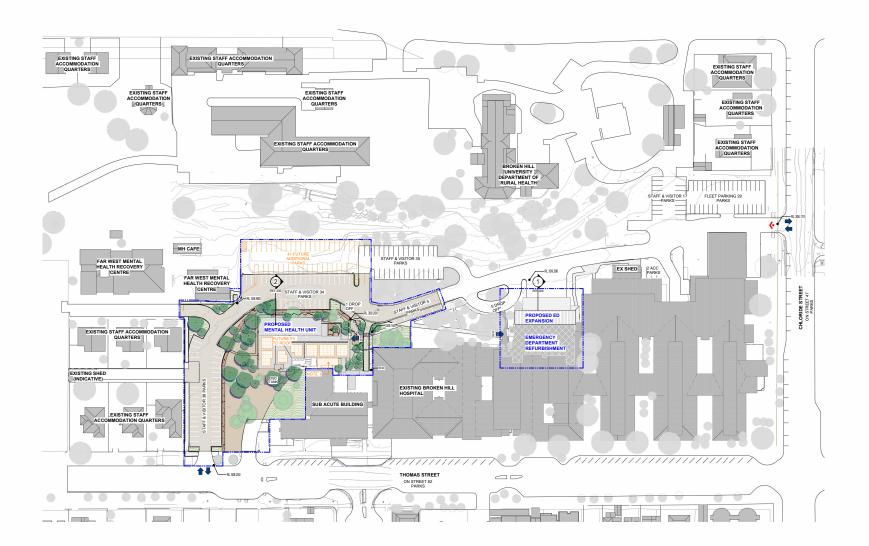








Appendix A – Proposed Development Plan









LEGEND











OTAL ON-SITE LONG TERM PARKING

EXISTING CAR SPACES:	
PROPOSED TOTAL	

PROPOSED TOTAL CAR SPACES:

TOTAL FUTURE CO

LANDSCAPING:

PROPOSED TREES (STAGE 1): FUTURE PROPOSED

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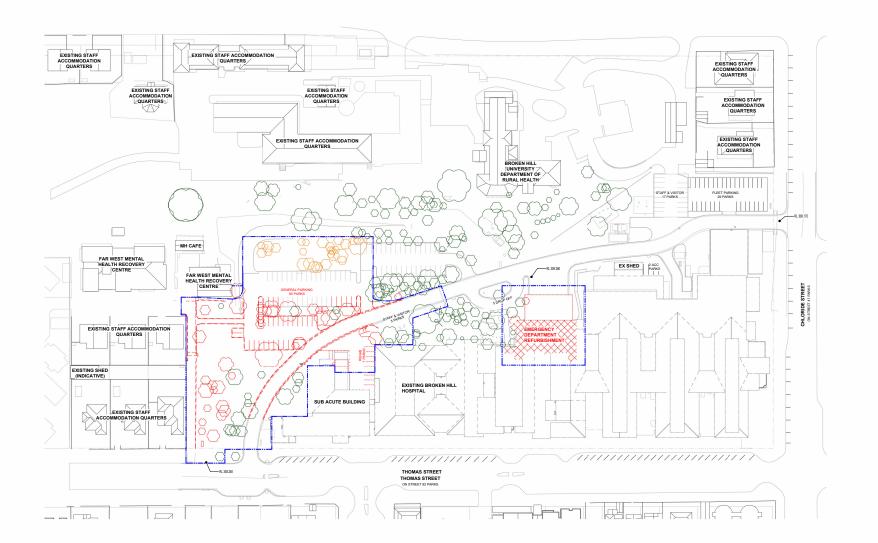


BROKEN HILL ACUTE ADULT MENTAL HEALTH UNIT AND EMERGENCY DPT

176 Thomas Street Broken Hill NSW 2880

SITE PLAN

- SOULE - SOURCE - SO





LEGEND

CTTT DEMOLITION WORKS EXISTING TO REMAIN

TREES TO BE RETAINED

STAGE 1 TREES TO BE REMOVED

STAGE 2 TREES TO BE REMOVED

TOTAL ON-SITE LONG TERM PARKING (LOWER CAMPUS):

EXISTING CAR SPACE: EXISTING CAR SPACE TO BE DEMOLISHED: 38 SPACES

LANDSCAPING:

EXISTING TREES TO BE REMOVED (STAGE 1): 38 TREES

TOTAL EXISTING TREES TO BE RETAINED:

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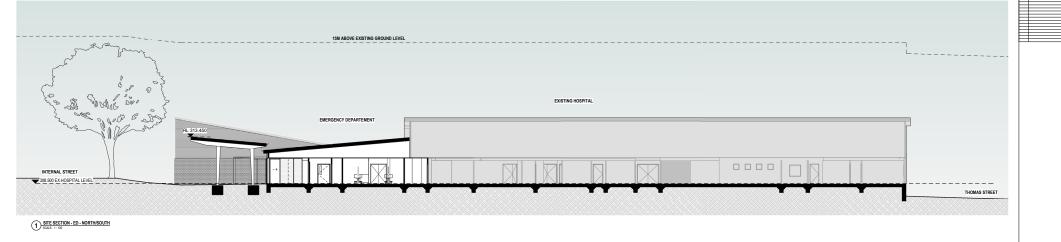


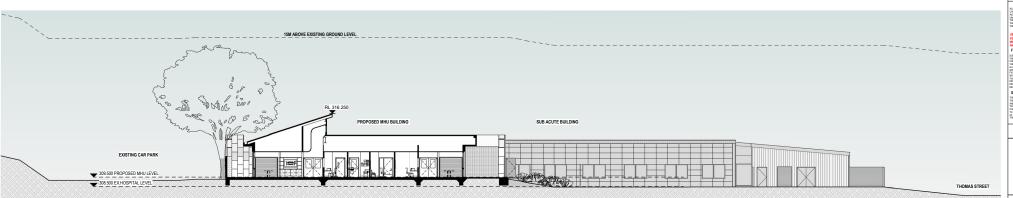
BROKEN HILL ACUTE ADULT MENTAL HEALTH UNIT AND EMERGENCY DPT

176 Thomas Street Broken Hill NSW 2880

DEMOLITION SITE PLAN

10600 STH-AR-DWG-REF-005 1

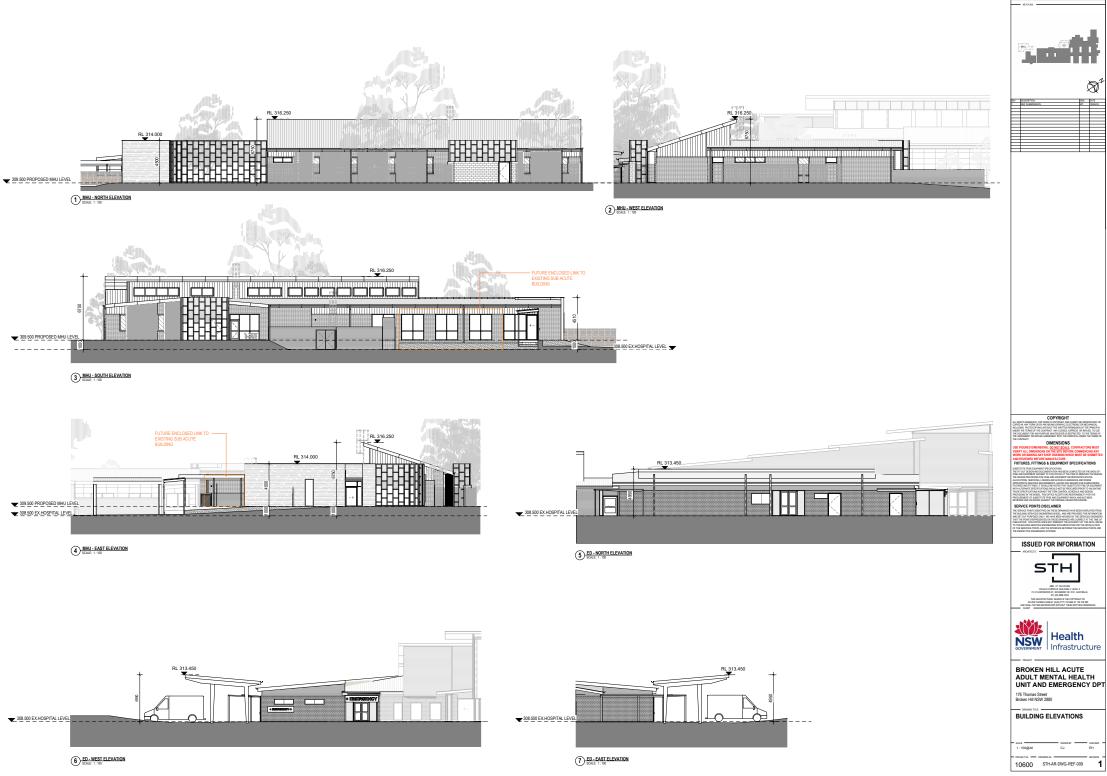




2 SITE SECTION - MHU - NORTH/SOUTH









Appendix B - Summary Tables

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



							Me	tals & Me	etalloids					TPHS	(NEPC	1999)				TRH:	s (NEPC 2	013)						BTE	XN	
					Ι	Ι				T	Ι				(П		(
	BS &	G		Arsenic	Cadmium	Chromium (III+VI)	Copper	Iron	Pead	Mercury	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total
				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	5	5	20	5	0.1	5	5	20	20	50	50	50	20	50	100	100	100	20	50	0.1	0.1	0.1	0.1	0.2	0.3
NEPM 2013 Table 14	. ,	Doc / Dorldond Fine Co.		500	150	500	30000		1200	120	1200	60000						900	1000	2500	10000									
	B(7) Management Limits in A(3) Res A/B Soil HSL for Va																	800	1000	3500	10000									
0-1m	A(3) RES A/B SUII HSL IUI Va	apour intrusion, sand								-													50	280	0.7	480	NL			110
0-1111																							30	260	0.7	460	INL			110
Field_ID	Location	Sample Depth (m)	Matrix Description																											
ED-B1 0.4-0.5				2.7	<0.4	21	30	-	14	<0.1	13	39	-	-	-	-	-	-	- [-	-	- 1	-	-	-	- 1	-	- 1	-	-
SPLIT02	ED-B1	0.4-0.5	Fill, clayey, gravelly sand	<4	<0.4	12	37	-	10	<0.1	6	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP02	1			<2	< 0.4	11	51	-	10	<0.1	7.1	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ED-B1_0.9-1.0	ED-B1	0.9-1	Fill, clayey, gravelly sand	2.1	<0.4	18	37	-	13	<0.1	12	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ED-B1_0.0-0.1	ED-B1	0-0.1	Fill, clayey, gravelly sand	2.1	<0.4	16	26	31,000	11	<0.1	14	46	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B2_0.2-0.3	ED-B2	0.2-0.3	Fill, silty sand	4.5	<0.4	18	16	-	12	<0.1	21	52	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B2_0.0-0.1	ED-B2	0-0.1	Fill, roadbase	11	<0.4	17	25	-	16	<0.1	19	53	-	-	-		-	-		-	-	-	-	-	-	-		-	-	-
ED-B3_0.2-0.3	ED-B3	0.2-0.3	FII, sand	<2	<0.4	14	<5	-	<5	<0.1	7.9	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ED-B3_0.0-0.1	ED-B3	0-0.1	Fill, roadbase	5.9	<0.4	17	9	-	9	<0.1	11	41	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B4_0.1-0.2	ED-B4	0.1-0.2	Fill, sand	<2	<0.4	7.7	<5	-	<5	<0.1	<5	9.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ED-B4_0.4-0.5	ED-B4	0.4-0.5	Fill, sand	<2	<0.4	7.4	<5	-	<5	<0.1	<5	7.4	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B5_0.2-0.3	ED-B5	0.2-0.3	Fill, sand	<2	<0.4	7.6	<5	-	<5	<0.1	<5	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ED-B5_0.0-0.1	ED-B5	0-0.1	Fill, sand	<2	<0.4	7.7	<5	-	<5	<0.1	<5	9.2	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B6_0.1-0.2	ED-B6	0.1-0.2	Fill, sand	<2	<0.4	7.4	<5	-	<5	<0.1	<5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ED-B6_0.2-0.3	ED-B6	0.2-0.3	Fill, sand	3.4	<0.4	8.5	6	-	<5	<0.1	6	14	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B7_0.2-0.3	ED-B7	0.2-0.3	Fill, gravelly clay	4.7	1.1	24	17	-	25	<0.1	18	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ED-B7_0.0-0.2	ED-B7	0-0.2	Fill, roadbase	69	<0.4	25	40	-	17	<0.1	28	77	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B8_0.3-0.4	ED-B8	0.3-0.4	Fill, roadbase	7.7 4.3	<0.4	29	26	-	37 43	<0.1	19	89	<20	<20	<50	150	150	<20	<50	130	170	300	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B8_0.5-0.6 ED-B8 0.8-1.0	ED-B8	0.5-0.6	Clavey, sandy gravel	3.9	<0.4	52 35	28 16	-	19	<0.1	31 27	95 43	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B8_0.0-0.2	ED-B8	0-0.2	Clayey, sandy gravel Fill, roadbase	110	<0.4	17	24	-	12	<0.1	22	60	-20		-			-20		-100	-100	-100	-20	-	-			\0.1	-0.2	\(\cdot\)
ED-B9 0.1-0.2	ED-B9	0.1-0.2	Fill, sand	<2	<0.4	8.7	5.5	-	<5	<0.1	<5	11	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
ED-B9 0.0-0.1	ED-B9	0-0.1	Fill, clayey, sandy gravel	2.5	<0.4	12	12	-	33	<0.1	7.1	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B1_0.1-0.2	MH-B1	0.1-0.2	Fill, gravelly sand	2.7	<0.4	27	59	-	35	<0.1	19	110	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B1_0.2-0.3	MH-B1	0.2-0.3	Fill, sandy clay	8.9	<0.4	34	35	-	140	0.2	24	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B1_0.0-0.1	MH-B1	0-0.1	Fill, silty sand	3.5	<0.4	26	23	-	42	<0.1	14	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MH-B10_0.2-0.4	MH-B10	0.2-0.4	Fill, sandy clay	5.8	1	26	34	-	310	0.8	17	490	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B10_0.5-0.6	MH-B10	0.5-0.6	Fill, clay	6.1	1.2	27	36	-	470	0.8	19	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B10_0.0-0.2	MH-B10	0-0.2	Fill, sandy clay	4.4	0.8	23	32	-	260	1.6	15	330	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B2_0.2-0.3	MH-B2	0.2-0.3	Fill, roadbase	11	<0.4	51	74	-	120	<0.1	36	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B2_0.4-0.5	MH-B2	0.4-0.5	Fill, roadbase	7.9	<0.4	48	44	-	100	<0.1	33	180	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



