REPORT TO

CITY OF PARRAMATTA COUNCIL

ON

REMEDIATION ACTION PLAN

FOR

PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

AT

351-353 CHURCH STREET, PARRAMATTA, NSW

Date: 26 February 2025
Ref: E37231PTrpt4-RAP

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DOCUMENT REVISION RECORD

Report Reference	Report Status	Report Date
E37231PTrpt4-RAP DRAFT	Draft Report	14 February 2025
E37231PTrpt4-RAP	Final Report	25 February 2025

Executive Summary

The City of Parramatta Council ('the client') commissioned JK Environments (JKE) to prepare a Remediation Action Plan (RAP) for the proposed Riverside Theatres redevelopment at 351—353 Church Street, Parramatta, NSW ('the site'). The site location is shown on Figure 1 and the RAP applies to the land within the site boundaries as shown on Figure 2 attached in Appendix A.

The RAP includes a methodology to remediate and validate the site. A contingency plan for remediation is included together with site management procedures and an unexpected finds protocol (UFP) to be implemented during remediation.

The goal of the remediation is to reduce contamination-related risks to human health and the environment, and to render the site suitable for the proposed development from a contamination viewpoint.

The primary aim of the remediation at the site are to mitigate risks from asbestos in fill soil. The objectives of this RAP are to: provide a rationale to support the extent of proposed remediation and the remedial/validation approach; provide a methodology to remediate and validate the site; provide a contingency plan for the remediation works; outline site management procedures to be implemented during remediation work; and provide an unexpected finds protocol to be implemented during the development works.

The scope of work included a review of the previous reports and preparation of a RAP.

The Detailed Site Investigation (DSI) identified fill impacted and contaminated with asbestos that requires remediation. The proposed remediation strategies for the contaminated fill include a combination of excavation and off-site disposal of contaminated fill/soil to a suitably licensed landfill, and in-situ capping of fill and long-term management of the capped areas via an Environmental Management Plan (EMP).

The anticipated sequence of remediation works is outlined at the beginning of Section 6 of this RAP. Remediation will occur concurrently with the development works and this should be considered by the consent authority so that the conditions in the development approval/consent align with the sequence of works and requirements of the RAP.

We are of the opinion that the site can be made suitable for the proposed development via remediation and the implementation of this RAP. A site validation report is to be prepared on completion of remediation activities and submitted to the consent authority to demonstrate that the site is suitable for the proposed development following completion of remediation/validation. An EMP will also be prepared to manage the contaminated fill capped on site as part of the remediation. The EMP will provide a passive management approach and is not expected to impose onerous constraints on the day-to-day site use under the proposed development scenario.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.

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Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Australian Drinking Water Guidelines	**ADWG**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Below Ground Level	**BGL**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Before You Dig Australia	**BYDA**
Contaminated Land Management	**CLM**
Contaminant(s) of Potential Concern	**CoPC**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Development Application	**DA**
Detailed Site Investigation	**DSI**
Environmental Management Plan	**EMP**
Environment Protection Authority	**EPA**
Fibre Cement Fragment(s)	**FCF**
Health Investigation Level(s)	**HIL**
JK Environments	**JKE**
Map Grid of Australia	**MGA**
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National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Preliminary Environmental Site Assessment	**PESA**
Polycyclic Aromatic Hydrocarbons	**PAH**
Polychlorinated Biphenyls	**PCB**
Per-and Polyfluoroalkyl Substances	**PFAS**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Remediation Action Plan	**RAP**
Sampling, Analysis and Quality Plan	**SAQP**
State Environmental Planning Policy	**SEPP**
Source, Pathway, Receptor	**SPR**
State Significant Development Application	**SSDA**
Standard Sampling Procedure	**SSP**
Standing Water Level	**SWL**
Total Recoverable Hydrocarbons	**TRH**
Unexpected Finds Protocol	**UFP**
United States Environmental Protection Agency	**USEPA**
Virgin Excavated Natural Material	**VENM**
Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**M**

Millivolts	**mV**
Millilitres	**ml or mL**
Milliequivalents	**meq**
micro Siemens per Centimetre	**µS/cm**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage weight for weight	**%w/w**
Percentage	**%**

1 CLIENT SUPPLIED INTRODUCTION

This report has been prepared on behalf of City of Parramatta Council to support a State Significant Development Application (SSDA) for redevelopment of Riverside Theatres at 351-353 Church Street Parramatta.

The Riverside Theatres redevelopment project is Development for the purposes of an Entertainment Facility with an estimated development cost of more than $30 million. Such development is state significant development in accordance with Schedule 1, clause 13 of State Environmental Planning Policy (Planning Systems) 2021. The development is considered state significant as the proposed works are estimated to have a development cost exceeding $30 million.

1.1 Client Supplied Site Description

Riverside Theatres is situated upon the lands of the Dharug people. It is located within the City of Parramatta Council Local Government Area within Sydney's Central River City (refer to Plate 1).

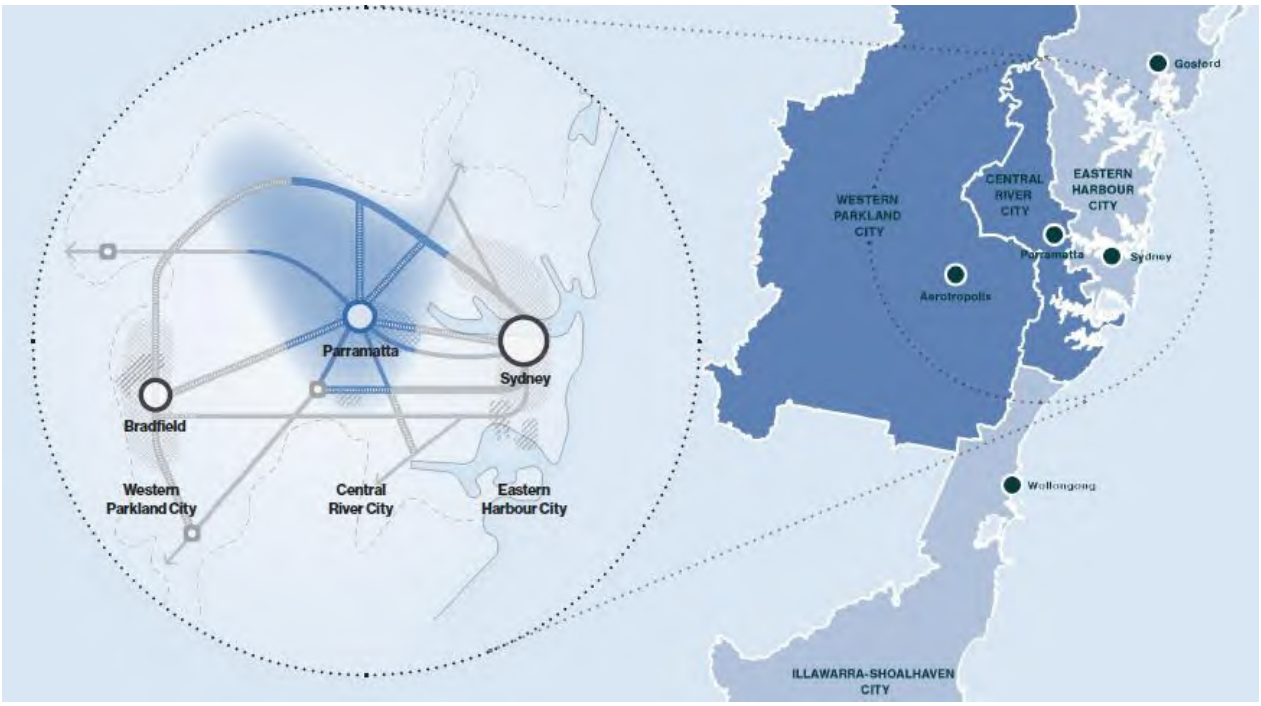


Plate 1 Context Plan

Located at 351-353 Church Street, Parramatta, the site comprises Lots 1 and 2 DP 740382. The site contains the existing Riverside Theatres, originally constructed in 1988 and modified since. The site also contains a small at-grade car park to the west adjacent to Marsden Street and accessed from Market Street.

The site is bordered by Church Street in the east, the Parramatta River in the south, Marsden Street to the west and Market Street to the north (refer to Plate 2).

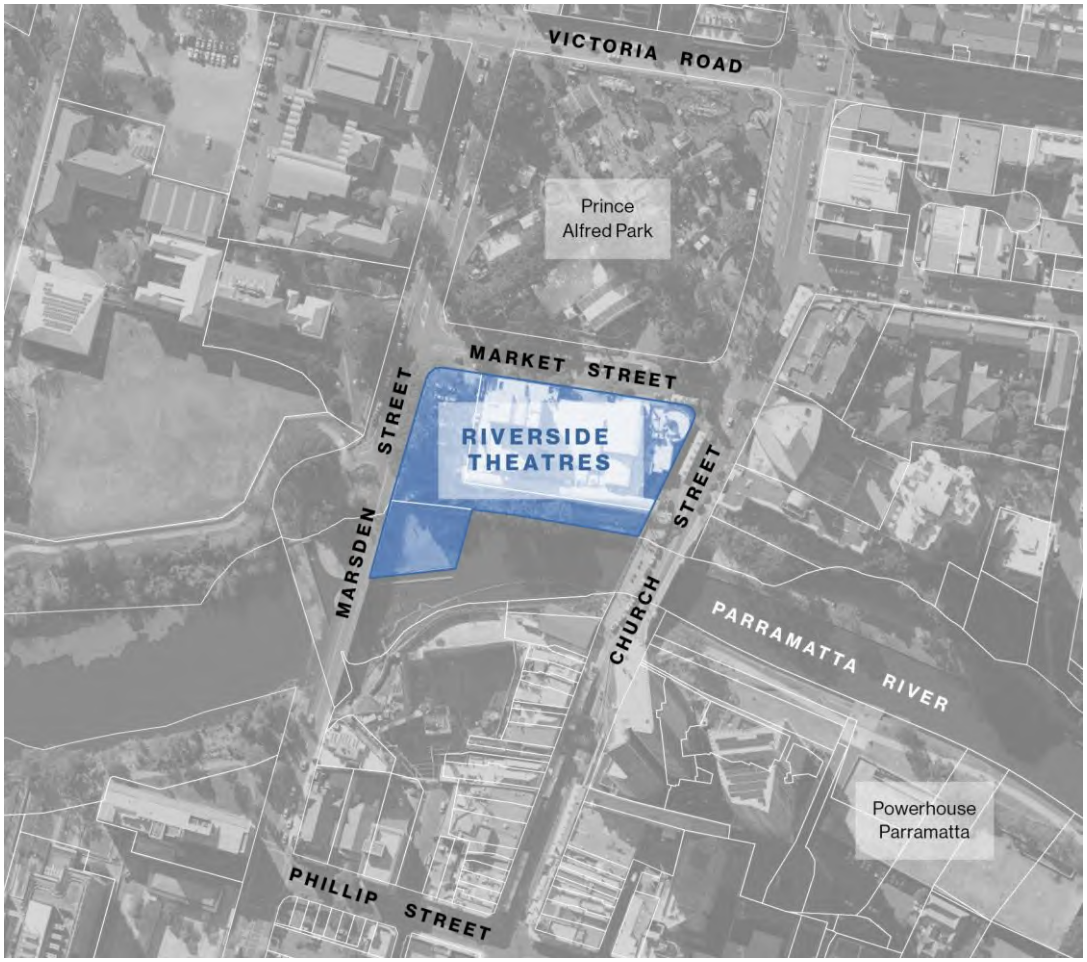


Plate 2 Riverside Theatres redevelopment site boundary (source: Arup)

1.2 Client Provided Overview of Proposed Development

The SSDA seeks consent for the design, construction and operation of the redeveloped Riverside Theatres. Specifically, approval is sought for the following:

- Site preparation works, including site services and infrastructure works, earthworks and the erection of site protection hoardings and fencing;
- Retention of the existing 761-seat Drama (Riverside) Theatre and demolition of all remaining buildings on the site;
- Construction of new front of house foyer spaces including:
  - New public entries facing Parramatta River and Church Street;
  - Food and beverage 'theatre' bars;
  - Arrival and gathering space;
  - Function spaces; and
  - Amenities.
- Construction of new theatre spaces including:
  - A 1,500 seat Lyric Theatre;
  - A 324 seat Studio Theatre with retractable seating; and
  - A 100 seat Cinema/Rehearsal space with dedicated entry from the public domain.
- Refurbishment of interiors to the 761 seat Drama (Riverside) Theatre;

- Construction of a new loading dock with access from Market Street;
- Construction of back of house spaces including:
    - Staff offices and amenities;
    - Central kitchen;
    - Dressing rooms;
    - Technical production spaces; and
    - Storage, cleaning and support spaces.
- Landscaping and public domain works including:
    - A new landscape between Riverside Theatres and the river foreshore;
    - An enhanced upper-level pedestrian connection between Church and Marsden Streets;
    - An enhanced landscape treatment to the Marsden Street interface;
    - A new lower-level pedestrian and cycle connection connecting to existing paths east and west; and
    - A riverfront café integrated within the landscape terraces.

Full details of the proposed development are set out in the Architectural Drawings and Landscape and Public Domain Drawings accompanying the Development Application (DA).

2 INTRODUCTION

The City of Parramatta Council ('the client') commissioned JK Environments (JKE) to prepare a Remediation Action Plan (RAP) for the proposed Riverside Theatres redevelopment at 351—353 Church Street, Parramatta, NSW ('the site'). The site location is shown on Figure 1 and the RAP applies to the land within the site boundaries as shown on Figure 2 attached in Appendix A.

The RAP includes a methodology to remediate and validate the site. A contingency plan for remediation is included together with site management procedures and an unexpected finds protocol (UFP) to be implemented during remediation.

2.1 Remediation Goal, Aims and Objectives

The goal of the remediation is to reduce contamination-related risks to human health and the environment, and to render the site suitable for the proposed development from a contamination viewpoint.

The primary aim of the remediation at the site are to mitigate risks from asbestos in fill soil. The objectives of this RAP are to:

- Provide a rationale to support the extent of proposed remediation and the remedial/validation approach;
- Provide a methodology to remediate and validate the site;
- Provide a contingency plan for the remediation works;
- Outline site management procedures to be implemented during remediation work; and
- Provide an unexpected finds protocol to be implemented during the development works.

2.2 Scope of Work

The RAP was prepared generally in accordance with a JKE proposal (Ref: EP70747PT) of 27 November 2024 and written acceptance from the client dated 3 December 2024. The scope of work included a review of the previous reports and preparation of a RAP.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[1], Consultants Reporting on Contaminated Land (2020)[2] guidelines, other guidelines made under or with regards to the Contaminated Land Management Act (1997)[3] and State Environmental Planning Policy (Resilience and Hazards) 2021[4] (formerly known as SEPP55). A list of reference documents/guidelines is included in the appendices.

[1] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

[2] NSW EPA, (2020). *Consultants reporting on contaminated land, Contaminated Land Guidelines.* (referred to as Consultants Reporting Guidelines)

[3] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

[4] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

3 SITE INFORMATION

3.1 Summary of Previous Investigations

A summary of relevant information from reports provided to JKE is outlined in the table below:

Table 3-1: Previous information summary

Report	Summary of relevant information
Stage 1 PESA, 2018[5]	JKE (as Environmental Investigation Services) undertook a Stage 1 PESA at the site in 2018. The site history assessment conducted as part of the PESA identified the following potential contamination sources/areas of environmental concern (AEC) in regards to contamination: imported fill material; fuel storage due to former land use as a council depot in the central and western portions; former onsite dry cleaner business in the east of the site; use of pesticides around the site; and hazardous building materials within the existing and former structures. The report concluded that further investigation of the contamination condition at the site was required.
Detailed Site Investigation (DSI), 2025[6]	JKE undertook a DSI at the site and for the proposed development in early 2025. The scope of work for the DSI included the following: review of site information, including background and site history information from various sources outlined in the report; preparation of a conceptual site model (CSM); design and implementation of a Sampling, Analysis and Quality Plan (SAQP); interpretation of the analytical results against the adopted Site Assessment Criteria (SAC); Data Quality Assessment; and preparation of a report including a Tier 1 risk assessment. Soil sampling was completed from 20 boreholes, groundwater sampling from three groundwater monitoring wells and soil vapour sampling from two vapour implants. The following potential sources of contamination/AEC were identified for the site: fill material; historical council depot/fuel storage; historical on-site dry cleaner; use of pesticides around site; and hazardous building materials in former and existing buildings. The boreholes generally encountered fill materials (i.e. historically imported/emplaced soils) to depths of approximately 0.1-3.0m below ground level (BGL). A number of boreholes terminated in fill due to the use of hand equipment. In places, there were creosote and hydrocarbon type odours. A selection of soil, groundwater and vapour samples were analysed for the contaminants of potential concern (CoPC) identified in the CSM. The following exceedances were reported for each media: • In fill soil: PAHs; lead and asbestos were reported at concentrations above the health-based SAC, and TRH, lead and arsenic were reported at concentrations above the ecological SAC; • In groundwater: arsenic, copper, nickel, and zinc were reported above the ecological SAC; and • In soil vapour samples: chloroform concentrations exceeded the health-based SAC.

[5] Environmental Investigation Services (EIS), (2018). *Report to Create NSW on Stage 1 Preliminary Environmental Site Assessment for Proposed Riverside Theatre Project at 351-353 Church Street, Parramatta, NSW.* (Ref: E31829KGrpt, dated 16 October 2018) (referred to as PESA)

[6] JK Environments (JKE), (2025). *Report to City of Parramatta Council on Detailed Site Investigation for Riverside Theatre Redevelopment at 351-353 Church Street, NSW.* (Ref: E37231PTrpt3-DSI, dated 26 February 2025) (referred to as DSI)

Report	Summary of relevant information
	The risk assessment established that the primary risks relate to asbestos in soil and that this would be the primary driver for remediation to be considered in the RAP. The DSI also inferred that the RAP would provide a validation framework for addressing data gaps when better site access is available. The report concluded that remediation of the site was required to render the site suitable for the proposed development, from a contamination viewpoint, and provided the following recommendations: 1. An asbestos management plan (AMP) should be prepared by a suitably qualified consultant and must be implemented by the current site users until the time remediation commences; 2. A Hazardous Building Materials Assessment (HAZMAT) should be undertaken for the existing buildings/structures at the site prior to the commencement of demolition work (if not already undertaken); 3. Preparation and implementation of a RAP. The RAP is to include requirements for a post-demolition investigation(s) to adequately address the data gaps identified and outline a contingency for remediation if the investigations identify a trigger for alternative/additional remediation; 4. Preparation and implementation of a construction-phase AMP; and 5. Preparation of a validation assessment report for the remediation works undertaken at the site. Key summary information from the DSI including figures/sample location plans, laboratory summary tables and borehole logs are included in Appendix A and C for reference purposes.
Preliminary Acid Sulfate Soil (ASS) and Salinity Assessment, and ASS Management Plan, 2025[7]	The preliminary ASS and Salinity assessment included soil sampling from five locations (BH5, BH13, BH17, BH19 and BH20) positioned judgementally across the site as shown on Figure 2. This sampling occurred concurrently with the DSI. The ASS component of the assessment was designed as a preliminary investigation and did not meet the minimum sampling density and analysis frequency. Soil sampling for the ASS assessment was limited to the depth of approximately 4.95mBGL. The low sampling density was considered reasonable given the site access limitations and localised extent of soil disturbance. The density for the salinity assessment was equivalent to approximately four sampling points per hectare (the area of the site is approximately 8,360m^2) and met the requirement for an 'initial site investigation' recommended in the relevant guideline document for 'moderately intensive construction'. The density was considered adequate to identify large areas of salinity impacted soils at the site. Soil sampling for this assessment was confined to the depth of approximately 4.95mBGL. Based on our understanding of the development at the time of the fieldwork, the investigation depth exceeded the deepest excavation depth and was considered adequate given other earthworks requirements and the largely on-grade development. The ASS assessment did not identify ASS materials to the depth of excavation. However, a management plan was included in the report specifying that the existing data must be reviewed once the proposed development and construction methods were finalised, and the depths of soil disturbance was known. The plan also included contingency management actions for the treatment of potential ASS (PASS).

[7] JK Environments (JKE), (2025). *Report to City of Parramatta Council on Preliminary Acid Sulfate Soil (ASS) and Salinity Assessment and ASS Management Plan for Riverside Theatre Redevelopment at 351-353 Church Street, NSW.* (Ref: E37231PTrpt4-ASS_SAL, dated 26 February 2025) (referred to as ASS and Salinity report)

Report	Summary of relevant information
	The salinity assessment identified the following: • The soils are classed as neutral (optimal plant growth) to strongly alkaline; • The soils are generally classed as non-saline to slightly saline; • The soils are classed as non-sodic; • The soils are generally non-aggressive to mildly aggressive towards buried concrete; • The soils are generally non-aggressive towards buried steel; • The groundwater is mildly-aggressive towards buried concrete; and • The groundwater is non-aggressive towards buried steel. The salinity assessment identified that the site is located in an area mapped as having a moderate salinity potential, however noted that the proposed redevelopment does not include salinity risk activities. The assessment concluded that salinity poses a low risk at the site in the context of the proposed development and a detailed salinity management plan was not required.

3.2 Site Identification

Table 3-2: Site Identification

Site Address:	351-353 Church Street, Parramatta, NSW
Lot & Deposited Plan:	Lots 1 and 2 DP 740382 and part of Lot 1 in DP1172250
Current Land Use:	Riverside Theatres, associated carpark and landscaped areas
Proposed Land Use:	Continued use as Riverside Theatres, associated carpark, landscaped areas and public open space
Local Government Area:	City of Parramatta Council
Current Zoning:	MU1: Mixed Use RE1: Public recreation
Site Area (m^2) (approx.):	8,360
Geographical Location (decimal degrees) (approx.):	Latitude: -33.8101875 Longitude: 151.0027391
Site Plans:	Appendix A
Site Address:	351-353 Church Street, Parramatta, NSW

3.3 Summary of Site Setting and Description

The site is located in a mixed-use area of Parramatta, on the western side of Church Street, the southern side of Market Street and the eastern side of Marsden Street, with Parramatta River forming the southern boundary.

The regional topography is undulating with a general fall to the south towards Parramatta River. The site appears to have been locally filled to accommodate the existing buildings.

A walkover inspection of the site was undertaken by JKE on 6 January 2025 as part of the DSI. The inspection was limited to accessible areas of the site and the basement and underfloor area of the theatre building. The key findings from the inspection are outlined below:

- The majority of the central and eastern portion of the site were occupied by the existing theatre building and walkways. An asphaltic concrete paved carpark occupied the western portion of the site. In the south-west corner was a low-lying grass covered area adjacent to the Parramatta River and a concrete paved public pathway extended along the southern boundary of the site;
- The theatre building was of brick, concrete, glass and metal construction with suspended slab across the eastern portion and slab on ground across the majority of the central portion;
- The building was of an age indicative of housing hazardous building materials (i.e. asbestos containing materials (ACM), lead based paint, etc);
- Fill material (i.e. igneous gravels and anthropogenic inclusions, etc) were observed in the unpaved areas of the site;
- The site levels were indicative of some cut and fill works having taken place to allow for the existing site development;
- Small quantities of paint, varnish and glue for stage props was observed to be stored in the basement workshop area. No obvious staining, spillages or odours were noted on the ground surface or shelving where these products were stored:
- Landscaped areas were present along the southern and western boundaries and along the north-western and south-eastern boundaries. These areas generally included medium to large trees and small to medium shrubs and grasses. A grass covered landscaped area was also present in the south-west corner of the site adjacent to the Parramatta River. All vegetation appeared to be in good condition with no obvious evidence of phyto-toxic stress or die back; and
- Surface water would be expected to flow in keeping with the site topography and generally flow towards the south and into the Parramatta River.

3.4 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – Market Street, with Prince Alfred Park beyond;
- South – Parramatta River with a mixed-use development beyond;
- East – Church Street, with residential and commercial properties beyond; and
- West – Marsden Street, with Bayanami Public School beyond.

JKE did not observe any land uses in the immediate surrounds that were identified as potential contamination sources for the site.

3.5 Underground Services

The 'Before You Dig Australia' (BYDA) plans were reviewed for the DSI in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. The BYDA plans indicated that a sewer main extends through the southern section of the site in a west to east direction. The invert level for the sewer is shown as 2.8m just beyond the western boundary and 1.2m to 2m towards the central and eastern sections of the sewer. A local sewer connection also extends in a north to south direction in the eastern portion of the site and connects with the sewer main.

There is potential for the sewer/sewer trenches to act as preferential pathways for contamination migration (i.e. through relatively permeable backfill). The approximate alignment of the infrastructure is shown on Figure 2 attached in the appendices.

3.6 Summary of Geology, Soils and Hydrogeology

3.6.1 Regional Geology

Regional geological information was reviewed as part of the previous investigations. The information indicated that the site is underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite.

The subsurface conditions encountered during the DSI are summarised in the table below:

Table 3-3: Summary of Subsurface Conditions

Profile	Description
Pavement	Asphaltic Concrete (AC)/Concrete/Brick pavement was encountered at the surface in BH1, BH2, BH3, BH4, BH5, BH6, BH7, BH13 and BH18 and was approximately 30mm to 400mm in thickness.
Fill	Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 0.1m to 3.0mBGL. Approximate fill depths (recorded as depth from the ground surface to the bottom of the fill layer) are presented on Figure 2. BH2, BH8, BH9, BH10, BH11, BH12, BH15, BH16, BH19 and BH20 were terminated in the fill at a maximum depth of approximately 0.8mBGL. The fill typically comprised silty gravelly sand, silty sand, silty clay, gravel, silty clayey sand, sandy gravel, and clayey sand with inclusions of sandstone, ironstone and igneous gravel, concrete, plastic and glass fragments, metal wire, sand, ash, wood chips, roots and root fibres. A creosote type odour was recorded in fill beneath the pavement in BH2 and in BH5 at approximately 1mBGL, and hydrocarbon odours were recorded in BH13 at approximately 1.2mBGL during fieldwork. No fibre cement fragments (FCF)/ACM was encountered in the fill profiles during fieldwork.
Natural Soil	Natural clayey and sandy soils were encountered beneath the fill material in BH1, BH3 to BH7, BH13, BH14, BH17 and BH18. The majority of natural soils were alluvial, with a residual profile encountered in BH17 between 3.0m and 3.4mBGL. Neither staining nor odours were recorded in the natural soils during fieldwork.

Profile	Description
Bedrock	Sandstone bedrock was encountered beneath the natural soils in BH5, BH13 and BH17, from depths of approximately 4.0m to 4.7mBGL. The bedrock extended to the termination depth of these boreholes, to a maximum of 8mBGL. Neither staining nor odours were recorded in the bedrock during fieldwork.
Groundwater	Groundwater seepage was encountered in BH13, BH14 and BH17 at depths of between approximately 2.2m and 3.8mBGL during drilling. All other boreholes remained dry on completion of drilling and a short time after.

A copy of the borehole logs from the DSI is included in Appendix C.

3.6.2 Acid Sulfate Soil (ASS) Risk and Planning

ASS risk maps were reviewed as part of the previous investigations. The information indicated that that the southeast and a portion of the southwest section of the site is located within a Class 1 area. The remaining area of the site is located in a Class 5 risk area.

An ASS Management Plan (ASSMP) was prepared for the proposed development. Reference should be made to the ASS and Salinity report for further information. A high-level summary of that report is provided in Section 3.1.

3.6.3 Salinity Hazard Map

The site is located within the area of Western Sydney included in the Salinity Potential Map. Based upon interpretation from the geological formations and soil groups presented on the map, the site is located in a region of moderate salinity potential.

The moderate classification is attributed to scattered areas of scalding and indicator vegetation, in areas where concentrations have not been mapped. Saline areas may occur in this zone, which have not been identified or may occur if risk factors change adversely.

A Salinity Management Plan was not considered to be required for the proposed development. Reference should be made to the ASS and Salinity report for further information. A high-level summary of that report is provided in Section 3.1.

3.6.4 Dryland Salinity

Dryland salinity information was reviewed previously as part of the PESA. No dryland salinity data was mapped onsite.

3.6.5 Hydrogeology and Groundwater

Hydrogeological information presented in the previous reports indicated:

- There was a total of five registered bores within a buffer of 1,000m;
- The nearest registered bore was located approximately 110m to the north-west (up-gradient) of the site and registered for domestic uses;
- The majority of the bores were registered for monitoring purposes; and
- The drillers log information from the closest registered bores typically identified fill and/or clay soil to depth of approximately 1m, underlain by shale and sandstone bedrock. Standing water levels (SWLs) in the bores ranged from 5m below ground level (BGL) to 7mBGL.

A summary of the groundwater conditions during the DSI is provided below:

Table 3-4: Summary of Groundwater Field Screening

Aspect	Details
Groundwater Depth & Flow	Groundwater seepage was encountered in boreholes BH13, BH14 and BH17 during drilling at depths of approximately 2.2m to 3.8mBGL. The remaining boreholes were dry during and a short time after completion of drilling. The relative heights of the ground surface at each monitoring well location were recorded using a GPS and the relative levels (RLs) of groundwater in each well were calculated based of the SWLs. A contour plot was prepared for the groundwater flow direction using Surfer v8.08 (Surface Mapping Program) as shown on Figure 4. Groundwater flow generally occurs in a down gradient direction perpendicular to the groundwater elevation contours. The contour plot indicates that groundwater generally flow towards the south, which is consistent with expectations based on the topography, down-gradient water bodies.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 5.67 to 7; - EC ranged from 429.1µS/cm to 1,955µS/cm; - Eh ranged from -261mV to -95mV; and - DO ranged from 0.31mg/L to 0.82mg/L. The PID readings in the monitoring well headspace recorded during sampling ranged from 0.3ppm in MW17 to 7.1ppm in MW5.
LNAPLs petroleum hydrocarbons	Phase separated product (i.e. LNAPL) was not detected using the interphase probe during groundwater sampling.

Considering the local topography and surrounding land features, JKE anticipate groundwater to flow towards the Parramatta River in a south and south-east direction.

The Parramatta River is a potential receptor that was considered in the context of the DSI in the assessment of groundwater contamination.

4 SITE CHARACTERISATION AND CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information and investigation data to date. Reference should also be made to the figures attached in the appendices.

4.1 Summary of Contamination (Site Characterisation)

A copy of the soil, soil vapour and groundwater data summary tables and borehole logs from the DSI report is included in Appendix C. The SAC exceedances are shown on Figure 3 in Appendix A. The following exceedances were reported for each media:

- In fill soil: PAHs, lead and asbestos were reported at concentrations above the health-based SAC and TRHs, lead and arsenic were reported at concentrations above the ecological SAC;
- In groundwater: arsenic, copper, nickel, and zinc were reported above the ecological SAC; and
- In soil vapour samples: chloroform concentrations exceeded the health-based criterion.

As discussed in the DSI, a first pass of the soil results was undertaken using land use type C (pubic open space) for all locations. Upon review of the proposed redevelopment works and dataset, land use type D (commercial/industrial) was considered to be more appropriate for locations within the building footprint and outside of the proposed area of public open space that is in the south-west corner of the site. On this basis, and considering the preliminary statistical analysis for lead that was presented in the DSI, lead was not considered to pose an unacceptable risk in the context of the proposed development or in the current layout as there was no complete source-pathway-receptor (SPR) linkage. The PAHs, arsenic and TRHs in these areas were also not of concern when considering the commercial/industrial SAC.

Asbestos fines/fibrous asbestos (AF/FA) in one location exceeded the SAC of 0.001%w/w which applies in a land use type C and D scenario. This occurred in BH2, located in the paved carpark in the western section of the site. AF/FA was detected in two other locations, albeit at concentrations below the SAC. Considering multiple lines of evidence, JKE consider the asbestos impacts to be widespread, though asbestos concentrations above the SAC are not, based on the DSI dataset.

Asbestos as AF/FA is ‘friable’ asbestos by definition in Schedule B1 of NEPM 2013.

Impacts to soil vapour and groundwater will be further assessed under the RAP framework. However, remediation in this context is not proposed at this stage as we consider it unlikely that there are unacceptable risks that would warrant remediation.

4.2 CSM

The table below includes a review of the CSM which has been used to design the remediation strategy. The CSM will require further review if additional site data becomes available.

Table 4-1: CSM

Contaminant source(s) and contaminants of concern	**Contamination sources/potential contamination sources:** fill material; historical council depot/fuel storage; historical on-site dry cleaner; use of pesticides around site; and hazardous building materials in former and existing buildings. **Contaminants of concern for remediation include:** asbestos in fill/soil. Other CoPC are to be assessed in further detail to address data gaps.
Affected media	**Affected medium for remediation:** fill/soil across the site. Remediation of soil vapour or groundwater is not proposed at this stage. However, it is noted that soil vapour and groundwater require further investigation (via the pre-remediation validation sampling process) to validate assumptions made in the Tier 1 risk assessment during the DSI. Refer to Section 6.2.4 for further details.
Receptor identification	Human receptors include site users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users, groundwater users and recreational water users within the Parramatta River. Ecological receptors include terrestrial organisms and plants within unpaved areas (including the proposed landscaped areas), and marine ecology in the Parramatta River. Although the section of the Parramatta River positioned adjacent to the site is approximately 600m upgradient of the weir, given its proximity, the primary downgradient ecosystem is considered to be estuarine and marine.
Exposure pathways and mechanisms	The potential exposure pathway for asbestos is via inhalation of airborne asbestos fibres. Potential exposure pathways for other CoPC relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRHs, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site as a theatre. Potential exposure pathways for ecological receptors include primary/direct contact and ingestion. Such pathways are not considered to be significant where the soils are covered by buildings/pavements. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings and basements. Exposure to contaminated groundwater is could also occur in the Parramatta River through direct migration due to its proximity to the site.
Evaluation of data gaps	The primary data gap identified in the DSI was the limited sampling beneath the existing building/structure and pavements. Whilst the conditions are expected to be similar across the site due to the nature of the filling history, additional soil data (including inspection of the surface soils following slab removal) is required after demolition and removal of pavements/slab. The DSI also made reference to further groundwater investigation to support the groundwater risk assessment.

	A pre-remediation/data gap investigation (DGI) framework is provided in Section 6.2.4 to address these items.

4.3 Remediation Extent

For the purpose of the RAP, remediation extends across the entire area, and applies to all fill. Fill was found to extend to depths of between 0.1mBGL to 3.0mBGL during the DSI. Please refer to Figure 2 in Appendix A which presents the fill depths at the previous sample locations.

A holistic approach to remediation will occur whereby all fill will be deemed to be impacted (i.e. asbestos present but at concentrations <SAC) or contaminated (i.e. asbestos >SAC) with asbestos for remedial purposes. Notwithstanding, the extent of remediation and future management of the site will depend on the outcome of the DGI and the site validation process.

It is noted that with the exception of the existing Playhouse Theatre located in the west of the site, all buildings, structures and pavements on the site will be demolished.

5 REMEDIATION OPTIONS AND PREFERRED REMEDIATION STRATEGY

5.1 Soil Remediation

The NSW EPA follows the hierarchy set out in NEPM 2013 for the remediation of contaminated sites. The preferred order for soil remediation and management is as follows:

1. On-site treatment of soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
2. Off-site treatment of excavated material 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:

3. Consolidation and isolation of the soil by on-site containment within a properly designed barrier; and
4. Removal of contaminated material to an approved site or facility, followed where necessary by replacement with clean material; or
5. Where the assessment indicates that remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

For simplicity herein, the above hierarchy are respectively referred to as Option 1, Option 2, Option 3 etc.

The NEPM 2013 and the associated Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)[8] prefer the following asbestos remediation hierarchy:

1. Minimisation of public risk;
2. Minimisation of contaminated soil disturbance; and
3. Minimisation of contaminated material/soil moved to landfill.

The NSW EPA Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd Edition) (2017)[9] provides the following additional requirements to be taken into consideration:

- Remediation should not proceed in the event that it is likely to cause a greater adverse effect than leaving the site undisturbed; and
- Where there are large quantities of soil with low levels of contamination, alternative strategies should be considered or developed.

The table below discusses and assesses a range of soil remediation options:

[8] Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

[9] NSW EPA, (2017). *Contaminated land Management, Guidelines for the NSW Site Auditor Scheme (3rd ed.).* (referred to as Site Auditor Guidelines 2017)

Table 5-1: Consideration of Soil Remediation Options

Option	Discussion	Assessment/Applicability
Option 1 **On-site treatment of contaminated soil**	On-site treatment can provide a mechanism to reuse the processed material, and in some instances, avoid the need for large scale earthworks. Treatment options are contaminant-specific and can include bio-remediation, soil washing, air sparging and soil vapour extraction, and thermal desorption. Depending on the treatment option, licences may be necessary for specific individual waste streams due to the potential for air pollution and the formation of harmful by-products during incineration processes. Licences for re-use of treated material/waste may also be required.	Treatment options for asbestos in fill containing AF/FA are not applicable and are not endorsed by the NSW EPA.
Option 2 **Off-site treatment of contaminated soil**	Contaminated soils are excavated, transported to an approved/licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site, transported to an alternative site or disposed to an approved landfill facility. This option is also contaminant-specific. The cost per tonne for transport to and from the site and for treatment is considered to be relatively high. The material would also have to be assessed in terms of suitability for reuse as part of the proposed development works under the waste and resource recovery regulatory framework.	Not applicable for fill due to the occurrence of asbestos (as noted above).
Option 3 **Consolidation and isolation of impacted soil by cap and containment**	This would include the consolidation of contaminated soil within an appropriately designed cell, followed by the placement of an appropriate barrier over the material to reduce the potential for future disturbance (or capping in-situ beneath appropriate capping layers). The capping and/or containment must be appropriate for the specific contaminants of concern. An ongoing environmental management plan (EMP) would be required and this would need to be publicly notified and made to be legally enforceable (e.g. via listings in the Section 10.7 planning certificate and on the land title).	Given the limited excavation and the fact that most of the site will be paved with hardstand/covered by buildings, this option is applicable for the fill to be retained onsite and is well suited to asbestos. Capping the asbestos mitigates the risk of disturbance and exposure in the context of the proposed land use.

Option	Discussion	Assessment/Applicability
<u>Option 4</u> Removal of contaminated material (excavation and disposal) to an appropriate facility and reinstatement with clean material	Contaminated soils would be classified in accordance with NSW EPA guidelines for waste disposal, excavated and disposed of off-site to a licensed landfill. The material would have to meet the requirements for landfill disposal. Landfill gate fees (which may be significant) would apply in addition to transport costs.	This option is considered to be applicable in conjunction with Option 3 to achieve the required site levels to facilitate capping. However, it is not considered to be applicable where there is deep fill and/or large quantities of fill across the site.
<u>Option 5</u> Implementation of management strategy	Contaminated soils would be managed in such a way to reduce risks to the receptors and monitor the conditions over time so that there is an on-going minimisation of risk. This may occur via the implementation of monitoring programs.	Applicable for the long-term management of contamination, in conjunction with option 3. A passive management system is anticipated for the development if contaminated soil is capped in-situ.

5.2 Rationale for the Preferred Option for Remediation

The preferred option for remediation is a combination of Option 3, Option 4 and option 5 which includes excavation of contaminated fill soils to enable installation of appropriate cap and containment in areas outside of the building/pavement footprint, and managing the site via a long-term EMP.

The preferred option for remediation is considered to be appropriate on the basis that:

- The asbestos contamination is considered to be widespread in fill. At this stage asbestos has exceeded the land use-based SAC only at one location. However, asbestos was found in two other locations and there are widespread precursors for asbestos in fill across the site (in the form of building/demolition rubble inclusions);
- Excavating and disposing of surplus contaminated soil, only to the extent required to facilitate installation of the capping system, reduces unnecessary disturbance and disposal of material to landfill (this aligns with the asbestos remediation hierarchy);
- Capping the landscaped and public open space areas, combined with the proposed buildings and pavements being constructed, will result in an incomplete exposure pathway to asbestos during future day-to-day use of the site, hence mitigating the risks from exposure to asbestos; and
- The strategy is sustainable, economically viable considering it minimises soil disposal costs, commensurate with the level of risk posed by the contaminant an is technically achievable to implement concurrently with the proposed development works.

6 REMEDIATION DETAILS

Prior to commencement of demolition and any soil disturbance, the client, project manager and remediation contractor must review and make arrangements to meet the remediation site management requirements for the project as outlined in Section 9 of this RAP.

The following general sequence of works is anticipated (and can be applied in stages to align with the development stages where required):

- Pre-commencement meeting;
- Preparation and implementation of a construction phase AMP;
- Site establishment and demolition;
- Pre-remediation DGI and any additional associated reporting;
- Remediation and validation of remedial works; and
- Validation of imported soil materials. This includes materials imported to reinstate the remedial excavations and/or used as capping layers, together with engineering material such as sub-base and drainage materials (e.g. recovered aggregate etc), landscaping materials or any other materials imported for service trenches etc, to the point in time that the validation report is issued. This is required even if remediation does not occur.