							Me	etals & Me	etalloids					TPH	s (NEPC	1999)				TRH	s (NEPC 2	2013)			Ι			BTEX	XN	
					Π																									
	IBS &	G																												
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						∊								_	_	_	n (Su						S B.	Sa Sa						
						(III+VI)							ह	ctio	r Gi.	ractio	ction					E	minus	ess			l a		<u>a</u>	_
					_	E							action	Fra	Ē	Fra	Ę.					Ins	C10 n	-C16			zen	ا ء	m &	Total
				<u>:</u>	i <u>ē</u>] 3.	a			l a	<u></u>		Œ	C14	758	36	36		C16	C34	C40	C40		(C10-(ene	e e	pen) e		u
				l se	admiur	hromiu	dd	5	ead	lerci	Vickel	<u>.</u> 2	ှ မ	10-(1	15-(Z3-(6	<u>ن</u>	6	16-(34.0	6	1 (C6) z	enz		thylber	(ylene (o)) Jer	Xylen
				∢ mg/kg	- 3	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	5	5	20	5	0.1	5	5	20	20	50	50	50	20	50	100	100	100	20	50	0.1	0.1	0.1	0.1	0.2	0.3
	1A(1) HILs Res B Soil			500	150	500	30000	20	1200	120	1200		20	20	30	30	30	20	30	100	100	100	20	30	0.1	0.1	0.1	0.1	U.E	0.5
	1B(7) Management Limits	in Res / Parkland, Fine Soi	l .	-00			23000											800	1000	3500	10000									
	1A(3) Res A/B Soil HSL for																													
0-1m		,																					50	280	0.7	480	NL			110
Field_ID	Location	Sample Depth (m)	Matrix Description																											
MH-B3_0.2-0.3	MH-B3	0.2-0.3	Fill, sand	<2	<0.4	9.3	<5	-	<5	<0.1	<5	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B3_0.8-1.0	MH-B3			3	<0.4	47	9.3	-	14	<0.1	26	49	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
SPLIT03	MH-B3	0.8-1	Fill, gravelly sand	<4	<0.4	38	7	-	10	<0.1	19	32	<25	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<50	<0.2	<0.5	<1	<1	<2	<1
DUP03	MH-B3			2.7	<0.4	43	8.3	-	14	<0.1	23	44	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B3_0.0-0.1	MH-B3	0-0.1	Fill, sand	<2	<0.4	10	13	-	14	<0.1	5.6	47	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B4_0.2-0.3	MH-B4	0.2-0.3	Fill, roadbase	71	<0.4	26	46	-	24	<0.1	35	87	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B4_0.6-0.7	MH-B4	0.6-0.7	Silty, gravelly clay	11	<0.4	28	<5	-	11	<0.1	15	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B5_0.1-0.2	MH-B5	0.1-0.2	Fill, gravelly clay	22	<0.4	21	45	-	24	<0.1	26	59	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B5_0.4-0.5	MH-B5	0.4-0.5	Fill, gravelly clay	6.7	<0.4	24	28	-	19	<0.1	16	53	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B5_0.8-0.9	MH-B5	0.8-0.9	Fill, gravelly clay	8.4	<0.4	21	21	-	20	<0.1	14	44	-	-	-	-	-	<u> </u>	-	-		-	-	-	-	-	-	-	-	-
MH-B5_0.0-0.1	MH-B5	0-0.1	Fill, sandy gravel	32	<0.4	19	42	- 27.000	24	<0.1	24	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B6_0.2-0.3	MH-B6	0.2-0.3	Fill, clayey, gravelly sand	4.9	<0.4	30	24	27,000	22	<0.1	17	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B6_0.4-0.5	MH-B6	0.4-0.5	Fill, clayey, gravelly sand	2.6	<0.4	29	11	-	13	<0.1	13	54	- 20	- 20	- <e0< td=""><td></td><td>- <50</td><td>- 20</td><td></td><td>-100</td><td>-100</td><td>-100</td><td>- 20</td><td></td><td></td><td>-01</td><td>-01</td><td></td><td></td><td></td></e0<>		- <50	- 20		-100	-100	-100	- 20			-01	-01			
MH-B6_0.0-0.1 MH-B7 0.2-0.3	MH-B6 MH-B7	0-0.1	Fill, clayey, gravelly sand	15 3.5	<0.4	30	35 9	-	25 13	<0.1	24 17	99 54	<20 <20	<20 <20	<50 <50	<50 <50	<50 <50	<20 <20	<50 <50	<100	<100 <100	<100 <100	<20 <20	<50 <50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B7_0.9-1.0	MH-B7	0.2-0.3	Fill, gravelly sand	2.3	<0.4	27	8.6	 	9.8	<0.1	15	47	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
SPLIT01	MH-B7	0.9-1	Fill, gravelly sand	4	<0.4	22	9	-	9	<0.1	12	35	<25	<50	<100		<50	<25	<50	<100	<100	<50	<25	<50	<0.2	<0.5	<1	<1	<2	<1
DUP01	MH-B7	- 0.5 1	,, g. a ve, sana	5.5	<0.4	26	9.3	-	16	<0.1	15	47	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B7 0.0-0.1	MH-B7	0-0.1	Fill, gravelly sand	3.5	<0.4	29	9.4	-	11	<0.1	16	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B8_0.1-0.2	MH-B8	0.1-0.2	Fill, silty gravel	42	<0.4	20	44	-	22	<0.1	31	71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B8_0.4-0.5	MH-B8	0.4-0.5	Fill, silty, gravelly clay	5.6	<0.4	37	22	-	18	<0.1	21	55	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B8_0.5-0.6	MH-B8	0.5-0.6	Clay	16	<0.4	38	27	-	16	<0.1	25	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B9_0.2-0.3	MH-B9	0.2-0.3	Fill, sandy clay	30	<0.4	22	38	-	100	<0.1	24	75	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B9_0.9-1.0	MH-B9	0.9-1	Silty clay	6.3	<0.4	41	27	-	15	<0.1	25	68	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
MH-B9_0.0-0.1	MH-B9	0-0.1	Fill, roadbase	34	<0.4	20	53	-	25	<0.1	27	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistical Summa	•																													
Number of Results				0	56	56	56	2	56	56	56	56	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Number of Detects				0	4	56	48	2	47	4	49	56	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0
Minimum Concent	tration			99999		7.4	<5	27000	<5	<0.1	<5	7.4	<20	<20	<50	<50	<50	<20	<50	<100	<100	<50	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
Minimum Detect				ND	0.8	7.4	5.5	_	9	0.2	5.6	7.4	ND	ND	ND	150	150	ND	ND	130	170	300	ND	ND	ND	ND -0.5	ND	ND 11	ND	ND
Maximum Concent	tration			0	1.2	52	74	31000	470	1.6	36	510	<25	<50	<100		150	<25	<50	130	170	300		<50	<0.2	<0.5	<1 ND	<1 ND	<2 ND	<1 ND
Maximum Detect	ation			ND	1.2	52	74	31000	470	1.6	36	510	ND 10	ND 11	ND 27	150	150	ND 10	ND	130	170	300	ND 10	ND	ND	ND 0.064	ND 0.091	ND 0.091	ND 0.16	ND 0.17
Average Concentra					0.26	24	23	20000	41 15.5	0.11	17	79	10	11	27	31	29	10	25 25	53	54	57	10	25	0.053	0.064	0.081	0.081	0.16	0.17
Median Concentra				_	0.2			29000		0.05	17	53.5	10	10	25	25	25	10		50	50	50	10	25	0.05	0.05	0.05	0.05	0.1	0.15
Standard Deviation Number of Guideli				0	0.22	12	17 0	0	81	0.25	9.1	97	0.64	3.9 0	6.4	24 0	23 0	0.64	0	15 0	22 0	47 0	0.64	0	0.013	0.052	0.12	0.12	0.23	0.09
	ine Exceedances ine Exceedances(Detects C	inly)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Livarriber of Guidell	THE EXCECUBITION (DETECTS C				1 0	J	1 0	1 0		1 0	1 0		U	U	U	U	U		U	U	U		U	1 0			U		U	U

Project Number: 63879

EQL

0-1m Field_ID

SPLIT02

DUP02 ED-B1_0.9-1.0

ED-B1_0.4-0.5

ED-B1_0.0-0.1

ED-B2_0.2-0.3

ED-B2_0.0-0.1

ED-B3 0.2-0.3

ED-B3_0.0-0.1

ED-B4_0.1-0.2

ED-B4_0.4-0.5

ED-B5_0.2-0.3

ED-B5_0.0-0.1

ED-B6_0.1-0.2

ED-B6_0.2-0.3

ED-B7_0.2-0.3

ED-B7_0.0-0.2

ED-B8_0.3-0.4

ED-B8 0.5-0.6

ED-B8_0.8-1.0

ED-B8_0.0-0.2

ED-B9 0.1-0.2

ED-B9_0.0-0.1

MH-B1 0.1-0.2

MH-B1_0.2-0.3

MH-B1_0.0-0.1

MH-B10_0.2-0.4

MH-B10_0.5-0.6

MH-B10_0.0-0.2

MH-B2 0.2-0.3

MH-B2_0.4-0.5

Project Name: Broken Hill Hospital Redevelopment



NEPM 2013 Table 1A(1) HILs Res B Soil

Location

ED-B1

ED-B1

ED-B1

ED-B2

ED-B2

ED-B3

ED-B3

ED-B4

ED-B4

ED-B5

ED-B5

ED-B6

ED-B6

ED-B7

ED-B7

ED-B8

ED-B8

ED-B8

ED-B8

ED-B9

ED-B9

MH-B1

MH-B1

MH-B1

MH-B10

MH-B10

MH-B10

MH-B2

MH-B2

NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand

Sample Depth (m)

0.4-0.5

0.9-1

0-0.1

0.2-0.3

0.2-0.3

0-0.1

0.1-0.2

0.4-0.5

0.2-0.3

0-0.1

0.1-0.2

0.2-0.3

0.2-0.3

0-0.2

0.3-0.4

0.5-0.6

0.8-1

0-0.2

0-0.1

0.1-0.2

0.2-0.3

0.2-0.4

0.5-0.6

0-0.2

0.2-0.3

0.4-0.5

0-0.1

0.1-0.2

0-0.1

<0.5

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<0.5

Fill, gravelly sand

Fill, sandy clay

Fill, silty sand Fill, sandy clay

Fill, sandy clay

Fill, roadbase

Fill, roadbase

Fill, clay

														PAH										
		rotal BTEX	Vaphthalene_VOC	Acenaphthene	acenaphthylene	Anthracene	3enz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ calc (Zero)	Benzo(b+j)fluoranthene	3enzo(b+j+k)fluoranthene	3enzo(g,h,i)perylene	3enzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	luorene	ndeno(1,2,3-c,d)pyrene	Naphthalene	henanthrene	yrene	PAHs (Sum of total)
		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
_		1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
oil									4	4	4													400
JII																								
			5																		5			
_	Matrix Description																							
	Fill, clayey, gravelly sand	-	-	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.05 <0.5	1.2 <0.5	0.6 <0.5 0.6	<0.5 <0.5 <0.5	<0.5 - <0.5	<0.2	<0.5 <0.1 <0.5	<0.5 - <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.1 <0.5	<0.5 <0.05 <0.5
\dashv	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, clayey, gravelly sand	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
\Box	Fill, silty sand	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
\rightarrow	Fill, roadbase	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
\rightarrow	FII, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	Fill, roadbase	-	<0.5	<0.5	<0.5 -	<0.5	<0.5	<0.5	1.2	0.6	<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
\rightarrow	Fill, sand Fill, sand	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
\rightarrow	Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	Fill, sand	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
\rightarrow	Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, sand	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
	Fill, gravelly clay	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
_	Fill, roadbase	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
4	Fill, roadbase	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	Clayey, sandy gravel	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
\rightarrow	Fill, roadbase	-	- -0 E	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
\rightarrow	Fill, sand	-	<0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	1.2	0.6	<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	<0.5 <0.5	<0.5 <0.5
4	Fill, clayey, sandy gravel			<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<u> </u>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<u.5< th=""><th>\U.5</th></u.5<>	\U.5

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Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



																DALL										
																PAH										
	BS &	G		M/6 Total BTEX	Naphthalene_VOC	Acenaphthene	Acenaphthylene	Anthracene	3 % Benz(a)anthracene m	Benzo(a)pyrene	යු මී Benzo(a)pyrene TEQ (LOR) කි	공 존 ^주	공 은 Benzo(a)pyrene TEQ calc (Zero)	ଞ୍ଚ Benzo(b+j)fluoranthene	공 Renzo(b+j+k)fluoranthene 주	Benzo(g,h,i)perylene	공 Renzo(k)fluoranthene 주	Chrysene	공 Pp Dibenz(a,h)anthracene 과	May Fluoranthene	Hloorene Mg/kg	공 Indeno(1,2,3-c,d)pyrene - 주	Maphthalene	y Phenanthrene	Pyrene with the state of the st	PAHs (Sum of total)
EQL				1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 Table 1	A(1) HILs Res B Soil			_		2.5	2.5	2.3			4	4	4	2.3					5.5		5		2.3		2.3	400
	B(7) Management Limits in	Res / Parkland, Fine Soi	1																							
	A(3) Res A/B Soil HSL for Va																									
0-1m					5																		5			
Field_ID	Location	Sample Depth (m)	Matrix Description																							
MH-B3_0.2-0.3	MH-B3	0.2-0.3	Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B3_0.8-1.0	MH-B3	1		-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
SPLIT03	MH-B3	0.8-1	Fill, gravelly sand	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	-	<0.2	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
DUP03	MH-B3	1		-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B3_0.0-0.1	MH-B3	0-0.1	Fill, sand	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B4_0.2-0.3	MH-B4	0.2-0.3	Fill, roadbase	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B4_0.6-0.7	MH-B4	0.6-0.7	Silty, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B5_0.1-0.2	MH-B5	0.1-0.2	Fill, gravelly clay	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B5_0.4-0.5	MH-B5	0.4-0.5	Fill, gravelly clay	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B5_0.8-0.9	MH-B5	0.8-0.9	Fill, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B5_0.0-0.1	MH-B5	0-0.1	Fill, sandy gravel	-	-	-	-	-		-	-	-		-	-	-	-	-	-	-	_	-	-	-	-	-
MH-B6_0.2-0.3	MH-B6	0.2-0.3	Fill, clayey, gravelly sand	-	—	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B6_0.4-0.5	MH-B6	0.4-0.5	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B6_0.0-0.1	MH-B6	0-0.1	Fill, clayey, gravelly sand	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B7_0.2-0.3	MH-B7	0.2-0.3	Fill, gravelly sand		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B7_0.9-1.0	MH-B7	0.2 0.3	i iii, graveiiy sana	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
SPLIT01	MH-B7	0.9-1	Fill, gravelly sand	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	-	<0.2	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
DUP01	MH-B7	0.5 1	ini, graveny sana	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	1.2	0.6	<0.5	<0.5	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
MH-B7 0.0-0.1	MH-B7	0-0.1	Fill, gravelly sand	-	-0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B8_0.1-0.2	MH-B8	0.1-0.2	Fill, silty gravel	-	 	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B8_0.4-0.5	MH-B8	0.4-0.5		-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		0.6	<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
MH-B8 0.5-0.6	MH-B8	0.5-0.6	Fill, silty, gravelly clay Clay	-					-	-	1.2			-0.5		-0.5	-0.5					- 0.5		-0.5		10.5
MH-B9 0.2-0.3	MH-B9	0.2-0.3	Fill, sandy clay	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B9_0.9-1.0	MH-B9	0.9-1	Silty clay	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
MH-B9 0.0-0.1	MH-B9	0-0.1	Fill, roadbase	-		<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<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
25_0.0 0.1	J1 00	U 0.1	j, roudbase		1	-0.5	-0.5	-0.5	-0.5	-0.5	1.2	0.0	-0.5	-0.5		-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	10.5	.0.5	.0.5	10.5
Statistical Summary	v																									
Number of Results	•			2	29	40	40	40	40	40	40	40	40	37	3	40	37	40	40	40	40	40	40	40	40	40
Number of Detects				0	0	0	0	0	0	0	37	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentr				<1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.5	<0.2	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Minimum Detect				ND	ND	ND	ND	ND	ND	ND	1.2	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentr	ration			<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Maximum Detect				ND	ND	ND	ND	ND	ND	ND	1.2	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentrat	tion			140	0.27	0.24	0.24	0.24	0.24	0.23	1.1	0.57	0.25	0.25	0.1	0.24	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.23
Median Concentrat				0.5	0.27	0.25	0.25	0.24	0.25	0.25	1.2	0.57	0.25	0.25	0.1	0.25	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.25
Standard Deviation				0.5	0.23	0.23	0.23	0.23	0.23	0.23	0.25	0.093	0.23	0.23	0.1	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23			_
Number of Guidelin				0	0.064	0.055	0.053	0.053	0.053	0.06	0.25	0.093	0	0	0	0.053	0	0.055	0.053	0.055	0.055	0.055	0.055	0.053	0.053	0.06
	ne Exceedances(Detects Onl	lv)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I diliber of Guidelli	ic Evecenatives/Detects Offi	171		U	U	U	U	U	U	U	U	U		U	U	U	U	U	U	U	U	U				U

Project Number: 63879

EQL

0-1m Field_ID

DUP02 ED-B1_0.9-1.0

ED-B1_0.4-0.5 SPLIT02

ED-B1_0.0-0.1

ED-B2_0.2-0.3

ED-B2_0.0-0.1

ED-B3 0.2-0.3

ED-B3_0.0-0.1

ED-B4_0.1-0.2

ED-B4_0.4-0.5

ED-B5_0.2-0.3

ED-B5_0.0-0.1

ED-B6_0.1-0.2

ED-B6_0.2-0.3

ED-B7_0.2-0.3

ED-B7_0.0-0.2

ED-B8_0.3-0.4

ED-B8_0.5-0.6

ED-B8_0.8-1.0

ED-B8_0.0-0.2

ED-B9_0.1-0.2

ED-B9_0.0-0.1

MH-B1_0.1-0.2

MH-B1_0.2-0.3

MH-B1_0.0-0.1

MH-B10_0.2-0.4

MH-B10_0.5-0.6

MH-B10_0.0-0.2

MH-B2 0.2-0.3

MH-B2_0.4-0.5

Project Name: Broken Hill Hospital Redevelopment



NEPM 2013 Table 1A(1) HILs Res B Soil

Location

ED-B1

ED-B1

ED-B1

ED-B2

ED-B2

ED-B3

ED-B3

ED-B4

ED-B4

ED-B5

ED-B5

ED-B6

ED-B6

ED-B7

ED-B7

ED-B8

ED-B8

ED-B8

ED-B8

ED-B9

ED-B9

MH-B1

MH-B1

MH-B1

MH-B10

MH-B10

MH-B10

MH-B2

MH-B2

NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand

Sample Depth (m)

Fill, roadbase

0.4-0.5

0.9-1

0-0.1

0.2-0.3

0-0.1

0.2-0.3

0-0.1

0.1-0.2

0.4-0.5

0.2-0.3

0-0.1

0.1-0.2

0.2-0.3

0.2-0.3

0-0.2

0.3-0.4

0.5-0.6

0.8-1

0-0.2

0.1-0.2

0.1-0.2

0.2-0.3

0-0.1

0.2-0.4

0.5-0.6

0-0.2

0.2-0.3

0.4-0.5

0-0.1

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		ا ا				<u> </u>		_	ے ا	aue	aue	aue			#	Fa	l ar	<u></u> ar		aldehyde	ketone	亨	亨	x	l en l
		,4-DDE	BHC -	BHC	BEC	-BHC (Lindane)	Æ	Dieldrin	Aldrin + Dieldrin	Chlordane	Chlordane (cis)	Chlordane	_	۵	DDT+DDE+DDD	Endosulfan	Endosulfan II	Endosulfan	Endrin	Endrin	Endrin	Heptachlor	Heptachlor	Methoxychlor	Toxaphene
		4,4	B	8 6	8	8-8	Aldrin	Die	PA	ਤ	동	동	DDT	aaa		Ë	E E	E E	E	E	Ë	H G	Ŧ	ğ	Ê
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.1	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	0.5
									10	90					600				20			10		500	30
oil																									
	Matrix Description																								
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- 1
	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ill, clayey, gravelly sand	<0.05	<0.05	<0.05	<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	<0.5
	ill, silty sand	<0.05	<0.05	<0.05	<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	<0.5
\rightarrow	-ill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	FII, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	Fill, roadbase	<0.05	<0.05	<0.05	<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	<0.5
\rightarrow	Fill, sand			- 40.05	- 40.05					- 10.1	-	-											- 40.05	- 40.05	
\rightarrow	Fill, sand	<0.05 -	<0.05	<0.05	<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	<0.5 -
-	Fill, sand Fill, sand	<0.05	<0.05	<0.05	<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	<0.5
\rightarrow	Fill, sand	-	-	-	-	-	- 0.03	-	-	-	-	-	-0.03	-0.03	-	-	- 0.03	- 0.03	- 0.03	-		-0.03	- 0.03	- 0.03	- 0.5
\rightarrow	Fill, sand	<0.05	<0.05	<0.05	<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	<0.5
\rightarrow	Fill, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	Fill, roadbase	<0.05	<0.05	<0.05	<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	<0.5
\rightarrow	Fill, roadbase	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.3	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	<0.05	<0.5
j		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Clayey, sandy gravel	<0.05	<0.05	<0.05	<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	<0.5
	Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
_	Fill, sand	<0.05	<0.05	<0.05	<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	<0.5
	-ill, clayey, sandy gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
\rightarrow	Fill, gravelly sand	<0.05	<0.05	<0.05	<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	<0.5
-	Fill, sandy clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Fill, silty sand Fill, sandy clay	<0.05	<0.05	<0.05	<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	<0.5
\rightarrow	Fill, clay	<0.05			<0.05	<0.05	<0.05	<0.05	-0.05	- \0.1		-	\U.U5	\U.U3	<0.05		<0.05	\U.U3	<0.05	\U.U3	\U.U5	\U.U5	\U.U5	\U.U5	<0.5
	Fill, sandy clay	<0.05	<0.05	<0.05	<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	<0.5
_	Fill, roadbase	-	-		-	- 0.05	- 0.03	-	-	- 0.1	-	-	<0.05	-	-	-	-	- 0.03	<0.05	- 0.05	-	-	- 0.05	- 0.05	-
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Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



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Decision Missage Mis	MH-B3_0.8-1.0	MH-B3			< 0.05	<0.05	< 0.05	<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	<0.5
Miss	SPLIT03	MH-B3	0.8-1	Fill, gravelly sand	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	-
Miss	DUP03	MH-B3			<0.05	<0.05	< 0.05	<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	<0.5
Mish	MH-B3 0.0-0.1	MH-B3	0-0.1	Fill, sand	< 0.05	< 0.05	< 0.05	<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	<0.5
Meshes M	MH-B4 0.2-0.3	MH-B4	0.2-0.3	Fill, roadbase	< 0.05	< 0.05	< 0.05	<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	<0.5
Miss		MH-B4	0.6-0.7		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mess	MH-B5_0.1-0.2	MH-B5	0.1-0.2		< 0.05	<0.05	< 0.05	<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	<0.5
Meshes M	MH-B5_0.4-0.5	MH-B5	0.4-0.5	Fill, gravelly clay	< 0.05	<0.05	< 0.05	<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	<0.5
MF-86 Q-Q-3 MF-86 Q-Q-	MH-B5_0.8-0.9	MH-B5	0.8-0.9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-86	MH-B5_0.0-0.1	MH-B5	0-0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-86 0-0-1 MH-87 0-2-0 Fill, gravelly sand 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.0	MH-B6_0.2-0.3	MH-B6	0.2-0.3	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Min	MH-B6_0.4-0.5	MH-B6	0.4-0.5	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	- 1	-	-	-	-	-	-	-	-	-	-	-	-
MH-87 Q.2-Q.3 MH-87 Q.2-Q.3 MII-gravelly sand Q.2-Q.3 MII-gravelly sand Q.2-Q.3 Q.2-Q.5	MH-B6_0.0-0.1	MH-B6	0-0.1	Fill, clayey, gravelly sand	<0.05	<0.05	<0.05	<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	<0.5
Filth Mile Filth Mile Filth Mile Filth Mile Mil	MH-B7_0.2-0.3	MH-B7	0.2-0.3	Fill, gravelly sand	<0.05	<0.05	<0.05	<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	<0.5
DUPO MH-87 PART	MH-B7_0.9-1.0	MH-B7			<0.05	<0.05	<0.05	<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	<0.5
Mil-18 M	SPLIT01	MH-B7	0.9-1	Fill, gravelly sand	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	-
MH-88	DUP01	MH-B7			<0.05	<0.05	<0.05	<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	<0.5
MH-88_04-0.5 MH-88	MH-B7_0.0-0.1	MH-B7	0-0.1	Fill, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mile Ba 0.5 0.6 Mile Ba 0.5 0.6 Clay Cl	MH-B8_0.1-0.2	MH-B8	0.1-0.2		-	-	-	-	-		-	-	-	-	-	-	-	-		-		-		-]	-	-]	
MH-Bg 0.2-0.3	-	MH-B8	_	1	<0.05	<0.05	<0.05	<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	<0.5
MH-B9				 					-				-	-	-					-				-]	-	-	-
MH-B9		+					<0.05	<0.05						-	-							<0.05	<0.05	<0.05	<0.05			
Statistical Summary Number of Results	MH-B9_0.9-1.0	+	_		<0.05	<0.05	<0.05	<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	<0.5
Number of Results 29 29 29 29 29 29 29 2	MH-B9_0.0-0.1	MH-B9	0-0.1	Fill, roadbase	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Number of Results 29 29 29 29 29 29 29 2																												
Number of Detects 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		У			i .																							
Minimum Concentration <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05<					_								_															
Minimum Detect ND					-		-	-	_			-		_		-	-	-	_	-		-				-		
Maximum Concentration <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1	-	ration										_																
Maximum Detect ND					_	_	_	_			_			-	_					_								
Average Concentration 0.027 0.025<		ration											_															
Median Concentration 0.025 </td <td></td> <td>ND</td> <td>ND</td> <td></td>														ND	ND													
Standard Deviation 0.0064																_	_											
Number of Guideline Exceedances 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					_									0.05	0.05													
	-																											
Number of Guideline Exceedances(Detects Only) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					-									_														
	Number of Guidelin	ne Exceedances(Detects O	nly)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project Number: 63879

EQL

0-1m Field_ID

DUP02 ED-B1_0.9-1.0

ED-B1_0.4-0.5 SPLIT02

ED-B1_0.0-0.1

ED-B2_0.2-0.3

ED-B2_0.0-0.1

ED-B3 0.2-0.3

ED-B3_0.0-0.1

ED-B4_0.1-0.2

ED-B4_0.4-0.5

ED-B5_0.2-0.3

ED-B5_0.0-0.1

ED-B6_0.1-0.2

ED-B6_0.2-0.3

ED-B7_0.2-0.3

ED-B7_0.0-0.2

ED-B8_0.3-0.4

ED-B8_0.5-0.6

ED-B8_0.8-1.0

ED-B8_0.0-0.2

ED-B9_0.1-0.2

ED-B9_0.0-0.1

MH-B1_0.1-0.2

MH-B1_0.2-0.3

MH-B1_0.0-0.1

MH-B10_0.2-0.4

MH-B10_0.5-0.6

MH-B10_0.0-0.2

MH-B2 0.2-0.3

MH-B2_0.4-0.5

Project Name: Broken Hill Hospital Redevelopment



NEPM 2013 Table 1A(1) HILs Res B Soil

Location

ED-B1

ED-B1

ED-B1

ED-B2

ED-B2

ED-B3

ED-B3

ED-B4

ED-B4

ED-B5

ED-B5

ED-B6

ED-B6

ED-B7

ED-B7

ED-B8

ED-B8

ED-B8

ED-B8

ED-B9

ED-B9

MH-B1

MH-B1

MH-B1

MH-B10

MH-B10

MH-B10

MH-B2

MH-B2

NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand

Sample Depth (m)

Fill, roadbase

Fill, roadbase

0.4-0.5

0.9-1

0-0.1

0.2-0.3

0-0.1

0.2-0.3

0-0.1

0.1-0.2

0.4-0.5

0.2-0.3

0-0.1

0.1-0.2

0.2-0.3

0.2-0.3

0-0.2

0.3-0.4

0.5-0.6

0.8-1

0-0.2

0.1-0.2

0.1-0.2

0.2-0.3

0-0.1

0.2-0.4

0.5-0.6

0-0.2

0.2-0.3

0.4-0.5

0-0.1

									hlorinate	ad Alba=	00								1				<u></u>	nlorinati	ed Alken	96					Solvents
	<u> </u>			Т					niormate	eu Aikan	es								_				C	normate	eu Aikene	es				$\overline{}$	Solvents
	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	Acetone
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	0.5	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	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Soil																															
Matrix Description																															
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-
Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, silty sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FII, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clayey, sandy gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, clayey, sandy gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, gravelly sand	<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	<0.5	<0.5	<0.5	<0.5	<0.5
Fill, sandy clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, silty sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sandy clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill, sandy clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fill readbase	1																													-	

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



												`hlorinat	ed Alkan	es												C	nlorinate	ed Alken						Solvents
					Т				Τ	Т	<u>`</u>	Inormac	- AIRAIN													<u> </u>	normate.	-u Aikein						Joivents
\$7-	BS 8	G		0						pane																					U			
				1,1,1,2-tetrachloroethan	1,1,1-trichloroethane	1,1,2,2-tetrachloroethan	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropro	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-dichloropropen	Trichloroethene	Vinyl Chloride	Acetone
FOL				mg/kg		_	mg/kg	_	_	mg/kg				mg/kg			mg/kg			mg/kg	-										-		-	mg/kg
EQL	1 A / 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	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	1A(1) HILs Res B Soil	in Doc / Barbland 5' 6	:1																															
		in Res / Parkland, Fine So	"																															
	1A(3) Res A/B Soil HSL for	vapour Intrusion, Sand																																
0-1m																																		
Field_ID	Location	Sample Depth (m)	Matrix Description																															
MH-B3_0.2-0.3	MH-B3	0.2-0.3	Fill, sand	-	-	-	-	-	-	-	<u> </u>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B3_0.8-1.0	MH-B3	\Box		-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-		-	-	-	-	-	-		-	-
SPLIT03	MH-B3	0.8-1	Fill, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<u> - </u>	-	-	-	-	-
DUP03	MH-B3			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-		-
MH-B3_0.0-0.1	MH-B3	0-0.1	Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B4_0.2-0.3	MH-B4	0.2-0.3	Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- !	-	-	-	-	-
MH-B4_0.6-0.7	MH-B4	0.6-0.7	Silty, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B5_0.1-0.2	MH-B5	0.1-0.2	Fill, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B5_0.4-0.5	MH-B5	0.4-0.5	Fill, gravelly clay	-	-	-	-	-	- 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- 1	-	-	-	-	-
MH-B5_0.8-0.9	MH-B5	0.8-0.9	Fill, gravelly clay	-	-	-	-	-	- 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- 1	-	-	-	-	-
MH-B5_0.0-0.1	MH-B5	0-0.1	Fill, sandy gravel	-	-	-	-	-	- 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- 1	-	-	-	- 1	-
MH-B6_0.2-0.3	MH-B6	0.2-0.3	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B6_0.4-0.5	MH-B6	0.4-0.5	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B6_0.0-0.1	MH-B6	0-0.1	Fill, clayey, gravelly sand	<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	<0.5	<0.5	<0.5	<0.5	<0.5
MH-B7_0.2-0.3	MH-B7	0.2-0.3	Fill, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B7_0.9-1.0	MH-B7		7,0 * * 7 * *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-
SPLIT01	MH-B7	0.9-1	Fill, gravelly sand	-	-	-	-	-	-	-	<u> </u>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP01	MH-B7		, , , , , , , , , , , , , , , , , , , ,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B7_0.0-0.1	MH-B7	0-0.1	Fill, gravelly sand	-	-	-	-	-	-	-	1 -	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-	\vdash		-	-	-	-
MH-B8_0.1-0.2	MH-B8	0.1-0.2	Fill, silty gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B8_0.4-0.5	MH-B8	0.4-0.5	Fill, silty, gravelly clay	T -	-	-	-	-	-	1 -	1 -	-	-	-	-	_	-	_	-	-	<u>-</u>	_	_	_	-	H . H	_	-	\vdash		<u></u>	_		
MH-B8 0.5-0.6	MH-B8	0.5-0.6	Clay	-	-	-	-	-	-	1 -	+ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\vdash	-	-	-	-	-
MH-B9 0.2-0.3	MH-B9	0.2-0.3	Fill, sandy clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	<u> </u>	-	-	-	-	-
MH-B9_0.9-1.0	MH-B9	0.9-1	Silty clay	-	-	-	-	-	-	-	+ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B9 0.0-0.1	MH-B9	0-0.1	Fill, roadbase	-	-	-	-	-	-	-	+ -	-	-	-	-	-	-	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-
		0-0.1	IIII, Todubase		<u> </u>				<u> </u>	1 -	1 -		-								- 1	-	-	-			-	_				-		
Statistical Summa Number of Results	•			2	2	2	2	2	2	0	2	2	2	0	2	2	2	2	2	2	2	2	0	0	2	2	2	2	2	2	2	2	2	2
Number of Detects				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concent				<0.5		<0.5	<0.5		_	99999				99999				<0.5	<0.5		<0.5		99999		<0.5	<0.5	<0.5	<0.5			<0.5	<0.5		<0.5
Minimum Detect				ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND ND	ND ND	ND	ND	ND	ND
Maximum Concent	tration			<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	0	<0.5		<0.5	<0.5	_	<0.5	<0.5	<0.5		<0.5
Maximum Detect				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND ND
Average Concentra	ation			1.10	1,40	1,40	1,40	1,40	110	+ 140	110	1,40	140	110	110	110	1.40	- 10	110	H-10	1,10	1,10	140	110	140	1,40	140	.,,,,	1,10			-110		
Median Concentra				0.25	0.25	0.25	0.25	0.25	0.25	+	0.25	0.25	0.25		0.25	U 2E	0.25	0.25	0.25	0.25	0.25	0.25			0.25	0.25	0.25	U 32	0.25	0.25	0.25	0.25	0.25	0.25
				0.23	0.23	0.23	0.23	0.23	0.23	+	0.23	0.23	0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23			0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Standard Deviation				+ -	-	_	_		-	+ _	1			_			-			_														
Number of Guideli		Darle A		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideli	ne Exceedances(Detects C	JNIY)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project Number: 63879

EQL

0-1m Field_ID

DUP02 ED-B1_0.9-1.0

ED-B1_0.4-0.5 SPLIT02

ED-B1_0.0-0.1

ED-B2_0.2-0.3

ED-B2_0.0-0.1

ED-B3 0.2-0.3

ED-B3_0.0-0.1

ED-B4_0.1-0.2

ED-B4_0.4-0.5

ED-B5_0.2-0.3

ED-B5_0.0-0.1

ED-B6_0.1-0.2

ED-B6_0.2-0.3

ED-B7_0.2-0.3

ED-B7_0.0-0.2

ED-B8_0.3-0.4

ED-B8_0.5-0.6

ED-B8_0.8-1.0

ED-B8_0.0-0.2

ED-B9_0.1-0.2

ED-B9_0.0-0.1

MH-B1_0.1-0.2

MH-B1_0.2-0.3

MH-B1_0.0-0.1

MH-B10_0.2-0.4

MH-B10_0.5-0.6

MH-B10_0.0-0.2

MH-B2 0.2-0.3

MH-B2_0.4-0.5

Project Name: Broken Hill Hospital Redevelopment



NEPM 2013 Table 1A(1) HILs Res B Soil

Location

ED-B1

ED-B1

ED-B1

ED-B2

ED-B2

ED-B3

ED-B3

ED-B4

ED-B4

ED-B5

ED-B5

ED-B6

ED-B6

ED-B7

ED-B7

ED-B8

ED-B8

ED-B8

ED-B8

ED-B9

ED-B9

MH-B1

MH-B1

MH-B1

MH-B10

MH-B10

MH-B10

MH-B2

MH-B2

NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand

Sample Depth (m)

Fill, roadbase

Fill, roadbase

0.4-0.5

0.9-1

0-0.1

0.2-0.3

0-0.1

0.2-0.3

0-0.1

0.1-0.2

0.4-0.5

0.2-0.3

0-0.1

0.1-0.2

0.2-0.3

0.2-0.3

0-0.2

0.3-0.4

0.5-0.6

0.8-1

0-0.2

0.1-0.2

0-0.1

0.1-0.2

0.2-0.3

0-0.1

0.2-0.4

0.5-0.6

0-0.2

0.2-0.3

0.4-0.5

				Poly	chlorina	ted Biph	enyls								MAH							IV	liscellan	eous Hyd	rocarbo	ns	
		교 제 제 제 제 제 제 제 제 제 제 제 제 제 M M M M M M	3 Arochlor 1221	Arochlor 1232	Arochlor 1242	May Arochlor 1248	ଅ ଜୁ Arochlor 1254	Arochlor 1260	යු අප PCBs (Sum of total) කි	යි 1,2,4-trimethylbenzene කි	3 1,3,5-trimethylbenzene	m-butylbenzene	3 % n-propylbenzene %	த் இது p-isopropyltoluene கி	ଞ୍ଚ ଜିବ୍ୟ sec-butylbenzene ଅ	Styrene	% tert-butylbenzene	mg/kg Total MAH	Bromobenzene	මු මි මි Isopropylbenzene	공 제 1,2-dibromoethane 주	್ರಿ ೫ ಶಾ ಶಾ	ලී Cyclohexane ශි	್ದಿ Dibromomethane ಹ	তি lodomethane জি	%% 4-Methyl-2-pentanone	Methyl Ethyl Ketone
_				_	_												8										
		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	1	0.5	0.5	0.5	0.5
									1																		
oil																											
	Matrix Description																										
		-	-	-	-	-	-	l -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill slavey gravelly sand																	_									
	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
_		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, clayey, gravelly sand	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
コ	Fill, silty sand	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	FII, sand	-	_	-	-	-	-	-	-	_	-	-		-	-	-	-	-	-	-	-	-	-	-	-	_	-
\rightarrow																			_						_		
\rightarrow	Fill, roadbase	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, sand	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tì	Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	Fill, sand	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	Fill, sand	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	_	-	-		-	-
\rightarrow																									_		
-	Fill, sand	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\rightarrow	Fill, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, roadbase	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, roadbase	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
╗	Clayey, sandy gravel	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, roadbase	-	-	-	-	-	-	-	-	-	_	_		-	_	-	_	-	-	-	-	_	-	-	_	-	
	Fill, sand	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, clayey, sandy gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill, gravelly sand	<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
	Fill, sandy clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
\neg	Fill, silty sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
_	Fill, sandy clay	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
_																	_	_							-		
	Fill, clay	-	-	-	-	-	-	-	-	-	-	-	<u> </u>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
_	Fill, sandy clay	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fill roadhase		_											1					_			1				. T	