Validation of the works will occur progressively throughout the remediation and construction program considering that the built form of the development and landscaping will form the cap.

Details in relation to the above are outlined in the respective subsection below.

6.1 Roles and Responsibilities

Table 6-1: Roles and Responsibilities

Role	Responsibility
Developer/ client	City of Parramatta Council The client (also acting as project manager) is required to appoint the project team for the remediation/validation, review all documents prepared for the project and manage the implementation of the procedures outlined in this RAP. The project manager is to take reasonable steps so that the remediation contractor and others have understood the RAP and will implement it in its totality. The project manager will review the RAP and other documents and will update the parties involved of any changes to the development or remediation sequence (in consultation with the validation consultant).
Principal Contractor/ Remediation Contractor	To be confirmed. The principal contractor is engaged by the client and is required to review all documents prepared for the project and manage the implementation of the procedures outlined in this RAP. The principal contractor is to take reasonable steps so that the remediation contractor and others have understood the RAP and will implement it in its totality. The principal contractor is to engage the validation consultant and make provisions so that the pre-remediation DGI and associated reporting occurs prior to commencement of remediation.

Role	Responsibility
	The principal contractor will review the RAP and other documents and will update the parties involved of any changes to the development or remediation sequence (in consultation with the validation consultant). The principal contractor must implement the construction-phase AMP referred to in Section 9 during all works.
Remediation Contractor	To be confirmed. The remediation contractor (this may be the same entity as the principal contractor) is required to review all relevant documents prepared for the project, apply for any relevant removal licences or permits and implement the remediation requirements and relevant validation requirements (that are the remediation contractor's responsibility) outlined in this RAP. For remediation works involving asbestos in/on soil, the remediation contractor should be or must subcontract a Class A licensed asbestos removalist to manage and undertake any works associated with the removal/disturbance of asbestos. The Class A contractor will need to submit the required notification to SafeWork NSW for asbestos removal works. The remediation contractor is required to collect all documentation associated with the remediation activities and forward this documentation onto the principal contractor, client and project manager as they become available. The remediation contractor must implement the construction-phase AMP referred to in Section 9 during all works.
Validation Consultant	To be confirmed. The validation consultant[10] provides consulting advice and validation services in relation to the remediation. The validation consultant undertakes the pre-remediation DGI and prepares the validation report (and EMP where applicable), as required. The validation consultant is required to review any deviation to this RAP or any unexpected finds if and when encountered during the site work. The validation consultant must have a Licensed Asbestos Assessor (LAA) on staff to facilitate the preparation of friable asbestos removal clearance certificates, should they be required. The validation consultant is required to liaise with the principal contractor, client, project manager and remediation contractor on all matters pertaining to the site contamination, remediation and validation, carry out the required pre-remediation DGI, validation sampling and inspections.

6.2 Remediation and Associate Tasks

6.2.1 Pre-commencement Meeting

The project team is to have a pre-commencement meeting to discuss the sequence of remediation and the remediation and validation tasks. The site management plan for remediation works (see Section 9) must be reviewed by the project manager and remediation contractor, and appropriate steps are to be taken to

[10] The validation consultant must be a certified practitioner (specialising in site contamination), under one of the NSW EPA endorsed certification schemes, i.e. CEnvP SC or equivalent

ensure the adequate implementation of the plan. Any relevant requirements are to be addressed by the project team during the implementation of this RAP.

6.2.2 Site Establishment and Demolition

The remediation contractor is to establish on site as required to facilitate the remediation and validation works. Consideration must be given to the work sequence and extent of remediation/excavation so that the site establishment (e.g. site sheds, fencing, access points etc) does not inhibit the required works. Any soil/gravel-type materials imported during the site establishment (e.g. DGB, 40/70 etc) must be validated in accordance with Section 7 of this report.

The demolition of buildings/structures etc must occur with regards to the findings of a HAZMAT survey report. It is understood that with the exception of the existing Playhouse Theatre located in the west of the site, all buildings, structures and pavements on the site will be demolished.

As part of the demolition process, all visible FCF/ACM must be removed from the ground surface across the entire site prior to any works that disturb the existing pavements. An asbestos surface clearance for the ground surface across the entire site must be provided by a LAA to demonstrate this has occurred. This ground surface clearance will be in addition to any specific clearances associated with the demolition works.

Following pavement removal, the site is to be managed on the basis that the exposed soils contain asbestos and the site must therefore me managed accordingly with regards to the construction-phase AMP. The BH2 area where asbestos as AF/FA was identified at a concentration >0.001%w/w is to be covered by geofabric or builder's plastic to minimise the potential for erosion and generation of dust from this area. The soils at BH2 and in the immediate (say 15m x 15m) surrounds must not be disturbed/excavated or relocated to any other area of the site.

All waste from the demolition is to be disposed to facilities that are licenced by the NSW EPA to accept the waste. The demolition contractor is to maintain adequate records and retain all documentation for such activities including:

- A summary register including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste. Legible dockets are to be provided for all waste materials so they can be reconciled with the register.

The above information is to be supplied to the validation consultant for assessment and inclusion in the site validation report.

6.2.3 Construction Phase Asbestos Management Plan (AMP)

A construction-phase AMP must be prepared for the site by a LAA and implemented for the site remediation and development works. The AMP must include the minimum personal protective equipment (PPE), work health and safety (WHS) and other requirements outlined in the documents published by Safe Work Australia, WorkCover Authority of NSW, National Occupational Health and Safety Commission, and other relevant authorities as applicable.

An ARCP must be prepared by the remediation contractor and issued to SafeWork, and notification of asbestos removal is to be provided to SafeWork at least five days prior to commencement of works.

6.2.4 Pre-remediation DGI and Reporting

Prior to the commencement of the pre-remediation DGI, the validation consultant must prepare a detailed SAQP in accordance with the Consultants Reporting Guidelines and NEPM (2013). The SAQP is to include a review of the relevant earthworks plans and proposed development plans which we expect should be available at that time.

The objective of the DGI is to inform the extent of the cap and contain strategy and the future management of the site, and to close out the identified data gaps. The investigation will include soil sampling from 29 additional sampling locations (as a minimum) as nominated on Figure 5 (TP101 to TP128, and BH129). A monitoring well is to be installed in one of the locations (BH/MW129). Additional samples are also to be collected if any visual or olfactory indicators of potential contamination are observed in other areas. The rationale for the selection of the locations is as follows:

- TP101 though TP124 – Site coverage in proposed Public Open Space area in the south-west corner and landscaped areas around car park and building; and
- TP125 through TP128 and BH/MW129 – Site coverage in proposed building footprint.

Reference is to be made to Figure 5 in Appendix A for the proposed investigation locations, and to Appendix D which includes the proposed test pit location coordinates.

Soil sampling is to be undertaken from test pits (TP101 through TP128) using an excavator (where possible). The monitoring well location (BH129) is to be drilled using a drill rig to a minimum depth of approximately 8mBGL considering the depth of earthworks and occurrence of groundwater. The well is to be constructed as follows:

- 50mm diameter Class 18 PVC (machine slotted screen) is to be installed in the lower section of the well to intersect the groundwater;
- 50mm diameter Class 18 PVC casing is to be installed in the upper section of the well (screw-fixed);
- A 2mm sand filter pack will be placed around the screen section for groundwater infiltration;
- A hydrated bentonite seal/plug is to be used on top of the sand pack to seal; and
- The well is to be finished with a concreted gatic cover, monument or similar to limit the inflow of surface water.

One soil sample per fill profile encountered (at each location) is to be analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH/BTEX, PAHs, OCPs, OPPs, and asbestos (500mL quantification sample). Fill samples collected within the building footprint will also be analysed for PFAS.

Field bulk quantification of soils for asbestos is not proposed due to the presence of AF/FA in the soils. Decisions regarding the final extent of asbestos will be made using a multiple lines of evidence approach, supported by the CSM.

One sample of the natural profile is to be collected from each sampling location. A selection of the samples (from within the building footprint) is to be analysed for heavy metals, TRH/BTEX, PAHs and PFAS for waste classification purposes. The samples are to be selected based on the results of the fill soil analysis and field observations.

One groundwater sample per monitoring well (new and existing) are to be analysed for heavy metals, TRH/BTEX, PAHs, PFAS and VOCs.

In the event that the existing groundwater monitoring wells cannot be located or are unserviceable (i.e. compromised, destroyed) after demolition works, replacement monitoring wells are to be installed in accordance with the above methodology within close proximity (i.e. 5m) from the existing wells. All monitoring wells are to be surveyed to determine the groundwater flow directions. QA/QC samples are to be obtained to meet the NEPM 2013 requirements (outlined in Section 7.3).

A record of any potential point source/s of contamination identified after demolition is to be maintained.

On completion of the DGI, a stand-alone report is to be prepared in accordance with the Consultants Reporting Guidelines. Based on the findings of the DGI, a stand-alone Remedial Works Plan (RWP) must be prepared to document the remedial approach, with regards to the construction methods and works sequence.

The investigation and reporting is expected to take approximately 4-5 weeks to complete. This should be adequately considered in the project timeline and the investigation should be initiated as soon as possible.

6.2.5 Remediation Details - Excavation and Off-site Disposal of Contaminated Fill

The excavation and off-site disposal remediation procedure is to be applied where required to achieve the pre-capping levels (see Section 6.2.6 for capping details).

The DSI included a preliminary waste classification of fill as **General Solid Waste (non-putrescible) containing Special Waste (asbestos)**. This classification is to be updated/confirmed following the pre-remediation investigation. We note that the receiving landfill is likely to require a standalone waste classification letter confirming this and the quantity of waste being disposed. This waste classification documentation should be arranged well in advance of the commencement of any excavation/soil disposal works.

The project team must carefully consider the sequence of works and requirements in relation to the proposed development and the excavation/remediation of fill. Where piling is required for the proposed development, if practicable (and subject to consideration of relevant geotechnical and construction-related constraints etc), we recommend that the fill be excavated/removed prior to the commencement of piling so that piling does not occur through the fill (where possible). Piling through the fill and into the natural soil/bedrock will create a mixed waste stream that will include special waste (asbestos) for disposal purposes. This can add significant additional costs to the project if not managed properly.

The procedure for excavation of fill soil is outlined in the table below:

Table 6-2: Remediation Details – Excavation and Disposal of Contaminated Fill

Step	Primary Role/ Responsibility	Procedure
1.	Validation Consultant	Waste Classification Letter A waste classification addendum letter for fill must be prepared to confirm the final expected waste quantities and the waste classification.
2.	Remediation contractor	Address Stability Issues and Underground Services: Geotechnical/structural advice must be sought regarding the stability of adjacent structures and/or adjacent areas prior to commencing remediation (as required). Stability issues are to be addressed to the satisfaction of a suitably qualified geotechnical/structural engineer. This may require the installation of temporary shoring, if specified by the engineer. All underground services are to be appropriately disconnected or rerouted to facilitate the works.
3.	Remediation contractor	Establish Asbestos Related Controls and Arrange Licenses and Tracking Requirements Prior to the commencement of any excavation that disturbs asbestos in soil, asbestos related controls, licences and tracking requirements must be implemented as outlined in the construction phase AMP (refer to Section 6.2.3).
4.	Remediation contractor	PPE and WHS: Confirm PPE and WHS requirements prior to commencement of remediation works. All personnel involved in the remediation works must wear appropriate PPE as specified in the construction phase AMP.
5.	Remediation contractor (or their nominated Class A licensed sub-contractor) and validation consultant	Excavation and disposal of fill, followed by validation: Following pavement removal, remediation will be undertaken as follows: • Submit an application to dispose of the fill (in accordance with the assigned waste classification) to a facility that is appropriately licensed by the NSW EPA to receive the waste, and obtain authorisation to dispose; • The excavation and removal of asbestos impacted or contaminated soil must be completed in accordance with the construction-phase AMP and the ARCP; • The areas where fill is to be removed must be marked out using an appropriate method;

		• The fill within the building and pavement footprint is to be excavated to the required depths to facilitate the construction. Depths must be confirmed with the remediation contractor prior to excavation; • Experienced personnel must monitor the fill excavation process so that fill is not inadvertently 'over excavated' into natural soil which could result in additional and unnecessary landfill fees. The details of the excavation works will need to be agreed with the remediation contractor. The works should be done in the most efficient manner that minimises cross contamination; • Load the fill directly into trucks and dispose of the soil to a facility licensed by the NSW EPA to receive the waste (the landfill will require a copy of the waste classification report refer to Item 1 above); and • All documents including landfill disposal dockets must be retained by the remediation contractor/asbestos removal contractor and forwarded to the client and validation consultant. This documentation forms a key part of the validation process and is to be included in the validation report.
6.	Validation consultant	Validation of Excavations: On completion of excavation, validation is to occur in accordance with the validation plan outlined in Section 7. A hold point is to be put in place until the validation consultant provides advice relating to the completion of validation.

6.2.6 Remediation Details - Capping of Contaminated Fill

The premise for remediating the site is based around capping the fill/soil beneath appropriate (clean) capping layers. The proposed capping system requires consideration during the design phase of the building, pavements and landscaping etc.

The capping specification is provided in the following table. The proposed specification is based on the current dataset from the DSI, which indicated asbestos in one location in the proposed building footprint at a concentration greater than the health-based SAC, and asbestos as AF/FA in two other locations detected at concentrations below the SAC in the building footprint and the public open space area. Consequently, as there are no asbestos SAC exceedances outside the building footprint, the extent of the proposed capping in these areas is limited at this point, and will be implemented as a precautionary approach.

The identification of more asbestos during the pre-remediation DGI process, may result in a revision of the capping strategy in unpaved/landscaped areas because thicker clean capping layers will be needed in such areas if asbestos is found to be present at concentrations that exceed the land use criteria. These revised capping details will be documented via the RWP reporting process, if the circumstances arise, and must be generally in line with the contingency procedure presented in Section 8.1 of this RAP. Ultimately, the validation consultant will need to agree on what is acceptable.

JK had not been provided with detailed landscape or pavement plans or for-construction drawings at the time of preparing this RAP, hence some assumptions have been made in designing the capping specification. Consequently, these requirements must be reviewed and discussed by the project team well in advance of construction commencing. In the event that the capping specification needs to be altered, an addendum to the RAP must be prepared by JKE or by the validation consultant, and approved by the client and consent

authority, prior to commencement (alternatively this can occur via consultation as part of the RWP preparation).

Table 6-3: Remediation Details – In-situ Capping Specification

Area	Capping Specification^
Landscaped and unpaved Public Open Space Areas	Installation of: • >100mm clean imported (validated) topsoil/growing medium; and • Surface finish (i.e. mulch or turf) to required development design. Material excavated for any new plantings must occur in such a way that eliminates the potential for cross-contamination and includes backfilling with clean materials so the minimum cap of 100mm is maintained above the fill.
New building, structures and pavements (including footpaths and on-grade pavements etc)	Installation of: • Clean imported (validated) basecourse, as required for engineering specification; and • Concrete slab as required. No marker layer proposed.

^ The capping specification relates to the remediation only and has not considered engineering requirements for the site. Engineering design requirements must be assessed by others in the context of the RAP requirements and the validation consultant must be advised if any aspects of the capping are not achievable or require alternative solutions.

The proposed remediation and validation steps associated with in-situ capping of impacted fill are outlined in the following table.

Table 6-4: Remediation Details – In-situ Capping

Step	Primary Role/ Responsibility	Procedure
1.	Remediation contractor/principal contractor	<u>Service Trenching and Establishment of Pre-Capping Site Levels:</u> The principal contractor and remediation contractor are to undertake the relevant site preparation works, piling/footing excavations and any excavations required to facilitate the capping procedures. Any surplus excavated materials must be managed and disposed off-site appropriately in accordance with the relevant requirements in Section 6.2.5. Any imported materials used are to be validated by the validation consultant in accordance with Section 7. This may include but is not limited to coarse gravels (e.g. 40/70) for driveways, DGB, material used to create a piling platform etc.
2.	Remediation contractor	<u>Survey of site levels:</u> After the excavation levels are achieved to facilitate the minimum capping requirements (i.e. the pre-capping levels), a pre-capping levels survey is to be completed by the remediation contractor prior to the placement of any overlying clean capping layers or construction of pavements etc. The purpose of the survey is to provide factual information of the site levels, and the horizontal extent of the marker, prior to installation of the clean capping layers. Survey points must be taken at appropriate frequencies (say every 5m lineal for narrow areas, a 5m grid for broader areas, and more frequently for significant change in surface elevation such as service trenches and tree pits etc). The pre-capping levels survey is to be provided to the client/project manager and the validation consultant prior to any further capping works commencing.

Step	Primary Role/ Responsibility	Procedure
3.	Validation consultant and remediation contractor	Capping: The cap is to be constructed in accordance with the capping specification outlined in Table 6-3 (or as subsequently specified in the RWP). Any imported materials are to be validated in accordance with Section 7. Validated materials can then be used to achieve the minimum capping requirements for the project.
4.	Remediation contractor	Post-Capping Survey of site levels: After completion of capping, a post-capping levels survey is to be completed by the remediation contractor. The purpose of the survey is to provide factual information regarding the capping thickness and confirm that the minimum capping requirements have been achieved. Survey points must be taken at appropriate frequencies as noted for the pre-capping survey. The post-capping levels survey is to be provided to the client/project manager and the validation consultant.

6.3 Remediation Documentation

The remediation contractor must retain all documentation associated with the remediation, including but not limited to:

- Asbestos management documentation, including all relevant notifications and monitoring reports, and clearance certificates where applicable (additional details in this regard are to be outlined in the construction-phase AMP);
- Waste disposal dockets and register (see below);
- Waste tracking documentation;
- Survey information as specified;
- Photographs of remediation works; and
- Imported materials documentation (see below and the example imported material tracking form in Appendix E).

Copies of these documents must be forwarded to the project manager and the validation consultant for assessment and inclusion in the validation report.

6.3.1 Waste Register

All waste removed from the site is to be appropriately classified, tracked and managed in accordance with the relevant guidelines and regulations. The remediation contractor is to maintain adequate records and retain all documentation for waste disposal activities including:

- A summary register (in Microsoft Excel format) including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with the associated waste classification documentation and the waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and

- Disposal dockets for the waste (i.e. weighbridge dockets for each load).

An example waste tracking register is attached in Appendix E.

Any soil waste classification documentation is to be prepared in accordance with the reporting requirements specified by the NSW EPA as outlined in the Consultants Reporting Guidelines and the NSW EPA Waste Classification Guidelines (2014). The documentation must be reviewed by the validation consultant (if the documentation is prepared by others) prior to the waste leaving the site.

A review of the disposal facility's Environment Protection Licence (EPL) issued under the Protection of the Environment Operations (POEO) Act (1997)[11] is to be undertaken to assess whether the facility is appropriately licensed to receive the waste.

The above information is to be provided to the validation consultant for inclusion in the validation report. The register must be set up at the beginning of the project and provided to the validation consultant regularly (i.e. weekly) so the details can be checked and any rectification of the record keeping process can occur in a timely manner.

6.3.2 Imported Materials Register

The remediation contractor (and/or their nominated construction contractor) is to maintain for the duration of the project an imported material register. This must include a register (in Microsoft Excel format) with details of each imported material type, supplier details, summary record of where the imported materials were placed on site, and importation docket numbers and a tally of quantities (separated for each import stream). Legible dockets for imported materials are to be provided electronically so these can be reconciled with the register.

Examples of imported materials for this project may include but would not be limited to: site preparation materials (e.g. DGB, 40/70, material to create the piling platform etc); and landscaping materials such as topsoil garden mixes, mulches etc.

Any materials brought to site (at least up to the point that the validation report is issued) must be validated in accordance with Section 7 of this RAP.

The above information is to be provided to the validation consultant for inclusion in the validation report. It is recommended that the register be set up at the beginning of the project and provided to the validation consultant regularly (say on fortnightly basis) so the details can be checked and any rectification of the record keeping process can occur in a timely manner.

An example imported materials register is attached in Appendix D.

[11] NSW Government, (1997)). *Protection of Environment Operations Act.* (referred to as POEO Act 1997)

7 VALIDATION PLAN

Validation is necessary to demonstrate that remedial measures have been successful and that the site is suitable for the intended land use. The sampling program for the validation is outlined in Section 7.1. This is the minimum requirement based on the remediation strategy.

7.1 Validation Sampling and Documentation

The table below outlines the validation requirements for the site:

7.1.1 Validation Requirements – Demolition

Table 7-1: Validation Requirements - Demolition

Aspect	Sampling	Analysis	Observations and Documentation
Demolition and surface ACM clearance	Not applicable	Not applicable	Photographs to be taken. Visual asbestos clearance certificate/s to be undertaken and asbestos air fibre monitoring results to be provided. Disposal dockets to be retained. A letter of compliance is required from the demolition contractor confirming that the demolition occurred with regards to the HAZMAT reports. LAA is to undertake a surface clearance inspection for ACM and prepare a clearance certificate to ensure the surface is free of visible ACM prior to the commencement of any excavation works.

7.1.2 Validation Requirements – Fill Removal, and Cap and Contain

Table 7-2: Validation Requirements – Fill

Aspect	Sampling	Analysis	Observations and Documentation
Excavation and Off-site Disposal of Impacted Fill (Section 6.2.5)			
Validation (clearance inspection) of excavations following fill removal	Not required.	Not required	**LAA** to provide asbestos surface clearance for the base and walls of the remedial excavations for FCF/ACM. Where the clearance is undertaken on fill material remaining in-situ, the clearance certificate must acknowledge that other forms of asbestos (i.e. AF/FA) may still be present and the clearance is for visible asbestos forms (i.e. FCF/ACM) only. Air monitoring results to be reviewed.

Aspect	Sampling	Analysis	Observations and Documentation
			Photographs are to be taken by the **validation consultant**. Disposal dockets to be retained by the **remediation contractor** and forwarded to validation consultant for inclusion in the validation report.
Capping of Impacted Fill (Section 6.2.6)			
Survey of site levels.	Not required	Not required	Pre- and post-capping surveys are to be undertaken by the **remediation contractor** or their chosen sub-contractor. As-built details for the development are to be documented on as-built drawings by the remediation contractor/principal contractor and provided to the validation consultant. As a minimum these must include: - Pre- and post-capping levels surveys, including surveys (and surveys of the horizontal extent of the marker layers, should these be installed as a requirement of the RWP); - The location and depth of any underground services; - Finished surface details (e.g. pavements, tiled/paved areas, concrete building floor slab thicknesses, landscape layer thickness etc).
Inspections.	Not required	Not required	**Validation consultant** to carry out inspections to document the installation of the cap. Key hold points for inspections include: - On completion of excavation, prior to installation of overlying capping layers; - During importation of materials used to construct the cap; and - Finished surface levels. A photographic record is to be maintained by the **remediation contractor and validation consultant**.
Validation of imported materials.	As indicated below in Section 0.	As indicated below in Section 0.	As indicated below in Section 0.

7.1.3 Validation Requirements - Imported Materials

The table below outlines the validation requirements for material imported onto the site:

Table 7-3: Validation Requirements – Imported Materials

Aspect	Sampling	Analysis	Observations and Documentation
Imported VENM backfill (if required)	Minimum of three samples per source	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml NEPM 2013 analysis). Additional analysis may be required depending on the site history of the source property.	**Remediation contractor** to supply existing VENM documentation/report (report to be prepared in accordance with the NSW EPA waste classification reporting requirements). A hold point remains until the **validation consultant** approves the material for importation or advises on the next steps. Material is to be inspected upon importation by the **validation consultant** to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation. Photographic documentation and an inspection log are to be maintained. Where check sampling occurs by the **validation consultant** due to deficiencies or irregularities in existing VENM documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the Validation Assessment Criteria (VAC).
Imported engineering materials such as recycled aggregate, road base etc Excavated Natural Material (ENM)	Minimum of three samples per source/material type. ENM testing must meet the specification within the ENM Order. If the analysis is not compliant, the validation consultant must carry out an ENM assessment and prepare a report in accordance with the ENM Order/Exemption	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml quantification). As required in the ENM Order, plus check sampling of three samples as noted above.	**Remediation contractor** to provide product specification and documentation to confirm the material has been classified with reference to a relevant Resource Recovery Order/Exemption. A hold point remains until the **validation consultant** approves the material for importation or advises on the next steps. Review of the facility's EPL, where applicable. Material is to be inspected by the **validation consultant** upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation.

Aspect	Sampling	Analysis	Observations and Documentation
	prior to material being imported.		Where check sampling occurs by the **validation consultant** due to deficiencies or irregularities in existing documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the VAC.
Imported engineering materials comprising only natural quarried products.	At the validation consultant's discretion based on robustness of supplier documentation.	At the validation consultant's discretion based on robustness of supplier documentation.	**Remediation contractor** to provide documentation from the supplier confirming the material is a product comprising only natural quarried material. A hold point remains until the **validation consultant** approves the material for importation or advises on the next steps. Review of the quarry's EPL. Material is to be inspected by the **validation consultant** upon importation to confirm it is free of anthropogenic materials, visible and olfactory indicators of contamination, and is consistent with documentation. Where check sampling occurs by the **validation consultant** due to deficiencies or irregularities in existing documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the VAC.
Imported garden mix/turf underlay/topsoil	Minimum of three samples per source.	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml). Analysis of mulch can be limited to asbestos (500ml) and visual observations to confirm there are no anthropogenic materials.	**Remediation contractor** to provide documentation from the supplier confirming the product specification. This must include a description of the Australian Standard or other relevant product specification under which the material is produced, and the components. A hold point remains until the **validation consultant** approves the material for importation or advises on the next steps. Material is to be inspected by the **validation consultant** upon importation to confirm it is free of anthropogenic

Aspect	Sampling	Analysis	Observations and Documentation
			materials, visible and olfactory indicators of contamination, and is consistent with documentation. The validation consultant is to review any existing/available analysis results for the materials. A minimum of one batch for each imported material type (from each individual supplier) must be inspected by the validation consultant. This inspection must be repeated for each material type from each supplier, a minimum of once per month thereafter. The monthly inspections are only required where additional batches are imported over such a duration. Where check sampling occurs by the **validation consultant** due to deficiencies or irregularities in existing documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the VAC.
Mulch	Minimum of three samples per source.	Asbestos (gravimetric quantification using methods endorsed in NEPM 2013).	As above.

7.2 Validation Assessment Criteria and Data Assessment

The VAC to be adopted for the validation assessment are outlined in the table below:

Table 7-4: VAC

Validation Aspect	VAC
Validation of excavations and disposal of fill	The VAC for soil validation is no visible asbestos (i.e. FCF/ACM), on the surface during the LAA inspection/clearance process. The validation report is to include a mass balance of disposal dockets and volume of material removed from the site.
Validation of capping	Validation of capping will occur via a review of survey information, as-built drawings and via the inspection process. The validation report is to include cross-sections documenting the completed capping details for the various areas of the site.
Imported materials	Material imported as general fill must only be VENM. VENM is defined in the POEO Act 1997 as material:

Validation Aspect	VAC
	• That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette. Recycled materials are to meet the criteria of the relevant exemption/order under which they are produced. Analytical results for VENM and other imported materials will need to be consistent with expectations for those materials. For VENM, it is expected that: - Heavy metal concentrations are to be less than the most conservative Added Contaminant Limit (ACL) concentrations for an 'urban residential and public open space' exposure setting presented in Schedule B1 of the NEPM 2013, except for lead which should be nominally less than 100mg/kg. We note the lead ACL is 1,100mg/kg and this concentration is not deemed to be representative of VENM; and - Organic compounds are to be less than the laboratory PQLs and asbestos to be absent. All materials imported onto the site must also be adequately assessed as being appropriate for the final use of the site. A risk-based assessment approach is to be adopted with regards to the tier 1 screening criteria presented in Schedule B1 of NEPM 2013. Aesthetics: all imported materials are to be free of staining and odours. Imported landscaping materials must be visually free of any anthropogenic materials such as plastic, metal, slag etc.

Data should initially be assessed as above or below the VAC. Statistical analysis is not proposed, however, can be considered in relation to data (not including asbestos), where applied in accordance with the NEPM (2013) and the EPA Sampling Design Guidelines 2022[12].

7.3 Validation Sampling, Analysis and Quality Plan (SAQP)

Appropriate QA/QC samples must be obtained during the validation (where applicable) and analysed for the same suite of contaminants as the primary samples (excluding asbestos). As a minimum, QA/QC sampling is to include duplicates (5% inter-laboratory and 5% intra-laboratory), trip spikes and trip blanks. Rinsate samples must be obtained if re-usable sampling equipment is utilised.

DQOs and DQIs must be clearly outlined and assessed as part of the validation process. A framework for the DQO and DQI process is outlined below and should be reflected in the validation report.

DQOs have been broadly established for the validation with regards to the seven-step process outlined NEPM (2013). The seven steps include the following which are detailed further in the following subsections:

- State the problem;
- Identify the decisions/goal of the study;

[12] NSW EPA, (2022). *Sampling design part 1 - application*, Contaminated Land Guidelines

- Identify information inputs;
- Define the study boundary;
- Develop the analytical approach/decision rule;
- Specify the performance/acceptance criteria; and
- Optimise the design for obtaining the data.

DQIs are to be assessed based on field and laboratory considerations for precision, accuracy, representativeness, completeness and comparability.

7.3.1 Step 1 - State the Problem

Validation data is required to demonstrate that the remediation is successful and that the site is suitable for the proposed land use described in Section 1.

7.3.2 Step 2 - Identify the Decisions of the Study

The remediation goal, aims and objectives are defined in Section 2.1. The decisions to be made reflect these objectives and are as follows:

- Was the pre-remediation DGI and the remediation undertaken in accordance with the RAP/RWP?
- If there were any deviations, what were these and how do they impact the outcome of the validation?
- Are any of the validation results above the VAC?
- Is the site suitable for the proposed development from a contamination viewpoint?

7.3.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Existing relevant data from previous reports;
- Pre-remediation DGI sampling results and any associated reports;
- Site information, including site observations, inspections, waste and imported materials registers;
- Validation sampling and analysis;
- Field and laboratory QA/QC data; and
- Records relating to unexpected finds (where applicable).

7.3.4 Step 4 - Define the Study Boundary

The remediation and validation (and the resulting validation report and EMP) will be confined to the site boundaries.

7.3.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

7.3.5.1 VAC

The validation data will be assessed in accordance with the requirements outlined in Section 7.1 and 7.2.

7.3.5.2 Field and Laboratory QA/QC

Field QA/QC is to include analysis of inter-laboratory duplicates (5% frequency), intra-laboratory duplicates (5% frequency), trip spike (one per sampling event), trip blank (one per sampling event) and rinsate samples (one per sampling event, only where re-usable equipment is utilised). Field QA/QC samples are to be analysed for the contaminants of concern, except asbestos. The trip spike will only be analysed for BTEX.

DQIs for field and laboratory QA/QC samples are defined below:

Field Duplicates

Acceptable targets for precision of field duplicates will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Trip Blanks

Acceptable targets for trip blank samples will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to the reference material used as the blank medium.

Trip Spikes

Acceptable targets for trip spike samples will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data will be assessed against the laboratory QA/QC criteria. These criteria are developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the typical limits is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics; and
- 60-140% recovery acceptable for organics.

Surrogate Spikes

- 60-140% recovery acceptable for general organics.

Method Blanks

- All results less than PQL.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence will be reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is to be undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, the validation consultant is to adopt the most conservative concentration reported.

7.3.5.3 Appropriateness of PQLs

The PQLs of the analytical methods are to be considered in relation to the VAC to confirm that the PQLs are less than the VAC. In cases where the PQLs are greater than the VAC, a discussion of this is to be provided.

7.3.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is to be undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected. Quantitative limits on decision errors have not been established due to the nature of the validation data being collected.

7.3.7 Step 7 - Optimise the Design for Obtaining Data

The design is to be optimised via the collection of validation data to demonstrate the success of the key aspects of the remediation. Data collection will be via various methods including inspections/clearances, sampling and laboratory analysis.

7.3.8 Sampling Plan

The proposed sampling plan is described in Section 7.1.

7.4 Validation Report and EMP

As part of the site validation process, a site validation report will be prepared by the validation consultant on completion of the remediation and validation works. The report will present the results of the validation assessment and will be prepared in accordance with the Consultants Reporting Guidelines.

Where contamination remains on site, an EMP will also be prepared as part of the validation process to document the long-term site management requirements for areas outside the basement/building footprint (as required). It is anticipated that the EMP will include 'passive' management requirements for maintaining the integrity of the capping layers, and will provide contingencies for minor intrusive works should these layers need to be breached in future. The notification and enforcement mechanisms for the EMP are to include notation on the planning certificate under Section 10.7 of the Environmental Planning and Assessment Act (1979) and a covenant registered on the title to land under Section 88B of the Conveyancing Act (1919).

8 CONTINGENCY PLAN

A review of the proposed remediation works has indicated that the greatest risks that may affect the success of the remediation include identification of unexpected finds. Contingency plans to address these risks are outlined below, in conjunction with a selection of other contingencies that may apply to this project.

8.1 Contingency - Landscaped and Public Open Space Areas Capping Specification

Where the DGI identified asbestos concentrations greater than the health-based SAC in the landscaped and/or public open space areas where there is no hardstand/pavement overlying the contaminated material, the contingency capping specification as outlined in the below table is to be adopted:

Table 8-1: Remediation Details – Contingency – Landscaped and Public Open Space Areas

Area	Capping Specification^
Turfed areas/unpaved areas (excluding new plantings)	Installation of: • Geotextile or mesh geogrid marker layer over the contaminated fill; • >500mm clean imported (validated) topsoil/growing medium; and • Surface finish to required development design.
New planting areas (trees and shrubs)	Arborist advice is to be provided initially to confirm acceptance of the approach below. Or an alternative is to be agreed upon. Plantings are to occur in the clean capping layers only to the extent practicable. Alternatively, excavation of a tree pit at least >500mm greater than the outer diameter of the root ball in all directions is to occur, followed by installation of: • Mesh geogrid marker layer over the contaminated fill, folded down the walls of the bit but not across the base so as not to restrict future growth (this must be secured to the marker in the area adjoining the tree pit (where applicable) – a >1,000mm overlap and use of soil 'U' nails to pin down the marker would be acceptable); • Backfill with clean imported (validated) topsoil/growing medium; and • Surface finish to required development design.
Existing trees being retained (i.e. tree protection zones)	Arborist advice is to be provided initially to confirm acceptance of the approach below. Or an alternative is to be agreed upon. Installation of: • Mesh geogrid marker layer over the contaminated fill, installed to within 0.1-0.2m of the tree base; • >200mm of clean imported (validated) topsoil or mulch, tapered towards the tree base; and • >50mm of mulch to the surface. Consideration is also to be given to constructing a raised bed around the trees using garden edging in order to maintain the >200mm clean cover.

There are a variety of commercially available products that could be used for the geotextile marker and for the mesh geogrid. The geotextile must (as a minimum):

- Be brightly coloured (e.g. red or orange);
- Be sufficiently permeable (permeability to be assessed by the client or arborist);

- Be rot proof and chemically inert;
- Have an expected lifespan/service life >50 years; and
- Have tensile strength properties as follows: wide strip >8kN/m, grab tensile strength >500N.

Subject to confirmation of permeability and service life parameters, an example of this type of product includes the TerraStop® Hi Vis Layer (HVL Medium).

The purpose of the mesh geogrid is to provide a physical barrier to deter any breaches of the marker layers in sensitive areas where the installation of thicker capping layers is not possible due to constraints associated with existing trees. Whilst it is acknowledged that this does not provide a complete 'separation' layer to the underlying soil, combined with the other risk mitigation measures, it is considered to be adequate. A highly visible (e.g. orange or red), rigid biaxial geogrid is proposed for this purpose, with perforations (pitch size) of 40mm or less, tensile strength of 40kN/m or greater.

It is acknowledged that, at the time of preparing this RAP, a brightly coloured geogrid meeting this specification could not be identified. Non-brightly coloured examples of this type of product include the E'GRID® SX 4040 or the SECUGRID® 40/40 Q1. Where a brightly coloured geogrid cannot be sourced, the above examples are considered adequate provided that an additional brightly coloured layer is also installed. The brightly coloured layer can include an orange barrier mesh or fence netting.

Where required, the marker is to be installed over the fill and secured appropriately using 'U' nails, pegs or other means.

8.2 Unexpected Finds

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. At this site, these types of hazards may include: underground tanks or other buried infrastructure and odorous or stained hydrocarbon impacted soils.

The procedure to be followed in the event of an unexpected find is presented below:

- In the event of an unexpected find, all work in the immediate vicinity should cease and the remediation contractor must contact the validation consultant, the client and the project manager and advise them of the find;
- Temporary barricades should be erected to isolate the area from access to workers;
- The client should engage the validation consultant to attend the site and assess the extent of remediation that may be required and/or adequately characterise the contamination in order to allow for remediation of the material;
- In the event additional remediation is required, the procedures outlined within this report should be adopted where appropriate. Alternatively, an addendum RAP or RWP is to be prepared;
- An additional sampling and analytical rationale should be established by the validation consultant and should be implemented with reference to the relevant guideline documents; and
- Appropriate validation sampling is to be undertaken and the results should be included in the validation report.

8.3 Importation Failure for VENM or other Imported Materials

Where material to be imported onto the site does not meet the importation acceptance criteria detailed in Section 7, the only option is to not accept the material. Alternative material must be sourced that meets the importation requirements.

8.4 Remediation Strategy Changes

Any material change to the proposed remediation strategy will require revision of the RAP or preparation of an addendum RAP. This must not occur without appropriate consultation and approvals from the client, consent authority and other relevant parties as applicable.

9 SITE MANAGEMENT PLAN FOR REMEDIATION WORKS

The information outlined in this section of the RAP is for the remediation work only. The client and project manager must also make reference to the development consent for specific site management requirements for the overall development of the site.

9.1 Construction-Phase Asbestos Management Plan (AMP)

A construction-phase AMP must be prepared prior to the commencement of remediation work and must be implemented during remediation. The construction-phase AMP must consider the specific activities to be undertaken during remediation that involve asbestos, informed by the results of the DSI and the pre-remediation DGI.

The AMP must include the minimum personal protective equipment (PPE), work health and safety (WHS) and other requirements outlined in the documents published by Safe Work Australia, WorkCover Authority of NSW, National Occupational Health and Safety Commission, and other relevant authorities as applicable.

An asbestos removal control plan (ARCP) must be prepared by the remediation contractor and issued to SafeWork, and notification of asbestos removal is to be provided to SafeWork at least five days prior to commencement of works. Based on the current data, the asbestos is considered friable, as AF/FA, with regards to the asbestos definitions in NEPM 2013.

Asbestos air-fibre monitoring must be included in the construction phase AMP due to the presence of AF/FA in/on soil, and the close proximity of adjoining properties utilised by the general public. Air monitoring must only be carried out by personnel registered and accredited by NATA (National Association of Testing Authorities). Filter analysis must only be carried out within a NATA certified laboratory. The monitoring results must conform to the requirements of the NOHSC Guidance note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)].

A monitoring program will be used to assess whether the control procedures being applied are satisfactory and that criteria for airborne asbestos fibre levels are not being exceeded. The following levels will be used as action criteria during the air monitoring:

- <0.01 Fibres/ml: Work procedures deemed to be successful;
- 0.01 to 0.02 Fibres/ml: Inspection of the site and review of procedures; and
- >0.02 Fibres/ml: Stop work, inspection of the site, review of procedures, clean-up, rectification works where required and notify the relevant regulator.

9.2 Interim Site Management

The site is operational and interim management of the site for the potential occurrence of asbestos is required. An interim AMP for ongoing and normal use of the site as Riverside Theatres and public open space must be prepared and implemented prior to the commencement of construction to fulfill the client's requirement to have an AMP in place under the WHS Regulation (2017).

In the event that any intrusive work is to occur in the remediation area prior to the commencement of remediation, a task-specific AMP and WHS plan must be prepared by the contractor undertaking the works, with due consideration to the contamination encountered to date.

9.3 Project Contacts and Signage

Emergency procedures and contact telephone numbers should be displayed in a prominent position at the site entrance gate and within the main site working areas. These details are to be confirmed when the various roles and responsibilities are assigned.

A sign displaying the contact details of the remediation contractor and site manager (if different from the remediation contractor) must be displayed on the site adjacent to the site access, including a contact telephone number that is available 24 hours a day, 7 days a week. The sign must be clearly legible from the street and be displayed for the duration of the remediation works.

9.4 Security

Appropriate fencing should be installed as required to secure the site. Warning signs should be erected, which outline the PPE required for remediation work.

9.5 Timing and Sequencing of Remediation Works

The anticipated sequence of remediation works is outlined at the beginning of Section 6 of this RAP. Remediation will occur concurrently with the development works to facilitate the implementation of the requirements under this RAP.

The consent authority must consider the nature/scope of remediation so that the conditions in the development approval/consent align with the sequence of works and requirements of the RAP. Notably, remediation requires completion of construction as parts of the constructed development (e.g. landscaping etc) will form the cap, and the DGI work will occur after demolition. Hence, remediation can only occur concurrently with construction and it will not be possible to remediate the site prior to the issue of a Construction Certificate.

9.6 Site Soil and Water Management Plan

The remediation contractor is to prepare a detailed soil and water management plan prior to the commencement of site works and this should consider the requirements of the AMP. Silt fences should be used to control the surface water runoff at all appropriate locations of the site and appropriate measures are to be implemented to manage soil/water disturbance to the satisfaction of the regulator/consent authority. Reference should be made to the consent conditions for further details.

All stockpiled materials should be placed within an erosion containment boundary with silt fences and sandbags employed to limit sediment movement. The containment area should be located away from drainage lines/low-points, gutters, stormwater pits and inlets and the site boundary. No liquid waste or

runoff should be discharged to the stormwater or sewerage system without the approval of the appropriate authorities. Reference is also to be made to the AMP in this regard.

9.7 Noise and Vibration Control Plan

The guidelines for minimisation of noise on construction sites outlined in AS-2460 (2002)[13] should be adopted. Other measures specified in the consent conditions should also be complied with. Noise producing machinery and equipment should only be operated between the hours approved by the consent authority (refer to consent documents).

All practicable measures should be taken to reduce the generation of noise and vibration to within acceptable limits. In the event that short-term noisy operations are necessary, and where these are likely to affect residences, notifications should be provided to the relevant authorities and the residents by the project manager, specifying the expected duration of the noisy works.

9.8 Dust Control Plan

All practicable measures should be taken to reduce dust emanating from the site. Factors that contribute to dust production are:

- Wind over a cleared surface;
- Wind over stockpiled material; and
- Movement of machinery in unpaved areas.

Visible dust should not be present at the site boundary. Measures to minimise the potential for dust generation include:

- Use of water sprays on unsealed or exposed soil surfaces;
- Covering of stockpiled materials and excavation faces (particularly during periods of site inactivity and/or during windy conditions) or alternatively the erection of hessian fences around stockpiled soil or large exposed areas of soil;
- Establishment of dust screens consisting of a 2m high shade cloth or similar material secured to a chain wire fence;
- Maintenance of dust control measures to keep the facilities in good operating condition;
- Stopping work during strong winds;
- Loading or unloading of dry soil as close as possible to stockpiles to prevent spreading of loose material around the development area; and
- Geofabric could be placed over exposed soils in the event that excavation is staged.

If stockpiles are to remain on-site or soil remains exposed for a period of longer than several days, dust monitoring should be undertaken at the site. If excessive dust is generated all site activities should cease until either wind conditions are more acceptable or a revised method of excavation/remediation is developed.

[13] Australian Standard, (2002). *AS2460: Acoustics - Measurement of the Reverberation Time in Rooms.*

Dust is also produced during the transfer of material to and from the site. All material should be covered during transport and should be properly disposed of on delivery. No material is to be left in an exposed, un-monitored condition.

All equipment and machinery should be brushed or washed down before leaving the site to limit dust and sediment movement off-site. In the event of prolonged rain and lack of paved areas all vehicles should be washed down prior to exit from the site, and any soil or dirt on the wheels of the vehicles removed. Water used to clean the vehicles should be collected and tested prior to appropriate disposal under the relevant waste classification guidelines.

Reference should also be made to the construction phase AMP in this regard.

9.9 Dewatering

Dewatering is not expected to be required within the scope of remediation. In the event that dewatering is required during construction, WaterNSW must be contacted to provide additional details regarding the approval process.

Groundwater must not be pumped to sewer or stormwater without obtaining prior approval from the relevant authorities. The groundwater will require some level of treatment prior to discharge. Or alternatively, pumped groundwater would need to be stored appropriately then removed by a liquid waste contractor.

9.10 Odour Control Plan

All activities undertaken at the site should be completed in a manner that minimises emissions of smoke, fumes and vapour into the atmosphere and any odours arising from the works or stockpiled material should be controlled. Control measures may include:

- Maintenance of construction equipment so that exhaust emissions comply with the Clean Air Regulations issued under the POEO Act 1997;
- Demolition materials and other combustible waste should not be burnt on site;
- The spraying of a suitable proprietary product to suppress any odours that may be generated by excavated materials; and
- Use of protective covers (e.g. builder's plastic).

All practicable measures should be taken to reduce fugitive emissions emanating from the site so that associated odours do not constitute a nuisance and that the ambient air quality is not adversely impacted. The following odour management plan should be implemented to limit the exposure of site personnel and surrounding residents to unpleasant odours:

- Excavation and stockpiling of material should be scheduled during periods with low winds if possible;

- A suitable proprietary product could be sprayed on material during excavation and following stockpiling to reduce odours (subject to an appropriate assessment of the product by the validation consultant);
- All complaints from workers and neighbours should be logged and a response provided. Work should be rescheduled as necessary to minimise odour problems;
- The site foreman should consider the following odour control measures as outlined in NEPM:
  - reduce the exposed surface of the odorous materials;
  - time excavation activities to reduce off-site nuisance (particularly during strong winds); and
  - cover exposed excavation faces overnight or during periods of low excavation activity.
- If continued complaints are received, alternative odour management strategies should be considered and implemented.

9.11 Work Health and Safety (WHS) Plan

A site specific WHS plan should be prepared by the remediation contractor for all work to be undertaken at the site. The WHS plan should meet all the requirements outlined in SafeWork NSW WHS regulations.

As a minimum requirement, personnel must wear appropriate protective clothing, including long sleeve shirts, long trousers, steel cap boots, hard hats and asbestos-related PPE. The specific asbestos-related PPE will be specified in the construction phase AMP. Washroom and lunchroom facilities should also be provided to allow workers to remove potential contamination from their hands and clothing prior to eating or drinking.

9.12 Waste Management

Prior to commencement of remedial works and excavation for the proposed development, the remediation contractor should develop a waste management plan to minimise the amount of waste produced from the site and promote recycling of building materials such as concrete pavement to the extent practicable, but with due consideration to the asbestos impacts in fill.

9.13 Incident Management Contingency

The validation consultant should be contacted if any unexpected conditions are encountered at the site. This should enable the scope of remedial/validation works to be adjusted as required. Similarly, if any incident occurs at the site (e.g. a fuel spill during refuelling of machinery), the validation consultant should be advised to assess potential impacts on contamination conditions and the remediation/validation timetable.

9.14 Hours of Operation

Hours of operation should be between those approved by the consent authority under the development approval process.

9.15 Community Consultation and Complaints

The remediation contractor should provide details for managing community consultation and complaints within their construction plans.

10 CONCLUSIONS

The DSI identified fill impacted and contaminated with asbestos that requires remediation. The proposed remediation strategies for the contaminated fill include a combination of excavation and off-site disposal of contaminated fill/soil to a suitably licensed landfill, and in-situ capping of fill and long-term management of the capped areas via an EMP.

The anticipated sequence of remediation works is outlined at the beginning of Section 6 of this RAP. Remediation will occur concurrently with the development works and this should be considered by the consent authority so that the conditions in the development approval/consent align with the sequence of works and requirements of the RAP.

We are of the opinion that the site can be made suitable for the proposed development via remediation and the implementation of this RAP. A site validation report is to be prepared on completion of remediation activities and submitted to the consent authority to demonstrate that the site is suitable for the proposed development following completion of remediation/validation. An EMP will also be prepared to manage the contaminated fill capped on site as part of the remediation. The EMP will provide a passive management approach and is not expected to impose onerous constraints on the day-to-day site use under the proposed development scenario.

JKE is of the opinion that the RAP has met the objectives outlined in Section 2.1.

The regulatory requirements applicable for the site are outlined in Section 10.1.

10.1 Regulatory Requirements

The regulatory requirements applicable for the remediation are discussed in the following table:

Table 10-1: Regulatory Requirement

Guideline / Legislation / Policy	Applicability
SEPP Resilience and Hazards 2021	It is our understanding that the remediation is Category 1 given it will be approved as part of the SSDA. We recommend that the client's expert planner assess these options and provide their planning advice in relation to the remediation category and approvals/planning pathway.
Water Management Act 2000	JKE understand that a controlled activity approval will be required for the works as it is on waterfront land. The client is to seek specialist advice in this regard and obtain any necessary approvals.
POEO Act 1997 (and associated regulations)	Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner. Appropriate waste tracking must occur for all waste that is disposed off-site, where required.

Guideline / Legislation / Policy	Applicability
	Activities must be carried out in a manner which does not result in the pollution of waters.
POEO (Waste) Regulation 2014	Part 7 of the POEO Waste Regulation 2014 set outs the requirements for the transportation and management of asbestos waste and Clause 79 of the POEO Waste Regulation requires waste transporters to provide information to the NSW EPA regarding the movement of any load in NSW of more than 10 square meters of asbestos sheeting, or 100 kilograms of asbestos waste. To fulfil these legal obligations, asbestos waste transporters must use the NSW EPA-endorsed asbestos waste tracking system. Appropriate waste tracking is required for all waste that is disposed off-site, in accordance with the regulations.
Work Health and Safety Regulation (2017) SafeWork NSW Code of Practice: How to manage and control asbestos in the workplace (2022)	Sites with asbestos become a 'workplace' when work is carried out there and require a register and AMP. Appropriate SafeWork NSW notification will be required for licensed asbestos removal works or handling. These requirements must be evaluated following the hazardous building materials survey and on completion of the additional soil sampling associated with the pre-remediation investigation.
NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997	The requirement to notify the NSW EPA should be assessed as part of the site validation process.

11 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Important Information About This Report

These notes have been prepared by JKE to assist with the interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors:
This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions:
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data:
Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Investigation Limitations:
Although information provided by an investigation can reduce exposure to the risk of the presence of contamination, no investigation can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

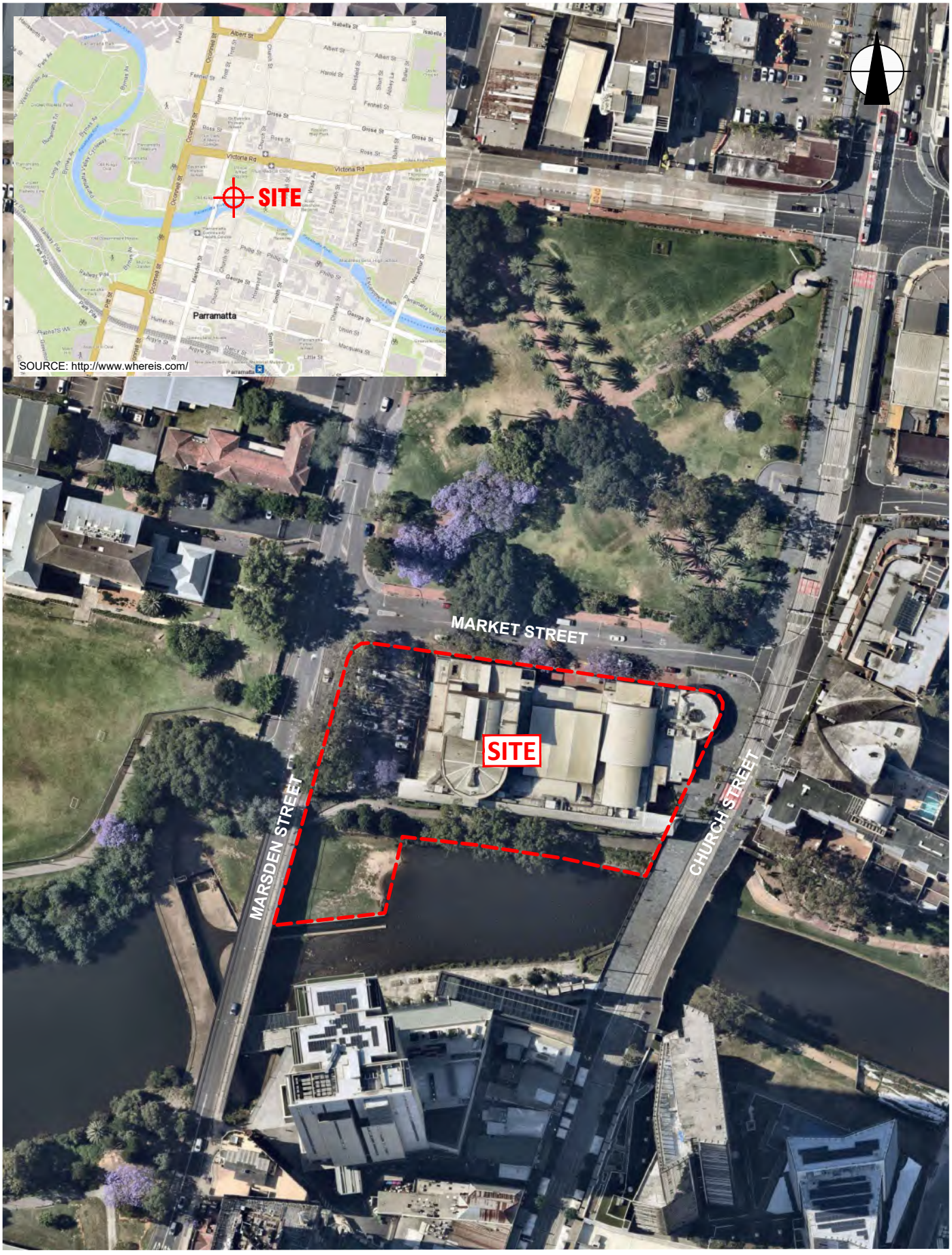
Misinterpretation of Reports by Design Professionals:
Costly problems can occur when design professionals develop plans based on misinterpretation of the report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Report:
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete report should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely:
As the investigation is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the report, and you are encouraged to read them closely.

Appendix A: Report Figures



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the Environmental report.

Title: **SITE LOCATION PLAN**

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Project No: E37231PT

Figure No: 1

JKEnvironments

PLOT DATE: 13/01/2025 2:00:15 PM DWG FILE: K:\SC EIS JOBS\37000\SIE37231PT PARRAMATTA\CAD\E37231PT.DWG

MARKET STREET

BH1 (1.6)

BH/MW13 (3.0)

BH14 (2.6)

BH6 (0.2)

BH7 (0.3)

BH18 (2.8)

SV2 (>1.2)

BH3 (1.2)

BH10 (>0.2)

BH2 (>0.8)

BH4 (1.7)

BH16 (>0.5)

BH8 (>0.2)

BH11 (>0.1)

BH15 (>0.1)

BH/MW5 (2.0)

SV1 (>1.2)

BH9 (>0.75)

BH12 (>0.5)

BH/MW17 (1.7)

LENNOX BRIDGE

BH20 (>0.5)

BH19 (>0.5)

PARRAMATTA RIVER

LEGEND

APPROXIMATE SITE BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
SV1	SOIL VAPOUR PIN AND DEPTH (m)
APPROXIMATE ALIGNMENT OF EXISTING SEWER	

0 5 10 15 20 25

SCALE 1:500 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN**

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Project No: E37231PT

Figure No: 2

JKEnvironments

PLOT DATE: 13/01/2025 2:00:27 PM DWG FILE: K:\5C EIS JOBS\37000\SIE37231PT PARRAMATTA\CADIE37231PT.DWG

MW13 / WDUP1	
Nickel	40µg/L
Zinc	100µg/L

BH14	0.4-0.6m
Arsenic	140mg/kg

BH1	0.5-0.95m
C_PAH	12mg/kg

BH3	0.15-0.3m
C_PAH	27mg/kg

BH2	0.03-0.2m
AF/FA	0.0014%w/w
BH2	0.5-0.8m
Lead	1,700mg/kg
C_PAH	6.4mg/kg
Lead	1,700mg/kg

BH16 / LAB DUP	0-0.1m
C_PAH	3.4mg/lg
TRH F3	1,000mg/kg

BH5	0.18-0.3m
TRH F3	600mg/kg
MW5	
Arsenic	54µg/L
Copper	3µg/L
Nickel	15µg/L

BH8	0-0.1m
Asbestos Detected	

BH19	0-0.1m
Asbestos Detected	

MARKET STREET

BH/MW13 (3.0)

BH14 (2.6)

BH1 (1.6)

BH6 (0.2)

BH7 (0.3)

BH18 (2.8)

SV2 (>1.2)

BH3 (1.2)

BH10 (>0.2)

BH2 (>0.8)

BH4 (1.7)

BH16 (>0.5)

BH/MW5 (2.0)

SV1 (>1.2)

BH8 (>0.2)

BH11 (>0.1)

BH15 (>0.1)

BH9 (>0.75)

BH12 (>0.5)

BH/MW17 (1.7)

BH20 (>0.5)

BH19 (>0.5)

LENNOX BRIDGE

PARRAMATTA RIVER

LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- BH/MW(Fill Depth) — BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
- ▲ SV1 — SOIL VAPOUR PIN AND DEPTH (m)
- APPROXIMATE ALIGNMENT OF EXISTING SEWER

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

SOIL/SURFACE SAMPLE EXCEEDANCE

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

- SOIL/SURFACE CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK
- SOIL/SURFACE CONTAMINATION ABOVE SAC FOR ECOLOGICAL RISK
- GROUNDWATER CONTAMINATION ABOVE SAC
- ASBESTOS DETECTED - NOT ABOVE SAC

0 5 10 15 20 25

SCALE 1:500 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAC EXCEEDANCE PLAN**

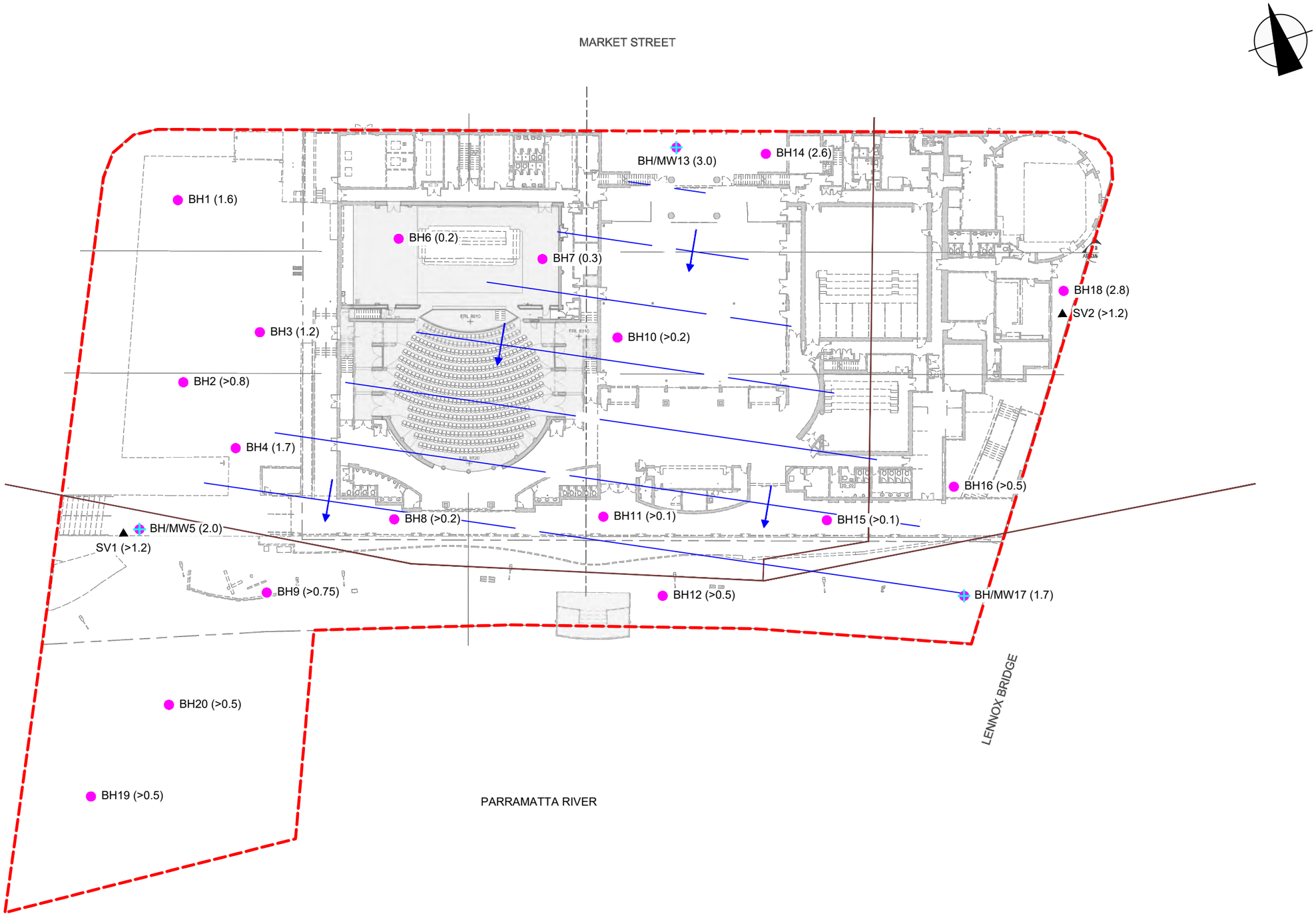
Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Project No: E37231PT

Figure No: 3

JKEnvironments

PLOT DATE: 30/01/2025 10:26:24 AM DWG FILE: K:\5C EIS JOBS\37000\SIE37231PT PARRAMATTA\CAD\E37231PT.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
- SV1 SOIL VAPOUR PIN AND DEPTH (m)
- APPROXIMATE ALIGNMENT OF EXISTING SEWER
- INFERRED GROUNDWATER FLOW DIRECTION

0 5 10 15 20 25
SCALE 1:500 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **GROUNDWATER CONTOUR PLOT**

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Project No: E37231PT

Figure No: 4

JKEnvironments

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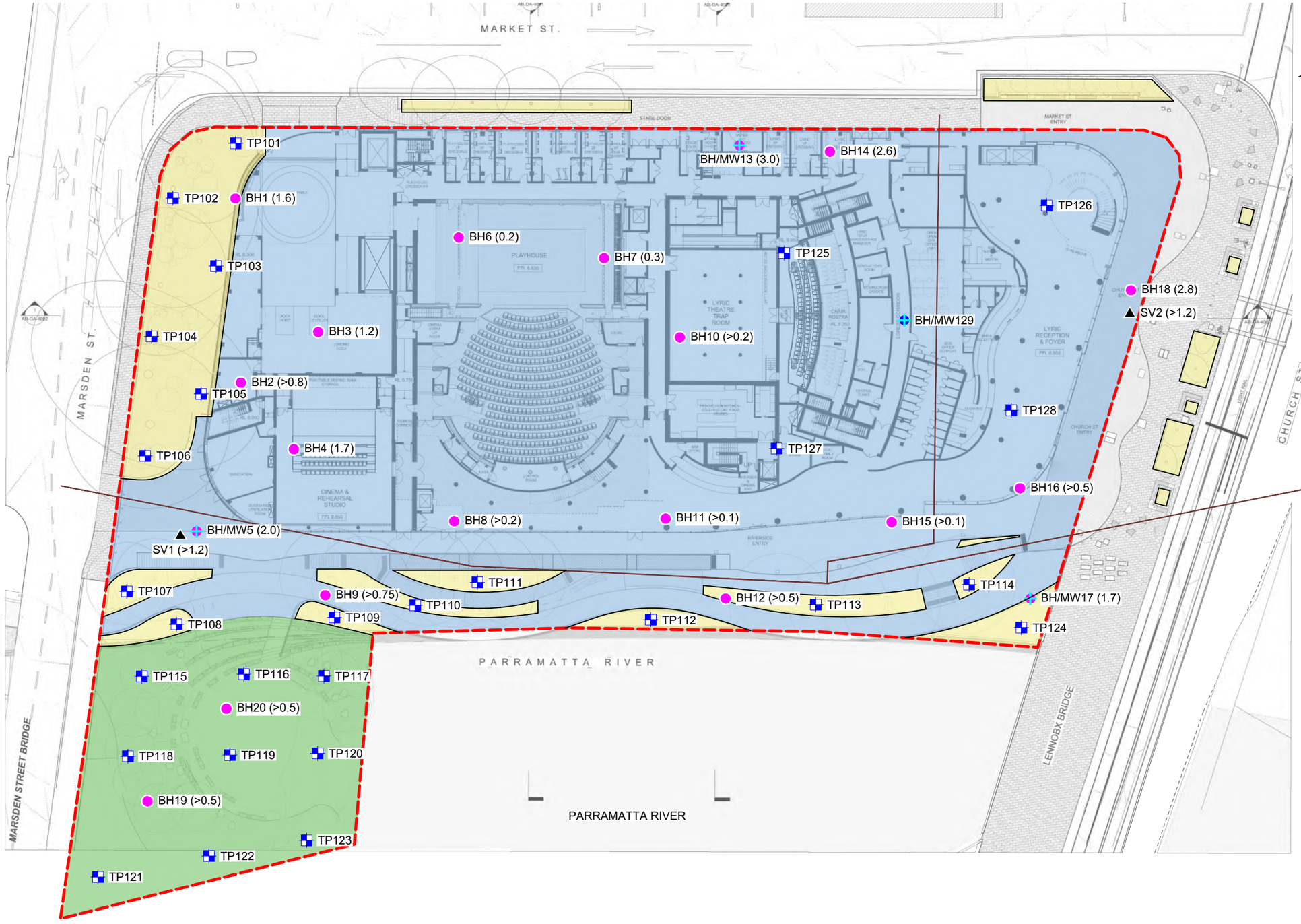

LEGEND

	APPROXIMATE SITE BOUNDARY
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
SV1	SOIL VAPOUR PIN AND DEPTH (m)
	APPROXIMATE ALIGNMENT OF EXISTING SEWER
TP101	PROPOSED TEST PIT LOCATION AND NUMBER
BH/MW129	PROPOSED BOREHOLE GROUNDWATER MONITORING WELL LOCATION AND NUMBER
	LANDSCAPED AREAS
	PUBLIC OPEN AREAS
	BUILDING FOOTPRINT / PAVED AREAS

0 5 10 15 20 25
SCALE 1:500 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **PROPOSED DATA GAP INVESTIGATION SAMPLE LOCATIONS**

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Project No: E37231PT

Figure No: 5

JKEnvironments

PLOT DATE: 12/02/2025 1:44:17 PM DWG FILE: K:\5C EIS JOBS\37000'S\E37231PT PARRAMATTA\CAD\E37231PT.DWG

Appendix B: Proposed Development Plans

Rev	Description	By	Date
01	Issue For Information		08/11/24
02	Draft SSDA - Issue for Information		28/11/24
03	DRAFT SSDA		11/02/25

RIVERSIDE THEATRES

CORNER MARKET & CHURCH STREET, PARRAMATTA, NSW, 2150

223100.00

RIVERSIDE THEATRES SSDA ARCHITECTURAL DRAWING SET			
SHEET NUMBER	SHEET NAME	CURRENT REVISION	CURRENT REVISION DATE
AR-DA-1000	LOCATION PLAN	02	11/02/25
AR-DA-1100	EXISTING SITE PLAN	03	11/02/25
AR-DA-1101	PROPOSED SITE PLAN	01	11/02/25
AR-DA-2000	OVERALL BASEMENT & RIVERSIDE PLAN	02	11/02/25
AR-DA-2001	OVERALL GROUND FLOOR PLAN	02	11/02/25
AR-DA-2002	OVERALL LEVEL 01 PLAN	02	11/02/25
AR-DA-2003	OVERALL LEVEL 02 PLAN	02	11/02/25
AR-DA-2004	OVERALL LEVEL 03 PLAN	02	11/02/25
AR-DA-2005	OVERALL LEVEL 04 PLAN	02	11/02/25
AR-DA-2006	OVERALL LEVEL 05 PLAN	03	19/12/25
AR-DA-2007	OVERALL ROOF PLAN	02	11/02/25
AR-DA-2020	OVERALL BASEMENT PLAN DEMOLITION PLAN	03	11/02/25
AR-DA-2021	OVERALL GROUND FLOOR DEMOLITION PLAN	03	11/02/25
AR-DA-2022	OVERALL LEVEL 01 DEMOLITION PLAN	03	11/02/25
AR-DA-2023	OVERALL LEVEL 02 DEMOLITION PLAN	03	11/02/25
AR-DA-2024	OVERALL LEVEL 03 DEMOLITION PLAN	03	11/02/25
AR-DA-2025	OVERALL LEVEL 04 DEMOLITION PLAN	03	11/02/25
AR-DA-2026	OVERALL LEVEL 05 DEMOLITION PLAN	03	11/02/25
AR-DA-2027	OVERALL ROOF DEMOLITION PLAN	03	11/02/25
AR-DA-3001	NORTH + SOUTH ELEVATIONS	02	19/12/25
AR-DA-3002	EAST + WEST ELEVATIONS	02	19/12/25
AR-DA-3100	ELEVATIONS - FACADE TYPES	02	19/12/25
AR-DA-4001	NORTH-SOUTH SECTIONS 01 & 02	02	11/02/25
AR-DA-4002	EAST-WEST SECTION 03	02	11/02/25
AR-DA-8000	WINTER SOLSTICE - SHADOW DIAGRAMS	02	19/12/25
AR-DA-8001	SPRING EQUINOX - SHADOW DIAGRAMS	02	19/12/25
AR-DA-8002	SUMMER SOLSTICE - SHADOW DIAGRAMS	02	19/12/25
AR-DA-8003	AUTUMN EQUINOX - SHADOW DIAGRAMS	02	19/12/25
AR-DA-8200	AREA PLANS SHEET 01	01	11/02/25
AR-DA-8201	AREA PLANS SHEET 02	01	11/02/25
AR-DA-9700	EXTERNAL MATERIALS SCHEDULE	01	19/12/25

DRAFT

Project Manager City of Parramatta Council

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Project No.
223100.00

Project
RIVERSIDE THEATRES
CNR MARKET & CHURCH ST,
PARRAMATTA NSW 2150

Acknowledgement
In the language of the Darug people,
this site is known as Burramattagal.

Document Control Status:
SSDA

Drawing Title
COVER SHEET & DRAWING LIST

Co-ordinated: Checker
Drawn: LF
Date: 11/05/2024
Scale: @ B1

Drawing Number: AR-DA-0100
Revision: 03

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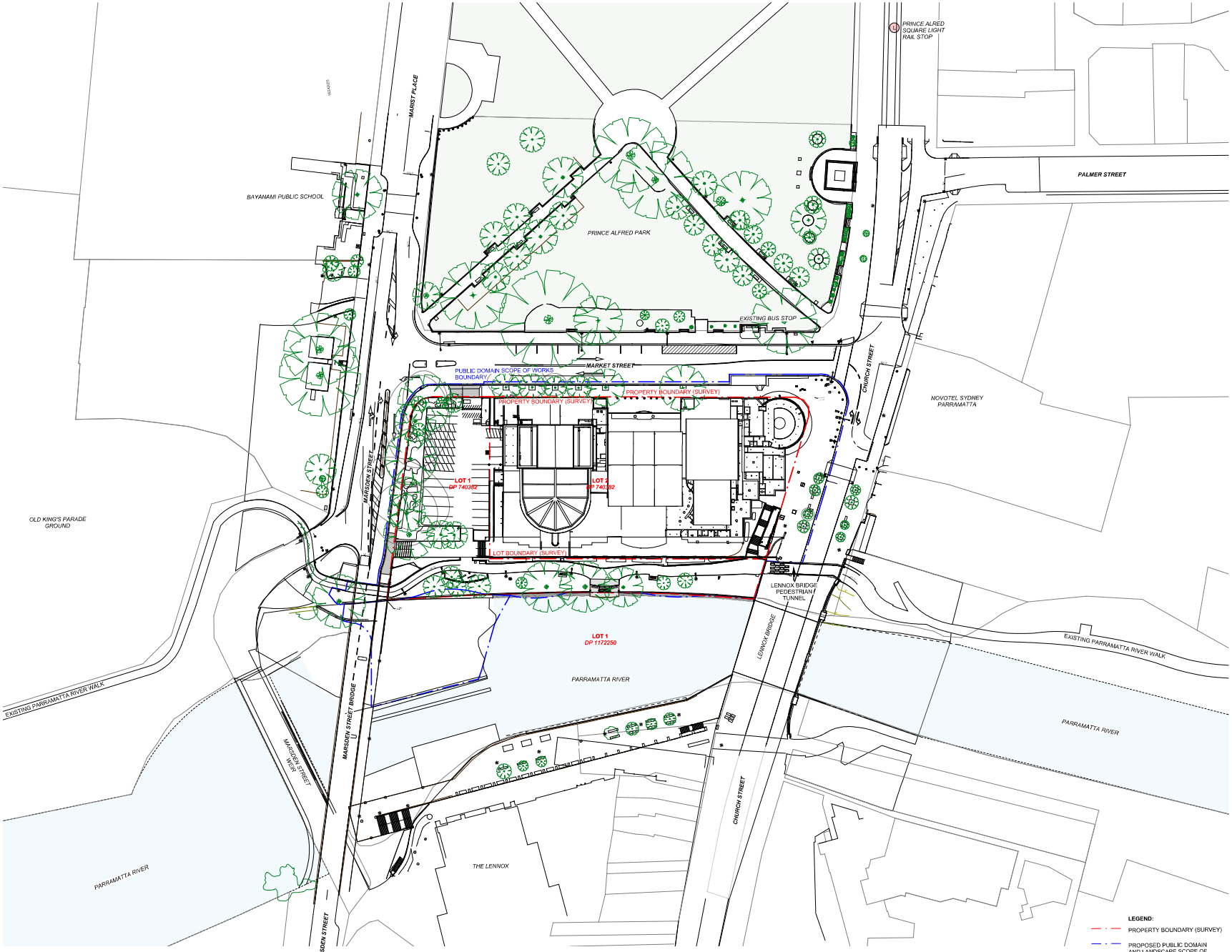

Rev	Description	By	Date
01	Draft 30% + For Costing		19/12/24
02	DRAFT SSDA		11/02/25

Project Manager — City of Parramatta Council

CITY OF PARRAMATTA

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Project No-

223100.00

Project

RIVERSIDE THEATRES
CNR MARKET & CHURCH ST,
PARRAMATTA NSW 2150

Acknowledgement

In the language of the Darug people, this site is known as Burramattagal.

Document Control Status:

SSDA

Drawing Title

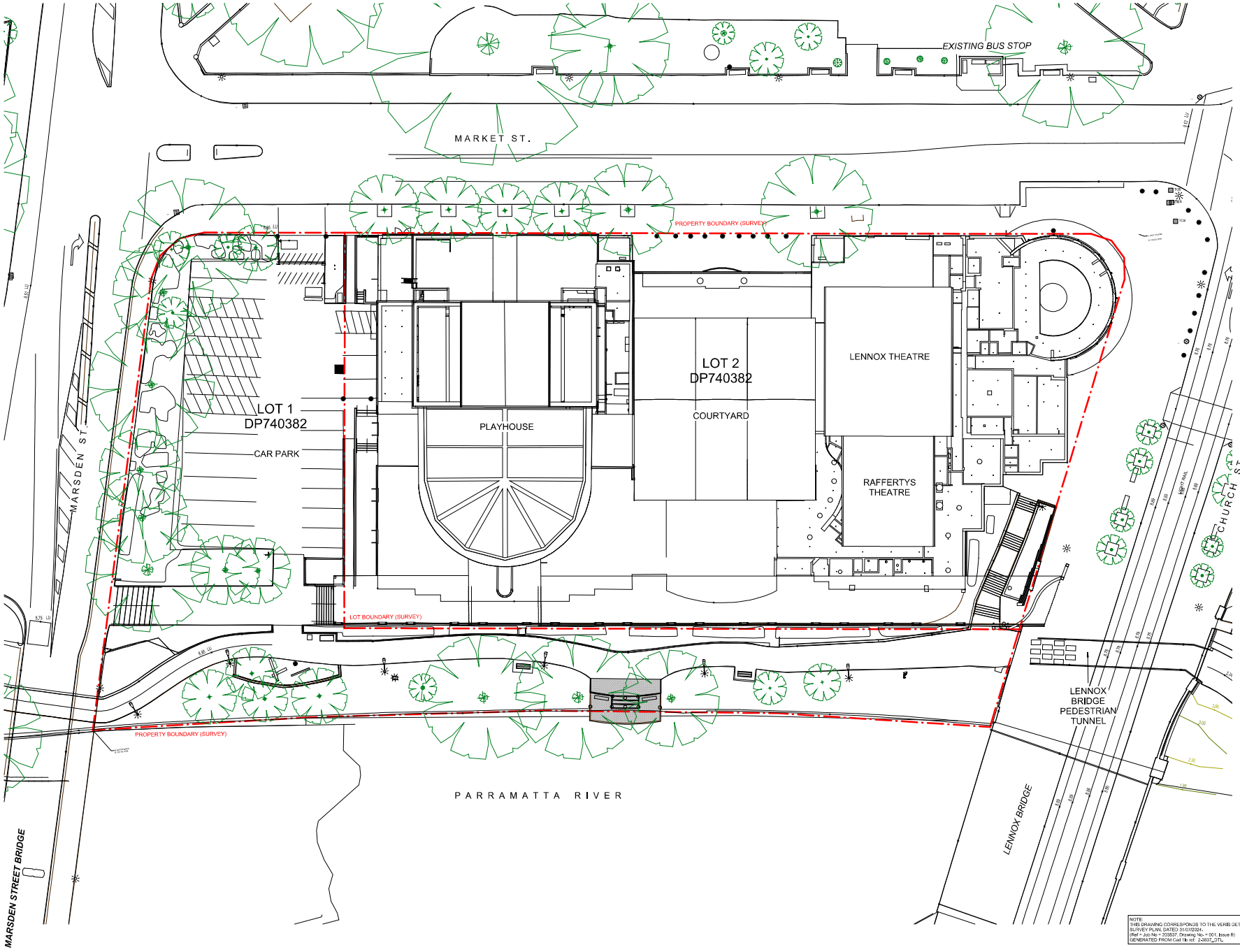
LOCATION PLAN

Co-ordinated:	Drawn:
Checker	LF
Date:	Scale:
25/01/2007	1 : 500 @ B1

Drawing Number: AR-DA-1000

Revision: 02

PLOT STAMP DATE: 11/02/2025 10:41:17 AM



Rev	Description	By	Date
01	Draft 30% - For Costing		19/12/24
02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25

Project Manager City of Parramatta Council
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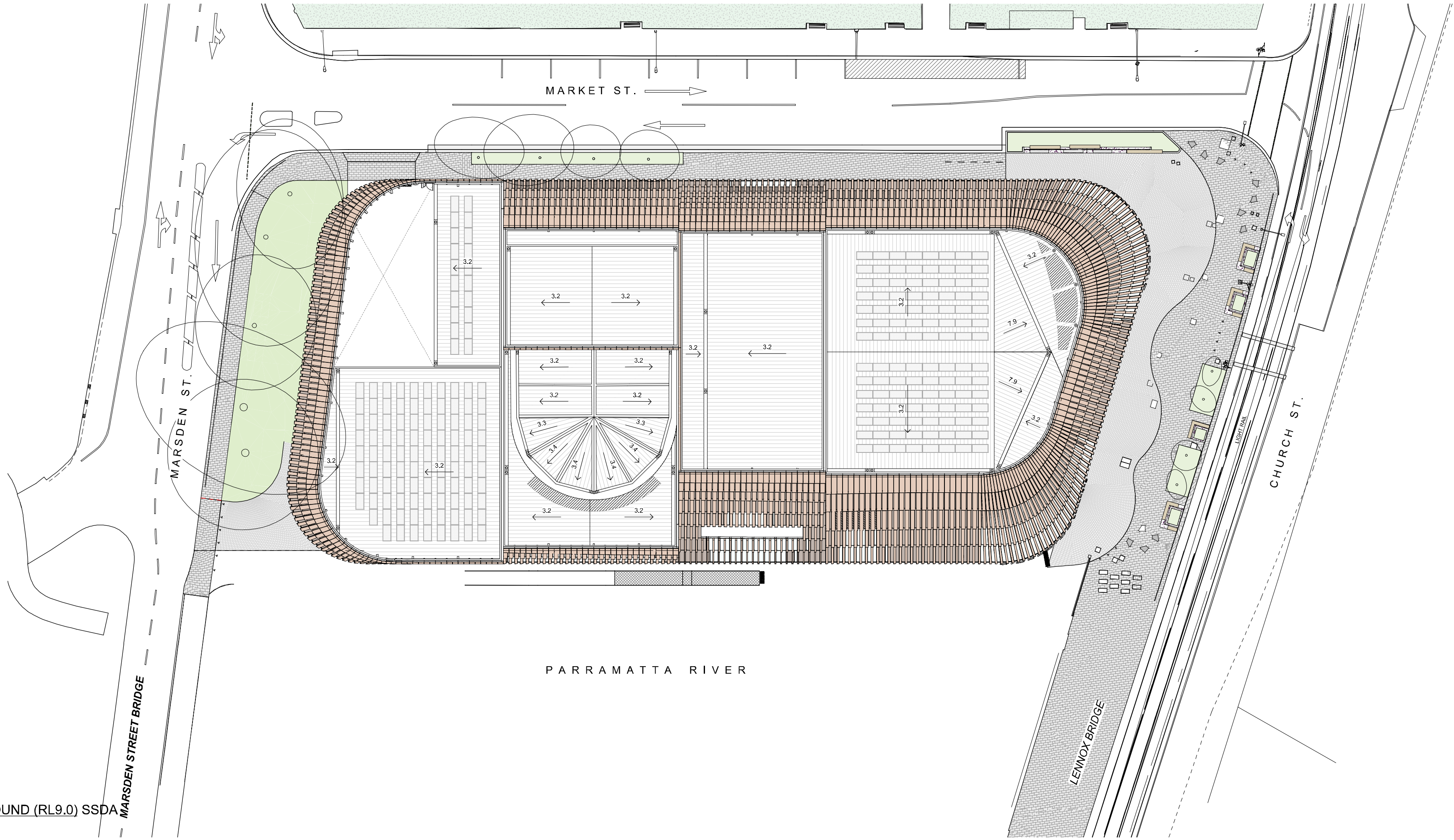
Acknowledgement
In the language of the Darug people, this site is known as Burramattagal.