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



EQL NEPM 2013 Table 1A(NEPM 2013 Table 1B(NEPM 2013 Table 1A(0-1m	(1) HILS Res B Soil (7) Management Limits in (3) Res A/B Soil HSL for Va	Res / Parkland, Fine Sc	oil	mg/kg 0.1	mg/kg 0.1	By/8a Arochlor 1232	Arochlor 1242	ochlor 1248	lor 1254	1260	of total)	.2,4-trimethylbenzene	ylbenzene	ə	ne	iene	90		e.			ene	thane	el.		methane	u	pentanone	Ethyl Ketone
NEPM 2013 Table 1A(NEPM 2013 Table 1B(NEPM 2013 Table 1A(0-1m	(7) Management Limits in		5il	mg/kg	mg/kg	Arochlor			lor 1254	r 1260	و	hylbenzene	ylbenzene	a a	e l	lene	<u>و</u>		e			eue	thane	e.		thane	a)		Ketone
NEPM 2013 Table 1A(NEPM 2013 Table 1B(NEPM 2013 Table 1A(0-1m	(7) Management Limits in		lic	_	_	mg/kg		Ā	Arochlor	Arochlor	PCBs (Sum	Ę,	1,3,5-trimethylb	n-butylbenzen	n-propylbenzene	p-isopropyltoluene	sec-butylbenzer	Styrene	tert-butylbenze	Total МАН	Bromobenzene	Isopropylbenzene	1,2-dibromoeth	Bromomethane	Cyclohexane	Dibromo	lodomethan	4-Methyl-2-	Methyl
NEPM 2013 Table 1A(NEPM 2013 Table 1B(NEPM 2013 Table 1A(0-1m	(7) Management Limits in		pil	0.1	0.1	_		mg/kg	mg/kg	mg/kg			mg/kg								mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		$\overline{}$	
NEPM 2013 Table 18(NEPM 2013 Table 1A(0-1m	(7) Management Limits in		pil			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	1	0.5	0.5	0.5	0.5
NEPM 2013 Table 1A(0-1m			Dil								1																		
0-1m	(3) Res A/B Soil HSL for Va	pour Intrusion, Sand																											
Field ID																													
CIPIO 117	Location	Sample Double (m)	Matrix Description																										
	Location MH-B3	Sample Depth (m) 0.2-0.3	Matrix Description Fill, sand	T -	Τ.	Ι.		-	-	-		-	-	- 1	_	-	- 1	- 1	- 1	- 1	-	-	-	-	-	_	- 1	- 1	_
	MH-B3	0.2-0.3	FIII, Sallu	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-		-			-	-	-	-	-	-	-	-	-	-	-	-	-
		0 0 1	Fill gravelly cand		_	_		_					-	-	-	-			-	-					_	-	-	-	
	MH-B3	0.8-1	Fill, gravelly sand	<0.1	_	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MH-B3	0.04	len i	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
_	MH-B3	0-0.1	Fill, sand	<0.1	_	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
_	MH-B4	0.2-0.3	Fill, roadbase	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MH-B4	0.6-0.7	Silty, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
_	MH-B5	0.1-0.2	Fill, gravelly clay	<0.1	_	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MH-B5	0.4-0.5	Fill, gravelly clay	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MH-B5	0.8-0.9	Fill, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MH-B5	0-0.1	Fill, sandy gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MH-B6	0.2-0.3	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MH-B6_0.4-0.5	MH-B6	0.4-0.5	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B6_0.0-0.1	MH-B6	0-0.1	Fill, clayey, gravelly sand	<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
MH-B7_0.2-0.3	MH-B7	0.2-0.3	Fill, gravelly sand	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B7_0.9-1.0	MH-B7			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPLIT01	MH-B7	0.9-1	Fill, gravelly sand	< 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP01	MH-B7			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B7_0.0-0.1	MH-B7	0-0.1	Fill, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B8_0.1-0.2	MH-B8	0.1-0.2	Fill, silty gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B8_0.4-0.5	MH-B8	0.4-0.5	Fill, silty, gravelly clay	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B8_0.5-0.6	MH-B8	0.5-0.6	Clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MH-B9	0.2-0.3	Fill, sandy clay	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B9_0.9-1.0	MH-B9	0.9-1	Silty clay	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B9_0.0-0.1	MH-B9	0-0.1	Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistical Summary				_																									
Number of Results				29	29	29	29	29	29	29	29	2	2	0	0	0	0	2	0	2	2	2	2	2	0	2	2	2	2
Number of Detects				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentrat	ion			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	99999	99999	99999	99999	<0.5	99999	<0.5	<0.5	<0.5	<0.5	<0.5	99999	<0.5	<0.5	<0.5	<0.5
Minimum Detect				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentrat	tion			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	0	0	0	0	<0.5	0	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	<0.5	<0.5
Maximum Detect				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	on			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05																		
Median Concentratio	n			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.25	0.25					0.25		0.25	0.25	0.25	0.25	0.25		0.25	0.25	0.25	0.25
Standard Deviation				0	0	0	0	0	0	0	0																	\rightarrow	
Number of Guideline	Exceedances			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline	Exceedances(Detects Onl	y)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					-																								

Project Number: 63879

EQL

0-1m Field_ID

DUP02 ED-B1_0.9-1.0

ED-B1_0.4-0.5 SPLIT02

ED-B1_0.0-0.1

ED-B2_0.2-0.3

ED-B2_0.0-0.1

ED-B3 0.2-0.3

ED-B3_0.0-0.1

ED-B4_0.1-0.2

ED-B4_0.4-0.5

ED-B5_0.2-0.3

ED-B5_0.0-0.1

ED-B6_0.1-0.2

ED-B6_0.2-0.3

ED-B7_0.2-0.3

ED-B7_0.0-0.2

ED-B8_0.3-0.4

ED-B8_0.5-0.6

ED-B8_0.8-1.0

ED-B8_0.0-0.2 ED-B9_0.1-0.2

ED-B9_0.0-0.1

MH-B1_0.1-0.2

MH-B1_0.2-0.3

MH-B1_0.0-0.1

MH-B10_0.2-0.4

MH-B10_0.5-0.6

MH-B10_0.0-0.2

MH-B2 0.2-0.3

MH-B2_0.4-0.5

Project Name: Broken Hill Hospital Redevelopment



NEPM 2013 Table 1A(1) HILs Res B Soil

Location

ED-B1

ED-B1

ED-B1

ED-B2

ED-B2

ED-B3

ED-B3

ED-B4

ED-B4

ED-B5

ED-B5

ED-B6

ED-B6

ED-B7

ED-B7

ED-B8

ED-B8

ED-B8

ED-B8

ED-B9

ED-B9

MH-B1

MH-B1

MH-B1

MH-B10

MH-B10

MH-B10

MH-B2

MH-B2

NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand

Sample Depth (m)

0.4-0.5

0.9-1

0-0.1

0.2-0.3

0-0.1

0.2-0.3

0-0.1

0.1-0.2

0.4-0.5

0.2-0.3

0-0.1

0.1-0.2

0.2-0.3

0.2-0.3

0-0.2

0.3-0.4

0.5-0.6

0.8-1

0-0.2

0-0.1

0.1-0.2

0.2-0.3

0-0.1

0.2-0.4

0.5-0.6

0-0.2

0.2-0.3

0.4-0.5

0.1-0.2

Fill, roadbase

Fill, roadbase

				Chlor	rinated B	0070000				Trihalon	othonor	.		lor	nic Balanc			DA VIC	IWRG62					Other	
				Cilio	Illiateu B	enzenes				TTITIAIUII	letilalies			101	IIC DalaiiC	-		PA VIC	IVVNG02		\vdash			Other	-
		1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	, 1,4-dichlorobenzene	, Chlorobenzene	, Hexachlorobenzene	, Dibromochloromethane	Chloroform	, Tribromomethane	Bromodichloromethane	Carbon disulfide	CEC	Conductivity (1:5 aqueous extract)	рн (Гаb)	Chlorinated Hydrocarbons EPAVic	Other Chlorinated Hydrocarbons EPAVic	Organochlorine Pesticides EPAVic	Other Organochlorine Pesticides EPAVic	% Clay*	, Hexachlorobutadiene	Moisture Content (dried @ 103°C)	100	Iron (%)
		mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	MEQ/100G	US/CM	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	%	%	%
		0.5	0.5	0.5	0.5	0.5	0.5	0.05	0.5	0.5	0.5	0.5	0.5	0.05	10	0.1	0.5	0.5	0.1	0.1	1	0.5	1	0.1	0.01
								15																	
oil																									
	Matrix Description																								
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-
F	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.7	-	-
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.5	-	-
F	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	9.4	-	-
_	Fill, clayey, gravelly sand	-	-	-	-	-	-	<0.05	-	-	-	-	-	26	410	9.1	-	-	<0.1	<0.1	6.1	-	8.5	0.3	3.1
\rightarrow	Fill, silty sand	-	-	-	-	-	-	<0.05	-	-	-	-	-	_	-	-	-	-	<0.1	<0.1	-	-	7	-	-
\rightarrow	Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	-	-
\rightarrow	FII, sand		-	-	-	-	-		-	-	-	-	-	-	-	-	-	_	-	-	-	-	6.7	-	-
\rightarrow	Fill, roadbase	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	_	-	-	<0.1	<0.1	-	-	4.9	-	-
\rightarrow	•		-	-			-	-							-	_		-		-	-				
\rightarrow	Fill, sand	-			-	-			-	-	-	-	-	-		-	-		0.4			-	3.8	-	-
\rightarrow	Fill, sand	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	2.9	-	-
\rightarrow	Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	-	-
\rightarrow	Fill, sand	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	4.7	-	-
_	Fill, sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.1	-	-
F	Fill, sand	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1		-	5.6	-	-
F	Fill, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	11	-	-
F	Fill, roadbase	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	4.2	-	-
F	Fill, roadbase	-	-	-	-	-	-	< 0.05	-	-	-	-	-	-	-	-	-	-	0.43	0.43	-	-	8.1	-	-
П		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	11	-	-
	Clayey, sandy gravel	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	12	-	-
F	Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	-	-
_	Fill, sand	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	4.3	-	-
	Fill, clayey, sandy gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.1	-	-
	Fill, gravelly sand	-	-	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.1	<0.1	-	-	16	-	-
_	Fill, sandy clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	_	-	-	-	-	-	-	14	-	-
	Fill, silty sand	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	-	-
_	-																				-				-
_	Fill, sandy clay	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	11	-	-
_	Fill, clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-
	Fill, sandy clay	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	7.4	-	-
1.0	Till roadbasa				1																		7 -	, ,	

7.5

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



						Chlo	rinated E	Benzenes	;			Trihalon	nethane	s		lor	nic Balanc	e		EPA VIC -	IWRG62	1				Other	\neg
	IBS&	G		1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Hexachlorobenzene	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Carbon disulfide	CEC	Conductivity (1:5 aqueous extract)	(дет) нd	Chlorinated Hydrocarbons EPAVic	Other Chlorinated Hydrocarbons EPAVic	Organochlorine Pesticides EPAVic	Other Organochlorine Pesticides EPAVic	% Clay*	Hexachlorobutadiene	Moisture Content (dried @ 103°C)	тос	Iron (%)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	MEQ/100G	US/CM	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	%	%	%
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.05	0.5	0.5	0.5	0.5	0.5	0.05	10	0.1	0.5	0.5	0.1	0.1	1	0.5	1	0.1	0.01
	1A(1) HILs Res B Soil									15																	
	1B(7) Management Limits i		il																								
	1A(3) Res A/B Soil HSL for \	apour Intrusion, Sand																									
0-1m																											
r:ald in	Landina	Camada De ette (es)	Madelia Danasi - 11																								
Field_ID	Location	Sample Depth (m)	Matrix Description			1	1	1														1	,				
MH-B3_0.2-0.3	MH-B3	0.2-0.3	Fill, sand	-	-	-	<u> </u>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-
MH-B3_0.8-1.0	MH-B3		l	<u> </u>	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	4.1	-	-
SPLIT03	MH-B3	0.8-1	Fill, gravelly sand	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	—	-
DUP03	MH-B3			-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	5.5	-	-
MH-B3_0.0-0.1	MH-B3	0-0.1	Fill, sand	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	- '	3.2	-	-
MH-B4_0.2-0.3	MH-B4	0.2-0.3	Fill, roadbase	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	5.6	-	-
MH-B4_0.6-0.7	MH-B4	0.6-0.7	Silty, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	3	-	-
MH-B5_0.1-0.2	MH-B5	0.1-0.2	Fill, gravelly clay	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	8.9	-	-
MH-B5_0.4-0.5	MH-B5	0.4-0.5	Fill, gravelly clay	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	11	-	-
MH-B5_0.8-0.9	MH-B5	0.8-0.9	Fill, gravelly clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-
MH-B5_0.0-0.1	MH-B5	0-0.1	Fill, sandy gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-
MH-B6_0.2-0.3	MH-B6	0.2-0.3	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	26	350	8.5	-	-	-	-	6.7	-	8	0.4	2.7
MH-B6_0.4-0.5	MH-B6	0.4-0.5	Fill, clayey, gravelly sand	-	-	-	-	-	-	-	-		-	-	-		-	-	-	-		-	-	-	8.5	-	
MH-B6_0.0-0.1	MH-B6	0-0.1	Fill, clayey, gravelly sand	-	-	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.1	<0.1	-	-	6	-	_
MH-B7_0.2-0.3	MH-B7	0.2-0.3	Fill, gravelly sand	-	-	-	-	-	-	<0.05				- 40.5	-	-	-	_			<0.1	<0.1	_	-	5.8		
	MH-B7	0.2-0.3	Fill, gravelly sallu	-		-	-	H	- -	<0.05	-	-		-	-	-	-	-	<u> </u>	-	<0.1	<0.1	-	-	4.6		
MH-B7_0.9-1.0			Fill gravally cand											-					-	-	VU.1		-		_		
SPLIT01	MH-B7	0.9-1	Fill, gravelly sand	<u> </u>	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	0.4	- 0.4	-	-	5.9	-	-
DUP01	MH-B7	0.0.1	Ell con all cond	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	6.1	-	-
MH-B7_0.0-0.1	MH-B7	0-0.1	Fill, gravelly sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3	-	-
MH-B8_0.1-0.2	MH-B8	0.1-0.2	Fill, silty gravel	-	-	-	-	<u> </u>	-	0.05	-	-	<u> </u>	<u> </u>	-	-	-	-	-	-	-	- 0.4	-	-	2.7	-	-
MH-B8_0.4-0.5	MH-B8	0.4-0.5	Fill, silty, gravelly clay	-	-	-	 -	-	- -	<0.05	-	-	-	 -	-	-	-	-	-	-	<0.1	<0.1	-		13	\vdash	-
MH-B8_0.5-0.6	MH-B8	0.5-0.6	Clay	-	-	-	-	<u> </u>	-	-	-	-	-	-	-	-	-	-	<u> </u>	-	-	-	-		15	-	-
MH-B9_0.2-0.3	MH-B9	0.2-0.3	Fill, sandy clay	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-		5.6	—	-
MH-B9_0.9-1.0	MH-B9	0.9-1	Silty clay	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	21	-	-
MH-B9_0.0-0.1	MH-B9	0-0.1	Fill, roadbase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		4.7	-	-
Statistical Summar	ry																										
Number of Results				0	0	2	2	2	2	29	2	2	2	2	2	2	2	2	2	2	27	27	2	0	56	2	2
Number of Detects	3			0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	1	1	2	0	56	2	2
Minimum Concentr	ration			99999	99999	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	26	350	8.5	<0.5	<0.5	<0.1	<0.1	6.1	99999	2.7	0.3	2.7
Minimum Detect				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	26	350	8.5	ND	ND	0.43	0.43	6.1	ND	2.7	0.3	2.7
Maximum Concent	tration			0	0	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	26	410	9.1	<0.5	<0.5	0.43	0.43	6.7	0	24	0.4	3.1
Maximum Detect				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	26	410	9.1	ND	ND	0.43	0.43	6.7	ND	24	0.4	
Average Concentra	ation									0.027											0.064	0.064	\Box		7.8		\neg
Median Concentrat				<u> </u>		0.25	0.25	0.25	0.25	0.025	0.25	0.25	0.25	0.25	0.25	26	380	8.8	0.25	0.25	0.05	0.05	6.4		6.85	0.35	2.9
Standard Deviation				_	-	5.23	5.23	0.25	0.25	0.0064	5.25	5.23	5.25	1.25	5.25		300	- 5.5	5.25	0.23	0.073	0.03	5.7		4.2	0.55	
Number of Guidelin				0	0	0	0	0	0	0.0004	0	0	0	0	0	0	0	0	0	0	0.073	0.073	0	0	0	0	0
	ne Exceedances(Detects O	alv)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lituriber of Guidelli	The Executatives (Detects Of	''71		1 0	1 0				1 0		U				U	. 0	U		. 0	U	<u> </u>		J				

Table B: Asbestos Analytical Data

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



EQL
NEPM 2013 Table 7 Res B Soil HSL for Asbestos in Soil

											A - I I						
											Asbestos						
Approximate Sample Mass	Asbestos Sample Dimensions	Mass ACM	Mass Asbestos in ACM	Asbestos from ACM in Soil	Mass FA	Mass Asbestos in FA	Mass AF	Mass asbestos in AF	Asbestos from FA & AF in Soil	Mass Asbestos in FA & AF	ACM - Comment	FA- Comment	AF - Comment	Organic Fibres - Comment	Respirable Fibres - Comment	Synthetic Fibres - Comment	Asbestos Reported Result
g	Comment	g	g	% (w/w)	g	g	g	g	% (w/w)	g	Comment	Comment	Comment	Comment	Comment	Comment	Comment
				0.04					0.001								