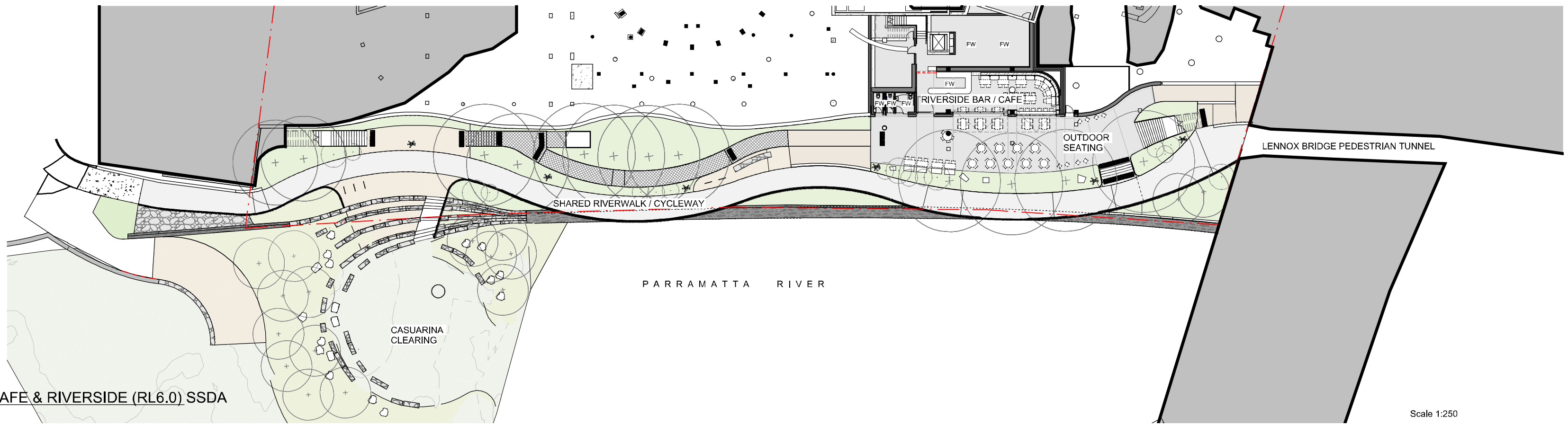
Document Control Status: SSDA

Drawing Title
EXISTING SITE PLAN

Co-ordinated: Checker	**Drawn:** LF
Date: 11/05/2024	**Scale:** 1 : 200 @ B1
Drawing Number: AR-DA-1100	**Revision:** 03



1 SITE PLAN - GROUND (RL9.0) SSDA
SCALE 1 : 250



2 SITE PLAN - CAFE & RIVERSIDE (RL6.0) SSDA
SCALE 1 : 250

Scale 1:250

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Rev	Description	By	Date
01	DRAFT SSDA		11/02/25

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Acknowledgement
In the language of the Darug people, this site is known as Burramattagal.

Document Control Status: SSDA

Drawing Title
PROPOSED SITE PLAN

Co-ordinated:	Checker	Drawn:	LF
Date:	25/01/2007	Scale:	1 : 250 @ B1
Drawing Number:	AR-DA-1101	Revision:	01

PLOT STAMP DATE: 11/02/2025 9:35:10 AM

Rev	Description	By	Date
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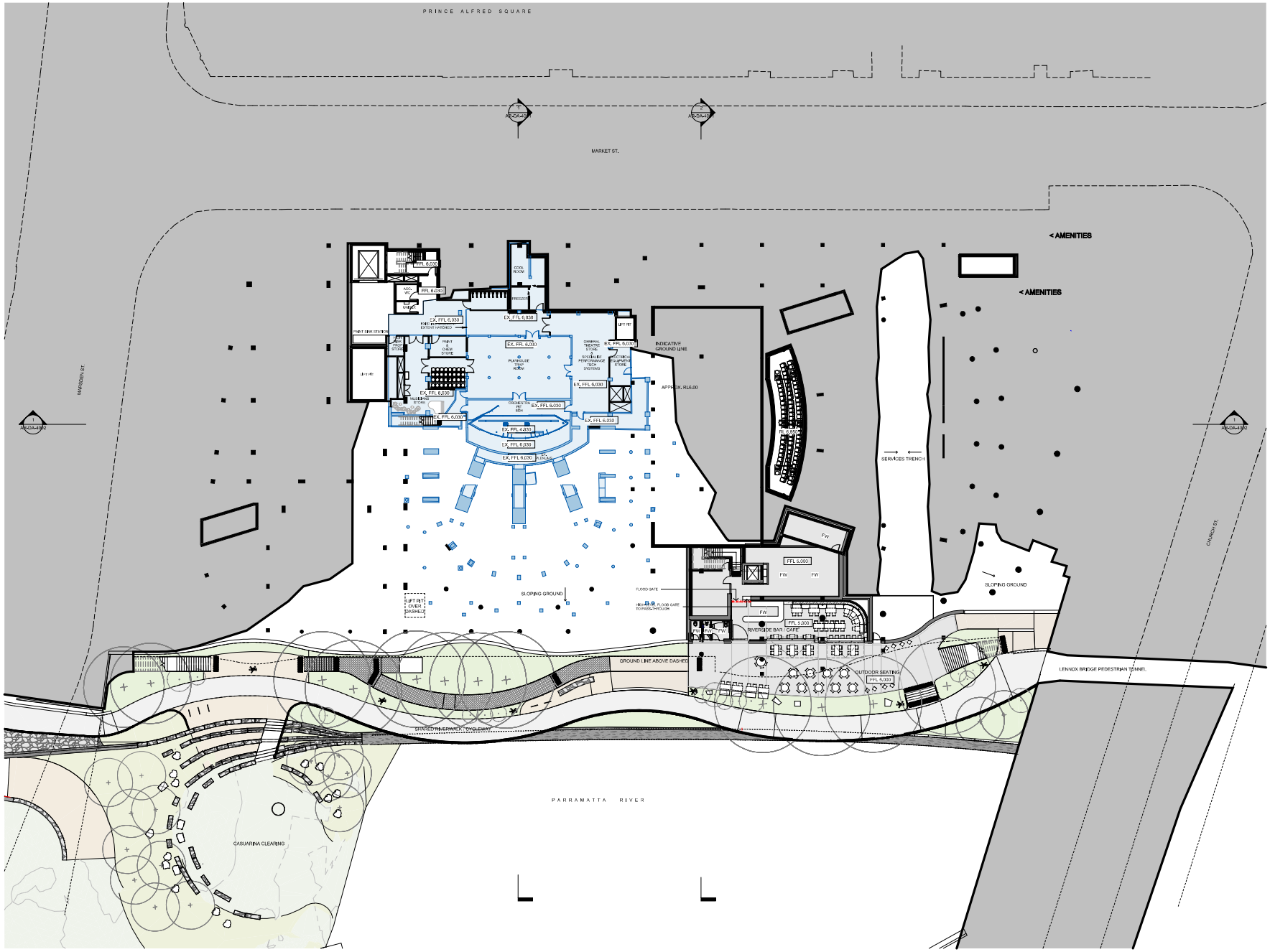
02	DRAFT SSDA		15/02/25



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LEGEND: EXISTING AND PROPOSED

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- PROPOSED SCOPE

GENERAL NOTES

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Acknowledgement

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Document Control Status:

SSDA

Drawing Title

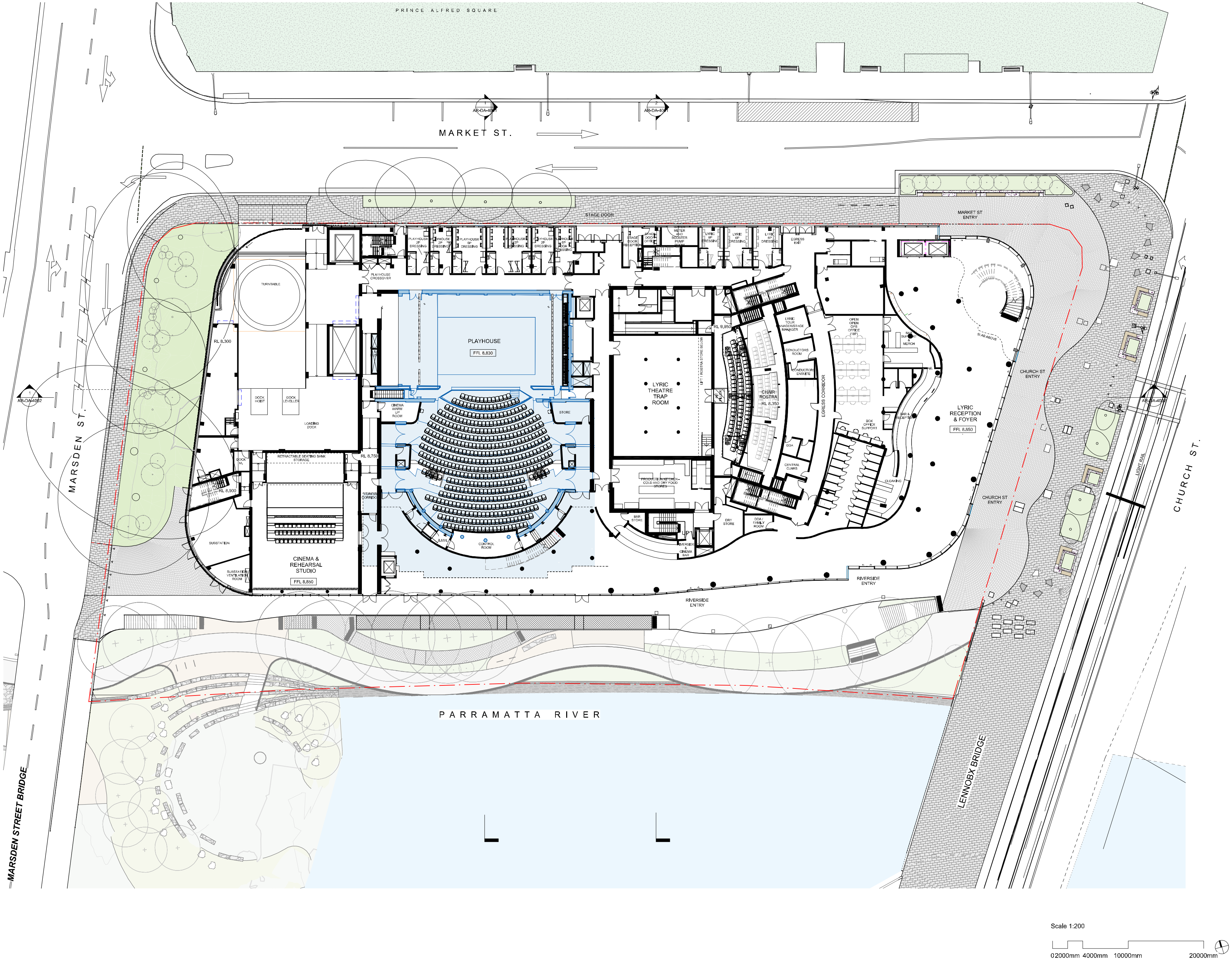
OVERALL BASEMENT & RIVERSIDE PLAN

Co-ordinated:	Drawn:
MD	LF
Date:	**Scale:**
25/01/2007	1 : 200 @ B1

Drawing Number: AR-DA-2000

Revision: 02

PLOT STAMP DATE: 11/02/2025 9:50:37 AM



Rev	Description	By	Date
01	Draft SSDA - Issue for Information		28/11/24
02	DRAFT SSDA		11/02/25

LEGEND: EXISTING AND PROPOSED **GENERAL NOTES**

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- PROPOSED SCOPE

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Acknowledgement

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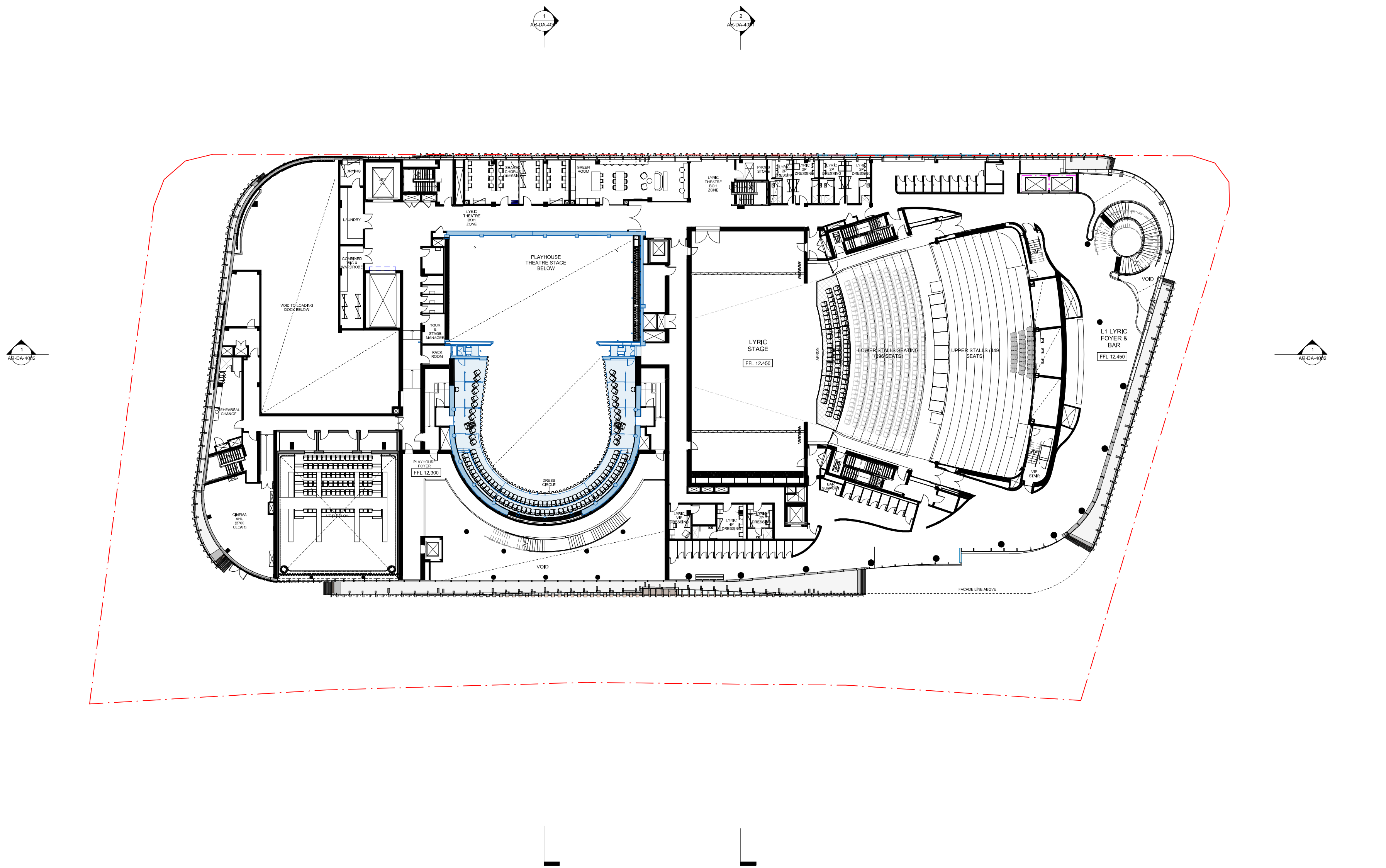
Document Control Status: SSDA

Drawing Title

OVERALL GROUND FLOOR PLAN

Co-ordinated: Checker	**Drawn:** LF
Date: 25/01/2007	**Scale:** 1 : 200 @ B1
Drawing Number: AR-DA-2001	**Revision:** 02

PLOT STAMP DATE: 11/02/2025 9:36:38 AM



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Rev	Description	By	Date
01	Draft SSDA - Issue for Information		28/11/24
02	DRAFT SSDA		11/02/25

LEGEND: EXISTING AND PROPOSED **GENERAL NOTES**

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- PROPOSED SCOPE

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Acknowledgement

In the language of the Darug people, this site is known as Burramattagal.

Document Control Status: SSDA

Drawing Title

OVERALL LEVEL 01 PLAN

Co-ordinated: Checker

Drawn: LF

Date: 25/01/2007

Scale: 1 : 200 @ B1

Drawing Number: AR-DA-2002

Revision: 02

PLOT STAMP DATE: 11/02/2025 9:37:10 AM

Rev	Description	By	Date
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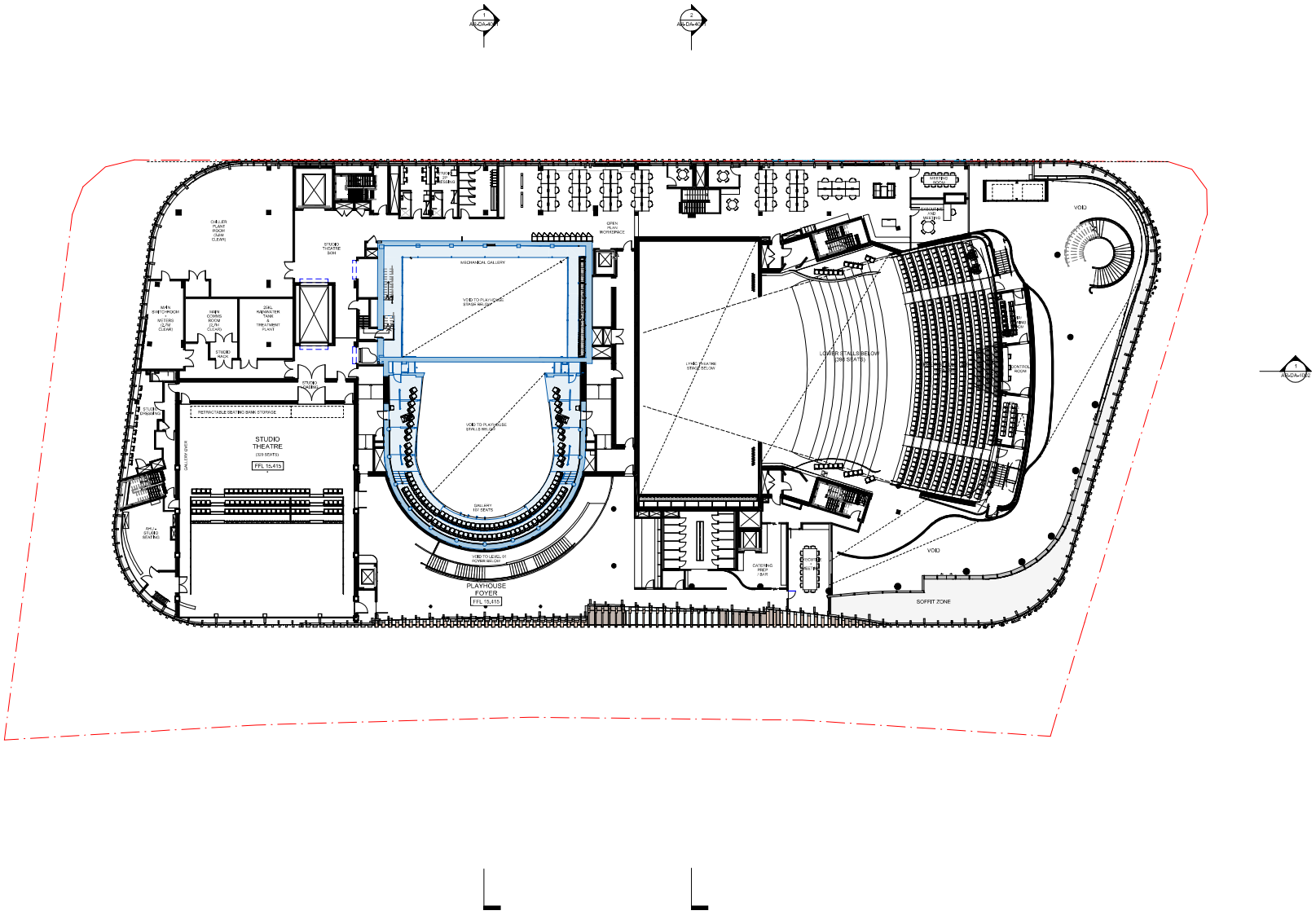
02	DRAFT SSDA		11/02/25



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LEGEND: EXISTING AND PROPOSED

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- PROPOSED SCOPE

GENERAL NOTES

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Acknowledgement

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Document Control Status: SSDA

Drawing Title

OVERALL LEVEL 02 PLAN

Co-ordinated: Checker	**Drawn:** LF
Date: 04/07/2018	**Scale:** 1 : 200 @ B1
Drawing Number: AR-DA-2003	**Revision:** 02

PLOT STAMP DATE: 11/02/2025 9:30:07 AM

Rev	Description	By	Date
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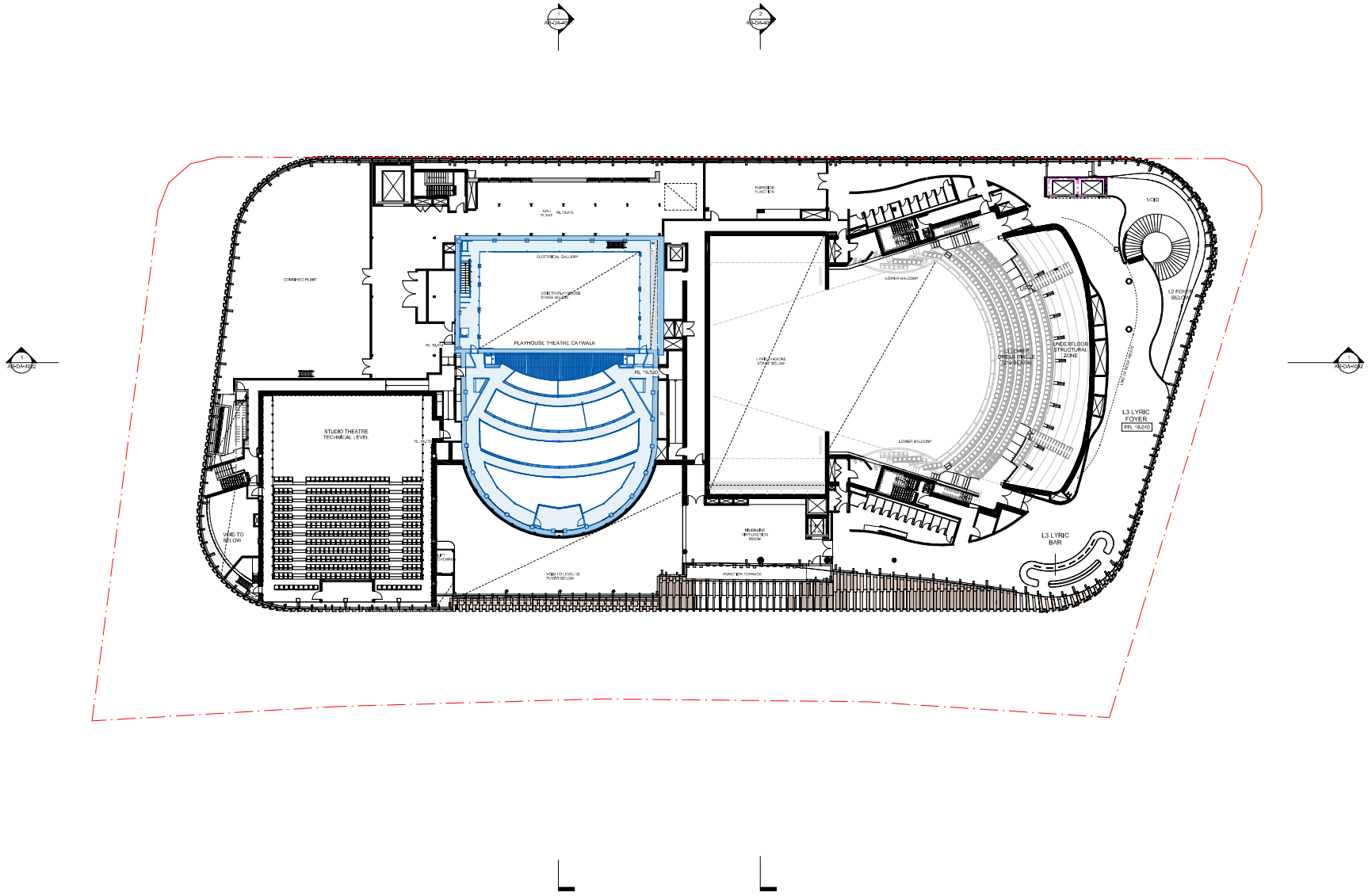
02	DRAFT SSDA		11/02/25



Scale 1:200

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LEGEND: EXISTING AND PROPOSED

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- PROPOSED SCOPE

GENERAL NOTES

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Acknowledgement

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Document Control Status: SSDA

Drawing Title

OVERALL LEVEL 03 PLAN

Co-ordinated:	Drawn:
Checker	JC
Date:	**Scale:**
04/07/2018	1 : 200 @ B1

Drawing Number: AR-DA-2004 **Revision:** 02

PLOT STAMP DATE: 11/02/2025 1:38:24 PM

Rev	Description	By	Date
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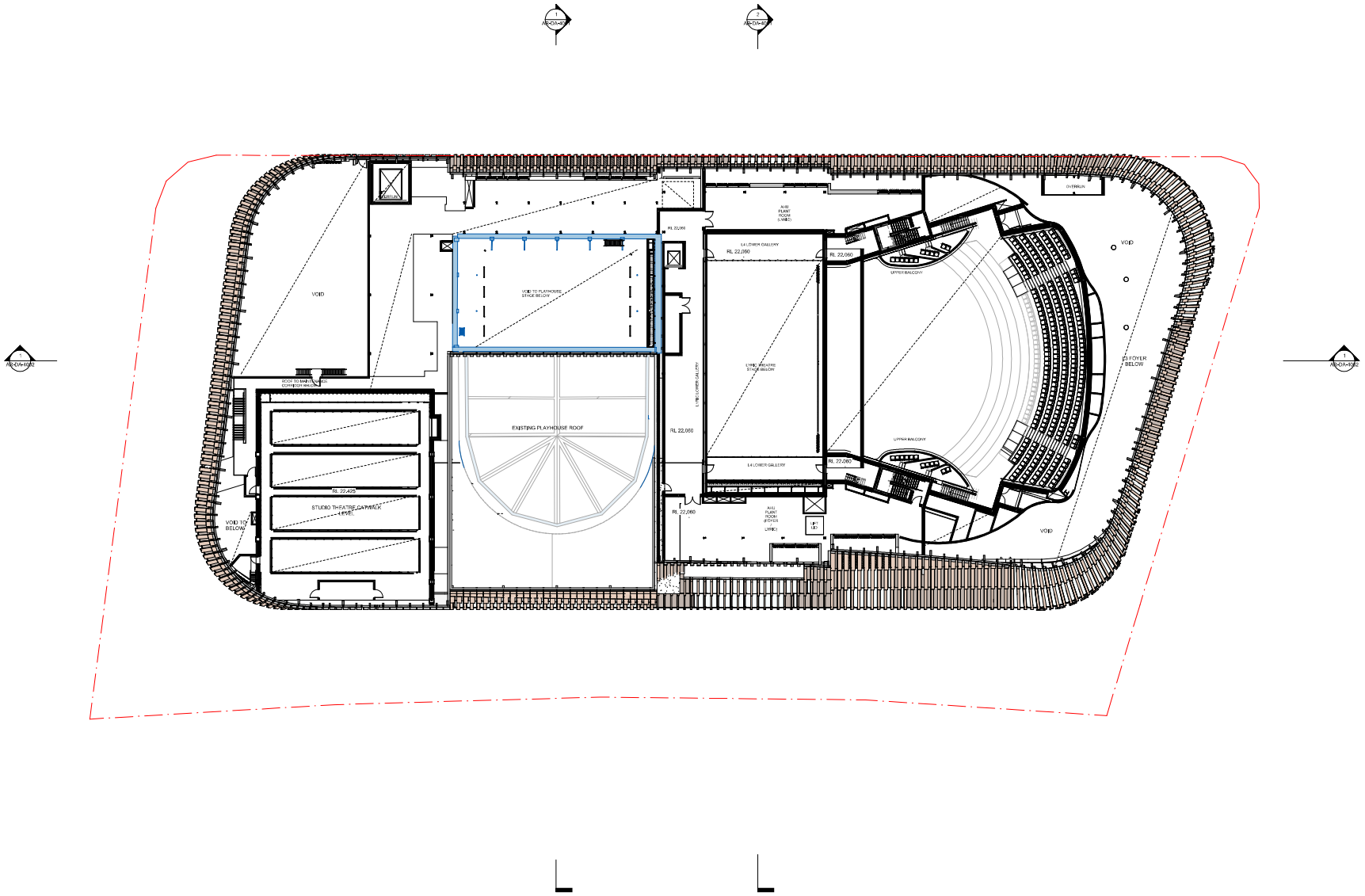
02	DRAFT SSDA		11/02/25



Scale 1:200

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LEGEND: EXISTING AND PROPOSED

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- PROPOSED SCOPE

GENERAL NOTES

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Acknowledgement

In the language of the Darug people, this site is known as Burramattagal.

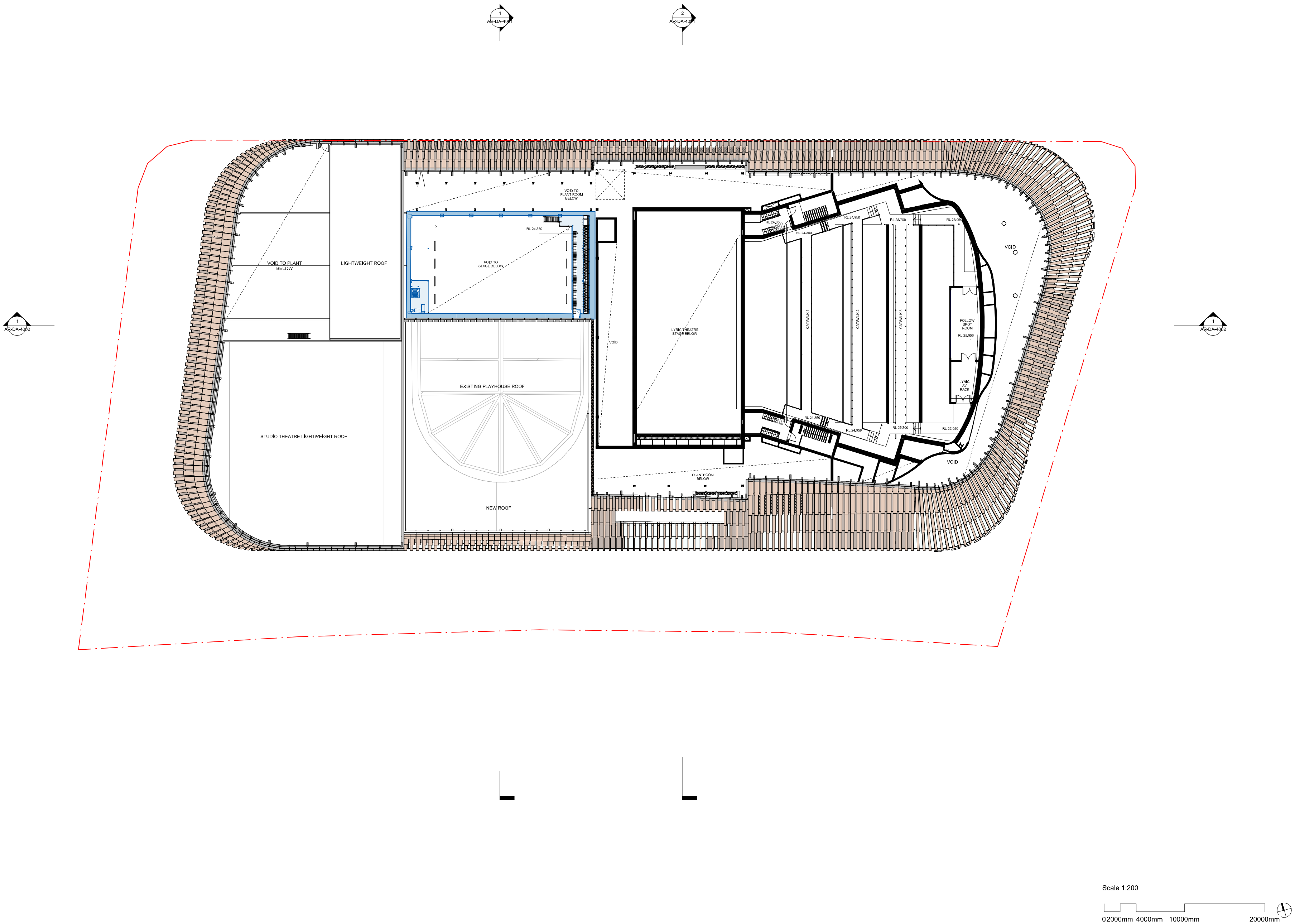
Document Control Status: SSDA

Drawing Title

OVERALL LEVEL 04 PLAN

Co-ordinated: Checker	**Drawn:** LF
Date: 04/07/2018	**Scale:** 1 : 200 @ B1
Drawing Number: AR-DA-2005	**Revision:** 02

PLOT STAMP DATE: 11/02/2025 9:30:52 AM



Rev	Description	By	Date
01	Draft 30% - For Costing		19/12/24
02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25

LEGEND: EXISTING AND PROPOSED **GENERAL NOTES**

PROPERTY BOUNDARY

EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED

PROPOSED SCOPE

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Project No. 223100.00

Project RIVERSIDE THEATRES
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Acknowledgement

In the language of the Darug people, this site is known as Burramatagal.

Document Control Status: SSDA

Drawing Title

OVERALL LEVEL 05 PLAN

Co-ordinated: Checker

Drawn: LF

Date: 07/04/2018

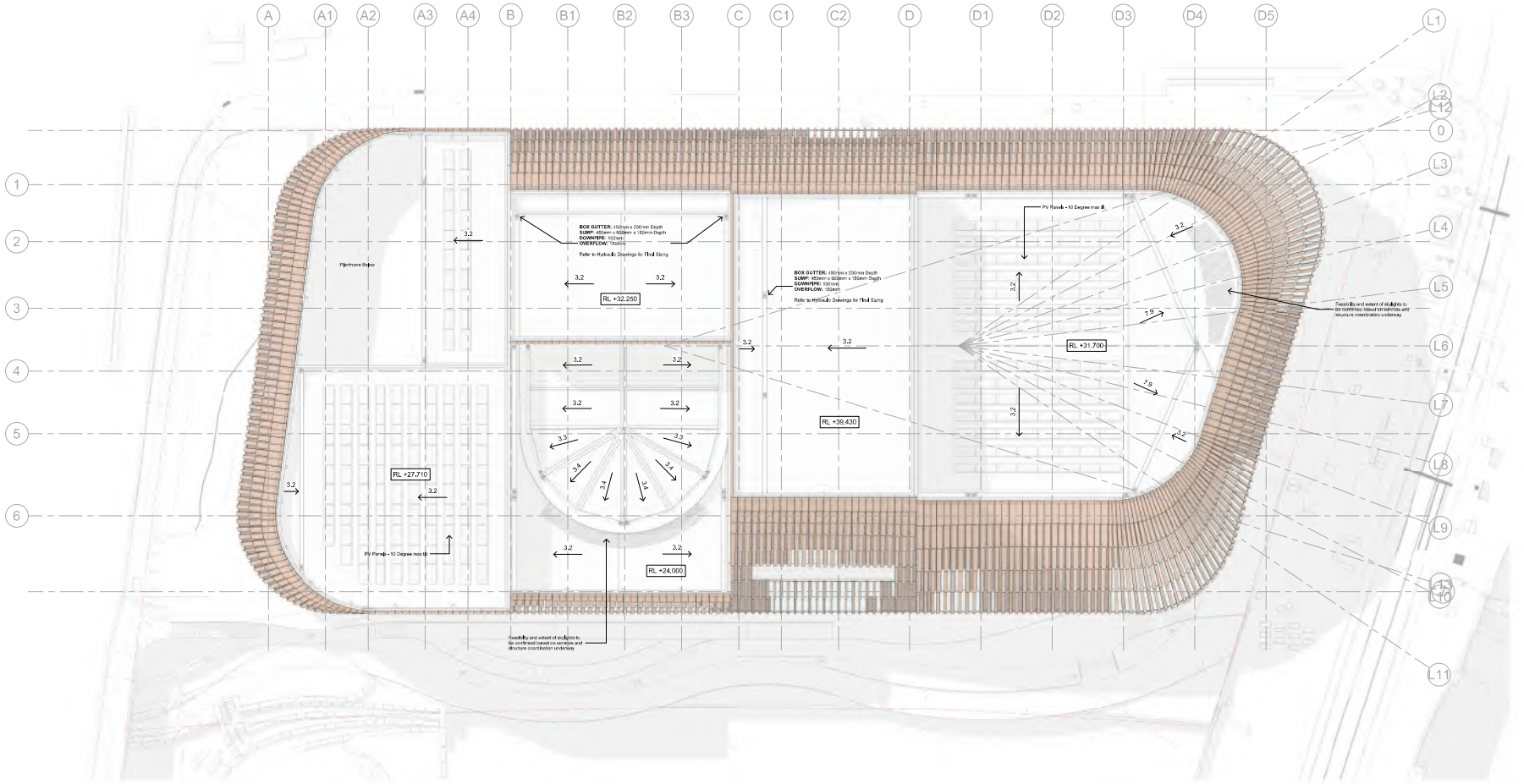
Scale: 1 : 200 @ B1

Drawing Number: AR-DA-2006

Revision: 03

PLOT STAMP DATE: 11/02/2025 9:40:53 AM

Rev	Description	By	Date
1	ISSUE FOR P-PHASE 1A		06/09/24
2	DRAFT SSDA - FOR INFORMATION		19/12/24



DRAFT

Project Manager — City of Parramatta Council

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Project No. 550055

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Acknowledgement
In the language of the Darug people, this site is known as Burramattagal.

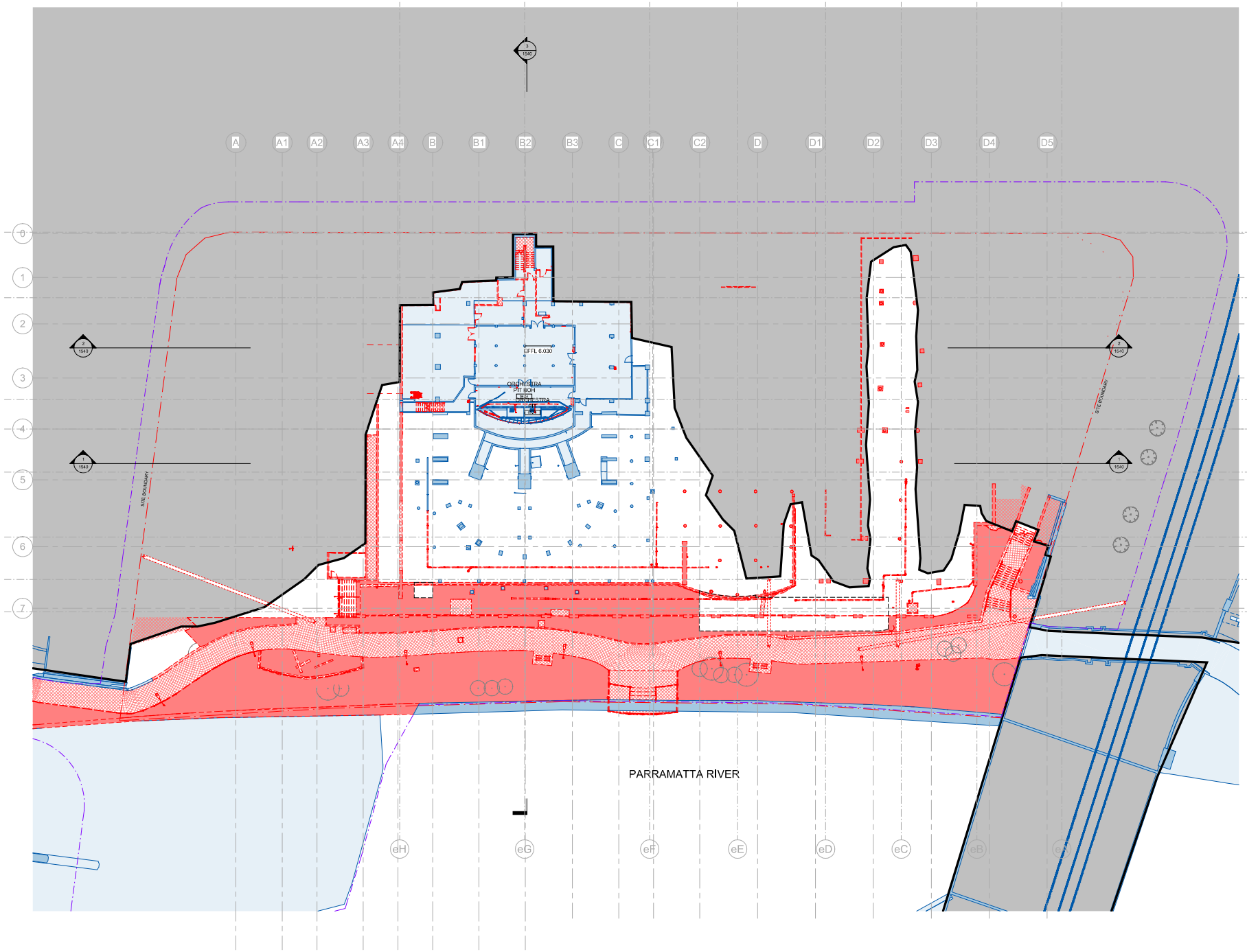
Drawing Title
OVERALL ROOF PLAN

Document Control Status:

Co-ordinated: 3XN	**Drawn:** 3XN
Project Architect:	**Scale:** 1 : 200 @ B1
Project Director: 3XN	**Date:** 06/09/2024
Drawing Number: AR-DA-2006	**Revision:** 2

PLOT STAMP DATE: 19/12/2024 3:55:53 PM

Rev	Description	By	Date
01	Draft 30% + For Costing		19/12/24
02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25



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LEGEND: EXISTING AND DEMOLITION

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- DEMOLITION SCOPE
- DEMOLITION (CUT THROUGH ON PLAN)

GENERAL NOTES

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Acknowledgement

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Document Control Status: SSDA

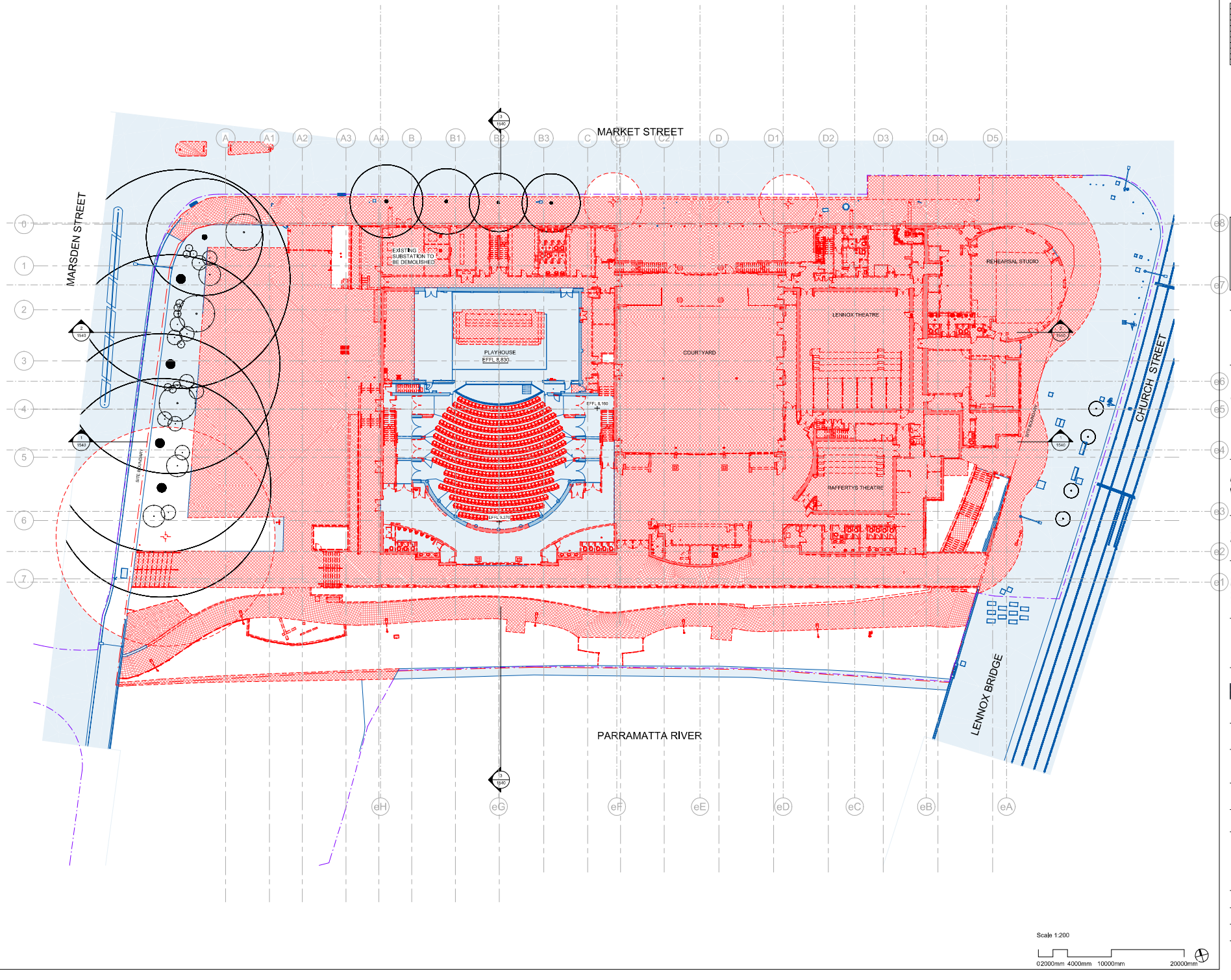
Drawing Title

OVERALL BASEMENT PLAN DEMOLITION PLAN

Co-ordinated: Checker	**Drawn:** AH
Date: 28/08/2024	**Scale:** 1 : 200 @ B1
Drawing Number: AR-DA-2020	**Revision:** 03

PLOT STAMP DATE: 11/02/2025 8:43:42 AM

Rev	Description	By	Date
01	Draft 30% - For Costing		19/12/24
02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25



LEGEND: EXISTING AND DEMOLITION GENERAL NOTES

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- DEMOLITION SCOPE
- DEMOLITION (CUT THROUGH ON PLAN)

Scale 1:200

0 2000mm 4000mm 10000mm 20000mm

Project Manager City of Parramatta Council

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Project No. 223100.00

Project

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Acknowledgement

In the language of the Darug people, this site is known as Burramattagal.

Document Control Status: SSDA

Drawing Title

OVERALL GROUND FLOOR DEMOLITION PLAN

Co-ordinated: Checker

Drawn: AH

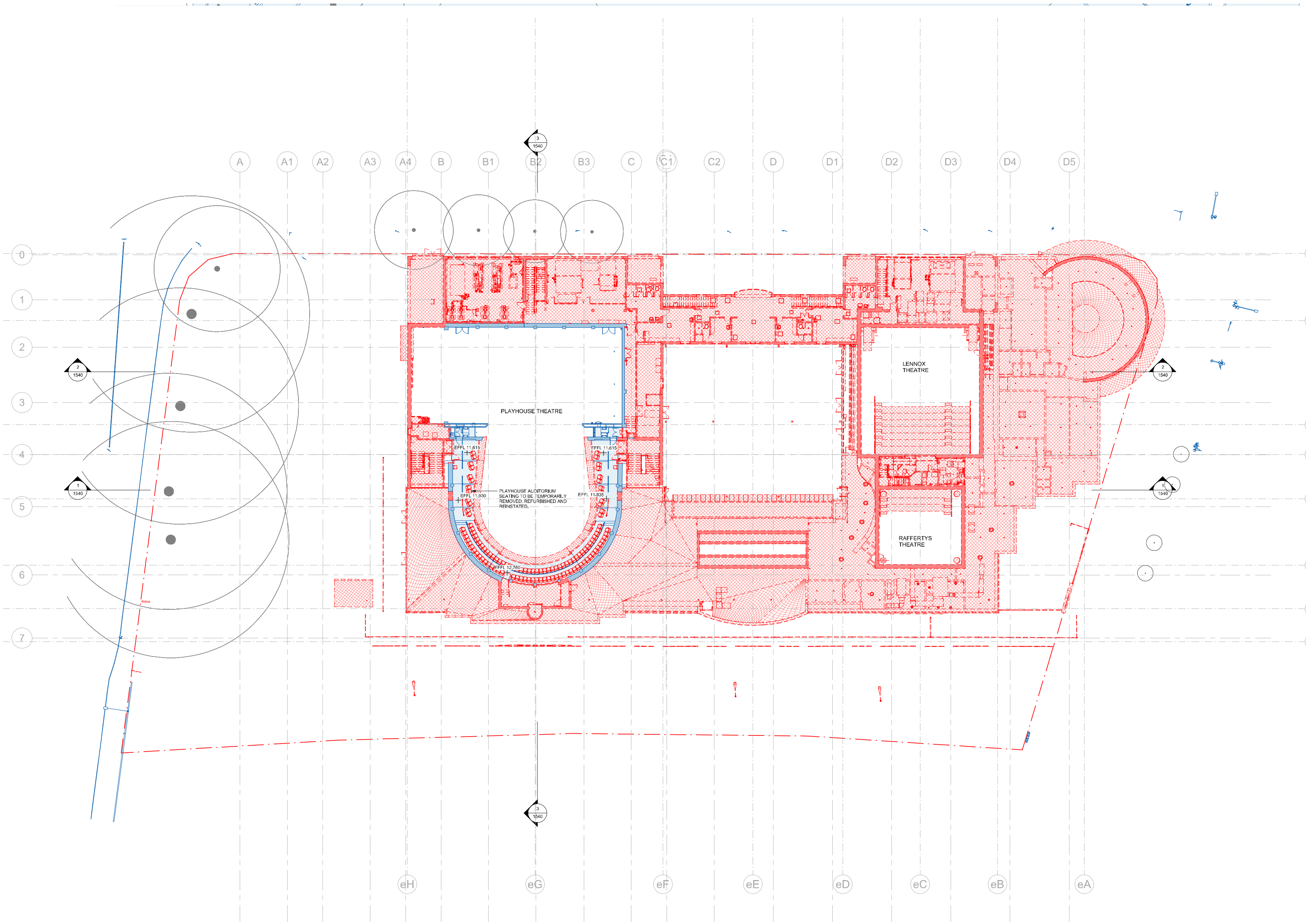
Date: 28/08/2024

Scale: 1 : 200 @ B1

Drawing Number: AR-DA-2021

Revision: 03

PLOT STAMP DATE: 11/02/2025 8:47:52 AM



Scale 1:200

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Rev	Description	By	Date
01	Draft 30% - For Costing		19/12/24
02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25

LEGEND: EXISTING AND DEMOLITION **GENERAL NOTES**

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- DEMOLITION SCOPE
- DEMOLITION (CUT THROUGH ON PLAN)

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Acknowledgement
In the language of the Darug people, this site is known as Burramattagal.

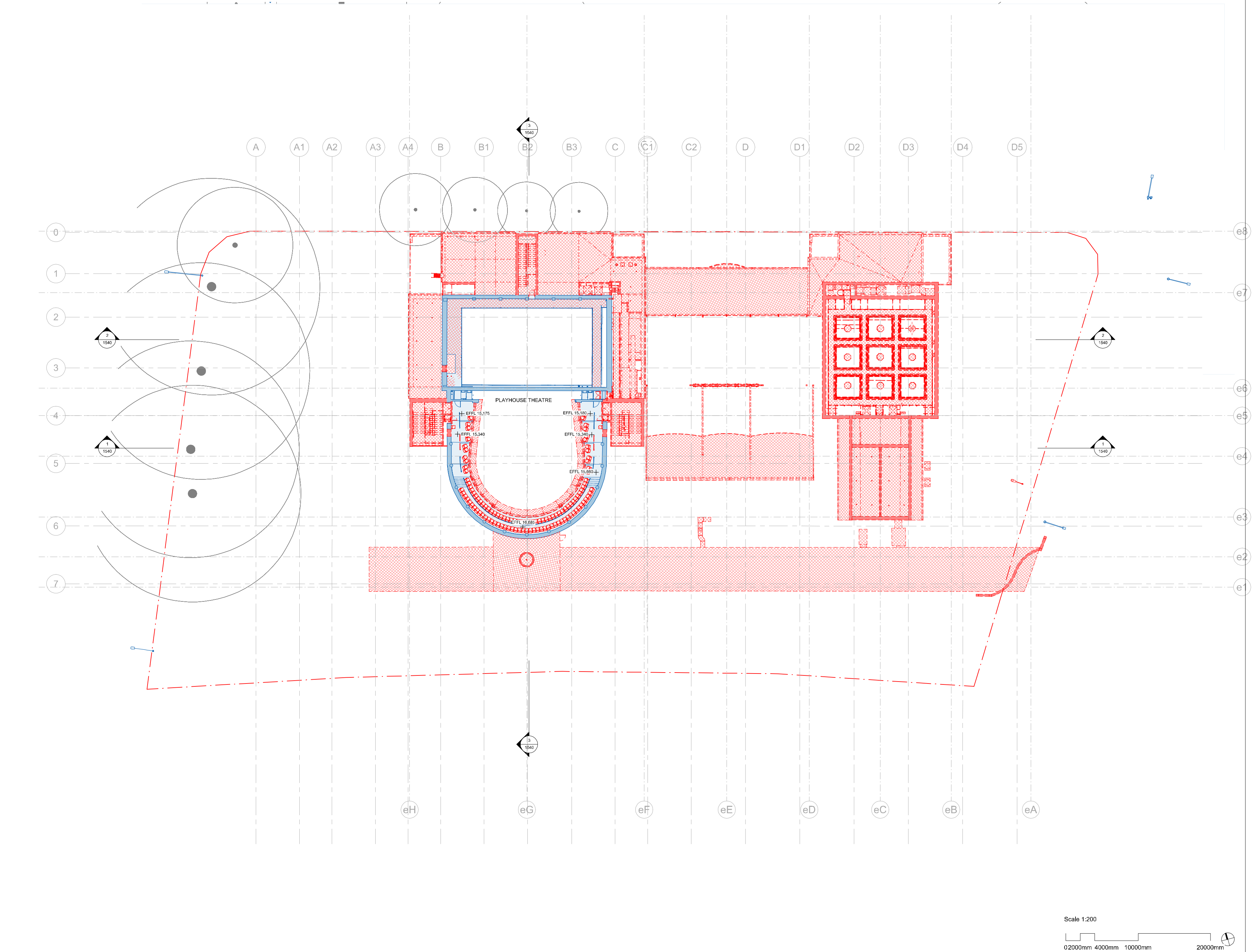
Document Control Status: SSDA

Drawing Title

OVERALL LEVEL 01 DEMOLITION PLAN

Co-ordinated: Checker	Drawn: AH
Date: 28/08/2024	Scale: 1 : 200 @ B1
Drawing Number: AR-DA-2022	Revision: 03

PLOT STAMP DATE: 11/02/2025 9:47:42 AM



Rev	Description	By	Date
01	Draft 30% - For Costing		19/12/24
02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25

LEGEND: EXISTING AND DEMOLITION GENERAL NOTES

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- DEMOLITION SCOPE
- DEMOLITION (CUT THROUGH ON PLAN)

Project Manager City of Parramatta Council

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Acknowledgement
In the language of the Darug people, this site is known as Burramattagal.

Document Control Status: SSDA

Drawing Title
OVERALL LEVEL 02 DEMOLITION PLAN

Co-ordinated: Checker	**Drawn:** AH
Date: 28/08/2024	**Scale:** 1 : 200 @ B1
Drawing Number: AR-DA-2023	**Revision:** 03

PLOT STAMP DATE: 11/02/2025 9:48:10 AM

Rev	Description	By	Date
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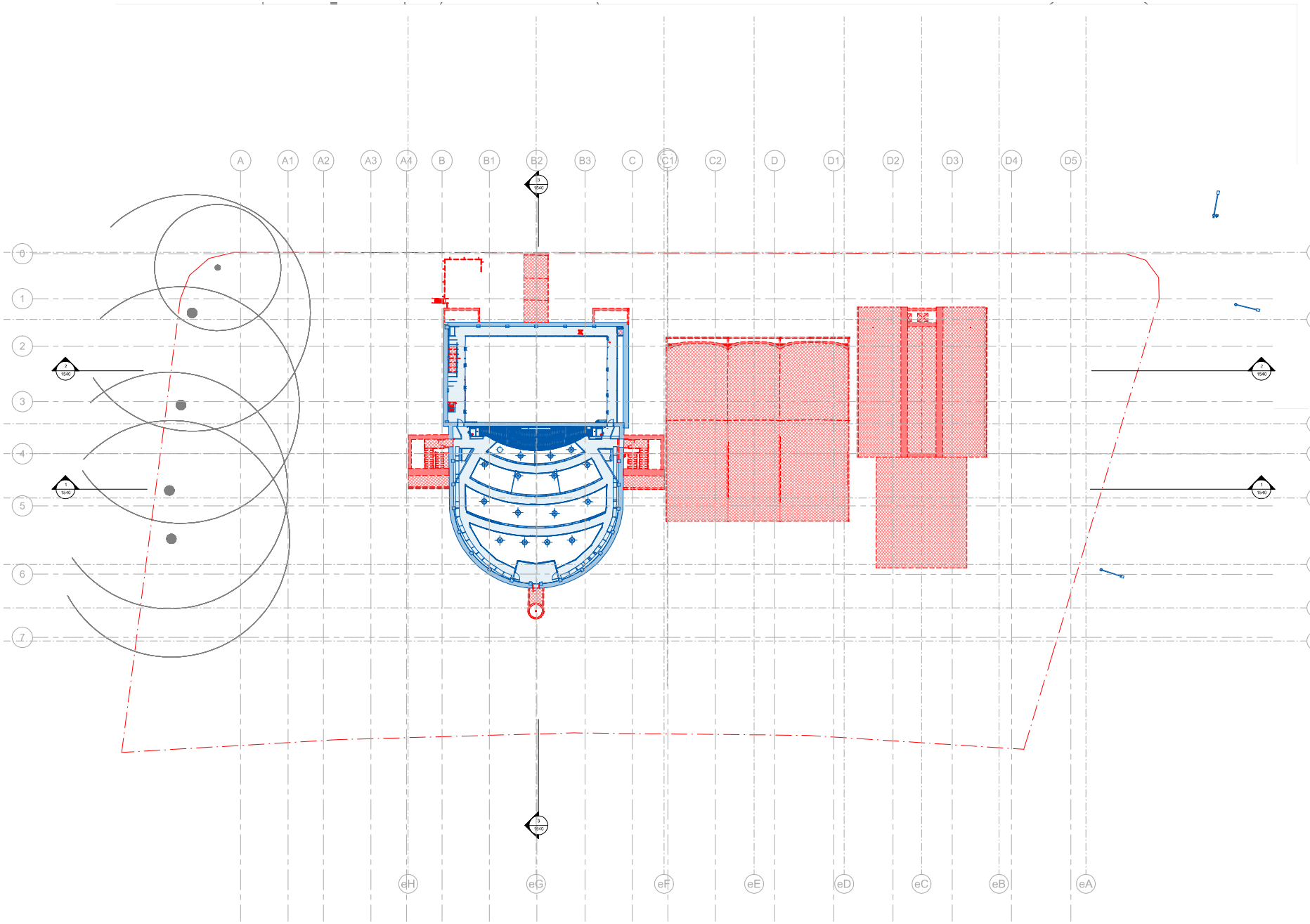
02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25



Scale 1:200

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LEGEND: EXISTING AND DEMOLITION

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- DEMOLITION SCOPE
- DEMOLITION (CUT THROUGH ON PLAN)

GENERAL NOTES

Project Manager City of Parramatta Council

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Acknowledgement

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Document Control Status: SSDA

Drawing Title

OVERALL LEVEL 03 DEMOLITION PLAN

Co-ordinated: Checker

Drawn: AH

Date: 28/08/2024

Scale: 1 : 200 @ B1

Drawing Number: AR-DA-2024

Revision: 03

PLOT STAMP DATE: 11/02/2025 8:45:52 AM

Rev	Description	By	Date
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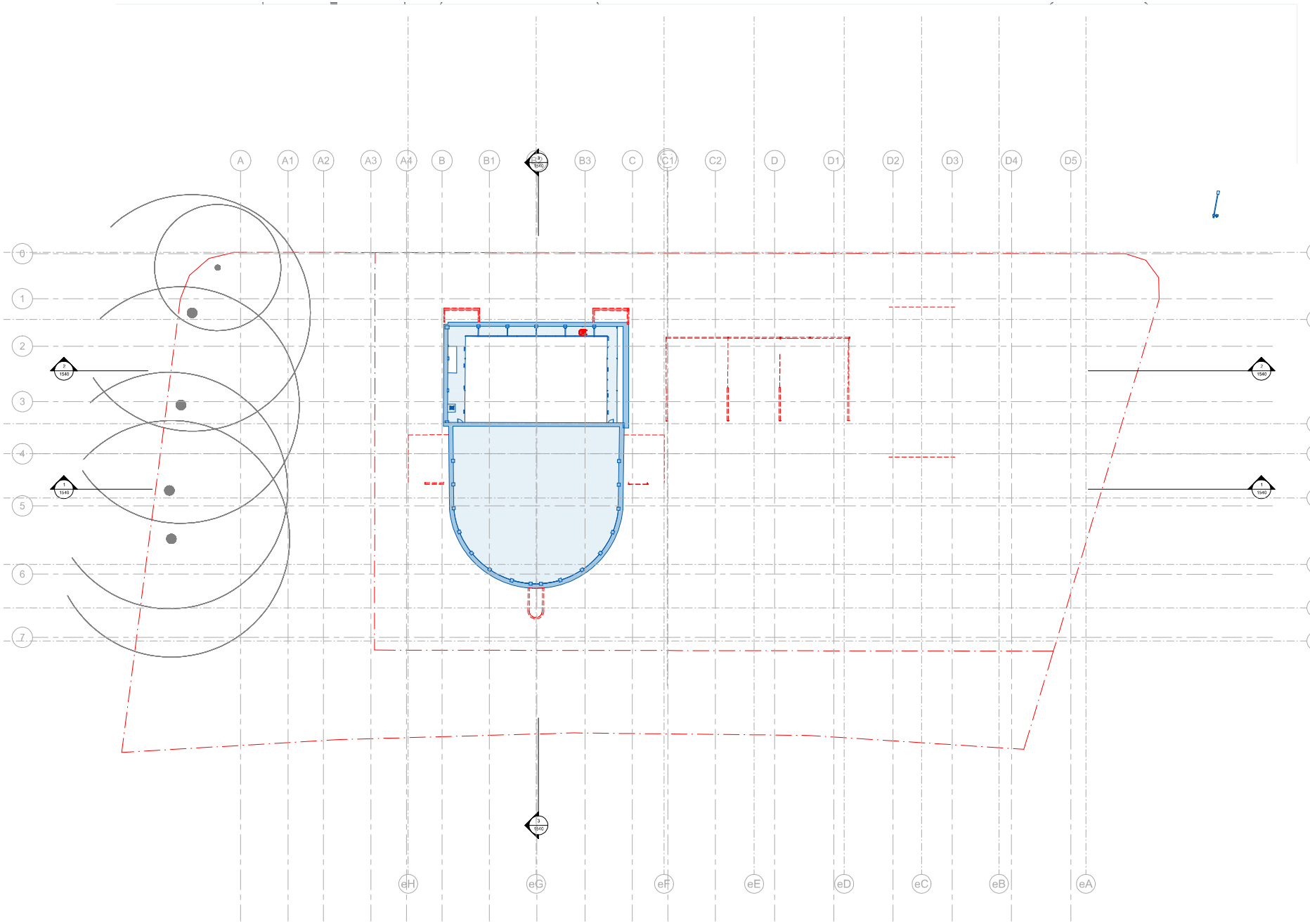
02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25



LEGEND: EXISTING AND DEMOLITION GENERAL NOTES

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- DEMOLITION SCOPE
- DEMOLITION (CUT THROUGH ON PLAN)

Scale 1:200

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Project Manager City of Parramatta Council

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Document Control Status: SSDA

Drawing Title

OVERALL LEVEL 04 DEMOLITION PLAN

Co-ordinated:	Drawn:
Checker	AH
Date:	**Scale:**
28/08/2024	1 : 200 @ B1

Drawing Number: AR-DA-2025

Revision: 03

PLOT STAMP DATE: 11/02/2025 8:45:54 AM

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02	30% Documentation		24/01/24
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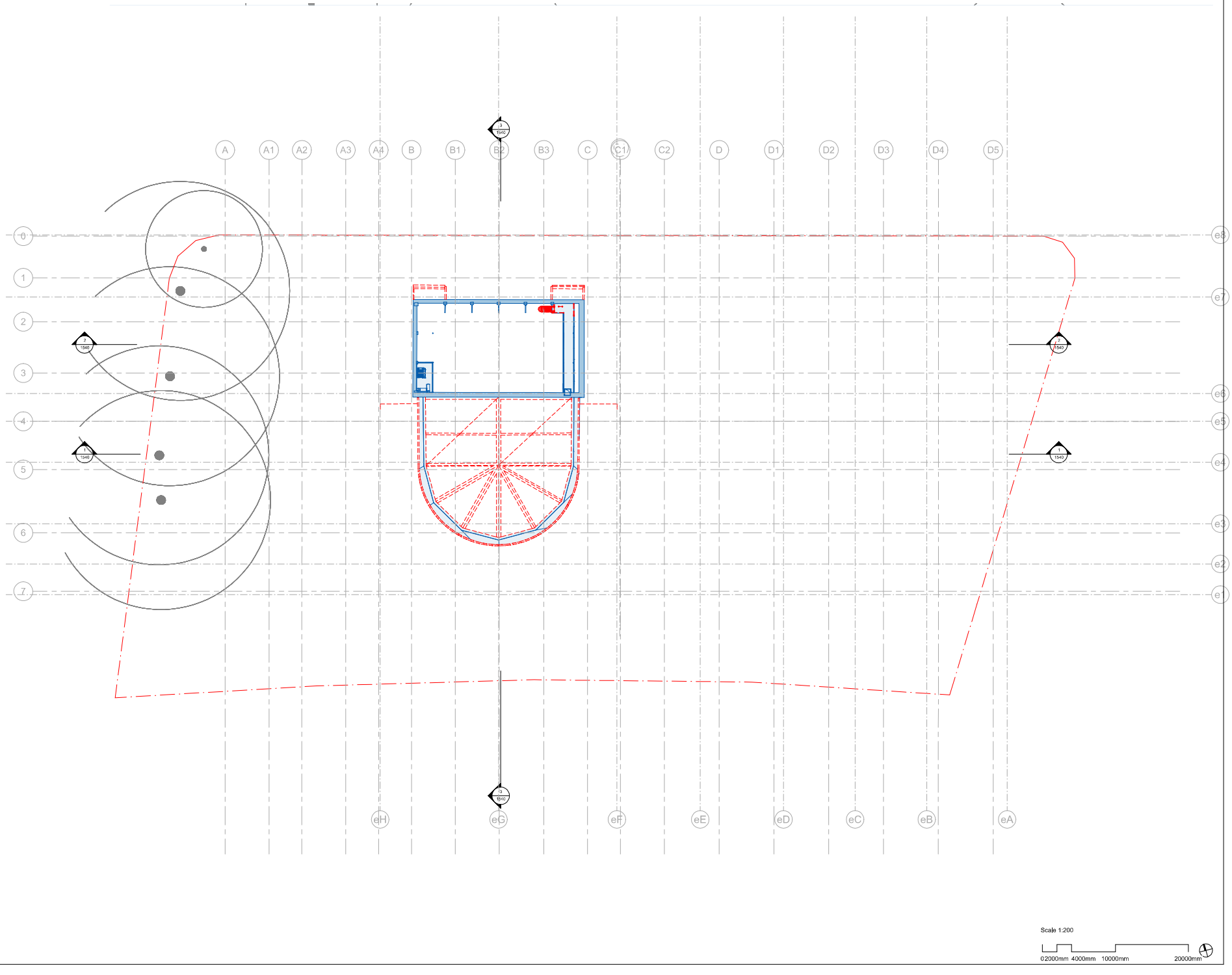

LEGEND: EXISTING AND DEMOLITION GENERAL NOTES

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- DEMOLITION SCOPE
- DEMOLITION (CUT THROUGH ON PLAN)

Project Manager — City of Parramatta Council

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Acknowledgement
In the language of the Darug people, this site is known as Burramattagal.

Document Control Status:
SSDA

Drawing Title
OVERALL LEVEL 05 DEMOLITION PLAN

Co-ordinated: Checker
Drawn: AH
Date: 28/08/2024
Scale: 1 : 200 @ B1

Drawing Number: AR-DA-2026
Revision: 03

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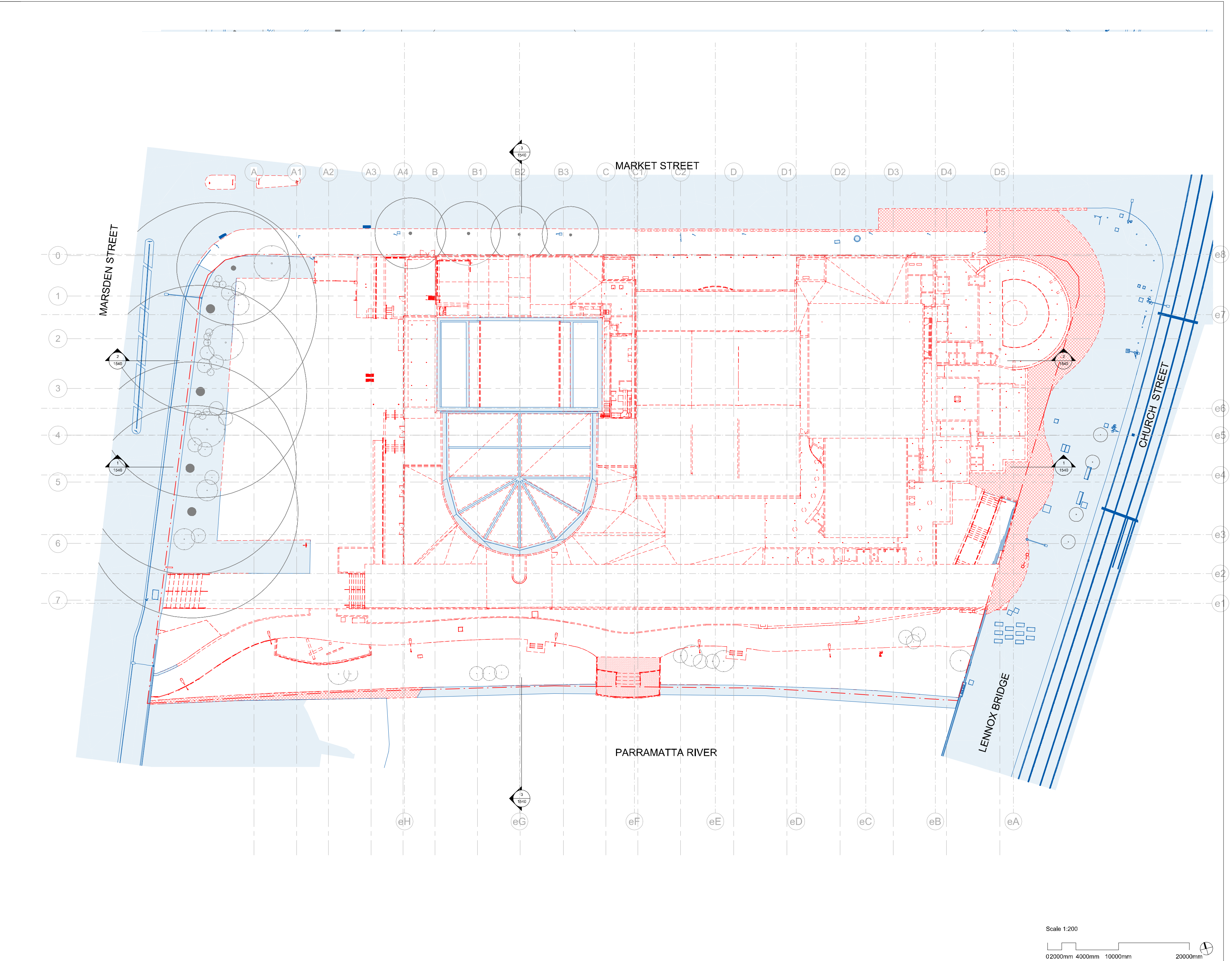

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02	30% Documentation		24/01/24
03	DRAFT SSDA		11/02/25

LEGEND: EXISTING AND DEMOLITION **GENERAL NOTES**

- PROPERTY BOUNDARY
- EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED
- DEMOLITION SCOPE
- DEMOLITION (CUT THROUGH ON PLAN)

Project Manager — City of Parramatta Council

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Acknowledgement

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Document Control Status: SSDA

Drawing Title

OVERALL ROOF DEMOLITION PLAN

Co-ordinated:	Checker	**Drawn:**	AH
Date:	28/08/2024	**Scale:**	1 : 200 @ B1
Drawing Number:	AR-DA-2027	**Revision:**	03

PLOT STAMP DATE: 11/02/2025 9:50:11 AM

Rev	Description	By	Date
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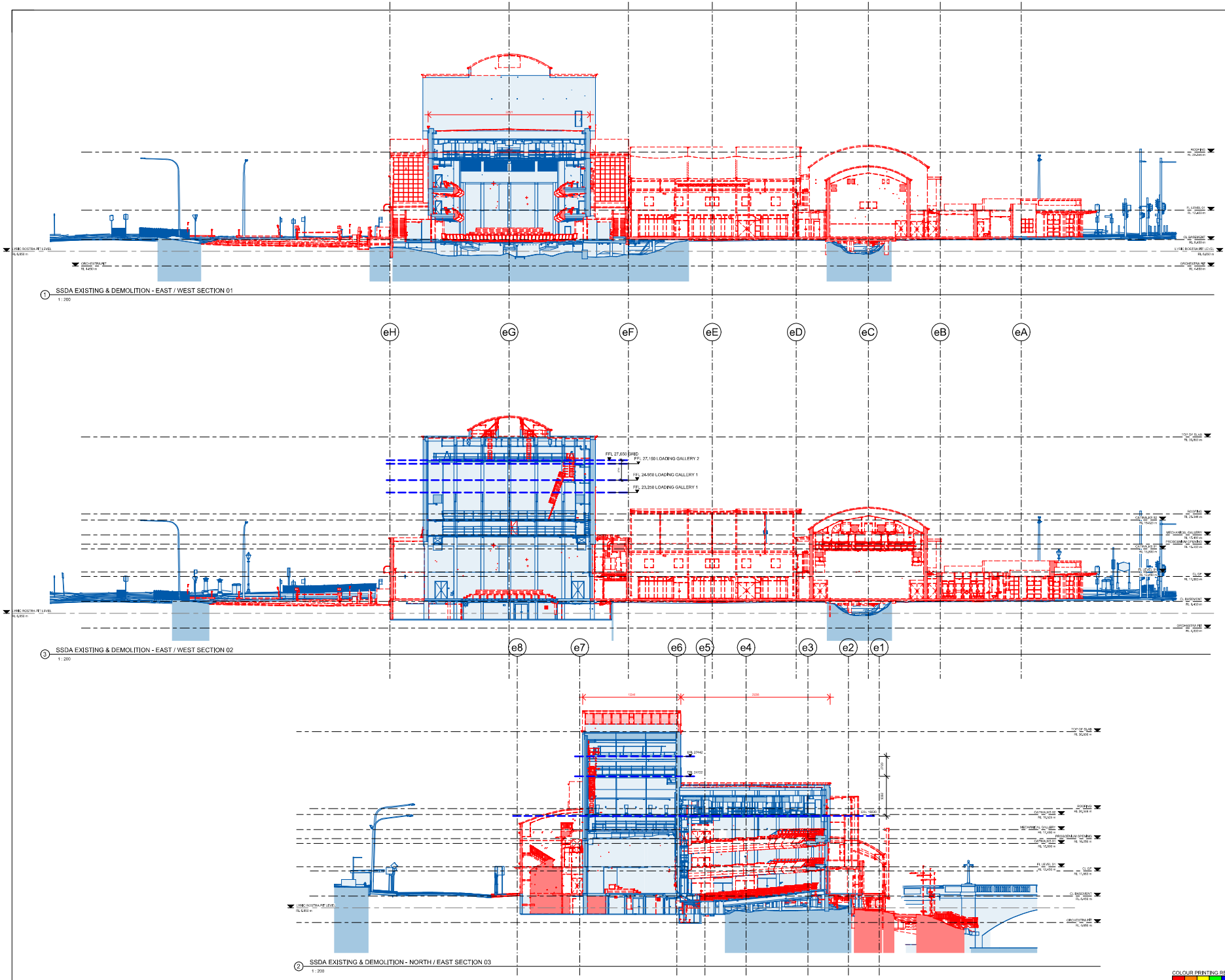
02	DRAFT SSDA		11/02/25



1 SSDA EXISTING & DEMOLITION - EAST / WEST SECTION 01
1 : 200

3 SSDA EXISTING & DEMOLITION - EAST / WEST SECTION 02
1 : 200

2 SSDA EXISTING & DEMOLITION - NORTH / EAST SECTION 03
1 : 200

COLOUR PRINTING REQUIRED

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Project Manager City of Parramatta Council

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Project No. 223100.00

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Acknowledgement
In the language of the Darug people, this site is known as Burramattagal.

Drawing Title
DEMOLITION SECTIONS

Document Control Status:

Co-ordinated: JC	**Drawn:** AB
Project Architect: KK	**Scale:** 1 : 200 @ R1
Project Director: JA	**Date:** 28/08/2024
Drawing Number: AR-DA-AR-DA-2028	**Revision:** 02

PLOT STAMP DATE: 11/02/2025 9:51:15 AM

Rev	Description	By	Date
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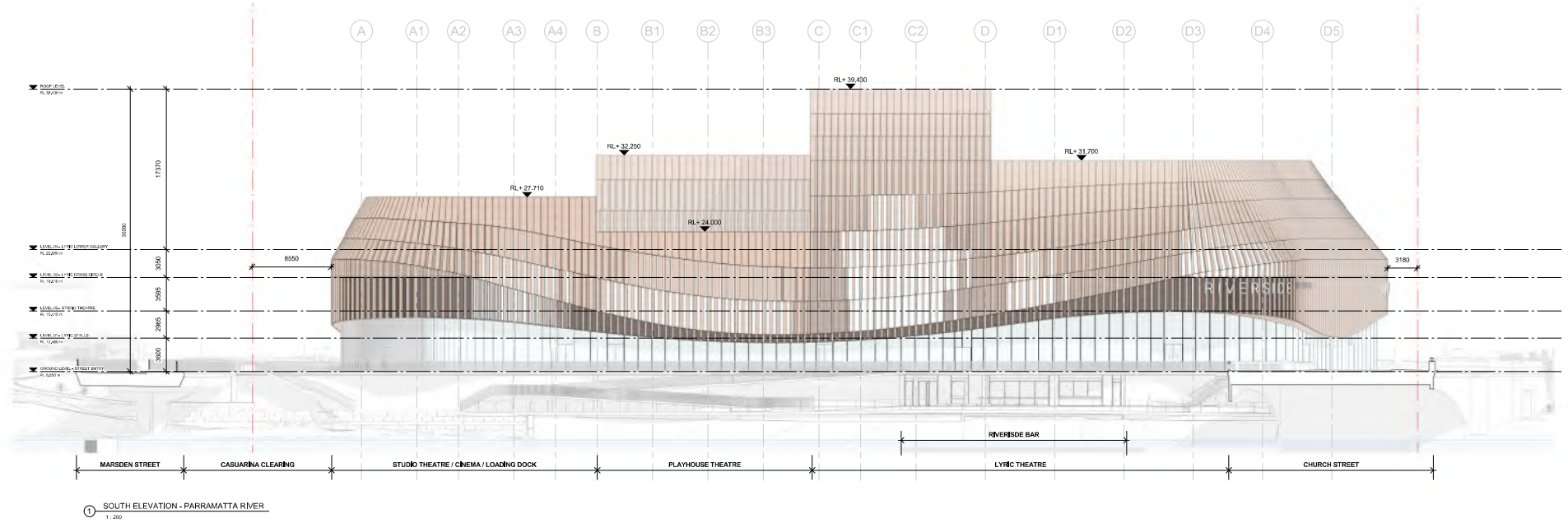
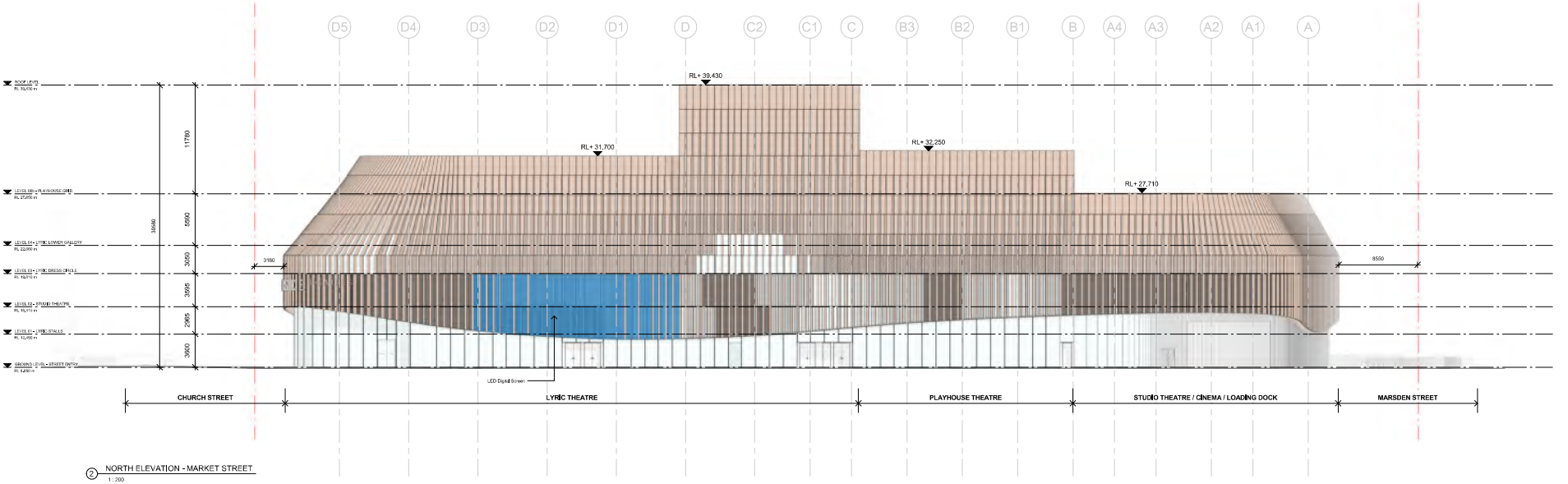
2	DRAFT SSDA - FOR INFORMATION		28/11/24
3	DRAFT SSDA - FOR INFORMATION		19/12/24



1 SOUTH ELEVATION - PARRAMATTA RIVER
1 : 200



2 NORTH ELEVATION - MARKET STREET
1 : 200

DRAFT

Project Manager City of Parramatta Council

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Project No.
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Acknowledgement
In the language of the Darug people, this site is known as Burramattagal.