Field_ID	Location	Sample Depth (m)	Matrix Description																		
ED-B1_0.0-1.0	ED-B1	0-1	Fill, clayey, gravelly sand	591	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B2_0.0-0.3	ED-B2	0-0.3	Fill, roadbase/silty sand	1329	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B3_0.0-0.7	ED-B3	0-0.7	Fill, roadbase	1203	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B4_0.1-0.5	ED-B4	0.1-0.5	Fill, sand	998	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B5_0.0-0.3	ED-B5	0-0.3	Fill, sand	639	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B6_0.1-0.3	ED-B6	0.1-0.3	Fill, sand	629	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B7_0.0-0.2	ED-B7	0-0.2	Fill, roadbase	1003	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
SPLIT08	ED-B7	0-0.2	i iii, Toaubase	-	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B8_0.0-0.6	ED-B8	0-0.6	Fill, roadbase	1080	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B9_0.1-0.5	ED-B9	0.1-0.5	Fill, sand	846	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
ED-B9_0.0-0.1	ED-B9	0-0.1	Fill, clayey, sandy gravel	952	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
MH-B1_0.1-0.2	MH-B1	0.1-0.2	Fill, gravelly sand	645	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
MH-B1_0.2-0.3	MH-B1	0.2-0.3	Fill, sandy clay	631	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1 ^{#12}	1 ^{#6}	1#5	1#12	1#1
MH-B1_0.0-0.1	MH-B1	0-0.1	Fill, silty sand	509	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1 ^{#12}	1 ^{#6}	1#5	1#12	1#1
MH-B10_0.2-1.0	MH-B10	0.2-1	Fill, clay	511	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1 ^{#12}	1 ^{#6}	1#5	1#12	1#1
MH-B10_0.2-1.0A	MH-B10	0.2-1	Fibreboard	6	1#8	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	1#4
MH-B10_0.0-0.2	MH-B10	0-0.2	Fill, sandy clay	634	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
MH-B10_0.0-0.2A	MH-B10	0-0.2	Fibreboard	8	1#11	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	1#3
MH-B2_0.2-0.8	MH-B2	0.2-0.8	Fill, roadbase	546	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
MH-B3_0.8-1.0	MH-B3	0.8-1	Fill, gravelly sand	805	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
MH-B3_0.0-0.6	MH-B3	0-0.6	Fill, sand	589	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1 ^{#12}	1 ^{#6}	1#5	1#12	1#1
MH-B4_0.0-0.6	MH-B4	0-0.6	Fill, roadbase	984	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1 ^{#12}	1 ^{#6}	1#5	1#12	1#1
MH-B5_0.0-0.9	MH-B5	0-0.9	Fill, gravelly clay	628	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1 ^{#12}	1 ^{#6}	1#5	1#12	1#1
MH-B6_0.0-0.6	MH-B6	0-0.6	Fill, clayey, gravelly sand	588	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1 ^{#12}	1 ^{#6}	1#5	1#12	1#1
MH-B7_0.0-1.0	MH-B7	0-1	Fill, gravelly sand	731	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
MH-B8_0.1-0.3	MH-B8	0.1-0.3	Fill, silty gravel	1109	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
MH-B8_0.3-0.5	MH-B8	0.3-0.5	Fill, silty, gravelly clay	819	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1
MH-B9_0.0-0.5	MH-B9	0-0.5	Fill, roadbase	667	-	0	0	0	0	0	0	0	0	0	1#12	1#12	1#12	1#6	1#5	1#12	1#1

Data Comments

- #1 No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No trace asbestos detected.
- #2 No asbestos detected. Organic fibres detected. No trace asbestos detected.
- #3 Chrysotile and crocidolite asbestos detected. Organic fibres detected.
- #4 Chrysotile asbestos detected. Organic fibres detected.
- #5 No trace asbestos detected.
- #6 Organic fibres detected.
- #7 20 x 20 x 3
- #8 25 x 20 x 5
- #9 40 x 20 x 3
- #10 50 x 50 x 5 #11 60 x 30 x 5
- #12 Nil
- #13 --

Table C: Field Asbestos Quantification Results

Health Screening L	evel Asbestos Concentration in Soil (% w/w)
Category	
Bonded ACM in soils	0.05
FA and AF in soils	0.001
ACM detected in soil	

Sample	<u>Information</u>			<u>Fiel</u>	d Asbesto	s Quantif	ication_	
Sample ID	Date	Fill Type	>7 mm ACM observed during screening?	Approx. Volume of Soil (50L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)*	Asbestos from ACM in soil (%w/w)
ED-B1_0-0.1	2/02/2023	0-0.1: Clayey Sand, brown	No	20	32600	0	0	0.000
ED-B2_0-0.3	4/02/2023	0.0-0.3: Sandy Gravel, grey/yellow/brown	No	5	8150	0	0	0.000
ED-B3_0-0.7	4/02/2023	0.0-0.7: Gravelly Sand, grey/yellow/brown	No	5	8150	0	0	0.000
ED-B4_0.1-0.5	4/02/2023	0.1-0.5: Sand, red/brown	No	10	16300	0	0	0.000
ED-B7_0-0.2	4/02/2023	0.0-0.2: Sandy Gravel roadbase, grey	No	10	16300	0	0	0.000
ED-B8_0-0.6	4/02/2023	0.0-0.6: Gravelly Sand roadbase, grey	No	15	24450	0	0	0.000
MH-B2_0.2-0.8	3/02/2023	0.2-0.8: Sandy Gravel, grey/brown	No	20	32600	0	0	0.000
MH-B3_0-0.6	3/02/2023	0.0-0.6: Sand, red/brown	No	20	32600	0	0	0.000
MH-B3_0.8-1	3/02/2023	0.8-1.0: Gravelly Sand, grey/red/brown	No	5	8150	0	0	0.000
MH-B5_0-0.9	2/02/2023	0.0-0.9: Gravelly Clay, red/brown	No	20	32600	0	0	0.000
MH-B6_0-0.6	2/02/2023	0.0-0.6: Gravelly Clayey Sand, grey/red/brown	No	20	32600	0	0	0.000
MH-B7_0-1	2/02/2023	0.0-1.0: Gravelly Sand, grey/brown	No	20	32600	0	0	0.000
MH-B8_0.1-0.3	2/02/2023	0.1-0.3: Silty Gravel, grey	No	10	16300	0	0	0.000
MH-B8_0.3-0.5	2/02/2023	0.3-0.5: Silty Gravelly Clay, red	No	10	16300	0	0	0.000
MH-B10_0-0.2	2/02/2023	0.0-0.2: Sandy Clay, brown	Yes	10	16300	8	1.2	0.007
MH-B10_0.2-1	2/02/2023	0.2-1.0: Sandy Clay, brown	Yes	10	16300	6	0.9	0.006

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				Metals &	Metalloid	s				TPH	ls (NEPC 1	.999)				TRH	s (NEPC 2	013)						BT	EXN			
ŞJBS&G	Arsenic	Cadmium	Chromium (III+VI)	Соррег	реал	Mercury	Nickel	Zinc	CG-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	06-C10	917-010	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Total BTEX	Naphthalene_VOC
FO!	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	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	0.02	0.05	0.1	0.1	0.1	0.02	0.05	0.1	0.1	0.1	0.02	0.05	0.001	0.001	0.001	0.001	0.002	0.003	0.001	0.01
ADWG (2011) Health - Petroleum Products (Adopted from WHO Drinking Water 2008)				-									0.09					0.09		0.09								
ADWG (2011) Health - Updated March-2021	0.01		0.05	2	0.01	0.001	0.02														0.001	0.8	0.3	0.6	0.6	0.6		
ADWG (2011) Health x 10 (Recreational) - Updated March-2021	0.1	0.02	0.5	20	0.1	0.01	0.2														0.01	8	3	6	6	6		
ANZECC 2000 Irrigation Long Term Trigger Values	0.1	0.01	0.1	0.2	2	0.002	0.2	2																				
ANZECC 2000 Irrigation Short Term Trigger Values	2	0.05	1	5	5	0.002	2	5																				-
ANZG (2018) Freshwater 95% toxicant DGVs	0.013	0.0002	0.001	0.0014	0.0034	0.0006	0.011	0.008													0.95	0.18	0.08	0.35	0.075			0.016
PFAS NEMP 2020 Table 5 Freshwater 95%																												
PFAS NEMP 2020 Table 5 Freshwater 99%																												
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Sand																												
2-4m																			1	1	0.8	NL	NL			NL		NL
4-8m																			1	1	0.9	NL	NL			NL		NL
>8m																			1	1	0.8	NL	NL			NL		NL

Field	ID	Location	Well	Sampled	Date	Time

rieiu_iD	Location	WEII	Janipieu_Date_Time																												
GW01	GW01		5/02/2023	<0.001	<0.0002	< 0.001	0.017	<0.001	<0.0001	0.017	0.076	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.001	0.006	<0.001	<0.001	<0.002	<0.003	- '	<0.01
GW02	GW02		5/02/2023	0.003	<0.0002	< 0.001	0.085	0.002	<0.0001	0.2	0.98	0.09	0.11	0.1	<0.1	0.21	0.1	0.09	0.1	<0.1	0.19	0.06	0.09	<0.001	0.04	<0.001	<0.001	<0.002	<0.003	- '	<0.01
GW03	GW03		5/02/2023	<0.001	<0.0002	< 0.001	0.008	<0.001	<0.0001	0.012	0.082	<0.04	0.12	<0.1	<0.1	0.12	<0.04	0.07	0.1	<0.1	0.17	<0.04	0.07	<0.002	0.007	<0.002	<0.002	<0.004	<0.006	- '	<0.02
DUP01	GW03		5/02/2023	<0.001	<0.0002	< 0.001	0.008	<0.001	<0.0001	0.012	0.081	0.22	0.13	<0.1	<0.1	0.13	0.21	0.07	<0.1	<0.1	<0.1	0.05	0.07	<0.002	0.16	<0.002	<0.002	<0.004	<0.006	- '	<0.02
SPLIT01	GW03		5/02/2023	<0.002	<0.0002	<0.002	0.008	<0.001	<0.00005	0.013	0.17	0.27	0.2	< 0.1	< 0.1	0.2	0.29	0.19	< 0.1	< 0.1	0.19	0.15	0.19	< 0.01	0.15	< 0.01	< 0.01	< 0.02	< 0.01	0.15	< 0.01

99% protectio levels adiopted for anthracene, benzo(a)pyrene, fluoranthene and phenanthrene due to potential for bioaccumulation

Data Comments
#1 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

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\$JBS&G																		
Me Acenaphthene		Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(b+j+k)fluoranthene	을 Benzo(g,h,i)perylene	Benzo(k/fluoranthene	Chrysene Mg/L	Dibenz(a,h)anthracene	Mg/L	Mg/L Huorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	W byrene	PAHs (Sum of total)
EQL 0.00	_	0.001	0.001	0.001	0.001		0.00002		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	01	0.001	0.001	0.001	0.001	0.001	0.00002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
ADWG (2011) Health - Petroleum Products (Adopted from WHO Drinking Water 2008)					0.00004													
ADWG (2011) Health - Updated March-2021					0.00001													
ADWG (2011) Health x 10 (Recreational) - Updated March-2021					0.0001													
ANZECC 2000 Irrigation Long Term Trigger Values																		
ANZECC 2000 Irrigation Short Term Trigger Values	_																	
ANZG (2018) Freshwater 95% toxicant DGVs			0.00001		0.0001							0.001			0.016	0.0006		
PFAS NEMP 2020 Table 5 Freshwater 95%																		
PFAS NEMP 2020 Table 5 Freshwater 99%																		
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Sand																		
2-4m															NL			
4-8m															NL			
>8m															NL			

Field_ID Location Well Sampled_Date_Time

GW01	GW01	5/02/2023	<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
GW02	GW02	5/02/2023	<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
GW03	GW03	5/02/2023	<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
DUP01	GW03	5/02/2023	<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
SPLIT01	GW03	5/02/2023	<0.00001	<0.00001	0.00003	<0.00001	<0.00001	-	<0.00002	<0.00001	-	<0.00001		<0.00001	<0.00001	<0.00001	0.00008	<0.00001	0.00001	0.00012

99% protectio levels adiopted for anthracene, benzo(a)pyrene, fluoranthene and phenanthrei

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									Chlorinate	ed Alkane	es													Chlorinate	d Alkenes	s				
JBS&G	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,24richloroethane	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
	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/
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	0.005	0.005	0.005	0.005	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00
ADWG (2011) Health - Petroleum Products (Adopted from WHO Drinking Water 2008)																														
ADWG (2011) Health - Updated March-2021								0.003					0.003				0.004		0.03							0.05				0.000
ADWG (2011) Health x 10 (Recreational) - Updated March-2021								0.03					0.03				0.04		0.3							0.5				0.003
ANZECC 2000 Irrigation Long Term Trigger Values																														
ANZECC 2000 Irrigation Short Term Trigger Values																														
ANZG (2018) Freshwater 95% toxicant DGVs		0.27	0.4	6.5				1.9	0.9	1.1			0.24				4		0.7							0.07			0.33	0.1
PFAS NEMP 2020 Table 5 Freshwater 95%																														
PFAS NEMP 2020 Table 5 Freshwater 99%																														
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Sand																														
2-4m																														
4-8m																														
>8m																														

Field_ID	Location	Well Sampled_Date_Time																														
GW01	GW01	5/02/2023	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	< 0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	-	-	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005
GW02	GW02	5/02/2023	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005
GW03	GW03	5/02/2023	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	-	<0.002	<0.002	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	<0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	<0.002	< 0.01
DUP01	GW03	5/02/2023	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.01	< 0.01	<0.01	<0.01	<0.01	<0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01
SPLIT01	GW03	5/02/2023	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1	< 0.1	-	<0.1	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	<0.01	<0.01	<0.1

99% protectio levels adiopted for anthracene, benzo(a)pyrene, fluoranthene and phenanthrei

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



	Solvents	5																	PFAS																	
JBS&G	Acetone	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic add (PFHXA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	N-ethylperfluorooctanesulfonamidoethanol (NEFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFDSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	Perfluoropropanesulfonic acid (PFP1S)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecanesuffonic acid (PFDS)	1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	. 1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum	Sum of PFAS	Perfluorononanesulfonic acid ion
	mg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L			ıg/L
	0.005	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1	0.01
ADWG (2011) Health - Petroleum Products (Adopted from WHO Drinking Water 2008)																																				
ADWG (2011) Health - Updated March-2021	14					0.56																	0.07		0.07						0.07					
ADWG (2011) Health x 10 (Recreational) - Updated March-2021	140					5.6																	0.7		0.7						0.7					
ANZECC 2000 Irrigation Long Term Trigger Values																																				
ANZECC 2000 Irrigation Short Term Trigger Values																																				
ANZG (2018) Freshwater 95% toxicant DGVs																																				
PFAS NEMP 2020 Table 5 Freshwater 95%						220																			0.13											
PFAS NEMP 2020 Table 5 Freshwater 99%						19																			0.00023											
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Sand																																				
2-4m																																				
4-8m																																				
>8m			1	1																															-	-

GW01 GW01	5/02/2023	<0.005	0.05	0.02	<0.01	<0.01 0.01#1	<0.01	<0.01	<0.01 <0.	01 <0.0	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.01	0.03	0.01#1	0.07#1	< 0.01	0.07#1	< 0.01	<0.01	<0.05	<0.01	<0.01	0.14	0.15	0.08	0.25	0.27	<0.01
GW02 GW02	5/02/2023	<0.005	< 0.05	<0.01	<0.01	<0.01 <0.01	<0.01	<0.01	<0.01 <0.	01 <0.0	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.01	< 0.01	0.04#1	< 0.01	0.04#1	< 0.01	< 0.01	<0.05	<0.01	<0.01	0.08	0.08	0.04	0.09	<0.1	<0.01
GW03 GW03	5/02/2023	<0.01	< 0.05	<0.01	<0.01	<0.01 <0.01	<0.01	<0.01	<0.01 <0.	01 <0.0	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	< 0.01	0.02#1	< 0.01	0.13#1	< 0.01	< 0.01	<0.05	<0.01	<0.01	0.15	0.15	0.13	0.15	0.15	<0.01
DUP01 GW03	5/02/2023	<0.01	< 0.05	<0.01	<0.01	<0.01 <0.01	<0.01	<0.01	<0.01 <0.	01 <0.0	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	< 0.01	0.03#1	< 0.01	0.28#1	< 0.01	< 0.01	<0.05	<0.01	<0.01	0.31	0.31	0.28	0.31	0.31	<0.01
SPLIT01 GW03	5/02/2023	-	< 0.02	<0.02	<0.01	<0.01 <0.01	< 0.01	<0.02	<0.02 <0.	05 <0.	1 <0.5	<0.1	< 0.05	<0.1	< 0.05	<0.5	<0.02	<0.02	-	0.01	< 0.01	0.02	< 0.01	0.04	<0.02	< 0.01	< 0.01	<0.02	< 0.02	0.06	-	0.04	-	0.08	-

99% protectio levels adiopted for anthracene, benzo(a)pyrene, fluoranthene and phenanthrei

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



						MAH								Miscellan	eous Hyd	rocarbons	s				hlorinated	d Benzene	es .			Trihalon	nethanes			Major	Cations	
SIBSEG	1,2,4-trimethylbenzene	1,3.5-trimethylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Total MAH	Вготовелгеле	Ізоргоруївеп зепе	1,2-dibromoethane	Bromomethane	Cyclohexane	Dibromomethane	lodomethane	4-Methyl-2-pentanone	Methyl Ethyl Ketone	1,7,3-trichlorobenzene	1,2,4 trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Carbon disulfide	Caldum	Magnesium	Hardness as CaCO3
	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	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.005	0.001	0.001	0.001	0.005	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.001	0.001	0.001	0.5	0.5	5
ADWG (2011) Health - Petroleum Products (Adopted from WHO Drinking Water 2008)																																
ADWG (2011) Health - Updated March-2021							0.03					0.001									1.5		0.04	0.3								
ADWG (2011) Health x 10 (Recreational) - Updated March-2021							0.3					0.01	0.01								15		0.4	3								
ANZECC 2000 Irrigation Long Term Trigger Values																																
ANZECC 2000 Irrigation Short Term Trigger Values																																
ANZG (2018) Freshwater 95% toxicant DGVs											0.03								0.01	0.17	0.16	0.26	0.06	0.055		0.77						
PFAS NEMP 2020 Table 5 Freshwater 95%																																
PFAS NEMP 2020 Table 5 Freshwater 99%																																
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Sand																																
2-4m																																
2 4111								†		i i				1		i e			i e	İ								<u> </u>	i –	i e		
4-8m																																

riciu_ii	Location	Well Sampled_Date_Time																																
GW01	GW01	5/02/2023	<0.001	<0.001	-	-	-	-	<0.001	- 0.0	006 <	0.001 <0.0	01 <0.00	1 <0.005	-	<0.001	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	110	110	740	-
GW02	GW02	5/02/2023	<0.001	<0.001	-	-	-	-	<0.001	- 0.0	.04 <	0.001 <0.0	01 <0.00	1 <0.005	-	<0.001	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	110	72	580	-
GW03	GW03	5/02/2023	<0.002	<0.002	-	-	-	-	<0.002	- 0.0	007 <	0.002 <0.0	02 <0.00	2 <0.01	-	<0.002	<0.002	<0.01	<0.01	-	-	0.014	<0.002	<0.002	0.002	<0.002	<0.005	<0.002	<0.002	<0.002	67	53	380	-
DUP01	GW03	5/02/2023	<0.002	<0.002	-	-	-	-	<0.002	- 0.3	.16 <	0.002 <0.0	02 <0.00	2 <0.01	-	<0.002	<0.002	<0.01	< 0.01	-	-	0.27	<0.002	0.062	0.045	<0.002	<0.005	<0.002	<0.002	<0.002	-	-	-	-
SPLIT01	GW03	5/02/2023	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01 <0	0.01 -	- <	<0.01 <0.0	0.01	<0.1	< 0.01	< 0.01	-	-	-	< 0.01	< 0.01	0.26	0.013	0.058	0.036	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	- <	0.01