Drawing Title
SOUTH & NORTH ELEVATIONS

Document Control Status:

Co-ordinated: 3XN	**Drawn:** 3XN
Project Architect:	**Scale:** 1 : 200 @ B1
Project Director: 3XN	**Date:** 06/09/2024
Drawing Number: AR-DA-3001	**Revision:** 3

PLOT DRAWING DATE: 19/12/2024 4:55:56 PM

Rev	Description	By	Date
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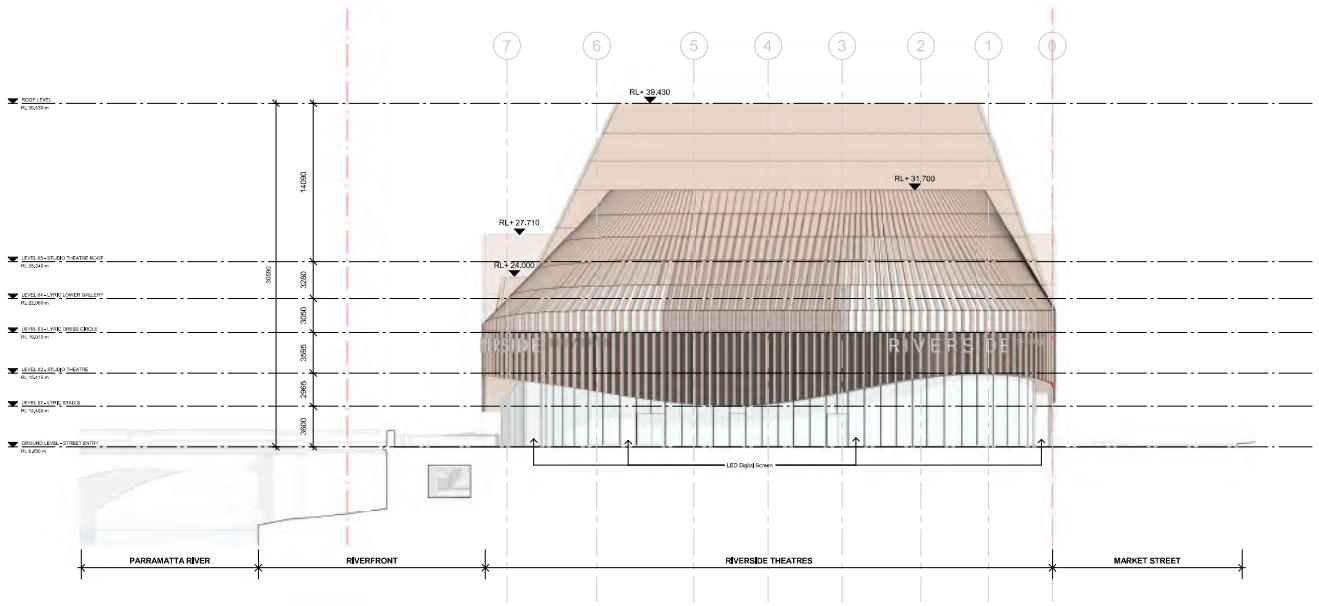
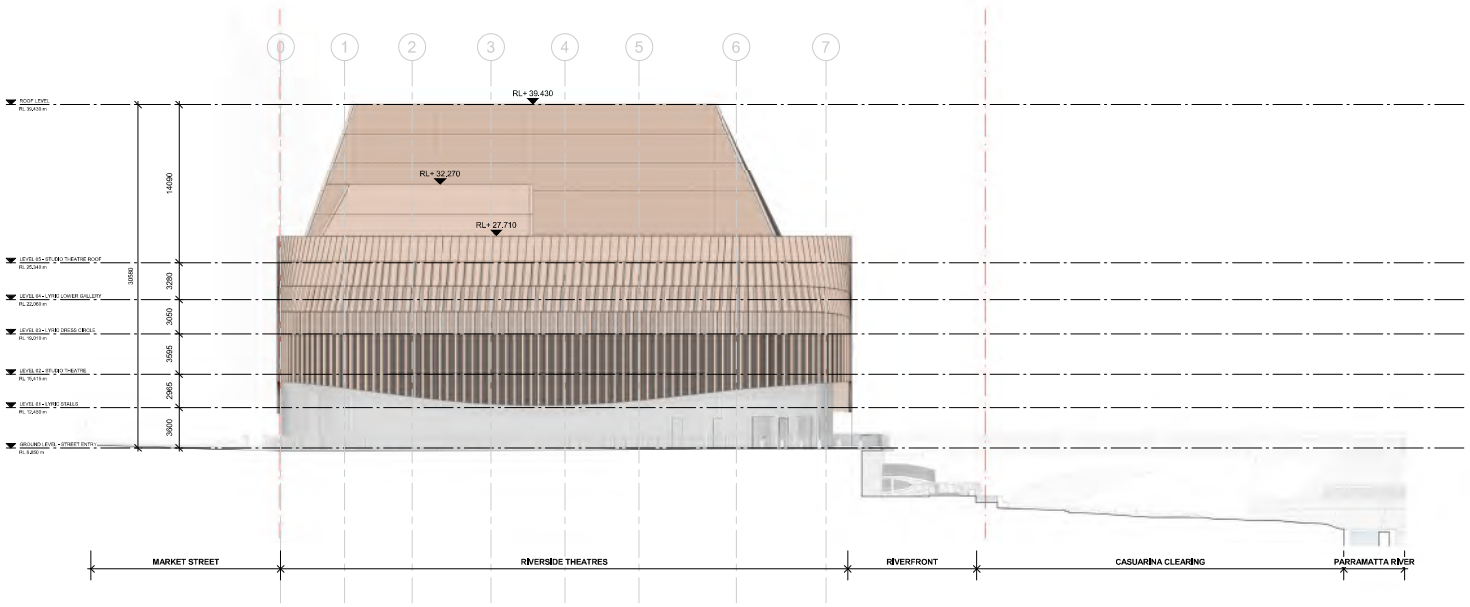
2	DRAFT SSDA - FOR INFORMATION		28/11/24
3	DRAFT SSDA - FOR INFORMATION		19/12/24



1 EAST ELEVATION - CHURCH STREET
1 : 200



2 WEST ELEVATION - MARSDEN STREET
1 : 200

DRAFT

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Acknowledgement
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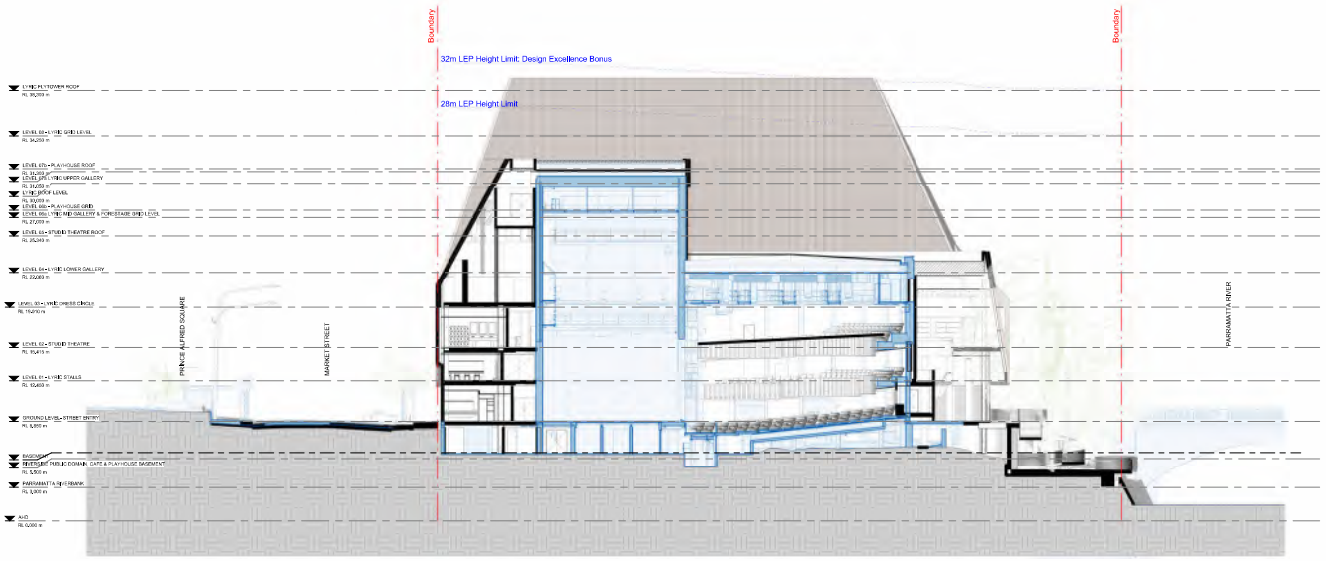
Drawing Title
EAST & WEST ELEVATIONS

Document Control Status:

Co-ordinated: 3XN	**Drawn:** 3XN
Project Architect:	**Scale:** 1 : 200 @ B1
Project Director: 3XN	**Date:** 06/09/2024
Drawing Number: AR-DA-3002	**Revision:** 3

PLOT DRAWING DATE: 19/12/2024 5:41:13 PM

Rev	Description	By	Date
01	Draft SSDA - Issue for Information		29/11/24
02	DRAFT SSDA		11/02/25



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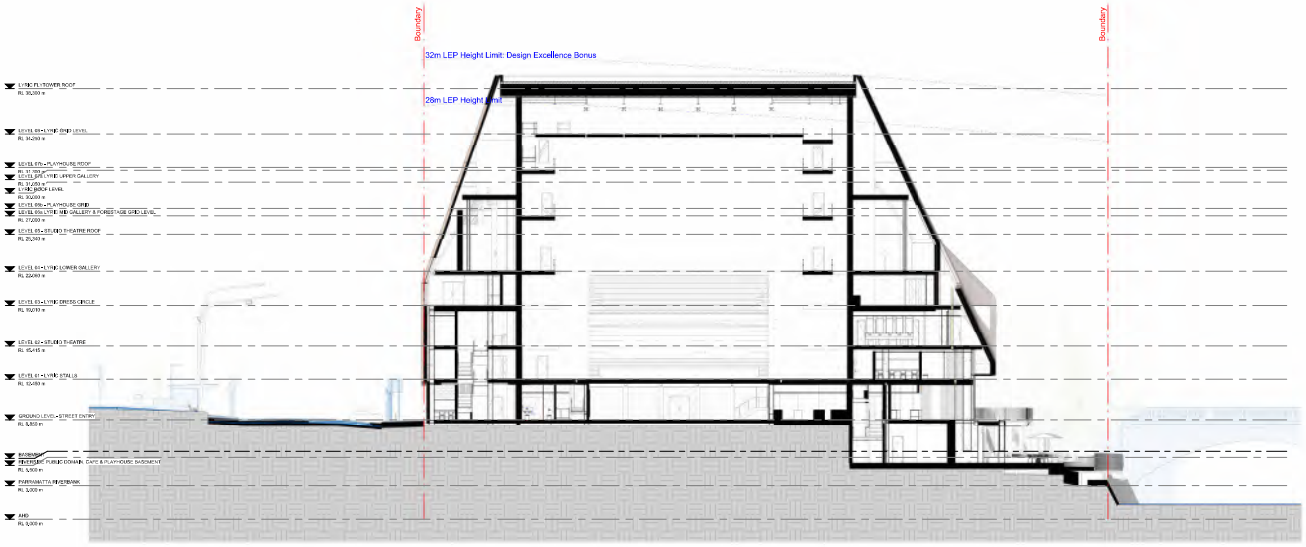

2 SSDA SECTION 02
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LEGEND: EXISTING AND PROPOSED

PROPERTY BOUNDARY

EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED

PROPOSED SCOPE

GENERAL NOTES

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Project No. 223100.00

Project

RIVERSIDE THEATRES
CNR MARKET & CHURCH ST,
PARRAMATTA NSW 2150

Acknowledgement

In the language of the Darug people, this site is known as Burramattagal.

Document Control Status: SSDA

Drawing Title

NORTH-SOUTH SECTIONS 01 & 02

Co-ordinated: Checker

Drawn: LF

Date: 25/01/2007

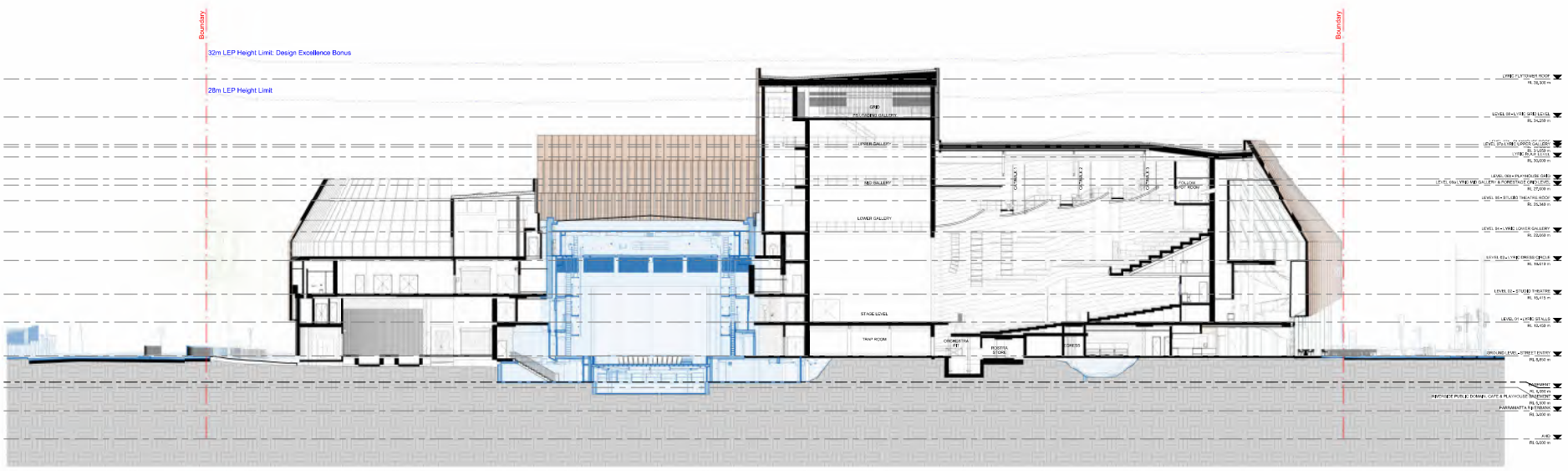
Scale: 1 : 200 @ B1

Drawing Number: AR-DA-4001

Revision: 02

PLOT STAMP DATE: 11/02/2025 8:53:52 AM

Rev	Description	By	Date
01	Draft SSDA - Issue for Information		29/11/24
02	DRAFT SSDA		11/02/25



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Scale 1:200

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LEGEND: EXISTING AND PROPOSED

PROPERTY BOUNDARY

EXISTING SITE, BUILDINGS, ELEMENTS AND WORK NOT IN SCOPE - TO BE PROTECTED & RETAINED

PROPOSED SCOPE

GENERAL NOTES

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Project No.
223100.00

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CNR MARKET & CHURCH ST,
PARRAMATTA NSW 2150

Acknowledgement
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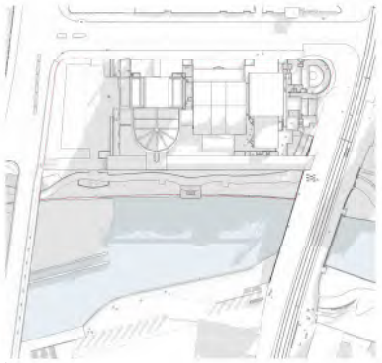
Document Control Status:
SSDA

Drawing Title
EAST-WEST SECTION 03

Co-ordinated: Checker
Drawn: LF
Date: 25/01/2007
Scale: 1 : 200 @ B1
Drawing Number: AR-DA-4002
Revision: 02

PLOT STAMP DATE: 11/02/2025 3:54:52 AM



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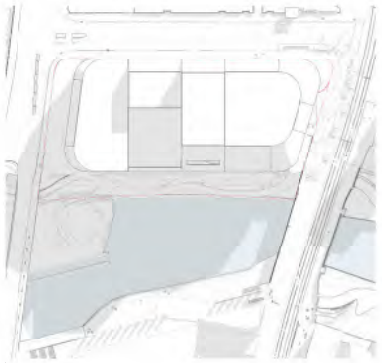

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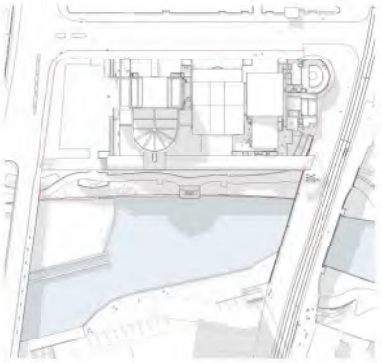

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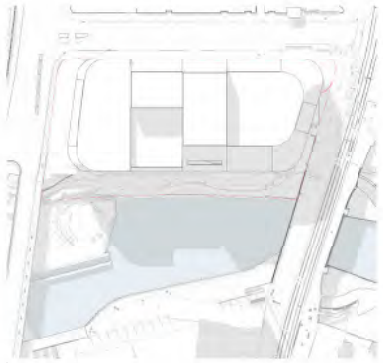

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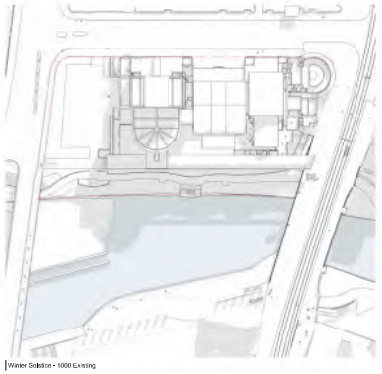

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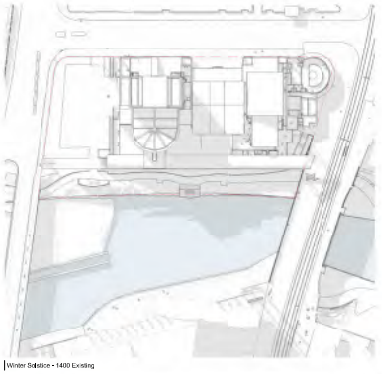

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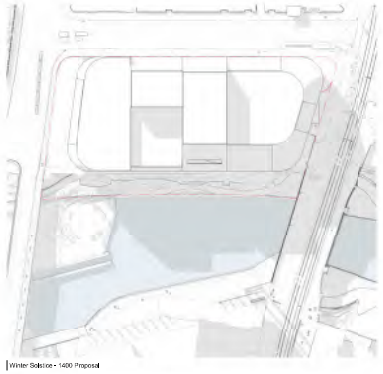

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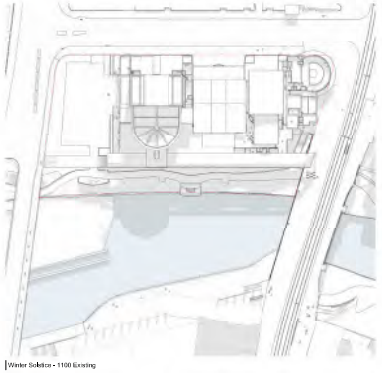

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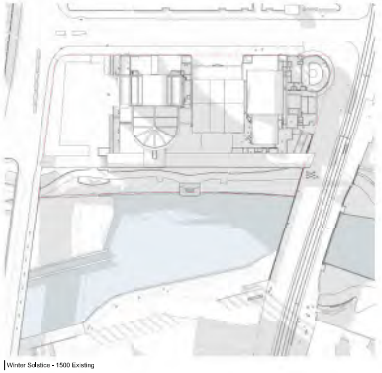

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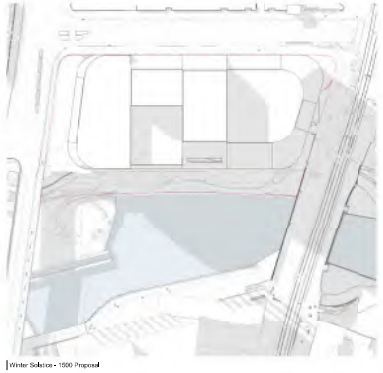

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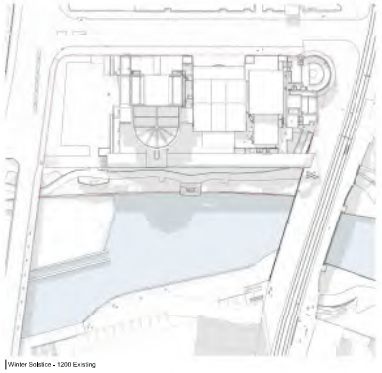

Winter Solstice - 1200 Existing

Winter Solstice - 1200 Proposal

Rev	Description	By	Date
1	ISSUE FOR PHASE 1A		06/09/24
2	DRAFT SSDA - FOR INFORMATION		28/11/24
3	DRAFT SSDA - FOR INFORMATION		19/12/24

NOTE: FOR FINAL SUBMISSION, SHADOWS ANALYSIS FOR THE PROPOSAL WILL BE OVERLAY TO THE EXISTING SHADOWS CONDITION

DRAFT

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Client

RIVERSIDE Riverside Theatres

Project No. 550055

Project Riverside Theatre
CNR MARKET & CHURCH ST,
PARRAMATTA NSW 2150

Acknowledgement

In the language of the Darug people, this site is known as Burramurragal.

Drawing Title WINTER SOLSTICE - SHADOW DIAGRAMS

Document Control Status:

Co-ordinated: Checker

Drawn: Author

Project Architect:

Scale: 1 : 1000 @ B1

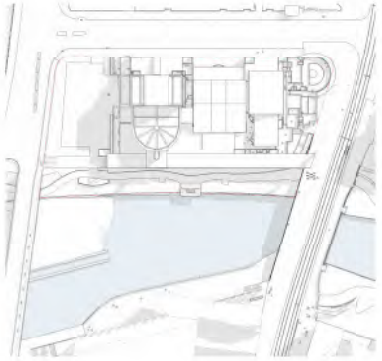
Project Director: Approver

Date: 9/29/2023

Drawing Number: AR-DA-8000

Revision: 3

PLOT STAMP DATE: 19/12/2024 8:45:33 PM



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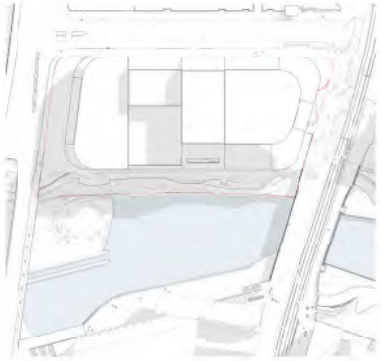
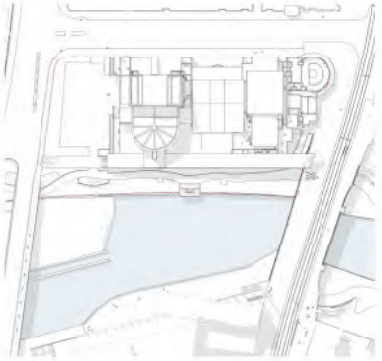


Spring Equinox - 900 Proposal



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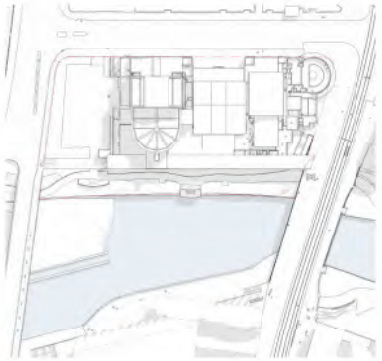

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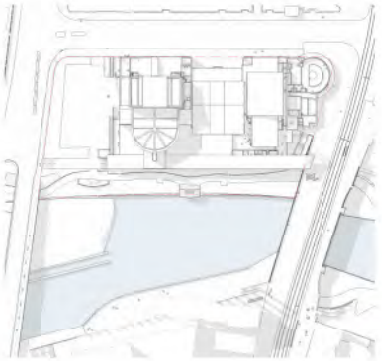
Spring Equinox - 1000 Proposal



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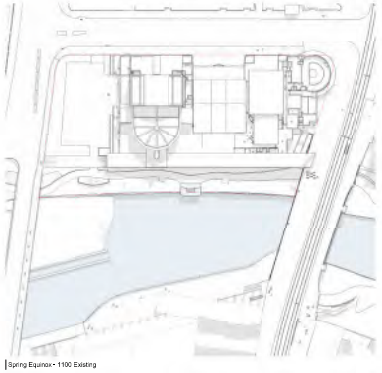
Spring Equinox - 1400 Proposal



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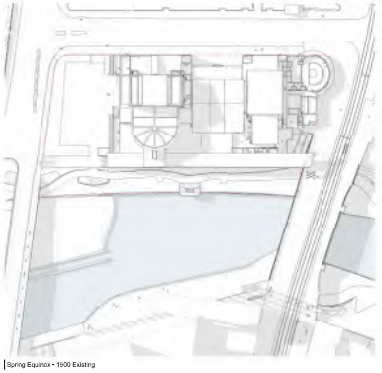

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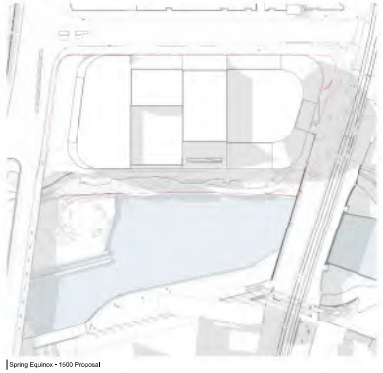
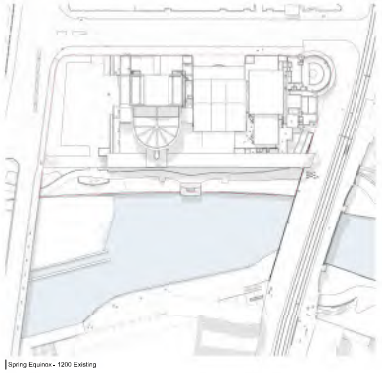


Spring Equinox - 1500 Proposal



Spring Equinox - 1200 Existing

Spring Equinox - 1200 Proposal

Rev	Description	By	Date
1	ISSUE FOR PHASE 1A		06/09/24
2	DRAFT SSDA - FOR INFORMATION		28/11/24
3	DRAFT SSDA - FOR INFORMATION		19/12/24

NOTE: FOR FINAL SUBMISSION, SHADOWS ANALYSIS FOR THE PROPOSAL WILL BE OVERLAY TO THE EXISTING SHADOWS CONDITION

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Client

RIVERSIDE Riverside Theatres

Project No. 550055

Project Riverside Theatre
CNR MARKET & CHURCH ST,
PARRAMATTA NSW 2150

Acknowledgement

In the language of the Darug people, this site is known as Burramattagal.

Drawing Title
SPRING EQUINOX - SHADOW DIAGRAMS

Document Control Status:

Co-ordinated: Checker

Drawn: Author

Project Architect:

Scale: 1 : 1000 @ B1

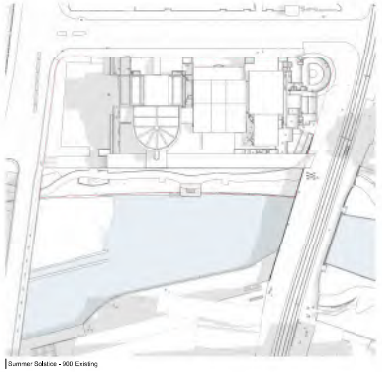
Project Director: Approver

Date: 9/29/2023

Drawing Number: AR-DA-8001

Revision: 3

PLOT STAMP DATE: 19/12/2024 9:49:53 PM



Summer Solstice - 900 Existing

Summer Solstice - 900 Proposal

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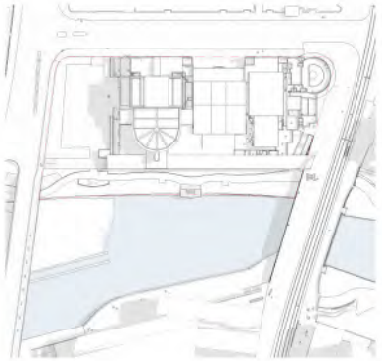

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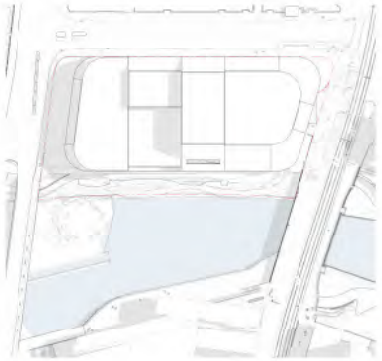
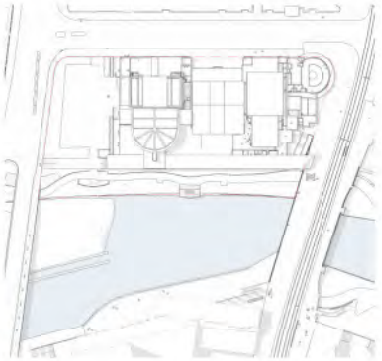


Summer Solstice - 1000 Proposal



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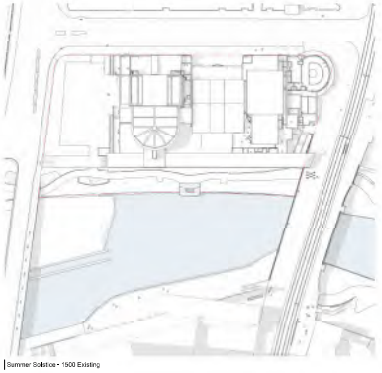

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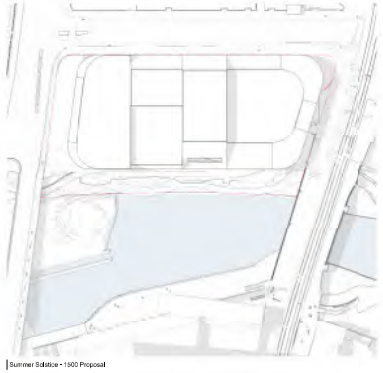
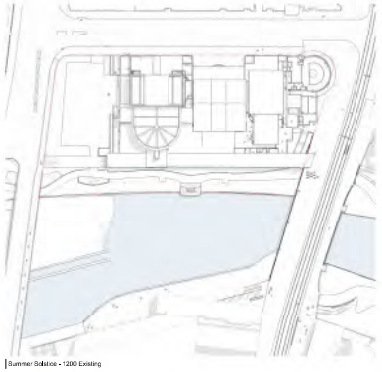


Summer Solstice - 1500 Proposal



Summer Solstice - 1200 Existing

Summer Solstice - 1200 Proposal

Rev	Description	By	Date
1	ISSUE FOR PHASE 1A		06/09/24
2	DRAFT SSDA - FOR INFORMATION		28/11/24
3	DRAFT SSDA - FOR INFORMATION		19/12/24

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Project No. 550055

Project Riverside Theatre
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PARRAMATTA NSW 2150

Acknowledgement

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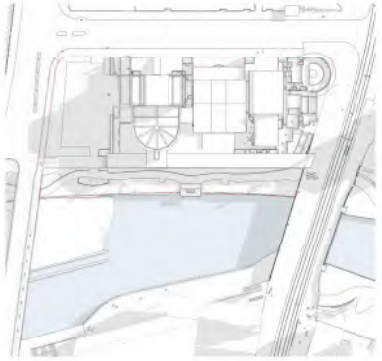
Drawing Title
SUMMER SOLSTICE - SHADOW DIAGRAMS

Document Control Status:

Co-ordinated: Checker	**Drawn:** Author
Project Architect:	**Scale:** 1 : 1000 @ B1
Project Director: Approver	**Date:** 9/29/2023
Drawing Number: AR-DA-8002	**Revision:** 3

PLOT STAMP DATE: 19/12/2024 8:55:14 PM



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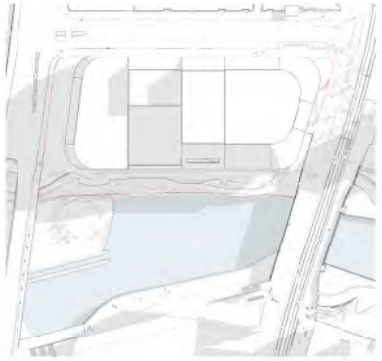
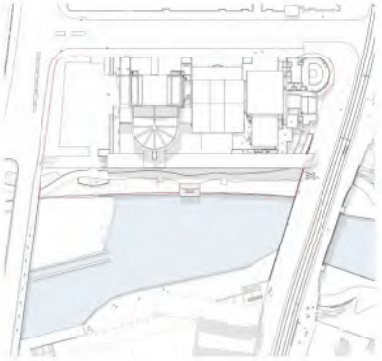


Autumn Equinox - 900 Proposal



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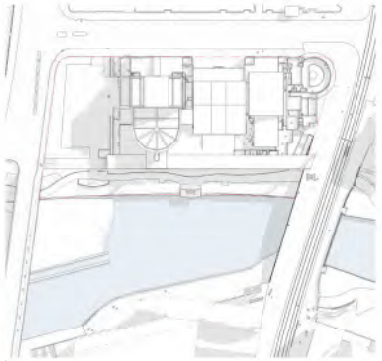
Autumn Equinox - 1300 Proposal



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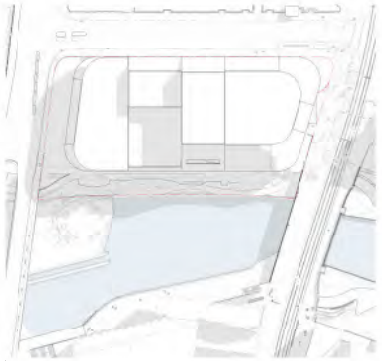
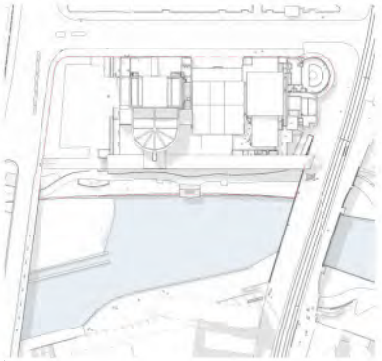
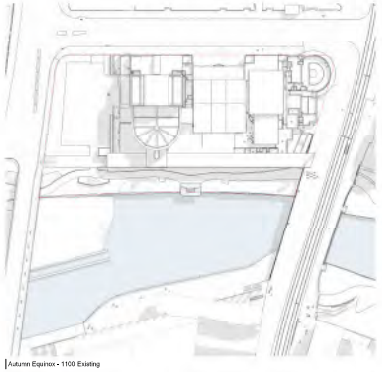


Autumn Equinox - 1000 Proposal



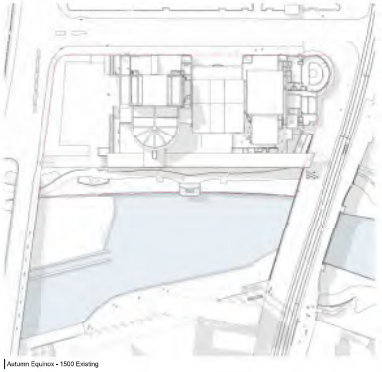
Autumn Equinox - 1400 Existing

Autumn Equinox - 1400 Proposal



Autumn Equinox - 1100 Existing

Autumn Equinox - 1100 Proposal



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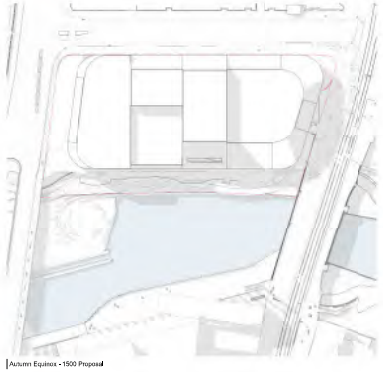

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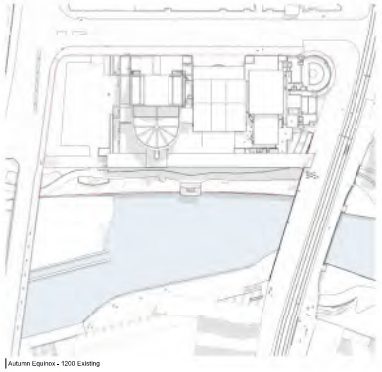

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Autumn Equinox - 1200 Proposal

Rev	Description	By	Date
1	ISSUE FOR PHASE 1A		06/09/24
2	DRAFT SSDA - FOR INFORMATION		28/11/24
3	DRAFT SSDA - FOR INFORMATION		19/12/24

NOTE: FOR FINAL SUBMISSION, SHADOWS ANALYSIS FOR THE PROPOSAL WILL BE OVERLAY TO THE EXISTING SHADOWS CONDITION

DRAFT

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RIVERSIDE Riverside Theatres

Project No. 550055

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Acknowledgement

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Drawing Title AUTUMN EQUINOX - SHADOW DIAGRAMS

Document Control Status:

Co-ordinated: Checker	**Drawn:** Author
Project Architect:	**Scale:** 1 : 1000 @ B1
Project Director: Approver	**Date:** 9/29/2023
Drawing Number: AR-DA-8003	**Revision:** 3

PLOT DRAWING DATE: 19/12/2024 4:55:15 PM

Rev	Description	By	Date
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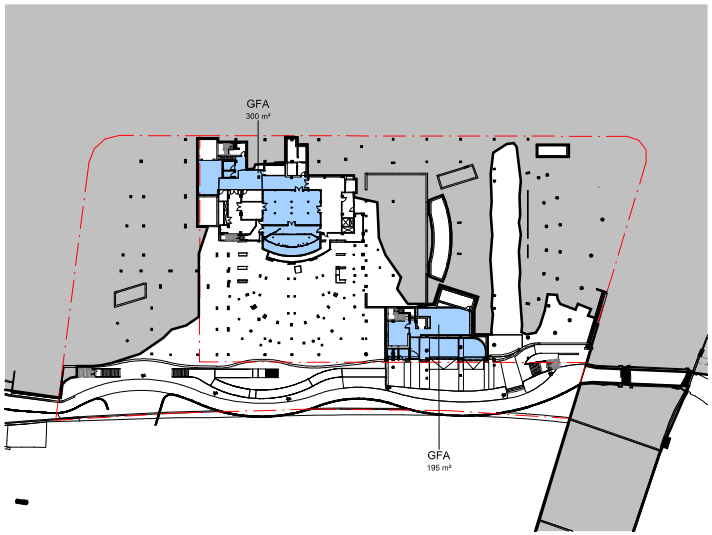

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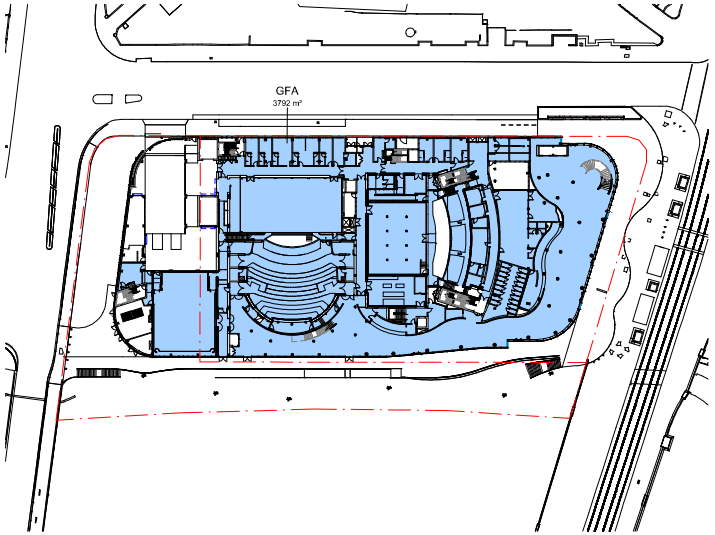

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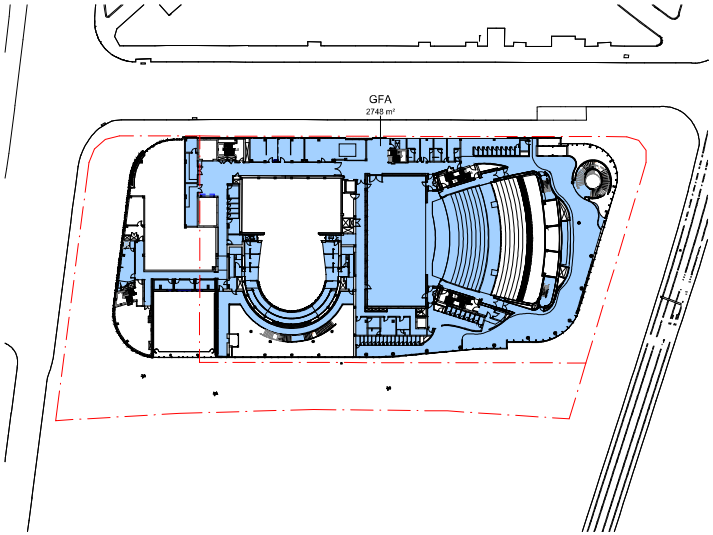

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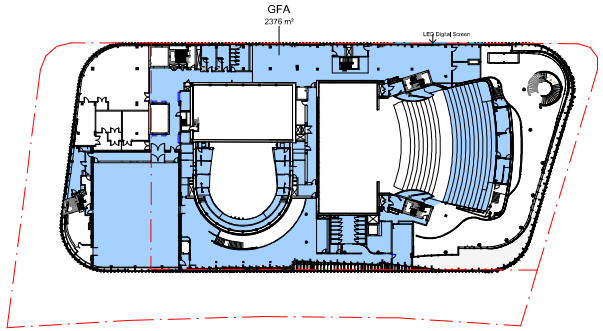

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223100.00

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Acknowledgement
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Document Control Status:
SSDA

Drawing Title
AREA PLANS SHEET 01

Co-ordinated:	Drawn:
Checker	JC
Date:	Scale:
25/01/2007	1 : 500 @ B1

Drawing Number:	Revision:
AR-DA-8200	01

PLOT STAMP DATE: 11/02/2025 9:55:52 AM

Rev	Description	By	Date
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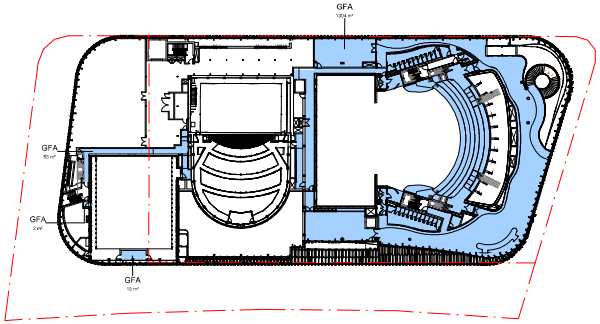

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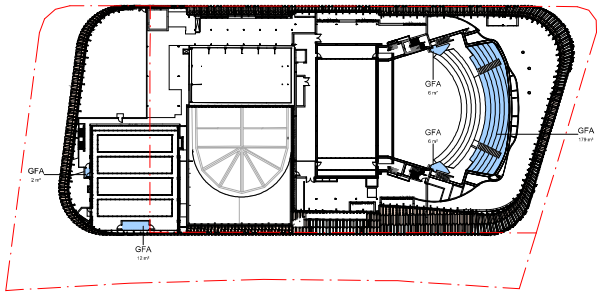

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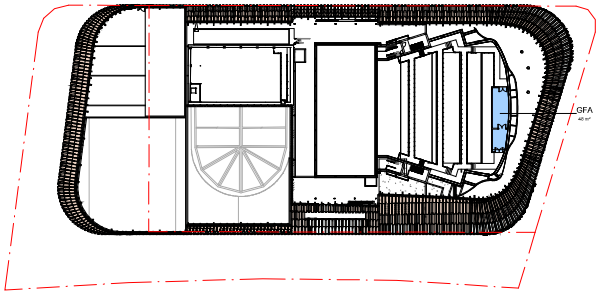

3 LEVEL 05 GFA
1 : 500

GFA SCHEDULE (BY LEVEL)	
Level	Area
BASEMENT	495 m²
GROUND LEVEL- STREET ENTRY	3792 m²
LEVEL 01 - LYRIC STALLS	2748 m²
LEVEL 02 - STUDIO THEATRE	2376 m²
LEVEL 03 - LYRIC DRESS CIRCLE	1372 m²
LEVEL 04 - LYRIC LOWER GALLERY	206 m²
LEVEL 05 - STUDIO THEATRE ROOF	48 m²
GRAND TOTAL	11038 m²

	PERMISSIBLE*	PROPOSED
GFA	3:1	1.50:1
FSR	22,056 m²	11,038 m²

*BASE PERMISSIBLE FIGURES AS PER PLEP 2023 / SH

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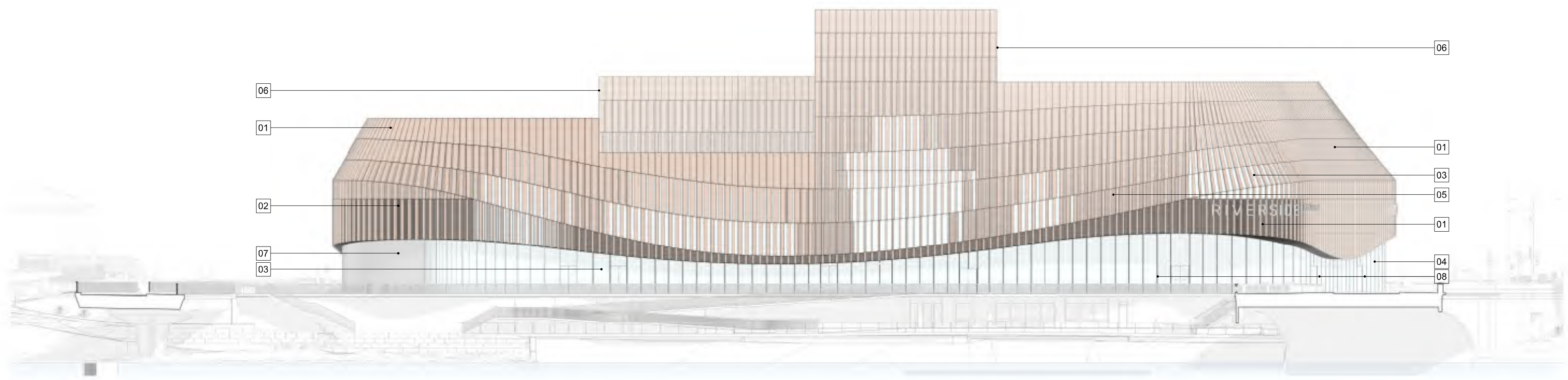
Document Control Status:
SSDA

Drawing Title
AREA PLANS SHEET 02

Co-ordinated: Checker
Drawn: JC
Date: 25/01/2007
Scale: 1 : 500 @ B1

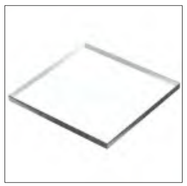
Drawing Number: AR-DA-8201
Revision: 01

PLOT STAMP DATE: 11/2/2025 9:57:52 AM



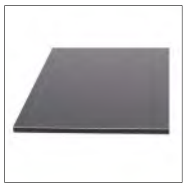
01 - GRC OR TERRACOTTA

02 - ALUMINIUM LAMELLA CLADDING



03 - VISION GLAZING

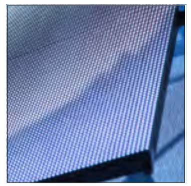
04 - DARK GREY COLOUR, ALUMINIUM FACADE MULLIONS



05 - ALUMINIUM CLADDING

06 - CFC CLADDING

07 - ALUMINIUM VERTICAL LOUVRES



08 - LED DIGITAL SCREEN

Rev	Description	By	Date
1	DRAFT SSDA - FOR INFORMATION		19/12/24

DRAFT

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Project No.: 550055

Project: Riverside Theatre
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Acknowledgement

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Drawing Title: EXTERNAL MATERIAL SCHEDULE

Document Control Status:

Co-ordinated:	Checker	Drawn:	Author
Project Architect:		Scale:	As indicated @ B1
Project Director:	Approver	Date:	9/29/2023
Drawing Number:	AR-DA-9700	Revision:	1

PLOT STAMP DATE: 18/12/2024 9:32:52 PM

Appendix C: JKE DSI Laboratory Summary Tables and Logs

Laboratory Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
ADWG:	AustralianDrinking Water Guidelines
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GIL:	Groundwater Investigation Levels
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
pH_{KCL} :	pH of filtered 1:20, 1M KCL extract, shaken overnight
pH_{ox} :	pH of filtered 1:20 1M KCl after peroxide digestion
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
S_{Cr}:	Chromium reducible sulfur
S_{POS}:	Peroxide oxidisable Sulfur
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TPA:	Total Potential Acidity, 1M KCL peroxide digest
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
TSA:	Total Sulfide Acidity (TPA-TAA)
UCL:	Upper Level Confidence Limit on Mean Value
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

Site specific ABC values for specific metals have been adopted.

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-C: 'Public open space; secondary schools; and footpaths'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	TOTAL VOCs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos			
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2/2	100
Site Assessment Criteria (SAC)			300	90	300	17000	600	80	1200	30000	300	3	10	340	400	10	70	400	10	250	1	0.2/2	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																					
BH1	0.5-0.95	F: Silty Sand	<4	<0.4	**17**	**25**	**240**	**0.3**	**17**	**150**	**87**	**12**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH1 - [LAB_DUP]	0.5-0.95	F: Silty Sand	<4	<0.4	**14**	**25**	**280**	**0.2**	**17**	**150**	**18**	**2.7**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
BH1	1.1-1.5	F: Silty Clay	**6**	<0.4	**14**	**7**	**23**	<0.1	**5**	**6**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	2.4-2.7	Silty Clay	**5**	<0.4	**15**	**8**	**12**	<0.1	**4**	**14**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
BH2	0.03-0.2	F: Silty Gravelly Sand	<4	<0.4	**11**	**96**	**120**	<0.1	**82**	**790**	**3.6**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Detected
BH2	0.5-0.8	F: Silty Clayey Sand	<4	<0.4	**8**	**23**	**1700**	**0.3**	**6**	**36**	**49**	**6.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH3	0.15-0.3	F: Silty Clay	**5**	<0.4	**10**	**21**	**430**	**1.8**	**7**	**98**	**260**	**27**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH3 - [TRIPLICATE]	0.15-0.3	F: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH3	0.6-0.9	F: Silty Clay	**5**	<0.4	**14**	**9**	**51**	**0.2**	**4**	**27**	**6**	**0.8**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
BH4	0.2-0.5	F: Silty Clay	**4**	<0.4	**15**	**21**	**43**	**0.1**	**6**	**26**	**1.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH5	0.18-0.3	F: Sandy Gravel	<4	<0.4	**6**	**49**	**4**	<0.1	**68**	**28**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5	0.5-0.95	F: Clayey Sand	<4	<0.4	**14**	**6**	**16**	<0.1	**2**	**12**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH6	0.1-0.2	F: Gravel	<4	<0.4	**5**	**44**	**2**	<0.1	**69**	**25**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH7	0.08-0.2	F: Sandy Clay	<4	<0.4	**12**	**17**	**18**	<0.1	**6**	**41**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH8	0-0.1	F: Gravelly Sand	<4	<0.4	**8**	**15**	**31**	<0.1	**14**	**270**	**3.8**	**0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Detected
BH9	0-0.1	F: Silty Sand	<4	<0.4	**11**	**26**	**20**	<0.1	**15**	**95**	**0.72**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH9 - [LAB_DUP]	0-0.1	F: Silty Sand	<4	<0.4	**10**	**27**	**23**	<0.1	**13**	**99**	**0.5**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
BH10	0-0.2	F: Gravelly Sand	<4	<0.4	**7**	**20**	**20**	<0.1	**22**	**52**	**7.1**	**0.9**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH11	0-0.1	F: Gravelly Sand	**4**	<0.4	**6**	**22**	**25**	**0.3**	**13**	**93**	**5.1**	**0.6**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH12	0.4-0.5	F: Silty Clayey Sand	<4	<0.4	**8**	**16**	**28**	<0.1	**13**	**45**	**3.6**	**0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH13	0.3-0.5	F: Clayey Sand	<4	<0.4	**99**	**9**	**38**	**0.1**	**4**	**19**	**19**	**2.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH13	1.5-1.95	F: Silty Clay	<4	<0.4	**11**	**4**	**13**	<0.1	**3**	**4**	**8.1**	**0.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2	NA
BH14	0.4-0.6	F: Silty Gravelly Clay	**140**	<0.4	**9**	**8**	**42**	**0.2**	**11**	**23**	**13**	**1.8**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH14	1.0-1.3	F: Silty Clayey Sand	<4	<0.4	**5**	**4**	**12**	**0.1**	**3**	**4**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH15	0-0.1	F: Gravelly Sand	**8**	<0.4	**12**	**23**	**53**	**0.4**	**10**	**60**	**9.4**	**1.2**	<0.1	<0.1	<0.1	<0.1	<0.1	**0.8**	<0.1	<0.1	<0.1	NA	Not Detected
BH16	0-0.1	F: Silty Clayey Sand	<4	<0.4	**11**	**32**	**41**	<0.1	**17**	**120**	**25**	**3.4**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH16 - [LAB_DUP]	0-0.1	F: Silty Clayey Sand	<4	<0.4	**12**	**34**	**39**	<0.1	**18**	**120**	**6.5**	**1**	<0.1	<0.1	<0.1	<0.1	<0.1	**0.2**	<0.1	<0.1	<0.1	NA	NA
BH16	0.4-0.5	F: Silty Clayey Sand	**4**	<0.4	**11**	**31**	**42**	**0.2**	**25**	**81**	**8.2**	**1.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
BH17	0-0.1	F: Silty Sand	<4	<0.4	**14**	**41**	**54**	<0.1	**12**	**330**	**11**	**1.4**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
BH17	0.8-1.0	F: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2	NA
BH17	1.7-1.95	Silty sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2	NA
BH18	0.16-0.3	F: Silty Sandy Clay	**5**	<0.4	**12**	**19**	**40**	**0.2**	**11**	**40**	**2.7**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2	Not Detected
BH18	1.8-2.1	F: Silty Clay	**7**	<0.4	**21**	**7**	**15**	<0.1	**4**	**16**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2	NA
BH19	0-0.1	F: Silty Sand	<4	<0.4	**10**	**16**	**26**	<0.1	**8**	**140**	**0.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Detected
BH20	0-0.2	F: Silty Sand	<4	<0.4	**12**	**12**	**19**	<0.1	**7**	**110**	**0.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	Not Detected
SDUP1	BH1 (2.4-2.7m	Silty clay	<4	<0.4	**12**	**4**	**10**	<0.1	**3**	**6**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
SDUP2	BH3 (0.6-0.9m	F: Silty clay	**4.8**	<0.40	**16**	**9.9**	**83**	**0.99**	**3.9**	**31**	**5.8**	**0.81**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
SDUP3	BH19 (0-0.1m	F: Silty sand	<4	<0.4	**8**	**13**	**23**	<0.1	**7**	**130**	**0.2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
SDUP4	BH20 (0-0.1m	F: Silty sand	<4.0	<0.40	**8**	**14**	**22**	<0.10	**8.6**	**120**	**2**	<0.50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
Total Number of Samples			36	36	36	36	36	36	36	36	36	36	30	30	30	30	30	30	30	30	30	5	20
Maximum Value			140	<PQL	99	96	1700	1.8	82	790	260	27	<PQL	<PQL	<PQL	<PQL	<PQL	0.8	<PQL	<PQL	<PQL	<PQL	Detected
Statistical Analysis on Fill Samples																							
Number of Fill Samples			NC	NC	NC	NC	**27**	NC	NC	NC	NC	**27**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Mean Value			NC	NC	NC	NC	**118.8**	NC	NC	NC	NC	**2.48**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Standard Deviation			NC	NC	NC	NC	**329**	NC	NC	NC	NC	**5.48**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
% UCL			NC	NC	NC	NC	**95**	NC	NC	NC	NC	**95**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
UCL Value			NC	NC	NC	NC	**191.1**	NC	NC	NC	NC	**7.072**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
Asbestos Detected — **Detected**

Standard deviation exceeds data assessment criteria — **VALUE**

TABLE S2
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH1	0.5-0.95	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1 - [LAB_DUP]	0.5-0.95	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1	1.1-1.5	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1	2.4-2.7	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH2	0.03-0.2	F: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.4
BH2	0.5-0.8	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH3	0.15-0.3	F: Silty Clay	0m to <1m	Sand	<25	**91**	<0.2	<0.5	<1	<1	**7**	0
BH3 - [LAB_DUP]	0.15-0.3	F: Silty Clay	0m to <1m	Sand	<25	NA	<0.2	<0.5	<1	<1	**8**	0
BH3 - [TRIPLICATE]	0.15-0.3	F: Silty Clay	0m to <1m	Sand	<25	NA	<0.2	<0.5	<1	<1	**6**	0
BH3	0.6-0.9	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH4	0.2-0.5	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0.18-0.3	F: Sandy Gravel	0m to <1m	Sand	<25	**83**	<0.2	<0.5	<1	<1	<1	0
BH5	0.5-0.95	F: Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH6	0.1-0.2	F: Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH7	0.08-0.2	F: Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH8	0-0.1	F: Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH9	0-0.1	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH9 - [LAB_DUP]	0-0.1	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH10	0-0.2	F: Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH11	0-0.1	F: Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH12	0.4-0.5	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH13	0.3-0.5	F: Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH13	1.5-1.95	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH14	0.4-0.6	F: Silty Gravelly Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH14	1.0-1.3	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH15	0-0.1	F: Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH16	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH16 - [LAB_DUP]	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	<25	**100**	<0.2	<0.5	<1	<1	<1	0
BH16	0.4-0.5	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH17	0-0.1	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH18	0.16-0.3	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH18	1.8-2.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH19	0-0.1	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH20	0-0.2	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
SDUP1	BH1 (2.4-2.7m)	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP2	BH3 (0.6-0.9m)	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP3	BH19 (0-0.1m)	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP4	BH20 (0-0.1m)	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples					38	36	38	38	38	38	38	34
Maximum Value					<PQL	100	<PQL	<PQL	<PQL	<PQL	8	0.4

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH1	0.5-0.95	F: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH1 - [LAB_DUP]	0.5-0.95	F: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH1	1.1-1.5	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH1	2.4-2.7	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH2	0.03-0.2	F: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH2	0.5-0.8	F: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH3	0.15-0.3	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH3 - [LAB_DUP]	0.15-0.3	F: Silty Clay	0m to <1m	Sand	260	NA	3	NL	NL	230	NL
BH3 - [TRIPLICATE]	0.15-0.3	F: Silty Clay	0m to <1m	Sand	260	NA	3	NL	NL	230	NL
BH3	0.6-0.9	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH4	0.2-0.5	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH5	0.18-0.3	F: Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH5	0.5-0.95	F: Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH6	0.1-0.2	F: Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH7	0.08-0.2	F: Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH8	0-0.1	F: Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH9	0-0.1	F: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH9 - [LAB_DUP]	0-0.1	F: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH10	0-0.2	F: Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH11	0-0.1	F: Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH12	0.4-0.5	F: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH13	0.3-0.5	F: Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH13	1.5-1.95	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH14	0.4-0.6	F: Silty Gravelly Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH14	1.0-1.3	F: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH15	0-0.1	F: Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH16	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH16 - [LAB_DUP]	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH16	0.4-0.5	F: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH17	0-0.1	F: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH18	0.16-0.3	F: Silty Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH18	1.8-2.1	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH19	0-0.1	F: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH20	0-0.2	F: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP1	BH1 (2.4-2.7m)	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP2	BH3 (0.6-0.9m)	F: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP3	BH19 (0-0.1m)	F: Silty sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP4	BH20 (0-0.1m)	F: Silty sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH1	0.5-0.95	Coarse	<25	<50	**130**	<100
BH1 - [LAB_DUP]	0.5-0.95	Coarse	<25	<50	**280**	**200**
BH1	1.1-1.5	Fine	<25	<50	<100	<100
BH1	2.4-2.7	Fine	<25	<50	<100	<100
BH2	0.03-0.2	Coarse	<25	<50	<100	<100
BH2	0.5-0.8	Coarse	<25	<50	**200**	<100
BH3	0.15-0.3	Fine	<25	**98**	**1200**	**220**
BH3 - [LAB_DUP]	0.15-0.3	Fine	<25	NA	NA	NA
BH3 - [TRIPLICATE]	0.15-0.3	Fine	<25	NA	NA	NA
BH3	0.6-0.9	Fine	<25	<50	<100	<100
BH4	0.2-0.5	Fine	<25	<50	<100	<100
BH5	0.18-0.3	Coarse	<25	**83**	**600**	**780**
BH5	0.5-0.95	Coarse	<25	<50	**120**	**200**
BH6	0.1-0.2	Coarse	<25	<50	<100	<100
BH7	0.08-0.2	Fine	<25	<50	<100	<100
BH8	0-0.1	Coarse	<25	<50	**130**	**150**
BH9	0-0.1	Coarse	<25	<50	**240**	**260**
BH9 - [LAB_DUP]	0-0.1	Coarse	<25	<50	**280**	**270**
BH10	0-0.2	Coarse	<25	<50	**140**	**160**
BH11	0-0.1	Coarse	<25	<50	**120**	**160**
BH12	0.4-0.5	Coarse	<25	<50	<100	<100
BH13	0.3-0.5	Coarse	<25	<50	<100	<100
BH13	1.5-1.95	Fine	<25	<50	<100	<100
BH14	0.4-0.6	Fine	<25	<50	<100	<100
BH14	1.0-1.3	Coarse	<25	<50	<100	<100
BH15	0-0.1	Coarse	<25	<50	<100	<100
BH16	0-0.1	Coarse	<25	<50	**860**	**570**
BH16 - [LAB_DUP]	0-0.1	Coarse	<25	**100**	**1000**	**750**
BH16	0.4-0.5	Coarse	<25	<50	<100	<100
BH17	0-0.1	Coarse	<25	<50	**150**	**200**
BH18	0.16-0.3	Fine	<25	<50	**160**	**240**
BH18	1.8-2.1	Fine	<25	<50	**160**	**250**
BH19	0-0.1	Coarse	<25	<50	**160**	**240**
BH20	0-0.2	Coarse	<25	<50	<100	**120**
SDUP1	BH1 (2.4-2.7m)	Fine	<25	<50	<100	<100
SDUP2	BH3 (0.6-0.9m)	Fine	<25	<50	<100	<100
SDUP3	BH19 (0-0.1m)	Coarse	<25	<50	<100	**130**
SDUP4	BH20 (0-0.1m)	Coarse	<25	<50	<100	<100
Total Number of Samples			38	36	36	36
Maximum Value			<PQL	100	1200	780

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Soil Texture	C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
BH1	0.5-0.95	Coarse	700	1000	2500	10000
BH1 - [LAB_DUP]	0.5-0.95	Coarse	700	1000	2500	10000
BH1	1.1-1.5	Fine	800	1000	3500	10000
BH1	2.4-2.7	Fine	800	1000	3500	10000
BH2	0.03-0.2	Coarse	700	1000	2500	10000
BH2	0.5-0.8	Coarse	700	1000	2500	10000
BH3	0.15-0.3	Fine	800	1000	3500	10000
BH3 - [LAB_DUP]	0.15-0.3	Fine	800	NA	NA	NA
BH3 - [TRIPLICATE]	0.15-0.3	Fine	800	NA	NA	NA
BH3	0.6-0.9	Fine	800	1000	3500	10000
BH4	0.2-0.5	Fine	800	1000	3500	10000
BH5	0.18-0.3	Coarse	700	1000	2500	10000
BH5	0.5-0.95	Coarse	700	1000	2500	10000
BH6	0.1-0.2	Coarse	700	1000	2500	10000
BH7	0.08-0.2	Fine	800	1000	3500	10000
BH8	0-0.1	Coarse	700	1000	2500	10000
BH9	0-0.1	Coarse	700	1000	2500	10000
BH9 - [LAB_DUP]	0-0.1	Coarse	700	1000	2500	10000
BH10	0-0.2	Coarse	700	1000	2500	10000
BH11	0-0.1	Coarse	700	1000	2500	10000
BH12	0.4-0.5	Coarse	700	1000	2500	10000
BH13	0.3-0.5	Coarse	700	1000	2500	10000
BH13	1.5-1.95	Fine	800	1000	3500	10000
BH14	0.4-0.6	Fine	800	1000	3500	10000
BH14	1.0-1.3	Coarse	700	1000	2500	10000
BH15	0-0.1	Coarse	700	1000	2500	10000
BH16	0-0.1	Coarse	700	1000	2500	10000
BH16 - [LAB_DUP]	0-0.1	Coarse	700	1000	2500	10000
BH16	0.4-0.5	Coarse	700	1000	2500	10000
BH17	0-0.1	Coarse	700	1000	2500	10000
BH18	0.16-0.3	Fine	800	1000	3500	10000
BH18	1.8-2.1	Fine	800	1000	3500	10000
BH19	0-0.1	Coarse	700	1000	2500	10000
BH20	0-0.2	Coarse	700	1000	2500	10000
SDUP1	BH1 (2.4-2.7m)	Fine	800	1000	3500	10000
SDUP2	BH3 (0.6-0.9m)	Fine	800	1000	3500	10000
SDUP3	BH19 (0-0.1m)	Coarse	700	1000	2500	10000
SDUP4	BH20 (0-0.1m)	Coarse	700	1000	2500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		82,000	62,000	85,000	120,000	1,100	120,000	85,000	130,000	29,000	
Site Use		**Intrusive Maintenance Worker - DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
BH1	0.5-0.95	<25	<50	**130**	<100	<0.2	<0.5	<1	<1	<1	0
BH1 - [LAB_DUP]	0.5-0.95	<25	<50	**280**	**200**	<0.2	<0.5	<1	<1	<1	0
BH1	1.1-1.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH1	2.4-2.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH2	0.03-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.4**
BH2	0.5-0.8	<25	<50	**200**	<100	<0.2	<0.5	<1	<1	<1	0
BH3	0.15-0.3	<25	**91**	**1200**	**220**	<0.2	<0.5	<1	<1	**7**	0
BH3 - [LAB_DUP]	0.15-0.3	<25	NA	NA	NA	<0.2	<0.5	<1	<1	**8**	0
BH3 - [TRIPLICATE]	0.15-0.3	<25	NA	NA	NA	<0.2	<0.5	<1	<1	**6**	0
BH3	0.6-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH4	0.2-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0.18-0.3	<25	**83**	**600**	**780**	<0.2	<0.5	<1	<1	<1	0
BH5	0.5-0.95	<25	<50	**120**	**200**	<0.2	<0.5	<1	<1	<1	0
BH6	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH7	0.08-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH8	0-0.1	<25	<50	**130**	**150**	<0.2	<0.5	<1	<1	<1	0
BH9	0-0.1	<25	<50	**240**	**260**	<0.2	<0.5	<1	<1	<1	0
BH9 - [LAB_DUP]	0-0.1	<25	<50	**280**	**270**	<0.2	<0.5	<1	<1	<1	0
BH10	0-0.2	<25	<50	**140**	**160**	<0.2	<0.5	<1	<1	<1	0
BH11	0-0.1	<25	<50	**120**	**160**	<0.2	<0.5	<1	<1	<1	0
BH12	0.4-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH13	0.3-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH13	1.5-1.95	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH14	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH14	1.0-1.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH15	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH16	0-0.1	<25	<50	**860**	**570**	<0.2	<0.5	<1	<1	<1	0
BH16 - [LAB_DUP]	0-0.1	<25	**100**	**1000**	**750**	<0.2	<0.5	<1	<1	<1	0
BH16	0.4-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH17	0-0.1	<25	<50	**150**	**200**	<0.2	<0.5	<1	<1	<1	0
BH18	0.16-0.3	<25	<50	**160**	**240**	<0.2	<0.5	<1	<1	<1	0
BH18	1.8-2.1	<25	<50	**160**	**250**	<0.2	<0.5	<1	<1	<1	0
BH19	0-0.1	<25	<50	**160**	**240**	<0.2	<0.5	<1	<1	<1	0
BH20	0-0.2	<25	<50	<100	**120**	<0.2	<0.5	<1	<1	<1	0
SDUP1	BH1 (2.4-2.7m)	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP2	BH3 (0.6-0.9m)	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP3	BH19 (0-0.1m)	<25	<50	<100	**130**	<0.2	<0.5	<1	<1	<1	-
SDUP4	BH20 (0-0.1m)	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples		38	36	36	36	38	38	38	38	38	34
Maximum Value		<PQL	100	1200	780	<PQL	<PQL	<PQL	<PQL	8	0.4

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-C:Public open space; secondary schools; and footpaths

FIELD DATA															LABORATORY DATA										
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample reference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
SAC			**No**					**0.02**			**0.001**			**0.001**											**0.02**	**0.001**
6/01/2025	BH1	0.03-0.4	No	<10	3,230	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH1	0.4-0.95	NA	<10	7,140	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH1	0.5-0.95	923.4	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH1	0.95-1.6	NA	<10	7,920	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH1	1.6-2.0	NA	<10	9,030	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH2	0.03-0.2	No	<10	2,980	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH2	0.03-0.2	998.43	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	Chrysotile	–	0.0135	<0.01	0.0014
6/01/2025	BH2	0.2-0.8	NA	<10	4,730	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH3	0.15-0.3	NA	<10	4,520	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH3	0.15-0.3	866.97	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH3	0.3-0.9	NA	<10	5,610	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH3	0.9-1.2	NA	<10	2,940	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH4	0.15-1.1	NA	<10	2,420	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH4	0.2-0.5	632.31	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH4	1.1-1.7	NA	<10	4,870	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH5	0.3-1.1	NA	<10	8,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH5	0.5-0.95	546.56	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH5	1.1-2.0	NA	<10	5,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370062	BH6	0.1-0.2	911.13	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370062	BH7	0.08-0.2	919.83	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370062	BH8	0-0.1	1147.11	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	Chrysotile	–	0.001	<0.01	<0.001
7/01/2025	BH9	0-0.1	No	10	10170	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH9	0-0.1	386.84	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
7/01/2025	BH9	0.1-0.65	NA	<10	6360	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/01/2025	BH10	0-0.2	No	<10	7,020	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH10	0-0.2	1227.6	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370062	BH11	0-0.1	1160.35	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
7/01/2025	BH12	0.1-0.5	No	<10	3,470	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH12	0.4-0.5	943.77	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
7/01/2025	BH13	0.29-1.2	No	<10	9,470	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH13	0.3-0.5	706.29	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH14	0.4-1.0	No	<10	2,990	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH14	0.4-0.6	821.12	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH14	1.0-1.3	No	<10	3,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH14	1.3-2.0	No	<10	6,540	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH14	2.0-2.5	No	<10	6,190	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH14	2.5-2.6	No	<10	3,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370062	BH15	0-0.1	1111.1	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
7/01/2025	BH16	0-0.5	No	<10	7,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH16	0-0.1	494.96	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH17	0-0.3	No	<10	2,130	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH17	0-0.1	704.04	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH17	0.3-1.0	NA	<10	6,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH17	1.0-1.7	NA	<10	2,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH18	0.16-1.16	NA	<10	6,970	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH18	0.16-0.3	751.65	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
6/01/2025	BH18	1.16-1.8	NA	<10	7,340	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH18	1.8-2.5	NA	<10	5,140	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/01/2025	BH18	2.5-2.8	NA	<10	3,010	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/01/2025	BH19	0-0..1	No	10	10,070	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH19	0-0.1	634.66	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	Amosite	–	0.0007	<0.01	<0.001
7/01/2025	BH19	0.1-0.25	NA	<10	7,420	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/01/2025	BH19	0.25-0.5	NA	<10	5,680	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/01/2025	BH20	0-0.1	No	10	11,120	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	370062	BH20	0-0.2	881.34	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
7/01/2025	BH20	0.1-0.3	NA	<10	5,430	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Concentration above the SAC **VALUE**

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																		
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																			
BH1	0.5-0.95	F: Silty Sand	Coarse	NA	NA	NA	<4	**17**	**25**	**240**	**17**	**150**	<1	<0.1	<25	<50	**130**	<100	<0.2	<0.5	<1	<1	**8**
BH1 - [LAB_DUP]	0.5-0.95	F: Silty Sand	Coarse	NA	NA	NA	<4	**14**	**25**	**280**	**17**	**150**	<1	<0.1	<25	<50	**280**	**200**	<0.2	<0.5	<1	<1	**1.7**
BH1	1.1-1.5	F: Silty Clay	Fine	NA	NA	NA	**6**	**14**	**7**	**23**	**5**	**6**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1	2.4-2.7	Silty Clay	Fine	NA	NA	NA	**5**	**15**	**8**	**12**	**4**	**14**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH2	0.03-0.2	F: Silty Gravelly Sand	Coarse	**9.4**	**24**	NA	<4	**11**	**96**	**120**	**82**	**790**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.3**
BH2	0.5-0.8	F: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**8**	**23**	**1700**	**6**	**36**	<1	NA	<25	<50	**200**	<100	<0.2	<0.5	<1	<1	**4.3**
BH3	0.15-0.3	F: Silty Clay	Fine	NA	NA	NA	**5**	**10**	**21**	**430**	**7**	**98**	**7**	<0.1	<25	**91**	**1200**	**220**	<0.2	<0.5	<1	<1	**19**
BH3 - [LAB_DUP]	0.15-0.3	F: Silty Clay	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	**8**	NA	<25	NA	NA	NA	<0.2	<0.5	<1	<1	NA
BH3 - [TRIPLICATE]	0.15-0.3	F: Silty Clay	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	**6**	NA	<25	NA	NA	NA	<0.2	<0.5	<1	<1	NA
BH3	0.6-0.9	F: Silty Clay	Fine	NA	NA	NA	**5**	**14**	**9**	**51**	**4**	**27**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.5**
BH4	0.2-0.5	F: Silty Clay	Fine	NA	NA	NA	**4**	**15**	**21**	**43**	**6**	**26**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
BH5	0.18-0.3	F: Sandy Gravel	Coarse	NA	**15**	NA	<4	**6**	**49**	**4**	**68**	**28**	<1	NA	<25	**83**	**600**	**780**	<0.2	<0.5	<1	<1	<0.05
BH5	0.5-0.95	F: Clayey Sand	Coarse	NA	NA	NA	<4	**14**	**6**	**16**	**2**	**12**	<1	<0.1	<25	<50	**120**	**200**	<0.2	<0.5	<1	<1	<0.05
BH6	0.1-0.2	F: Gravel	Coarse	NA	**9.1**	NA	<4	**5**	**44**	**2**	**69**	**25**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH7	0.08-0.2	F: Sandy Clay	Fine	NA	NA	NA	<4	**12**	**17**	**18**	**6**	**41**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH8	0-0.1	F: Gravelly Sand	Coarse	**7.8**	**13**	NA	<4	**8**	**15**	**31**	**14**	**270**	<1	<0.1	<25	<50	**130**	**150**	<0.2	<0.5	<1	<1	**0.3**
BH9	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	<4	**11**	**26**	**20**	**15**	**95**	<1	<0.1	<25	<50	**240**	**260**	<0.2	<0.5	<1	<1	**0.1**
BH9 - [LAB_DUP]	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	<4	**10**	**27**	**23**	**13**	**99**	<1	<0.1	<25	<50	**280**	**270**	<0.2	<0.5	<1	<1	**0.1**
BH10	0-0.2	F: Gravelly Sand	Coarse	NA	NA	NA	<4	**7**	**20**	**20**	**22**	**52**	<1	<0.1	<25	<50	**140**	**160**	<0.2	<0.5	<1	<1	**0.62**
BH11	0-0.1	F: Gravelly Sand	Coarse	NA	NA	NA	**4**	**6**	**22**	**25**	**13**	**93**	<1	<0.1	<25	<50	**120**	**160**	<0.2	<0.5	<1	<1	**0.3**
BH12	0.4-0.5	F: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**8**	**16**	**28**	**13**	**45**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.3**
BH13	0.3-0.5	F: Clayey Sand	Coarse	NA	NA	NA	<4	**99**	**9**	**38**	**4**	**19**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**1.7**
BH13	1.5-1.95	F: Silty Clay	Fine	NA	NA	NA	<4	**11**	**4**	**13**	**3**	**4**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.5**
BH14	0.4-0.6	F: Silty Gravelly Clay	Fine	NA	NA	NA	**140**	**9**	**8**	**42**	**11**	**23**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**1.2**
BH14	1.0-1.3	F: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**5**	**4**	**12**	**3**	**4**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH15	0-0.1	F: Gravelly Sand	Coarse	NA	NA	NA	**8**	**12**	**23**	**53**	**10**	**60**	<1	**0.4**	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.82**
BH16	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**11**	**32**	**41**	**17**	**120**	<1	<0.1	<25	<50	**860**	**570**	<0.2	<0.5	<1	<1	**2.4**
BH16 - [LAB_DUP]	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**12**	**34**	**39**	**18**	**120**	<1	<0.1	<25	**100**	**1000**	**750**	<0.2	<0.5	<1	<1	**0.67**
BH16	0.4-0.5	F: Silty Clayey Sand	Coarse	**8.3**	NA	NA	**4**	**11**	**31**	**42**	**25**	**81**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.86**
BH17	0-0.1	F: Silty Sand	Coarse	**7.5**	**20**	NA	<4	**14**	**41**	**54**	**12**	**330**	<1	<0.1	<25	<50	**150**	**200**	<0.2	<0.5	<1	<1	**0.98**
BH18	0.16-0.3	F: Silty Sandy Clay	Fine	NA	NA	NA	**5**	**12**	**19**	**40**	**11**	**40**	<1	<0.1	<25	<50	**160**	**240**	<0.2	<0.5	<1	<1	**0.3**
BH18	1.8-2.1	F: Silty Clay	Fine	NA	NA	NA	**7**	**21**	**7**	**15**	**4**	**16**	<1	NA	<25	<50	**160**	**250**	<0.2	<0.5	<1	<1	<0.05
BH19	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	<4	**10**	**16**	**26**	**8**	**140**	<1	<0.1	<25	<50	**160**	**240**	<0.2	<0.5	<1	<1	**0.07**
BH20	0-0.2	F: Silty Sand	Coarse	NA	NA	NA	<4	**12**	**12**	**19**	**7**	**110**	<1	<0.1	<25	<50	<100	**120**	<0.2	<0.5	<1	<1	**0.07**
SDUP1	BH1 (2.4-2.7m)	Silty clay	Fine	NA	NA	NA	<4	**12**	**4**	**10**	**3**	**6**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP2	BH3 (0.6-0.9m)	F: Silty clay	Fine	NA	NA	NA	**4.8**	**16**	**9.9**	**83**	**3.9**	**31**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.54**
SDUP3	BH19 (0-0.1m)	F: Silty sand	Coarse	NA	NA	NA	<4	**8**	**13**	**23**	**7**	**130**	<1	<0.1	<25	<50	<100	**130**	<0.2	<0.5	<1	<1	<0.05
SDUP4	BH20 (0-0.1m)	F: Silty sand	Coarse	NA	NA	NA	<4.0	**8**	**14**	**22**	**8.6**	**120**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.21**
Total Number of Samples				4	5	0	36	36	36	36	36	36	38	30	38	36	36	36	38	38	38	38	36
Maximum Value				9.4	24	NA	140	99	96	1700	82	790	8	0.4	<PQL	100	1200	780	<PQL	<PQL	<PQL	<PQL	19