99% protectio levels adiopted for anthracene, benzo(a)pyrene, fluoranthene and phenanthrei



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ED-B8_0.0-0.2 4/02/2023

ED-B8_0.0-0.6 4/02/2023

ED-B8_0.3-0.4 4/02/2023

ED-B8 0.5-0.6 2/02/2023

ED-B8 0.8-1.0 4/02/2023

ED-B9_0.0-0.1 4/02/2023

ED-B9_0.1-0.2 4/02/2023

ED-B9_0.1-0.5 4/02/2023

MH-B1_0.0-0.1 3/02/2023

MH-B1_0.1-0.2 3/02/2023

MH-B1_0.2-0.3 3/02/2023 MH-B10_0.0-0.2 2/02/2023

MH-B10 0.0-0.2A 2/02/2023

MH-B10_0.2-0.4 2/02/2023

MH-B10_0.2-1.0 2/02/2023

MH-B10_0.2-1.0A 2/02/2023

MH-B10_0.5-0.6 2/02/2023

MH-B2 0.2-0.3 3/02/2023

MH-B2_0.2-0.8 3/02/2023

7.7 <0.4 29 26

4.3 <0.4 52 28

3.9 <0.4 35 16

2.5 | <0.4 | 12 | 12 |

<2 <0.4 8.7 5.5

3.5 <0.4 26 23

2.7 <0.4 27 59

8.9 < 0.4 34 35

4.4 0.8 23 32

5.8 1 26 34

11 <0.4 51 74

150 150

- <50 <50

- <50 <50

- <50 <50

<20 <50 130 170 300 <20 <50

<20 <50 <100 <100 <100 <20 <50

37 <0.1 19 89 <20 <20

43 <0.1 31 95 - -

19 <0.1 27 43 <20 <20

<5 <0.1 <5 11 <20 <20

35 <0.1 19 110 <20 <20

140 0.2 24 150 - -

260 1.6 15 330 <20 <20

310 0.8 17 490 <20 <20

12 <0.1 22 60

33 <0.1 7.1 72

- - - -42 <0.1 14 120

470 0.8 19 510

120 <0.1 36 180

					- 1	Metals 8	& Metall	oids			TP	Hs (NEP	C 1999)				TRHs	(NEPC 2	(013)					BTEXN												PAH									_
\$	JBS	& G	Arsenic	Cadmium	Chromium (III+VI)	Copper	Iron	Lead	Nickel	Zinc	C6-C9 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	10-C16 less N	Benzene	Toluene	Ethylbenzene		Xylene (m & p)	Xylene lotal	Naphthalene_VOC	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene Benzo(alovrene TEO (LOR)	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ calc (Zero)	Benzo(b+j)fluoranthene	Benzo(b+j+k)fluoranthene Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene Indano(1.2.3-c.d)ovrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
							_	mg/kg mg																																					
EQL				0.4		5			.1 5	_	20 20	50	50		20	50	100	100	100 20	50		0.1		0.1 0			0.5	0.5	0.5	0.5	0.5	0.5 0.	5 0.5	0.5	0.5	0.2 0.5	0.5	0.5	0.5	0.5 0.	0.5 0.5	5 0.5	0.5	0.5).5
	al Solid Waste CT1 (No			20 1				100 4	_		650#2			10000#2							_	288				000		-				0.8#3						4	\vdash				4		
	al Solid Waste SCC1 (v	· · · · · · · · · · · · · · · · · · ·		100 1				1500 5			650#5	-	-	10000"5							_	518				300		+				10#6						+	\vdash			_	+		
	ted Solid Waste CT2 (ted Solid Waste SCC2	- -		80 4 400 7				400 1 6000 20			2600 ^{#2}	-	-	40000#2							_	2073			_	200		-	_			3.2 ^{#3}						+					4		
ED-B1_0.0-0.1	Sampled Date 2/02/2023	Lab Report Number 962621		<0.4	16 2	26 31	1,000	11 <0	0.1 14	46	<20 <20) <50	<50	<50	<20	<50	<100	<100	<100 <2	0 <50	<0.1	l <0.1	<0.1 <	:0.1 <0	0.2 <0	0.3 -	<0.5	o <0.5	<0.5	<0.5	<0.5	<0.5 1.	2 0.6	<0.5	<0.5	- <0.5	5 <0.5	<0.5	<0.5	<0.5 <0	0.5 <0	0.5 <0.5	6 <0.5	<0.5 <	0.5
	2/02/2023	962621	-	-	-	-	-			-	· ·	-	-	-	-	-	-	-		-		-	-	-				-	-	-	-		-	-	-		-	 -				-	<u> </u>	-	-
	2/02/2023	962621 962621			_	30 37	-	14 <0 13 <0	0.1 13 0.1 12		· · ·	+ :	-	-	-	-	-	-	- -	-	<u> </u>	-	-	-		- -	-	<0.5	<0.5	<0.5	<0.5	<0.5 1.	2 0.6	<0.5	<0.5	- <0.5	<0.5	<0.5	<0.5	<0.5 <0	0.5 <0.	0.5 <0.5	<0.5	<0.5 <	0.5
ED-B1_0.9-1.0 ED-B2_0.0-0.1	4/02/2023	962621	_	-	_	25	-	16 <0	_			+:	+-	-	1	-		-		+ -	H	+-	-	-				-0.5	<0.5	-0.5	- 0.5	<0.5 1.	2 0.6	<0.5	<0.5	- <0.5	- 0.5	-0.5	-05	<0.5 <0	0.5	0.5 <0.5	<0.5	<0.5 <	- 5
ED-B2_0.0-0.1 ED-B2_0.0-0.3	4/02/2023	962621	11	VU.4	- 1	-	-	10 (0	.1 19	33	1 1	+ -	+ -	1	-	-		-		+ -	1	+ -	-	-				\U.5	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\U.5	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VU.5 1.	2 0.6	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	V0.5	- (0.5	0.5	10.5	10.5	VO.5 VO	7.5 (0.	.5 (0.5	- 10.5	\(\(\)\(\)	5.5
	4/02/2023	962621	4.5	<0.4	18 :	16	- +	12 <0	.1 21	52	<20 <20) <50	<50	<50	<20	<50	<100	<100	<100 <2	0 <50	<0.1	<0.1	<0.1 <	:0.1 <0	0.2 <0	13 -	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 1.	2 0.6	<0.5	<0.5	- <0.5	<0.5	<0.5	<0.5	<0.5 <0	0.5 <0	0.5 <0.5	<0.5	<0.5 <	0.5
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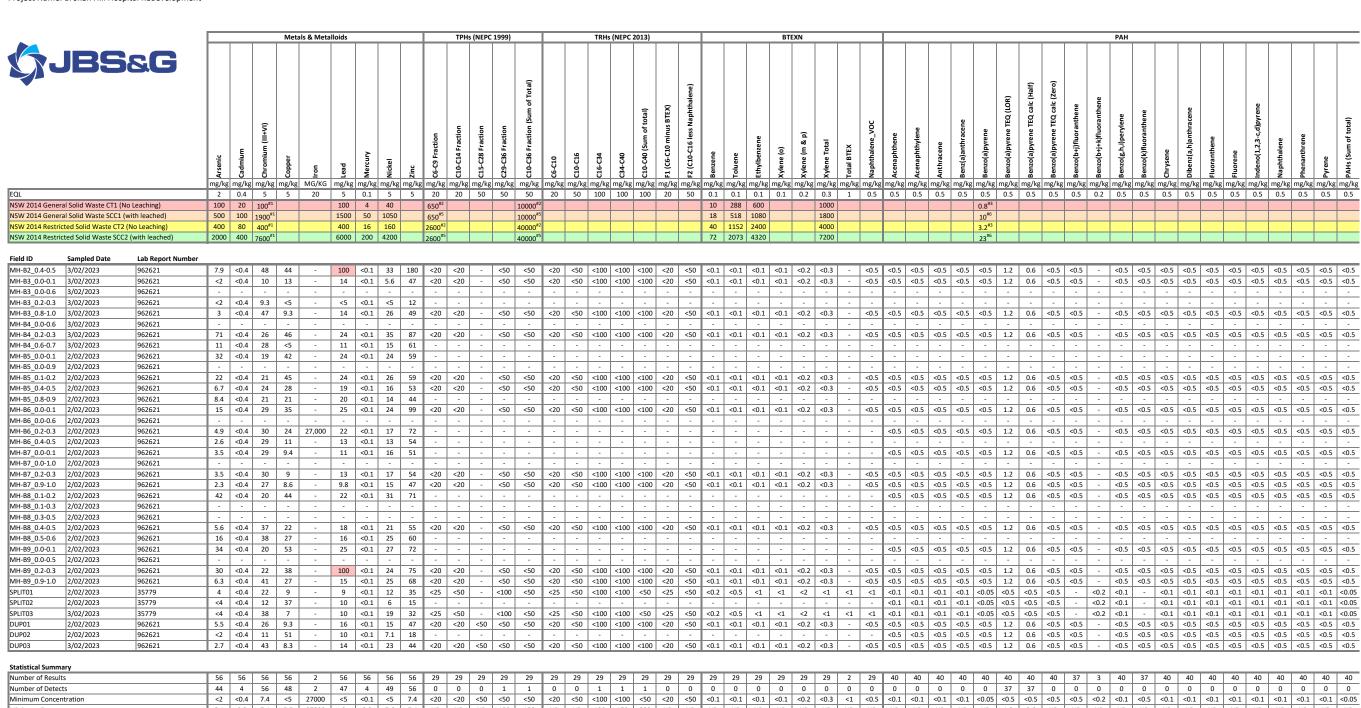
aximum Detect

Standard Deviation

Average Concentration

mber of Guideline Exceedances mber of Guideline Exceedances(Detects Only

Maximum Concentration



110 | 1.2 | 52 | 74 | 31000 | 470 | 1.6 | 36 | 510 | <25 | <50 | <100 | 150 | 150 | <25 | <50 | 310 | 170 | 300 | <25 | <50 | <0.2 | <0.5 | <1 | <1 | <2 | <1 | <1 | <1

81 U.25 S.1 0 7 0 0 0 0 0 0

41 0.11 17 79 10 11 27 31 29 10 25 53 54 57 10 25 0.053 0.064 0.081 0.081 0.16 0.17

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JBS&G																	9								oethane	Je	ethane	9	ane	ropropane		a)	ə	e	ine	<u>e</u>			thane		hane
	a 4,4-DDE	s-BHC	P Me/ks	OH9-P	gy g-BHC (Lindane)	mg/kg Aldrin	ay/sa Dieldrin	Aldrin + Dieldrin	Chlordane	Chlordane (cis)	Chlordane (trans)	mg/kg	000 mg/kg	DDT+DDE+DDD	Endosulfan I	Endosulfan II	Endosulfan sulphat	endrin	Endrin aldehyde	Endrin ketone	Hept	Heptachlor Epoxide	Methoxychlor	Toxaphene	1,1,1,2-tetrachlor	1,1,1-trichloroetha	ਜੇ	1,1,2-trichloroethan	1,2	1,2-dibromo-3-chlo	ay 1,2-dichloroethane	1,2-dichloropropan	1,3-dichloropropan	2,2-dichloropropan	Bromochlorometh	Carbon tetrachloride	mg/kg m	Chloromethane	Dichlorodifluorome	Dichloromethane	Trichlorofluoromet
EQL					0.05																																0.5			0.5	
NSW 2014 General Solid Waste CT1 (No Leaching)																										600		24			10					10				172	
NSW 2014 General Solid Waste SCC1 (with leached)																											46.8 4	3.2			18					18				310	
NSW 2014 Restricted Solid Waste CT2 (No Leaching)																									800 2	2400	104	96			40					40				688	
NSW 2014 Restricted Solid Waste SCC2 (with leached)																									1440 4	4320	187.2 17	2.8			72					72			1	1240	
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Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



March Marc																																				
Part								Ch	lorinat	ed Alke	nes					Solvents			Polyc	hlorina	ted Bipl	henyls					M	АН				Miscell	laneou	s Hydro	carbons	5
Change C	\$	JBS	S.G																																	
Column C				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	Acetone	Arochlor 1016		1 .	Arochlor 1242				(Sum of	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Styrene	Total МАН	Bromobenzene	Isopropylbenzene	1,2-dibromoethane	Bromomethane	Dibromomethane	lodomethane	4-Methyl-2-pentanone	Methyl Ethyl Ketone
Marie Mari																																				
Mathematical part					0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5			0.5	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	
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MH-B1_0.2-0.3 3/02/2023 962621				<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<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
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Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



							Ch	lorinate	d Alker	nes					Solvents			Polycl	hlorinat	ted Biph	nenyls					MA	Н				Miscell	aneous	Hydro	arbons	
S J	JBS	8. G	.1-dichloroethene	,1-dichloropropene	chlorotoluene	chloropropene	chlorotoluene	s-1,2-dichloroethene	is-1,3-dichloropropene	etrachloroethene	ans-1,2-dichloroethene	ans-1,3-dichloropropene	richloroethene	/inyl Chloride	etone	ochlor 1016	ochlor 1221	ochlor 1232	ochlor 1242	rochlor 1248	ochlor 1254	ochlor 1260	CBs (Sum of total)	.2,4-trimethylbenzene	3,5-trimethylbenzene	yrene	otal MAH	omobenzene	opropylbenzene	,2-dibromoethane	omomethane	bromomethane	domethane	Methyl-2-pentanone	Methyl Ethyl Ketone
			H.	⊩ì mg/kg	-	က် mg/kg	mg/kg	mg/kg	0	<u>-</u>	mg/kg	=	Ē	_	ĕ mg/kg	mg/kg	_ ₹ mg/kg	- Ā	- Ā	₹	Ā	_₹ mg/kg		⊢i mg/kg	ਜੰ	mg/kg		mg/kg	mg/kg	-	mg/kg	mg/kg	_ <u>o</u> mg/kg	mg/kg	
EQL			0.5	-	0.5	-	0.5			0.5	0.5	0.5	0.5	0.5	0.5	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
	al Solid Waste CT1 (No		14							14			10	4									<50#4			60									4000
	al Solid Waste SCC1 (v		25							25.2			18	7.2									<50 ^{#7}			108									7200
	ted Solid Waste CT2 (ted Solid Waste SCC2		56 100							56 100.8			40 72	16 28.8									<50 ^{#4}			432									16000 28800
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MH-B3_0.0-0.1 MH-B3_0.0-0.6	3/02/2023	962621 962621	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
	3/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	÷	-	Ë	-	-	H	<u> </u>	-
MH-B3_0.8-1.0	3/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		-	-	-	-	-	-	-	-	-	-	-	-
MH-B4_0.0-0.6	3/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B4_0.2-0.3	3/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
MH-B4_0.6-0.7	3/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B5_0.0-0.1	2/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH-B5_0.0-0.9	2/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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DUP03	3/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Statistical Summa Number of Results	•		2	0	0	2	2	2	2	2	2	2	2	2	2	29	29	29	29	29	29	29	29	2	2	2	2	2	2	2	2	2	2	2	2
Number of Detects			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concent	tration			99999			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<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	_
Minimum Detect			ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	_
Maximum Concent			<0.5	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<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
Jan 1 -			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
																0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05				- 1		1		1				1
Maximum Detect Average Concentra			0.25			0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25						0.05	0.05	0.05	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Average Concentra Median Concentra	ation		0.25			0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.05	0.05	0.05	0.05	0.05	0.05		0.05	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Average Concentra	ation n		0.25	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25						0.05 0 0	0.05 0 0	0.05 0 0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

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				Chlori	nated B	enzene	s	1	rihalon	nethane	es	Organic Sulfur Compounds	lon	ic Balanc	e	Particle Size				Asbes	tos		_	=	_	Mo	oisture Content	匚	Other	
\$.	JBS	& G	1,2-Dichlorobenzene	% 1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Mexachlorobenzene	공 전 Dibromochloromethane 정	Chloroform	Tribromomethane	Bromodichloromethane	යrbon disulfide නි Zarbon disulfide	GEC/100G	Conductivity (1:5 aqueous extract)	(qen) Hd pH Units	% Clay*	Approximate Sample Mass	Asbestos Sample Dimensions	Mass ACM Mass Achaetas in ACM	estos from	Mass FA	Mass Asbestos in FA	Mass asbestos in AF	: ₫	Aspestos from FA & AF III	Mass Asbestos in FA & AF	% Moisture Content	% Moisture Content (dried @ 103°C)	701 %	% Iron (%)
EQL			0.5	0.5		0.5	0.05	0.5	0.5	0.5	0.5	0.5	0.05	10	0.1	1	g	Comment	8 8	; 70 (W/W	/) g	g	8 8	70 (W	w/w)	g	0.1		0.1	-
	eral Solid Waste CT1 (N	o Leaching)	86	0.5		2000	0.03	0.5	120	0.5	0.5	0.5	0.03	10	0.1												0.1		0.1	0.01
	eral Solid Waste SCC1 (v		155		270	3600			216										_		1		_		_	_				
	ricted Solid Waste CT2		344		600	8000			480																					
	icted Solid Waste SCC2		620			14400			864																					
		•																												
Field ID	Sampled Date	Lab Report Number																												
ED-B1_0.0-0.1	2/02/2023	962621	-	-	-	-	<0.05	<u> </u>	-	-	-	-	26	410	9.1	6.1	- 1	-	- -	-	-	-		-	-	-	-	8.5	0.3	3.1
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ED-B2_0.0-0.1	4/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	-	-			-	-	-	5.6	-	-
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MH-B10_0.2-1.0		962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	1#8	0 0				0 0		_	0	-	-	-	
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				Chlori	nated B	enzene	s		Trihalo	methan	es	Organic Sulfur Compounds	lon	ic Balan	ice	Particle Size					Asbest	os			_		Mo	oisture Content		Otl
EQL NSW 2014 Genera NSW 2014 Genera	I Solid Waste CT1 (i	No Leaching) (with leached)		0.5	0.5 150 270	mg/kg 0.5 2000 3600 8000	mg/kg 0.05					mg/kg mg/kg 0.5	MEQ/100G 0.05	Conductivity (1:5 aqueous extract)	(q g) Hd 1 pH Units 0.1	*Ango 80 % 1	∞ Approximate Sample Mass	O March Sample Dimensions	Mass ACM	B Mass Asbestos in ACM	S Asbestos from ACM in Soil			© Mass asbestos in AF	Ashestos from	III JA 8 AT III OII 6016	Mass Asbestos in FA & AF	Moisture Content %	Moisture Content (dried @ 103°C)	% 0.:
	ted Solid Waste SCO		620			14400			864																					
Field ID	Sampled Date	Lab Report Numbe	r																											
	3/02/2023	962621	·	T -	-	-	<0.05		-	-	-			١.	-		- 1	-	1.1	-	-	-	-		Τ.	. T	-		7.7	-
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MH-B3_0.0-0.6	3/02/2023	962621	-	-	-	-	-		-	-	-	-	-	-	-	-	589	-	0	0	0	0	0 0	0 0	-	\rightarrow	0	-	-	Н
MH-B3_0.2-0.3	3/02/2023	962621	-	-	-	-	-		-	-	-		-	-	-	-	-	-	1-1	-	-	-	-	- -		.	-	-	5	Г
MH-B3_0.8-1.0	3/02/2023	962621	-	-	-	-	<0.05		-	-	-	-		-	-	-	805	-	0	_	0	-	\rightarrow	0 0	_	_	0	-	4.1	
MH-B4_0.0-0.6	3/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	984	-	0	0	0	0	0	0 0	C)	0	-	Ŀ	
MH-B4_0.2-0.3	3/02/2023	962621	-	-	-	-	<0.05		-	-	-	-	-	-	-	-	-	-	<u> </u>	-	-	-	-	· -	-	\rightarrow	•	-	5.6	-
MH-B4_0.6-0.7	3/02/2023	962621	-	-	-	-	-	·	-	-	-			-	-		-	-	-	-	-	-	-	· -	-	-	-	-	3	_
MH-B5_0.0-0.1	2/02/2023	962621	-	-	-	-	-		-	-	-	-	<u> </u>	-	-		- 620	-	-	-	-	-	-	- -	-	\rightarrow	-	-	7.3	H
MH-B5_0.0-0.9 MH-B5_0.1-0.2	2/02/2023	962621		-	-	-	<0.05	-	-	-	-	-	-	-	-	-	628	-	0	0	0	0	U I	0 0	0	\rightarrow	0	-	- 0	╙
MH-B5_0.1-0.2 MH-B5_0.4-0.5	2/02/2023	962621 962621		-	-	-	<0.05	<u> </u>	-	-	-	-	<u> </u>	-	-	-			+:-	-		-	-	+-	+	-	-	-	8.9	-
MH-B5_0.8-0.9	2/02/2023	962621	-	-	-	-	-		-	-	+ -			-	-		-		-	-		-		. -	١.	\rightarrow			7.2	-
MH-B6_0.0-0.1	2/02/2023	962621	<0.5		<0.5	<0.5	<0.05	<0.5	_	_	<0.5	<0.5		-	-		-	-	-	-	-	-	-	. -	١.	\rightarrow	-	-	6	-
MH-B6_0.0-0.6	2/02/2023	962621	-	-	-	-	-	-	-	-	-			-	-	-	588	-	0	0	0	0	0 1	0 0	-	<u> </u>	0	-	-	Н
MH-B6_0.2-0.3	2/02/2023	962621	-	-	-	-	-		١.	-	-	-	26	350	8.5	6.7	-	-	-	-	-	-	-		1	\rightarrow	-	-	8	⊢
MH-B6_0.4-0.5	2/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- 1	-	-	-	-	-	-		1 -	-	-	-	8.5	Г
MH-B7_0.0-0.1	2/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- -	-	-	-	-	5.3	
MH-B7_0.0-1.0	2/02/2023	962621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	731	-	0	0	0	0	0 (0 0	C)	0	-	-	L
MH-B7_0.2-0.3	2/02/2023	962621	-	-	-	-	<0.05		-	-	-			-	-	-	-	-	-	-	-	-	-	- -	-		•	-	5.8	-
MH-B7_0.9-1.0	2/02/2023	962621	-	-	-	-	<0.05		-	-	-	-	-	-	-		-	-	-	-	-	-	-	- -	-	-	-	-	4.6	-
MH-B8_0.1-0.2	2/02/2023	962621	-	-	-	-	-	·	-	-	-		-	-	-	-	-	-	-	-	-	-	-		1	\rightarrow	-	-	2.7	L
MH-B8_0.1-0.3	2/02/2023	962621	-	-	-	-	-	·	<u> </u>	-	-	-	-	-	-	-	1109	-	0	_	0	\rightarrow	0 1	\rightarrow	0	_	0	-	-	L
MH-B8_0.3-0.5 MH-B8_0.4-0.5	2/02/2023	962621	-	-	-	-	-0.05		-	-	-	-	<u> </u>	-	-		819	-	0	0	0	0	0 1	0 0	_	\rightarrow	0	-	13	H
MH-B8_0.5-0.6	2/02/2023	962621 962621		-	-	-	<0.05	-	-	-	-	-	-	-	-	-	\vdash		+ -	-		-	-	+ -	+	\rightarrow	-	-	15	-
MH-B9_0.0-0.1	2/02/2023	962621	-	-	-	-	-	H	-	-	1	-	-	+ -	-	-	H		+ -	-	-	-	-	+	+	\rightarrow		-	4.7	-
MH-B9_0.0-0.5	2/02/2023	962621	-	-	-	-	-		-	-	-		-	-	-	-	667	-	0	0	0	0	0 1	0 0	-	\rightarrow	0	-	-	H
MH-B9_0.2-0.3	2/02/2023	962621	-	-	-	-	<0.05	-	-	-	-	-		-	-	-	- 1	-	-	-	-	-	-	1 -	1 -	\rightarrow	-	-	5.6	Н
MH-B9_0.9-1.0	2/02/2023	962621	-	-	-	-	<0.05	-		-	-	-	-	-	-	-		-		-	-	-	-	1-	-		-		21	-
SPLIT01	2/02/2023	35779	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	1-	-	-	-	-	- [-	-		-	5.9	[-]	
SPLIT02	2/02/2023	35779	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	<u> -</u>	-	-	-	-	· -	_ -		-	9.7	<u> - </u>	
SPLIT03	3/02/2023	35779	-	-	-	-	<0.1		-	-	-		-	-	-			-	-	-	-	-	-	- -	 	-	-	8.2	-	Н
DUP01 DUP02	2/02/2023	962621	-	-	-	-	<0.05		-	-	-	-	-	-	-		-	-	+-	-	-	-	-	+-	 	\rightarrow	-	-	6.1	
DUP02 DUP03	2/02/2023 3/02/2023	962621 962621	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-		-	-		-	+	-	\rightarrow	-	-	8.5 5.5	
DUPUS	3/02/2023	307071		1 -			\0.05												1 - 1	-	_	1 - 1	-	1 -	Щ.		-		J.5	_
Statistical Summa	ry																													
Number of Results	;		2	2	2	2	29	2	2	2	2	2	2	2	2	2	27	2	27	27	27	27	27 2	7 27	2	7 :	27	3	53	Ī
Number of Detect			0	0	0	0	0	0	0	0	0	0	2	2	2	2	27	2	27	_	27	_	_	7 27		_	27	3	53	
Minimum Concen	tration		<0.5	_	_	<0.5	<0.05	_	-	-	_	<0.5	26	350	8.5	6.1	6	1	0	-	0	_	-	0 0	$\overline{}$	\rightarrow	0	5.9	2.7	
Minimum Detect			ND		ND	ND	ND	ND	ND		ND	ND	26	350	8.5	6.1	6	1	ND	_	ND			D ND			ND	5.9	2.7	_
Maximum Concen	tration		<0.5	_	_	<0.5	<0.1	<0.5			_	<0.5	26	410	9.1	6.7	1329	1	0		0	_	_	0 0		\rightarrow	0	9.7	24	
Maximum Detect			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	26	410	9.1	6.7	1329	1	ND		ND			D ND		_	ND	9.7	24	_
Average Concentre Median Concentre			0.25	0.25	0.25	0.25	0.027	0.25	0.25	0.35	0.25	0.25	26	380	8.8	6.4	729 645	1	0	_	0			0 0		_	0	7.9 8.2	7.8 6.7	
			0.25	0.25	0.25	0.25	0.025	_	0.25	0.25	0.25	0.25	26	380	6.8	6.4	306	1	0	_	0	-	_	0 0		\rightarrow	0	1.9	4.3	-
Standard Dovistic			1	1	1	1	J 0.0064					I .		1			300		\rightarrow	<u> </u>	U	1 0 1	vΙ	, I O	1 (, I	٧ .	1.3		
Standard Deviatio Number of Guidel			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n	0 1	0 0	C)	0	0	∥ n ∣	(

Table F ASLP-TCLP

Project Number: 63879

Project Name: Broken Hill Hospital Redevelopment



EQL
NSW 2014 General Solid Waste TCLP1 (leached)
NSW 2014 Restricted Solid Waste TCLP2 (leached)

	ASLP			Heavy Meta	al	Organic		TC	LP	
pH of Leaching Fluid	pH (Final)	pH (Initial)	Arsenic	Lead	Nickel	Benzo(a)pyrene	pH of Leaching Fluid	рН (after HCL)	pH (Final)	рН (Initial)
pH Units	pH Units	pH Units	mg/L	mg/L	mg/L	mg/L	pH Units	pH Units	pH Units	pH Units
0.1	0.1	0.1	0.01	0.01	0.01	0.0005	0.1	0.1	0.1	0.1
			5	5	2	0.04				
			20	20	8	0.16				

Field ID	Sampled Date	Lab_Report_Number											
ED-B8_0.0-0.2	4/02/2023	967191	-	-	-	0.02	-	-	-	5	1.6	5.2	8.6
MH-B1_0.2-0.3	3/02/2023	967191	-	-	-	-	0.07	-	-	5	1.6	5.3	8.5
MH-B10_0.2-0.4	2/02/2023	967191	-	-	-	-	0.03	-	-	5	1.6	6.1	8.1
MH-B10_0.5-0.6	2/02/2023	967191	-	-	-	-	0.04	-	-	5	1.5	6.1	8.3
MH-B2_0.2-0.3	3/02/2023	967191	-	-	-	-	0.06	-	-	5	1.6	5.7	8.6

Appendix C – Bore Logs



PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY GTE
DRILLING DATE 02-Feb-23
DRILL RIG N/A

DRILLING METHOD Solid Flight Auger **DIMENSIONS** x m

EASTING N/A
NORTHING N/A

COORD SYS GDA94_MGA_zone_54
COORD SOURCE

LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples		Additional Observations
D.	Wate	Dept	Grap	Lit		Mois		PID	
SFA		0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 1.1 1.1	9	Fill	Fill - Clayey, gravelly SAND, brown damp, medium plasticity well graded, medium sand	DP	ED-B1_0.0-1.0 ED-B1_0.20-0.30 ED-B1_0.40-0.50	<u>a</u>	No odour, staining or ACM. 20L AQ completed from 0.0-0.1 mbgs. DUP/SPLIT02 collected from 0.4-0.5 mbgs.
		- 1.4 - 1.5 - 1.6 - 1.7 - 1.8 - 1.9		SG	Natural - Gravelly SAND, grey/brown moist, well graded, medium sand Termination Depth at: 2.00 m.	M	ED-B1_1.40-1.50		No odour, staining or ACM End of Hole @ 2.0
		- 2.1 - 2.2 - 2.3 - 2.4 - 2.5							mbgs. Programmed depth.



BOREHOLE ED-B2

PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 04-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY MacGeo

DRILL RIG N/A

DRILLING METHOD Solid Flight Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA				Bitumen	Fill - BITUMEN		ED-B2_0.0-0.3		No odour, staining
		0.1		Fill	Fill - ROADBASE, grey dry, medium gravel	DR			\or ACM No odour, staining or ACM. 5L AQ
		0.2		Fill	Fill - Silty SAND, yellow/brown dry, low plasticity fine sand trace fine gravel (<5%), refusal with auger at 0.6 m, inferred natural bedrock	DR	ED-B2_0.20-0.30		completed from 0.0-0.3 mbgs No odour, staining or ACM
		0.4			beneath				OI ACIVI
		0.5			Touristic Double to 0.00 m		ED-B2_0.50-0.60		Ford of Hole O O O
		0.7			Termination Depth at: 0.60 m.				End of Hole @ 0.6 mbgs. Refusal on rock.
		0.9							
		- 1 - 1.1							
		- 1.2 - 1.3							
		1.4							
		1.5							
		- - 1.7 - - - 1.8							
		1.9							
		- 2 - 2 - 2.1							
		2.2							
		- 2.3 - - - 2.4							
		2.5							



BOREHOLE ED-B3

PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 04-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY MacGeo

DRILL RIG N/A **DRILLING METHOD** Solid Flight Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54 COORD SOURCE

LOGGED BY AJ

			ø					
Drilling Method Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA	Ì		Bitumen	Fill - BITUMEN		ED-B3_0.0-0.7		No odour, staining
	0.1 0.2 0.3		Fill	Fill - ROADBASE, grey dry, well graded, medium sand	DR	ED-B3_0.20-0.30		No odour, staining or ACM. 5L AQ completed from 0.0-0.7 mbgs
	0.5					ED-B3_0.50-0.60		
	0.7 0.8	XXX)	SG	Natural - Crushed, gravelly SAND, yellow/brown/grey dry, well graded, fine sand	DR	ED-B3_0.70-0.80		No odour, staining or ACM
	0.9 1 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2 2.1 2.2 2.3 2.4 2.5			Termination Depth at: 0.80 m.				End of Hole @ 0.8.



PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 04-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY JBS&G

DRILL RIG N/A

DRILLING METHOD Hand Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

ethod	(lbq	(lgd	go.	cal Class					Additional
Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Observations
НА				Fill	Fill - GRAVEL dry, medium gravel	DR			No odour, staining or ACM
		0.1		RWN	Fill - SAND, red/brown dry, well graded, fine sand	DR	ED-B4_0.1-0.5		No odour, staining or ACM. 10L AQ completed from 0.1-0.5
		0.4					ED-B4_0.40-0.50		
		0.5	0.00	SG	Natural - Crushed/weathered, gravelly SAND, grey dry, well graded, medium sand	DR	ED-B4_0.50-0.60		No odour, staining or ACM
		0.0			Termination Depth at: 0.60 m.				End of Hole @ 0.6 mbgs. Refusal on rock.
		0.8							
		- 0.9 - - - 1							
		_ ' _ 1.1							
		1.2							
		1.3							
		1.4							
		1.5							
		_ 1.6 _ _ _ 1.7							
		1.8							
		1.9							
		2							
		2.1							
		2.2 - - - 2.3							
		- 2.3 - - - - 2.4							
		2.5							
		=							



BOREHOLE ED-B5

PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY GTE **DRILLING DATE** 02-Feb-23

DRILL RIG N/A

DRILLING METHOD Solid Flight Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		0.1		Fill	Fill - SAND, red/brown damp, well graded, fine sand	DP	ED-B5_0.0-0.3 ED-B5_0.20-0.30		Thin grey layer on surface, no odour, staining or ACM
		0.3		GC-GS	Natural - Clayey, sandy GRAVEL, grey/brown damp, low plasticity well graded, medium gravel	DP	ED-B5_0.30-0.40 ED-B5_0.90-1.00		No odour, staining or ACM
		1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.1 2.1 2.2 2.3 2.4			Termination Depth at: 1.00 m.				End of Hole @ 1.0 mbgs. Programmed depth.



BOREHOLE ED-B6

PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY GTE
DRILLING DATE 02-Feb-23

DRILL RIG N/A

DRILLING METHOD Solid Flight Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		- - -	$\otimes\!\!\!\otimes$	Fill	Fill - GRAVEL, white dry, medium gravel	DR			No odour, staining or ACM
		0.1		Fill	Fill - SAND, red/brown damp, well graded, fine sand	DP	ED-B6_0.1-0.3		No odour, staining or ACM
			\bowtie				ED-B6_0.20-0.30		
		0.3		Fill	Fill - Gravelly, clayey SAND, grey damp, medium plasticity well graded, fine sand with water pipe at base of hole (1.0 - 1.1)	DR	ED-B6_0.30-0.40		No odour, staining or ACM
		- 1	$\times\!\!\times\!\!\times$		Termination Depth at: 1.00 m.				End of Hole @ 1.0
		1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.1 2.2 2.3			Termination Depth at. 1.00 III.				mbgs. PVC pipe encountered at EOH.



PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 04-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill, NSW

DRILLING COMPANY JBS&G

DRILL RIG N/A **DRILLING METHOD** Hand Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

	_	ı			T	1	.	1	
Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
НА		=		Bitumen	Fill - BITUMEN		ED-B7_0.00-0.20		No odour, staining
		0.1		Fill	Fill - ROADBASE, grey dry, medium gravel	DR			No odour, staining or ACM. 10L AQ completed from
		0.3		RWN	Fill - Gravelly CLAY, red/brown damp, high plasticity fine gravel	DP	ED-B7_0.20-0.30		0.0-0.2 No odour, staining
		0.3		CL-GM-ML	Natural - Gravelly, silty CLAY, pale brown/red moist, low plasticity fine gravel	М	ED-B7_0.30-0.40		or ACM No odour, staining or ACM
		0.5			Natural - Sandy SILT, pale grey moist, low plasticity medium sand inclusions of medium				
		0.6		ML-SM	gravel (<10%), refusal with hand auger at 0.65 m, inferred natural bedrock/hard ground	M	ED-B7_0.50-0.65		No odour, staining or ACM
	\vdash	0.7			beneath Termination Depth at: 0.65 m.				End of Hole @ 0.65. Refusal on rock/hard ground
		0.8							Toolynara ground
		0.9							
		_ _ 1							
		1.1							
		1.2							
		1.3							
		1.4							
		1.5							
		1.6							
		1.7							
		1.8							
		1.9							
		2							
		2.1							
		2.2							
		2.4							
		2.5							
		_							



BOREHOLE ED-B8

PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 04-Feb-23 **CLIENT** Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY JBS&G DRILL RIG N/A

DRILLING METHOD Hand Auger **DIMENSIONS** x m

EASTING N/A NORTHING N/A COORD SYS GDA94_MGA_zone_54 COORD SOURCE LOGGED BY AJ

	_						i		
Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
НА				Bitumen		DR	ED-B8_0.0-0.6		No odour, staining
		0.1		Fill	Fill - ROADBASE, grey dry, well graded, medium sand inclusions of fine gravels (<10%) and trace cobbles (<5%)	DR	ED-B8_0.30-0.40		or ACM No odour, staining or ACM. 15L AQ completed from 0.0-0.6 mbgs
		0.4							
		0.5					ED-B8_0.50-0.60		
		0.7 							
		0.9		GC-GS	Natural - Clayey, sandy GRAVEL, red/brown/grey moist, medium plasticity well graded, medium gravel	M	ED-B8_0.8-1.0		No odour, staining or ACM
		- 1	1 × 8		Termination Depth at: 1.00 m.				End of Hole @ 1.0
		- - - - - - - - 1.2							mbgs. Programmed depth.
		1.2							
		- 1.4 1.5							
		 1.6							
		- 1.7 - - - - 1.8							
		1.9							
		2 2.1							
		2.2 							
		2.3 							
		2.5 							



BOREHOLE ED-B9

PROJECT NUMBER 63879 DRILLING COMPANY JBS& PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 04-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,
NSW

DRILLING COMPANY JBS&G
DRILLING DATE 04-Feb-23
DRILL RIG N/A
DRILLING METHOD Hand Auger
DIMENSIONS x m

EASTING N/A
NORTHING N/A
COORD SYS GDA94_MGA_zone_54
COORD SOURCE
LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
НА				Fill	Fill - Clayey, sandy GRAVEL, grey/brown dry, low plasticity well graded, fine gravel	DR	ED-B9_0.00-0.10		No odour, staining or ACM. Damaged
		0.1		Fill	Fill - SAND, red/brown damp, well graded, fine gravel	DP	ED-B9_0.1-0.5		brown irrigation pipe at top of hole, was repaired. No odour, staining or ACM
		0.5		SG	Natural - Gravelly SAND, grey damp, well graded, medium sand refusal with hand auger	DP	ED-B9_0.50-0.60		No odour, staining
		_ _ 0.6	O		at 0.6 m, inferred natural bedrock beneath		_		or ACM
		- 0.7 - 0.8 - 0.9 - 1 - 1.1 - 1.2 - 1.3 - 1.4 - 1.5 - 1.6 - 1.7 - 1.8 - 1.9 - 2.1 - 2.2 - 2.3			Termination Depth at: 0.60 m.				End of Hole @ 0.6 m. Refusal on rock.
		2.5 							



PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 03-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY JBS&G

DRILL RIG N/A

DRILLING METHOD Hand Excavation (Shovel)

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

	_	l			1	1	Г		<u> </u>
Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
HE		_		Fill	Fill - Silty SAND, brown wet, low plasticity well graded, fine sand	w	MH-B1_0.00-0.10		No odour, staining or ACM. Sample too
		0.1		Fill	Fill - Gravelly SAND, grey/brown wet, well graded, medium sand	W	MH-B1_0.10-0.20		\wet to sieve. No odour, staining
		0.2		Fill	Fill - Sandy CLAY, red/brown wet, medium plasticity	W	MH-B1_0.20-0.30		or ACM. Sample too wet to sieve.
		0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.1 2.2 2.3			Termination Depth at: 0.30 m.				No odour, staining or ACM. Sample too wet to sieve. End of Hole @ 0.3 mbgs upon suspected service.
		E							



BOREHOLE MH-B2

PROJECT NUMBER 63879

CLIENT Health Infrastructure ADDRESS 176 Thomas Street, Broken Hill, NSW

DRILLING COMPANY GTE PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 03-Feb-23 DRILL RIG N/A **DRILLING METHOD** Solid Flight Auger **DIMENSIONS** x m

EASTING N/A NORTHING N/A COORD SYS GDA94_MGA_zone_54 COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		0.1	7 · · · · · · · · · · · · · · · · · · ·	Concrete	Fill - CONCRETE				No odour, staining or ACM
		0.2 - 0.3 - 0.4 - 0.5 - 0.6		Fill	Fill - ROADBASE, grey/brown dry, well graded, fine gravel	DR	MH-B2_0.2-0.8 MH-B2_0.40-0.50		No odour, staining or ACM. 20L AQ completed from 0.2-0.8 mbgs.
		- 0.8 - 0.9 - 1 - 1.1 - 1.2 - 1.3		CL-ML	Natural - Silty CLAY, red/brown damp, medium plasticity trace medium gravels (<5%)	DP	MH-B2_0.80-0.90 MH-B2_1.40-1.50		No odour, staining or ACM
		- 1.5 - 1.6 - 1.7 - 1.8 - 1.9 - 2.1 - 2.2 - 2.3 - 2.4 - 2.5			Termination Depth at: 1.50 m.				End of Hole @ 1.5 mbgs. Programmed depth.



PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 03-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY JBS&G

DRILL RIG N/A **DRILLING METHOD** Hand Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
НА	^	0.1		Fill	Fill - SAND, red/brown damp, well graded, fine sand	DP	MH-B3_0.20-0.30 MH-B3_0.50-0.60		No odour, staining or ACM. 20L AQ completed from 0.0-0.6 mbgs.
		0.6		Fill	Fill - GRAVEL, black/grey dry, medium sand Fill - Gravelly SAND, grey/red/brown damp,	DR DP	MH-B3_0.8-1.0		No odour, staining or ACM No odour, staining or ACM. 5L AQ completed from
		- - - - - - - - - - - - - - - - - - -		FIII	coarse sand with clay fines (<10%)	DP	WIN-B3_U.0-1.U		0.8-1.0 mbgs. DUP/SPLIT03 collected from 0.8-1.0 mbgs.
		1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 1.9 1.2 1.2 1.2 1.2 1.2 1.3 1.4 1.5 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9			Termination Depth at: 1.00 m.				End of Hole @ 1.0 mbgs. Proximal to service.



PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 03-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY MacGeo

DRILL RIG N/A

DRILLING METHOD Solid Flight Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		- 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.6		Bitumen Fill	Fill - BITUMEN Fill - ROADBASE, grey dry, medium gravel	DR	MH-B4_0.0-0.6 MH-B4_0.20-0.30		No odour, staining or ACM / No odour, staining or ACM
		0.7		CL-ML-GM Bedrock	Natural - Silty, gravelly CLAY, red/grey Natural - Gravelly BEDROCK, grey		MH-B4_0.60-0.70		No odour, staining or ACM No odour, staining or ACM
		1.1 -1.2 -1.3 -1.4 -1.5 -1.6 -1.7 -1.8 -1.9 -2.1 -2.1			Termination Depth at: 1.00 m.				End of Hole @ 1.0 mbgs. Programmed depth.



PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY GTE **DRILLING DATE** 02-Feb-23

DRILL RIG N/A

DRILLING METHOD Solid Flight Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA				Bitumen	Fill - BITUMEN	DR	MH-B5_0.0-0.9		No odour, staining
		_ _ 0.1	\bigvee	Fill	Fill - Sandy GRAVEL, grey dry, medium gravel	DR			\or ACM /\No odour, staining /
		_	\bowtie	Fill	Fill - Gravelly CLAY, red/brown dry, medium plasticity inclusions of cobbles, medium sand	DR	MH-B5_0.10-0.20		or ACM
		0.2			(<10%), red brick pieces, tile, ceramic pipe			1	No odour, staining
		_ _ 0.3	\bowtie		(<5%)				or ACM. 20L AQ completed from
		_	\bowtie						0.0-0.9 mbgs.
		0.4					MH-B5_0.40-0.50	1	
		_ _ 0.5	\bowtie				_		
		_	\bowtie						
		0.6	\bowtie						
		_ _ 0.7	\bowtie						
		0.8	\bowtie				MH-B5_0.80-0.90	1	
		_ 	\bowtie						
					Termination Depth at: 0.90 m.				End of Hole @ 0.9 mbgs. Refusal on
		<u> </u>							gravels.
		_ _ 1.1							
		_							
		_ 1.2							
		1.3							
		_ 1.4							
		- 1. 4							
		1.5							
		_ _ _ 1.6							
		- 1.0							
		1.7							
		1.8							
		_							
		1.9							
		_ _ 2							
		2.1							
		_ _ 2.2							
		=							
		2.3							
		_ - 2.4							
		2.5							



PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY GTE

DRILL RIG N/A

DRILLING METHOD Solid Flight Auger

DIMENSIONS x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		- 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.6		Bitumen Fill SC	Fill - BITUMEN Fill - Clayey, gravelly SAND, grey/red/brown dry, medium plasticity well graded, medium sand inclusions of red brick fragments (<10%) Natural - Clayey, gravelly, weathered SAND,	DR	MH-B6_0.0-0.6 MH-B6_0.20-0.30 MH-B6_0.40-0.50		No odour, staining or ACM No odour, staining or ACM. 20L AQ completed from 0.0-0.6 mbgs.
		- 0.8 - 0.9 - 1.1 - 1.2 - 1.3 - 1.4 - 1.5 - 1.6 - 1.7 - 1.8 - 2.1 - 2.1 - 2.2 - 2.3 - 2.4			grey damp, medium plasticity fine sand with natural bedrock at base of hole Termination Depth at: 0.70 m.				or ACM End of Hole @ 0.7 mbgs. Refusal on hard rock.



PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY GTE **DRILLING DATE** 02-Feb-23

DRILL RIG N/A

DRILLING METHOD Solid Flight Auger

DIMENSIONS x m

EASTING N/A
NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA	Mai Mai	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.1 1.2 1.3 1.4 1.5 1.6 1.7	Qra	Bitumen Fill	Fill - BITUMEN Fill - Gravelly SAND, grey/brown dry, well graded, medium sand inclusions of roadbase, weathered natural rock and fine clay Termination Depth at: 1.20 m.	DR	MH-B7_0.20-0.30 MH-B7_0.40-0.50 MH-B7_0.9-1.0 MH-B7_1.10-1.20		No odour, staining or ACM No odour, staining or ACM. 20L AQ completed from 0.0-0.1 mbgs. DUP/SPLIT01 collected from 0.9-1.0 mbgs.
		2.2							



PROJECT NAME Broken Hill Hos

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23
CLIENT Health Infrastructure DRILL RIG N/A

ADDRESS 176 Thomas Street, Broken Hill, NSW

DRILLING COMPANY GTE
DRILLING DATE 02-Feb-23
DRILL RIG N/A
DRILLING METHOD Solid Flight Auger
DIMENSIONS x m

EASTING N/A
NORTHING N/A
COORD SYS GDA94_MGA_zone_54
COORD SOURCE
LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		_		Asphalt	Fill - ASPHALT				No odour, staining or ACM
		0.1		Fill	Fill - Silty GRAVEL, grey dry, medium gravel	DR	MH-B8_0.1-0.3		No odour, staining or ACM. 10L AQ completed from 0.1-0.3 mbgs.
		0.3		RWN	Fill - Silty, gravelly CLAY, red damp, medium plasticity	DP	MH-B8_0.3-0.5		No odour, staining or ACM. 10L AQ completed from
							MH-B8_0.40-0.50		0.3-0.5 mbgs.
		0.5		CL-ML	Natural - CLAY, red damp, high plasticity	DP	MH-B8_0.50-0.60		No odour, staining or ACM
		0.7							
		 0.9 					MH-B8_0.90-1.00		
		_ ' _ 1.1			Termination Depth at: 1.00 m.				End of Hole @ 1.0 mbgs. Programmed depth.
		1.2							
		- - 1.4 - - 1.5							
		1.6							
		1.7							
		1.9							
		2 2.1							
		2.2 - 2.3							
		2.4							
		2.5							



PROJECT NUMBER 63879

PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill,

NSW

DRILLING COMPANY GTE
DRILLING DATE 02-Feb-23
DRILL RIG N/A

DRILLING METHOD Solid Flight Auger **DIMENSIONS** x m

EASTING N/A NORTHING N/A

COORD SYS GDA94_MGA_zone_54

COORD SOURCE LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		0.1		Bitumen Fill	Fill - BITUMEN Fill - ROADBASE, grey dry, well graded, medium sand	DR	MH-B9_0.0-0.5		No odour, staining Or ACM No odour, staining or ACM
		0.2		Fill	Fill - Gravelly, clayey SAND, gre/red/brown damp, medium plasticity fine sand	DP	MH-B9_0.20-0.30		No odour, staining or ACM
		0.5		CL-ML	Natural - Silty CLAY, red/brown damp, medium plasticity	DP	MH-B9_0.50-0.60		No odour, staining or ACM
		- 1.1 - 1.2 - 1.3 - 1.4 - 1.5 - 1.6 - 1.7 - 1.8 - 1.9 - 2.1 - 2.2 - 2.3 - 2.4			Termination Depth at: 1.00 m.				End of Hole @ 1.0 mbgs. Programmed depth.



PROJECT NAME Broken Hill Hospital Redevelopr DRILLING DATE 02-Feb-23

CLIENT Health Infrastructure

ADDRESS 176 Thomas Street, Broken Hill, NSW

DRILLING COMPANY GTE
DRILLING DATE 02-Feb-23
DRILL RIG Excavator

DRILLING METHOD Bucket Excavation **DIMENSIONS** x m

EASTING N/A
NORTHING N/A
COORD SYS GDA94_MGA_zone_54
COORD SOURCE
LOGGED BY AJ

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
BE		0.1	\bigotimes	Fill	Fill - Sandy CLAY, brown dry, medium plasticity fine sand inclusions of medium gravel, cobbles, red brick fragments, glass, tile, ACM, slag, charcoal, metal, bitumen	DR	MH-B10_0.00-0.20		No odour or staining. 2pc ACM found on surface. AQ completed from
		0.2		Fill	Fill - Sandy CLAY, brown dry, low plasticity fine sand inclusions of medium gravel, cobbles, bitumen chunks, ceramic pipe, bricks, poly, ACM, two incactive ceramic pipes at 0.3 m	DR	MH-B10_0.2-1.0A		0.0-0.2 mbgs. 1pc ACM in AQ. No odour or staining. AQ completed from 0.2-1.0. 1pc ACM found.
		0.6					MH-B10_0.50-0.60		
		0.9 - 1 - 1.1		CL	Natural - CLAY, red/brown damp, high plasticity	DP	MH-B10_1.00-1.20		No odour, staining or ACM
		1.2					MH-B10_1.40-1.50		
		1.5 - 1.6 - 1.7 - 1.8 - 1.9		CL	Natural - CLAY, red/brown with calcareous mottling damp, medium plasticity fine sand	DP			No odour, staining or ACM
		- 2.1 - 2.2 - 2.3 - 2.4		CL-SG	Natural - Sandy, gravelly CLAY, dark red/brown moist, low plasticity fine sand black mica/schist	M			No odour, staining or ACM
		2.5 - - -	<i>\/////</i>		Termination Depth at: 2.50 m.				End of Hole @ 2.5 mbgs. Programmed



JOB no.: PSM4951

PROJECT: Broken Hill Hospital

PIEZOMETER CONSTRUCTION RECORD HOLE NUMBER: BH01 DRILLING CONTRACTOR: MacGeo PIEZOMETER: 1 RIG: Comacchio Geo 305 COLLAR EASTING: 542900 m DEPTH OF HOLE (m): 12 m **BOREHOLE INCLINATION: -90** COLLAR NORTHING: 6465200 m COLLAR RL(m): 309 m PIEZO INSTALLATION DATE: 2/02/2023 DATUM: MGA2020 Zone 54 SUPERVISED BY: HZ Tick boxes Complete dimensions if appropriate Height of stickup (m) 0 Steel protective well cover X Χ PVC cap Concrete colar Diameter of PVC (mm) 50 Back fill type: Cement bentonite Soil None 0 Depth to top of seal Seal: Bentonite pellets Other Depth to top of gravel pack 2 Gravel type: 2-5mm gravel Other Depth to top of screen 3 Perforation type: Monitored interval Drill holes Hack saw cuts 40um machine slots 12 Depth to base of screen Depth to base of piezo 12 12 Depth to base of gravel COMMENTS:



JOB no.: PSM4951

PROJECT: Broken Hill Hospital

PIEZOMETER CONSTRUCTION RECORD HOLE NUMBER: BH03 DRILLING CONTRACTOR: MacGeo PIEZOMETER: 2 RIG: Comacchio Geo 305 COLLAR EASTING: 542920 m DEPTH OF HOLE (m): 12 m **BOREHOLE INCLINATION: -90** COLLAR NORTHING: 6465240 m COLLAR RL(m): 309 m PIEZO INSTALLATION DATE: 1/02/2023 DATUM: MGA2020 Zone 54 SUPERVISED BY: HZ Tick boxes Complete dimensions if appropriate Height of stickup (m) 0 Steel protective well cover Χ Χ PVC cap Concrete colar Diameter of PVC (mm) 50 Back fill type: Cement bentonite Soil None 7 Depth to top of seal Seal: Bentonite pellets Other Depth to top of gravel pack 8 Gravel type: 2-5mm gravel Other Depth to top of screen 9 Perforation type: Monitored interval Drill holes Hack saw cuts 40um machine slots 12 Depth to base of screen Depth to base of piezo 12 12 Depth to base of gravel COMMENTS:



JOB no.: PSM4951

PROJECT: Broken Hill Hospital

PIEZOMETER CONSTRUCTION RECORD HOLE NUMBER: BH05 DRILLING CONTRACTOR: MacGeo PIEZOMETER: 3 RIG: Comacchio Geo 305 COLLAR EASTING: 543000 m DEPTH OF HOLE (m): 12 m **BOREHOLE INCLINATION: -90** COLLAR NORTHING: 6465315 m COLLAR RL(m): 309 m PIEZO INSTALLATION DATE: 4/02/2023 DATUM: MGA2020 Zone 54 SUPERVISED BY: HZ Tick boxes Complete dimensions if appropriate Height of stickup (m) 0 Steel protective well cover Χ Χ PVC cap Concrete colar Diameter of PVC (mm) 50 Back fill type: Cement bentonite Soil None 0 Depth to top of seal Seal: Bentonite pellets Other Depth to top of gravel pack 2 Gravel type: 2-5mm gravel Other Depth to top of screen 6 Perforation type: Monitored interval Drill holes Hack saw cuts 40um machine slots 12 Depth to base of screen Depth to base of piezo 12 12 Depth to base of gravel COMMENTS:

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