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Sample Description	Soil Texture	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH1	0.5-0.95	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH1 - [LAB_DUP]	0.5-0.95	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH1	1.1-1.5	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH1	2.4-2.7	Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH2	0.03-0.2	F: Silty Gravelly Sand	Coarse	9.4	24	NA	100	200	250	1300	360	1100	170	180	180	120	300	2800	50	85	70	105	20
BH2	0.5-0.8	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
BH3	0.15-0.3	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH3 - [LAB_DUP]	0.15-0.3	F: Silty Clay	Fine	NA	NA	NA	--	--	--	--	--	--	170	--	180	--	--	--	65	105	125	45	--
BH3 - [TRIPLICATE]	0.15-0.3	F: Silty Clay	Fine	NA	NA	NA	--	--	--	--	--	--	170	--	180	--	--	--	65	105	125	45	--
BH3	0.6-0.9	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH4	0.2-0.5	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH5	0.18-0.3	F: Sandy Gravel	Coarse	NA	15	NA	100	200	90	1300	280	190	170	--	180	120	300	2800	50	85	70	105	20
BH5	0.5-0.95	F: Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH6	0.1-0.2	F: Gravel	Coarse	NA	9.1	NA	100	200	90	1300	180	190	170	180	180	120	300	2800	50	85	70	105	20
BH7	0.08-0.2	F: Sandy Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH8	0-0.1	F: Gravelly Sand	Coarse	7.8	13	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH9	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH9 - [LAB_DUP]	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH10	0-0.2	F: Gravelly Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH11	0-0.1	F: Gravelly Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH12	0.4-0.5	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH13	0.3-0.5	F: Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH13	1.5-1.95	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH14	0.4-0.6	F: Silty Gravelly Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH14	1.0-1.3	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
BH15	0-0.1	F: Gravelly Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH16	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH16 - [LAB_DUP]	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH16	0.4-0.5	F: Silty Clayey Sand	Coarse	8.3	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH17	0-0.1	F: Silty Sand	Coarse	7.5	20	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH18	0.16-0.3	F: Silty Sandy Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH18	1.8-2.1	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH19	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH20	0-0.2	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
SDUP1	BH1 (2.4-2.7m)	Silty clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
SDUP2	BH3 (0.6-0.9m)	F: Silty clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
SDUP3	BH19 (0-0.1m)	F: Silty sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
SDUP4	BH20 (0-0.1m)	F: Silty sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20

TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total PCBs	Total VOCs	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled			C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	0.2/2	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	**	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	**	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	**	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	**	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																										
BH1	0.5-0.95	F: Silty Sand	<4	<0.4	**17**	**25**	**240**	**0.3**	**17**	**150**	**87**	**8**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH1 - [LAB_DUP]	0.5-0.95	F: Silty Sand	<4	<0.4	**14**	**25**	**280**	**0.2**	**17**	**150**	**18**	**1.7**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	**140**	**200**	**340**	<0.2	<0.5	<1	<1	NA
BH1	1.1-1.5	F: Silty Clay	**6**	<0.4	**14**	**7**	**23**	<0.1	**5**	**6**	<0.05	<0.05	NA	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH1	2.4-2.7	Silty Clay	**5**	<0.4	**15**	**8**	**12**	<0.1	**4**	**14**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH2	0.03-0.2	F: Silty Gravelly Sand	<4	<0.4	**11**	**96**	**120**	<0.1	**82**	**790**	**3.6**	**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Detected
BH2	0.5-0.8	F: Silty Clayey Sand	<4	<0.4	**8**	**23**	**1700**	**0.3**	**6**	**36**	**49**	**4.3**	NA	NA	NA	NA	NA	NA	<25	<50	**140**	<100	**140**	<0.2	<0.5	<1	<1	NA
BH3	0.15-0.3	F: Silty Clay	**5**	<0.4	**10**	**21**	**430**	**1.8**	**7**	**98**	**260**	**19**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	**890**	**470**	**1360**	<0.2	<0.5	<1	<1	Not Detected
BH3 - [LAB_DUP]	0.15-0.3	F: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<25	NA	NA	NA	NA	<0.2	<0.5	<1	<1	NA
BH3 - [TRIPLICATE]	0.15-0.3	F: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<25	NA	NA	NA	NA	<0.2	<0.5	<1	<1	NA
BH3	0.6-0.9	F: Silty Clay	**5**	<0.4	**14**	**9**	**51**	**0.2**	**4**	**27**	**6**	**0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH4	0.2-0.5	F: Silty Clay	**4**	<0.4	**15**	**21**	**43**	**0.1**	**6**	**26**	**1.4**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH5	0.18-0.3	F: Sandy Gravel	<4	<0.4	**6**	**49**	**4**	<0.1	**68**	**28**	<0.05	<0.05	NA	NA	NA	NA	NA	NA	<25	**70**	**200**	**630**	**900**	<0.2	<0.5	<1	<1	NA
BH5	0.5-0.95	F: Clayey Sand	<4	<0.4	**14**	**6**	**16**	<0.1	**2**	**12**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	**120**	**120**	<0.2	<0.5	<1	<1	Not Detected
BH6	0.1-0.2	F: Gravel	<4	<0.4	**5**	**44**	**2**	<0.1	**69**	**25**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH7	0.08-0.2	F: Sandy Clay	<4	<0.4	**12**	**17**	**18**	<0.1	**6**	**41**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH8	0-0.1	F: Gravelly Sand	<4	<0.4	**8**	**15**	**31**	<0.1	**14**	**270**	**3.8**	**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	**100**	**100**	<0.2	<0.5	<1	<1	Detected
BH9	0-0.1	F: Silty Sand	<4	<0.4	**11**	**26**	**20**	<0.1	**15**	**95**	**0.72**	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	**150**	**190**	**340**	<0.2	<0.5	<1	<1	Not Detected
BH9 - [LAB_DUP]	0-0.1	F: Silty Sand	<4	<0.4	**10**	**27**	**23**	<0.1	**13**	**99**	**0.5**	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	**170**	**210**	**380**	<0.2	<0.5	<1	<1	NA
BH10	0-0.2	F: Gravelly Sand	<4	<0.4	**7**	**20**	**20**	<0.1	**22**	**52**	**7.1**	**0.62**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	**100**	**100**	<0.2	<0.5	<1	<1	Not Detected
BH11	0-0.1	F: Gravelly Sand	**4**	<0.4	**6**	**22**	**25**	**0.3**	**13**	**93**	**5.1**	**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	**100**	**100**	<0.2	<0.5	<1	<1	Not Detected
BH12	0.4-0.5	F: Silty Clayey Sand	<4	<0.4	**8**	**16**	**28**	<0.1	**13**	**45**	**3.6**	**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH13	0.3-0.5	F: Clayey Sand	<4	<0.4	**99**	**9**	**38**	**0.1**	**4**	**19**	**19**	**1.7**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH13	1.5-1.95	F: Silty Clay	<4	<0.4	**11**	**4**	**13**	<0.1	**3**	**4**	**8.1**	**0.5**	NA	NA	NA	NA	NA	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH14	0.4-0.6	F: Silty Gravelly Clay	**140**	<0.4	**9**	**8**	**42**	**0.2**	**11**	**23**	**13**	**1.2**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH14	1.0-1.3	F: Silty Clayey Sand	<4	<0.4	**5**	**4**	**12**	**0.1**	**3**	**4**	<0.05	<0.05	NA	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH15	0-0.1	F: Gravelly Sand	**8**	<0.4	**12**	**23**	**53**	**0.4**	**10**	**60**	**9.4**	**0.82**	<0.1	<0.1	<0.1	**0.8**	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH16	0-0.1	F: Silty Clayey Sand	<4	<0.4	**11**	**32**	**41**	<0.1	**17**	**120**	**25**	**2.4**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	**470**	**590**	**1060**	<0.2	<0.5	<1	<1	Not Detected
BH16 - [LAB_DUP]	0-0.1	F: Silty Clayey Sand	<4	<0.4	**12**	**34**	**39**	<0.1	**18**	**120**	**6.5**	**0.67**	<0.1	<0.1	<0.1	**0.2**	<0.1	NA	<25	**78**	**550**	**760**	**1388**	<0.2	<0.5	<1	<1	NA
BH16	0.4-0.5	F: Silty Clayey Sand	**4**	<0.4	**11**	**31**	**42**	**0.2**	**25**	**81**	**8.2**	**0.86**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH17	0-0.1	F: Silty Sand	<4	<0.4	**14**	**41**	**54**	<0.1	**12**	**330**	**11**	**0.98**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	**170**	**170**	<0.2	<0.5	<1	<1	Not Detected
BH17	0.8-1.0	F: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH17	1.7-1.95	Silty sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH18	0.16-0.3	F: Silty Sandy Clay	**5**	<0.4	**12**	**19**	**40**	**0.2**	**11**	**40**	**2.7**	**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<25	<50	<100	**160**	**160**	<0.2	<0.5	<1	<1	Not Detected
BH18	1.8-2.1	F: Silty Clay	**7**	<0.4	**21**	**7**	**15**	<0.1	**4**	**16**	<0.05	<0.05	NA	NA	NA	NA	NA	<2	<25	<50	<100	**150**	**150**	<0.2	<0.5	<1	<1	NA
BH19	0-0.1	F: Silty Sand	<4	<0.4	**10**	**16**	**26**	<0.1	**8**	**140**	**0.4**	**0.07**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	**180**	**180**	<0.2	<0.5	<1	<1	Detected
BH20	0-0.2	F: Silty Sand	<4	<0.4	**12**	**12**	**19**	<0.1	**7**	**110**	**0.4**	**0.07**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
SDUP1	BH1 (2.4-2.7m)	Silty clay	<4	<0.4	**12**	**4**	**10**	<0.1	**3**	**6**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP2	BH3 (0.6-0.9m)	F: Silty clay	**4.8**	<0.40	**16**	**9.9**	**83**	**0.99**	**3.9**	**31**	**5.8**	**0.54**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP3	BH19 (0-0.1m)	F: Silty sand	<4	<0.4	**8**	**13**	**23**	<0.1	**7**	**130**	**0.2**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP4	BH20 (0-0.1m)	F: Silty sand	<4.0	<0.40	**8**	**14**	**22**	<0.10	**8.6**	**120**	**2**	**0.21**	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
Total Number of Samples			36	36	36	36	36	36	36	36	36	36	30	30	30	30	30	5	38	36	36	36	36	38	38	38	38	20
Maximum Value			140	<PQL	99	96	1700	1.8	82	790	260	19	<PQL	<PQL	<PQL	0.8	<PQL	<PQL	<PQL	78	890	760	1388	<PQL	<PQL	<PQL	<PQL	Detected
Statistical Analysis on Fill Samples In Building Footprint																												
Number of Fill Samples			NC	NC	NC	NC	**27**	NC	NC	NC	**27**	**27**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Mean Value			NC	NC	NC	NC	**118.8**	NC	NC	NC	**19.4**	**1.60**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Standard Deviation			NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
% UCL			NC	NC	NC	NC	**95**	NC	NC	NC	**95**	**95**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
UCL Value			NC	NC	NC	NC	**191.1**	NC	NC	NC	**41.23**	**4.84**	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Concentration above the CT1 — **VALUE**
Concentration above SCC1 — **VALUE**
Concentration above the SCC2 — **VALUE**
Concentration above PQL — **Bold**
Asbestos Detected > Special Waste (asbestos) — **Detected**

Standard deviation exceeds data assessment criteria — **VALUE**

TABLE S8
SOIL LABORATORY TCLP RESULTS
All data in mg/L unless stated otherwise

			Arsenic	Lead	Nickel	B(a)P
PQL - Envirolab Services			0.05	0.03	0.02	0.001
TCLP1 - General Solid Waste			5	5	2	0.04
TCLP2 - Restricted Solid Waste			20	20	8	0.16
TCLP3 - Hazardous Waste			>20	>20	>8	>0.16
Sample Reference	**Sample Depth**	**Sample Description**				
BH1	0.5-0.95	F: Silty sand	NA	**0.2**	NA	<0.0001
BH2	0.03-0.2	F: Silty Gravelly Sand	NA	**0.1**	**0.1**	NA
BH2 - LAB DUP	0.03-0.2	F: Silty Gravelly Sand	NA	**0.1**	**0.1**	NA
BH2	0.5-0.8	F: Silty Clayey Sand	NA	**0.06**	NA	<0.0001
BH2 - LAB DUP	0.5-0.8	F: Silty Clayey Sand	NA	NA	NA	<0.0001
BH3	0.15-0.3	F: Silty Clay	NA	**0.47**	NA	<0.0001
BH5	0.18-0.3	F: Sandy Gravel	NA	NA	**0.1**	NA
BH6	0.1-0.2	F: Gravel	NA	NA	**0.09**	NA
BH14	0.4-0.6	F: Silty Gravelly Clay	**0.3**	NA	NA	NA
BH16	0-0.1	F: Silty Clayey Sand	NA	NA	NA	<0.0001
Total Number of samples			1	5	4	5
Maximum Value			0.3	0.47	0.1	<PQL

General Solid Waste	**VALUE**
Restricted Solid Waste	**VALUE**
Hazardous Waste	**VALUE**
Concentration above PQL	**Bold**

TABLE Q1
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.05*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	BH1	2.4-2.7	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP1	BH1 (2.4-2.7m)	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH19	0-0.1	<25	<50	160	240	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.2	0.07	<0.1	<0.1	<0.1
laboratory	SDUP3	BH19 (0-0.1m)	<25	<50	<100	130	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	105	185	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.1	0.1	nc	nc	nc	0.0475	nc	nc	nc
	RPD %		nc	nc	105%	59%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	0%	nc	nc	nc	95%	nc	nc	nc
Inter	BH3	0.6-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	0.1	0.1	<0.1	<0.1	0.8	0.2	1.1	1	0.5	0.5	0.8	0.5	0.3	<0.1	0.3
laboratory	SDUP2	BH3 (0.6-0.9m)	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	0.15	<0.10	<0.10	<0.10	0.55	0.15	1	1	0.4	0.44	0.84	0.54	0.37	<0.10	0.31
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	0.125	0.075	nc	nc	0.675	0.175	1.05	1	0.45	0.47	0.82	0.52	0.335	nc	0.305
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	40%	67%	nc	nc	37%	29%	10%	0%	22%	13%	5%	8%	21%	nc	3%
Inter	BH20	0-0.2	<25	<50	<100	120	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.2	0.07	<0.1	<0.1	<0.1
laboratory	SDUP4	BH20 (0-0.1m)	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.10	<0.10	<0.10	<0.10	0.14	<0.10	0.36	0.37	0.13	0.17	0.33	0.21	0.15	<0.10	0.15
duplicate	MEAN		nc	nc	nc	85	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.095	nc	0.28	0.285	0.09	0.11	0.215	0.14	0.1	nc	0.1
	RPD %		nc	nc	nc	82%	nc	nc	nc	nc	nc	nc	nc	nc	nc	95%	nc	57%	60%	89%	109%	107%	100%	100%	nc	100%
Field	TB-S1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
Blank	6/01/25																									
Field	FR-HA	µg/L	17	<50	<100	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1
Rinsate	6/01/25																									
Trip	TS-S1		-	-	-	-	102%	102%	105%	104%	104%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	6/01/25																									

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		*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*
	PQL Envirolab VIC		*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*
Intra	BH1	2.4-2.7	<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
laboratory	SDUP1	BH1 (2.4-2.7m)	<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
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH19	0-0.1	<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
laboratory	SDUP3	BH19 (0-0.1m)	<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
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH3	0.6-0.9	<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
laboratory	SDUP2	BH3 (0.6-0.9m)	<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
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH20	0-0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP4	BH20 (0-0.1m)	<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
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB-S1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blank	6/01/25																					
Field	FR-HA	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rinsate	6/01/25																					
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	6/01/25																					

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*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*	*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*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*	*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra	BH1	2.4-2.7	<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	5	<0.4	15	8	12	<0.1	4	14
laboratory	SDUP1	BH1 (2.4-2.7m)	<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	<4	<0.4	12	4	10	<0.1	3	6
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	3.5	nc	13.5	6	11	nc	3.5	10
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	86%	nc	22%	67%	18%	nc	29%	80%
Intra	BH19	0-0.1	<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	<4	<0.4	10	16	26	<0.1	8	140
laboratory	SDUP3	BH19 (0-0.1m)	<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	<4	<0.4	8	13	23	<0.1	7	130
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	9	14.5	24.5	nc	7.5	135
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	22%	21%	12%	nc	13%	7%
Inter	BH3	0.6-0.9	<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	5	<0.4	14	9	51	0.2	4	27
laboratory	SDUP2	BH3 (0.6-0.9m)	<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	4.8	<0.40	16	9.9	83	0.99	3.9	31
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	4.9	nc	15	9.45	67	0.595	3.95	29
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	4%	nc	13%	10%	48%	133%	3%	14%
Inter	BH20	0-0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<4	<0.4	12	12	19	<0.1	7	110
laboratory	SDUP4	BH20 (0-0.1m)	<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	<4.0	<0.40	8	14	22	<0.10	8.6	120
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	10	13	20.5	nc	7.8	115
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	40%	15%	15%	nc	21%	9%
Field	TB-S1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<0.4	1	<1	<1	<0.1	<1	<1
Blank	6/01/25																						
Field	FR-HA	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.01	<0.01	0.3	<0.03	<0.0005	<0.02	0.04
Rinsate	6/01/25																						
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	6/01/25																						

Result outside of QA/QC acceptance criteria

Rinsate metals results in mg/L

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ADWG: AustralianDrinking Water Guidelines
ANZG Australian and New Zealand Guidelines
B(a)P: Benzo(a)pyrene
CRC: Cooperative Research Centre
ESLs: Ecological Screening Levels
GIL: Groundwater Investigation Levels
HILs: Health Investigation Levels
HSLs: Health Screening Levels
HSL-SSA: Health Screening Level-SiteSpecific Assessment
NA: Not Analysed
NC: Not Calculated
NEPM: National Environmental Protection Measure
NHMRC: National Health and Medical Research Council
NL: Not Limiting
NSL: No Set Limit
OCP: Organochlorine Pesticides
OPP: Organophosphorus Pesticides
PAHs: Polycyclic Aromatic Hydrocarbons
ppm: Parts per million
PCBs: Polychlorinated Biphenyls
PCE: Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
PQL: Practical Quantitation Limit
RS: Rinsate Sample
RSL: Regional Screening Levels
SAC: Site Assessment Criteria
SSA: Site Specific Assessment
SSHSLs Site Specific Health Screening Levels
TB: Trip Blank
TCA: 1,1,1 Trichloroethane (methyl chloroform)
TCE: Trichloroethylene (Trichloroethene)
TS: Trip Spike
TRH: Total Recoverable Hydrocarbons
UCL: Upper Level Confidence Limit on Mean Value
USEPA United States Environmental Protection Agency
VOCC: Volatile Organic Chlorinated Compounds
WHO: World Health Organisation

TABLE G1
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	ANZG 2018 Marine Waters	SAMPLES					
			MW5	MW5 - [LAB_DUP]	MW13	MW17	WDUP1 (MW13)	WDUP2 (MW17)
Inorganic Compounds and Parameters								
pH		7 - 8.5	7.2	7.2	5.9	7	-	-
Electrical Conductivity (µS/cm)	1	NSL	**1500**	**1500**	**1700**	**570**	-	-
Metals and Metalloids								
Arsenic (As III)	1	2.3	**53**	**54**	**1**	**1**	**1**	**1.3**
Cadmium	0.1	0.7	<0.1	<0.1	**0.1**	<0.1	**0.1**	<0.1
Chromium (SAC for Cr III adopted)	1	27	<1	<1	<1	<1	<1	<1.
Copper	1	1.3	**3**	**3**	**1**	<1	**1**	<1
Lead	1	4.4	<1	<1	<1	<1	<1	<1
Total Mercury (inorganic)	0.05	0.1	<0.05	[NT]	<0.05	<0.05	<0.05	<0.050
Nickel	1	7	**15**	**14**	**40**	**2**	**40**	**1.9**
Zinc	1	15	**7**	**6**	**100**	**6**	**100**	**5.4**
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)								
Benzene	1	500	<1	<1	<1	<1	<1	<1
Toluene	1	180	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	5	<1	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2	<2	<2	<2
o-xylene	1	350	<1	<1	<1	<1	<1	<1
Total xylenes	2	NSL	<2	<2	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs								
Dichlorodifluoromethane	10	NSL	<10	<10	<10	<10	<10	<10
Chloromethane	10	NSL	<10	<10	<10	<10	<10	<10
Vinyl Chloride	10	100	<10	<10	<10	<10	<10	<10
Bromomethane	10	NSL	<10	<10	<10	<10	<10	<10
Chloroethane	10	NSL	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	1	700	<1	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	<1	<1	<1	<1	<1
1,1-dichloroethane	1	250	<1	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	<1	<1	<1	<1	<1
Bromochloromethane	1	NSL	<1	<1	<1	<1	<1	<1
Chloroform	1	370	9	8	<1	<1	<1	<1
2,2-dichloropropane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichloroethane	1	1900	<1	<1	<1	<1	<1	<1
1,1,1-trichloroethane	1	270	<1	<1	<1	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1
Cyclohexane	1	NSL	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	1	240	<1	<1	<1	<1	<1	<1
Benzene	1	500	<1	<1	<1	<1	<1	<1
Dibromomethane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichloropropane	1	900	<1	<1	<1	<1	<1	<1
Trichloroethene	1	330	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	NSL	**2**	**2**	<1	<1	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1
1,1,2-trichloroethane	1	1900	<1	<1	<1	<1	<1	<1
Toluene	1	180	<1	<1	<1	<1	<1	<1
1,3-dichloropropane	1	1100	<1	<1	<1	<1	<1	<1
Dibromochloromethane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	<1	<1	<1	<1	<1
Tetrachloroethene	1	70	<1	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1	<1	<1	<1
Chlorobenzene	1	55	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	5	<1	<1	<1	<1	<1	<1
Bromoform	1	NSL	<1	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2	<2	<2	<2
Styrene	1	NSL	<1	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	<1	<1	<1	<1	<1
o-xylene	1	350	<1	<1	<1	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	<1	<1	<1	<1	<1
Isopropylbenzene	1	30	<1	<1	<1	<1	<1	<1
Bromobenzene	1	NSL	<1	<1	<1	<1	<1	<1
n-propyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
2-chlorotoluene	1	NSL	<1	<1	<1	<1	<1	<1
4-chlorotoluene	1	NSL	<1	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,3-dichlorobenzene	1	260	<1	<1	<1	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,4-dichlorobenzene	1	60	<1	<1	<1	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichlorobenzene	1	160	<1	<1	<1	<1	<1	<1
n-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	1	20	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	NSL	<1	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	1	3	<1	<1	<1	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)								
Naphthalene	0.2	50	**0.1**	<0.1	**0.2**	<0.1	**0.2**	<0.1
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	0.6	**0.1**	<0.1	**0.1**	<0.1	**0.2**	<0.1
Anthracene	0.1	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	NSL	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

TABLE G2
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILs
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	SAMPLES					
			MW5	MW5 - [LAB_DUP]	MW13	MW17	WDUP1 (MW13)	WDUP2 (MW17)
Inorganic Compounds and Parameters								
pH		6.5 - 8.5	7.2	7.2	5.9	7	-	-
Electrical Conductivity (µS/cm)	1	NSL	**1500**	**1500**	**1700**	**570**	-	-
Metals and Metalloids								
Arsenic (As III)	1	100	**53**	**54**	**1**	**1**	**1**	**1.3**
Cadmium	0.1	20	<0.1	<0.1	**0.1**	<0.1	**0.1**	<0.1
Chromium (total)	1	500	<1	<1	<1	<1	<1	<1.
Copper	1	20000	**3**	**3**	**1**	<1	**1**	<1
Lead	1	100	<1	<1	<1	<1	<1	<1
Total Mercury (inorganic)	0.05	10	<0.05	[NT]	<0.05	<0.05	<0.05	<0.050
Nickel	1	200	**15**	**14**	**40**	**2**	**40**	**1.9**
Zinc	1	30000	**7**	**6**	**100**	**6**	**100**	**5.4**
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)								
Benzene	1	10	<1	<1	<1	<1	<1	<1
Toluene	1	8000	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	3000	<1	<1	<1	<1	<1	<1
m+p-xylene	2	NSL	<2	<2	<2	<2	<2	<2
o-xylene	1	NSL	<1	<1	<1	<1	<1	<1
Total xylenes	2	6000	<2	<2	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs								
Dichlorodifluoromethane	10	NSL	<10	<10	<10	<10	<10	<10
Chloromethane	10	NSL	<10	<10	<10	<10	<10	<10
Vinyl Chloride	10	3	<10	<10	<10	<10	<10	<10
Bromomethane	10	NSL	<10	<10	<10	<10	<10	<10
Chloroethane	10	NSL	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	1	300	<1	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	1	600	<1	<1	<1	<1	<1	<1
1,1-dichloroethane	1	NSL	<1	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	1	600	<1	<1	<1	<1	<1	<1
Bromochloromethane	1	2500	<1	<1	<1	<1	<1	<1
Chloroform	1		**9**	**8**	<1	<1	<1	<1
2,2-dichloropropane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichloroethane	1	30	<1	<1	<1	<1	<1	<1
1,1,1-trichloroethane	1	NSL	<1	<1	<1	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1
Cyclohexane	1	NSL	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	1	30	<1	<1	<1	<1	<1	<1
Benzene	1	10	<1	<1	<1	<1	<1	<1
Dibromomethane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichloropropane	1	NSL	<1	<1	<1	<1	<1	<1
Trichloroethene	1	NSL	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	NSL	**2**	**2**	<1	<1	<1	<1
trans-1,3-dichloropropene	1	1000	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	1	1000	<1	<1	<1	<1	<1	<1
1,1,2-trichloroethane	1	NSL	<1	<1	<1	<1	<1	<1
Toluene	1	8000	<1	<1	<1	<1	<1	<1
1,3-dichloropropane	1	NSL	<1	<1	<1	<1	<1	<1
Dibromochloromethane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	<1	<1	<1	<1	<1
Tetrachloroethene	1	500	<1	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1	<1	<1	<1
Chlorobenzene	1	3000	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	3000	<1	<1	<1	<1	<1	<1
Bromoform	1	NSL	<1	<1	<1	<1	<1	<1
m+p-xylene	2	NSL	<2	<2	<2	<2	<2	<2
Styrene	1	300	<1	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	1	NSL	<1	<1	<1	<1	<1	<1
o-xylene	1	NSL	<1	<1	<1	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	<1	<1	<1	<1	<1
Isopropylbenzene	1	NSL	<1	<1	<1	<1	<1	<1
Bromobenzene	1	NSL	<1	<1	<1	<1	<1	<1
n-propyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
2-chlorotoluene	1	NSL	<1	<1	<1	<1	<1	<1
4-chlorotoluene	1	NSL	<1	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,3-dichlorobenzene	1	200	<1	<1	<1	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,4-dichlorobenzene	1	400	<1	<1	<1	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichlorobenzene	1	15000	<1	<1	<1	<1	<1	<1
n-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	1	300	<1	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	1		<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	7	<1	<1	<1	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)								
Naphthalene	0.2	NSL	**0.1**	<0.1	**0.2**	<0.1	**0.2**	<0.1
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	NSL	**0.1**	<0.1	**0.1**	<0.1	**0.2**	<0.1
Anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	NSL	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — Red

TABLE G3
GROUNDWATER LABORATORY RESULTS COMPARED TO HSLs
All data in µg/L unless stated otherwise

				C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	
PQL - Envirolab Services				10	50	1	1	1	2	1	PID
NEPM 2013 - Land Use Category				HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Water Depth**	**Depth Category**	**Soil Category**								
MW5	6.3	2m to <4m	Sand	<10	**260**	<1	<1	<1	<2	<1	7.1
MW5 - [LAB_DUP]	6.3	2m to <4m	Sand	<10	**200**	<1	<1	<1	<2	<1	7,1
MW13	3.78	2m to <4m	Sand	<10	<50	<1	<1	<1	<2	<1	5.1
MW17	2.7	2m to <4m	Sand	<10	<50	<1	<1	<1	<2	<1	0.3
WDUP1 (MW13)	3.78	2m to <4m	Sand	<10	<50	<1	<1	<1	<2	<1	-
WDUP2 (MW17)	2.7	2m to <4m	Sand	<10	<100	<1	<1	<1	<2	<1	-
Total Number of Samples				6	6	6	6	6	6	6	4
Maximum Value				<PQL	260	<PQL	<PQL	<PQL	<PQL	<PQL	7.1

Concentration above the SAC — **VALUE**
Site specific assesment (SSA) required — **VALUE**
Concentration above the PQL — **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the Groundwater Assessment Criteria Table below

HSL GROUNDWATER ASSESSMENT CRITERIA

Sample Reference	**Water Depth**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
MW5	6.3	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
MW5 - [LAB_DUP]	6.3	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
MW13	3.78	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
MW17	2.7	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
WDUP1 (MW13)	3.78	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
WDUP2 (MW17)	2.7	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL

TABLE Q2
GROUNDWATER QA/QC SUMMARY

		Dichlorodifluoromethane	Chloromethane	Vinyl Chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Trans-1,2-dichloroethene	1,1-dichloroethane	Cis-1,2-dichloroethene	Bromochloromethane	Chloroform	2,2-dichloropropane	1,2-dichloroethane	1,1,1-trichloroethane	1,1-dichloropropene	Cyclohexane	Carbon tetrachloride	Benzene	Dibromomethane	1,2-dichloropropane	Trichloroethene	Bromodichloromethane	trans-1,3-dichloropropene	cis-1,3-dichloropropene	1,1,2-trichloroethane	Toluene	1,3-dichloropropane	Dibromochloromethane
	PQL Envirolab SYD	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW13	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP1 (MW13)	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	MW17	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP2 (MW17)	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc

		1,2-dibromoethane	Tetrachloroethene	1,1,1,2-tetrachloroethane	Chlorobenzene	Ethylbenzene	Bromoform	m+p-xylene	Styrene	1,1,2,2-tetrachloroethane	o-xylene	1,2,3-trichloropropane	Isopropylbenzene	Bromobenzene	n-propyl benzene	2-chlorotoluene	4-chlorotoluene	1,3,5-trimethyl benzene	Tert-butyl benzene	1,2,4-trimethyl benzene	1,3-dichlorobenzene	Sec-butyl benzene	1,4-dichlorobenzene	4-isopropyl toluene	1,2-dichlorobenzene	n-butyl benzene	1,2-dibromo-3-chloropropane	1,2,4-trichlorobenzene	Hexachlorobutadiene	1,2,3-trichlorobenzene
	PQL Envirolab SYD	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW13	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP1 (MW13)	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	MW17	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP2 (MW17)	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc

		TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD	*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
	PQL Envirolab VIC	*10*	*50*	*100*	*100*	*1.0*	*1.0*	*1.0*	*2.0*	*1.0*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
Intra	MW13	<10	<50	<100	<100	<1	<1	<1	<2	<1	0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	0.1	<1	1	<1	<0.05	40	100
laboratory	WDUP1 (MW13)	<10	<50	<100	<100	<1	<1	<1	<2	<1	0.2	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	0.1	<1	1	<1	<0.05	40	100
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.2	nc	nc	nc	0.15	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1	0.1	nc	1	nc	nc	40	100
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	nc	nc	67%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	0%	nc	0%	nc	nc	0%	0%
Inter	MW17	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	<0.1	<1	<1	<1	<0.05	2	6
laboratory	WDUP2 (MW17)	<10	<100	<200	<200	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<1.	<1	<1	<0.050	1.9	5.4
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1.15	nc	nc	nc	nc	nc	1.95	5.7
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	26%	nc	nc	nc	nc	nc	5%	11%
Field	TB-W1	<10	<50	160	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	1	<1	<0.05	1	16
Blank	9/01/2025																																
Trip	TS-W1	-	-	-	-	83%	100%	102%	97%	110%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Spike	9/01/2025																																

Result outside of QA/QC acceptance criteria — Value

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

CT:	Contaminant Threshold
FTS:	Fluorotelomer sulfonic acid
NA:	Not Analysed
NC:	Not Calculated
NEMP	National Environmental Management Plan
NSL:	No Set Limit
PFAS	Per- and polyfluoroalkyl substances
PFHxS	Perfluorohexanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
TB:	Trip Blank
TCLP:	Toxicity Characteristics Leaching Procedure
TS:	Trip Spike
UCL:	Upper Level Confidence Limit on Mean Value

Table Specific Explanations:

Groundwater Ecology Tables:

- 95% refers to a concentration that has been derived to protect 95% of aquatic species
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

Waste Classification and TCLP Table:

- Data assessed using the Addendum to the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014) -October 2016

TABLE P1
SUMMARY OF PFAS CONCENTRATIONS IN SOIL - ECOLOGY
Units are µg/Kg unless stated otherwise.

	PQL Envirolab Services	NEMP 2020 Indirect exposure All land use	BH17 0.8-1.0 F: Silty Clay	BH17 0.8-1.0 LAB DUP	BH17 1.7-1.95 Silty Sand	BH18 0.16-0.3 F: Silty Sandy Clay	BH18 1.8-2.1 F: Silty Clay
PFAS Compound							
Perfluorobutanesulfonic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	0.1	10	**0.5**	**0.5**	**0.6**	<0.1	<0.1
Perfluorooctanoic acid PFOA	0.1	NSL	**0.4**	**0.4**	**1.2**	<0.1	<0.1
6:2 FTS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
8:2 FTS	0.1	NSL	<0.2	<0.2	<0.2	<0.2	<0.2
Total Positive PFHxS & PFOS	0.1	NSL	**0.5**	**0.5**	**0.6**	<0.1	<0.1
Total Positive PFOS & PFOA	0.1	NSL	**0.9**	**0.9**	**1.8**	<0.1	<0.1
Total Positive PFAS	0.1	NSL	**0.9**	**0.9**	**1.8**	<0.1	<0.1

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

TABLE P2
SUMMARY OF PFAS CONCENTRATIONS IN SOIL - HUMAN HEALTH
Units are µg/Kg unless stated otherwise.

	PQL Envirolab Services	NEMP 2020 Industrial/ Commercial	BH17 0.8-1.0 F: Silty Clay	BH17 0.8-1.0 LAB DUP	BH17 1.7-1.95 Silty Sand	BH18 0.16-0.3 F: Silty Sandy Clay	BH18 1.8-2.1 F: Silty Clay
PFAS Compound							
Perfluorobutanesulfonic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	0.1	NSL	**0.5**	**0.5**	**0.6**	<0.1	<0.1
Perfluorooctanoic acid PFOA	0.1	50,000	**0.4**	**0.4**	**1.2**	<0.1	<0.1
6:2 FTS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
8:2 FTS	0.1	NSL	<0.2	<0.2	<0.2	<0.2	<0.2
Total Positive PFHxS & PFOS	0.1	20,000	**0.5**	**0.5**	**0.6**	<0.1	<0.1
Total Positive PFOS & PFOA	0.1	NSL	**0.9**	**0.9**	**1.8**	<0.1	<0.1
Total Positive PFAS	0.1	NSL	**0.9**	**0.9**	**1.8**	<0.1	<0.1

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

TABLE P3
SUMMARY OF PFAS CONCENTRATIONS IN SOIL - WASTE CLASSIFICATION
Units are µg/Kg unless stated otherwise.

	PQL Envirolab Services	SCC1	SCC2	BH17 0.8-1.0 F: Silty Clay	BH17 0.8-1.0 LAB DUP	BH17 1.7-1.95 Silty Sand	BH18 0.16-0.3 F: Silty Sandy Clay	BH18 1.8-2.1 F: Silty Clay
PFAS Compound								
Perfluorobutanesulfonic acid	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	0.1	NSL	NSL	**0.5**	**0.5**	**0.6**	<0.1	<0.1
Perfluorooctanoic acid PFOA	0.1	18,000	72,000	**0.4**	**0.4**	**1.2**	<0.1	<0.1
6:2 FTS	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
8:2 FTS	0.1	NSL	NSL	<0.2	<0.2	<0.2	<0.2	<0.2
Total Positive PFHxS & PFOS	0.1	1800	7,200	**0.5**	**0.5**	**0.6**	<0.1	<0.1
Total Positive PFOS & PFOA	0.1	NSL	NSL	**0.9**	**0.9**	**1.8**	<0.1	<0.1
Total Positive PFAS	0.1	NSL	NSL	**0.9**	**0.9**	**1.8**	<0.1	<0.1

Result above SCC1 Criteria **Bold**
Result above SCC2 Criteria **Bold**

TABLE P4
SUMMARY OF PFAS CONCENTRATIONS IN TCLP LEACHATE - WASTE CLASSIFICATION
Units are µg/L unless stated otherwise.

	PQL Envirolab Services	TCLP1	TCLP2	BH17 0.8-1.0 F: Silty Clay	BH17 1.7-1.95 Silty Sand	BH18 0.16-0.3 F: Silty Sandy Clay	BH18 1.8-2.1 F: Silty Clay
PFAS Compound							
Perfluorobutanesulfonic acid	0.01	NSL	NSL	<0.01	<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	0.01	NSL	NSL	<0.01	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	0.01	NSL	NSL	<0.01	<0.01	<0.01	<0.01
Perfluorooctanoic acid PFOA	0.01	500	2,000	**0.01**	**0.03**	<0.01	<0.01
6:2 FTS	0.01	NSL	NSL	<0.01	<0.01	<0.01	<0.01
8:2 FTS	0.02	NSL	NSL	<0.02	<0.02	<0.02	<0.02
Total Positive PFHxS & PFOS	0.01	50	200	<0.01	<0.01	<0.01	<0.01
Total Positive PFOS & PFOA	0.01	NSL	NSL	**0.01**	**0.03**	<0.01	<0.01
Total Positive PFAS	0.01	NSL	NSL	**0.01**	**0.03**	<0.01	<0.01

Result above TCLP1 Criteria **Bold**
Result above TCLP2 Criteria **Bold**

TABLE P5
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - ECOLOGY
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2018 Interim 95% Marine	SAMPLES				
			MW5	MW13	MW17	WDUP1 (MW13)	WDUP2 (MW17)
PFAS Compound							
Perfluorobutanesulfonic acid	0.1	NSL	**0.003**	**0.01**	**0.012**	**0.01**	**0.011**
Perfluoropentanesulfonic acid	0.1	NSL	<0.001	<0.001	**0.002**	<0.001	**0.0018**
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	**0.001**	**0.0031**	**0.02**	**0.0032**	**0.02**
Perfluoroheptanesulfonic acid	0.1	NSL	<0.001	<0.001	**0.002**	<0.001	**0.0022**
Perfluorooctanesulfonic acid PFOS	0.1	0.13	**0.0004**	**0.001**	**0.067**	**0.0009**	**0.08**
Perfluorodecanesulfonic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	0.2	NSL	<0.02	<0.02	**0.26**	<0.02	**0.25**
Perfluoropentanoic acid	0.2	NSL	**0.01**	<0.004	**1.2**	<0.004	**1.1**
Perfluorohexanoic acid	0.1	NSL	**0.018**	**0.002**	**1.9**	**0.002**	**1.8**
Perfluoroheptanoic acid	0.1	NSL	**0.003**	**0.0008**	**0.37**	**0.0009**	**0.37**
Perfluorooctanoic acid PFOA	0.1	220	**0.0037**	**0.002**	**0.35**	**0.002**	**0.34**
Perfluorononanoic acid	0.1	NSL	<0.001	<0.001	**0.042**	<0.001	**0.05**
Perfluorodecanoic acid	0.5	NSL	<0.002	<0.002	**0.17**	<0.002	**0.16**
Perfluoroundecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	0.5	NSL	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	0.5	NSL	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	5	NSL	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	0.1	NSL	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	0.1	NSL	**0.028**	<0.0004	<0.0004	<0.0004	**0.0004**
8:2 FTS	0.1	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	0.1	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	1	NSL	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	1	NSL	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	1	NSL	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
Total Positive PFHxS & PFOS	0.1	NSL	**0.002**	**0.0041**	**0.087**	**0.0041**	**0.1**
Total Positive PFOS & PFOA	0.1	NSL	**0.0041**	**0.0026**	**0.41**	**0.0025**	**0.42**
Total Positive PFAS	0.1	NSL	**0.072**	**0.019**	**4.4**	**0.019**	**4.2**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

TABLE P6
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - HUMAN HEALTH
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2020 Recreational	SAMPLES				
			MW5	MW13	MW17	WDUP1 (MW13)	WDUP2 (MW17)
PFAS Compound							
Perfluorobutanesulfonic acid	0.1	NSL	**0.003**	**0.01**	**0.012**	**0.01**	**0.011**
Perfluoropentanesulfonic acid	0.1	NSL	<0.001	<0.001	**0.002**	<0.001	**0.0018**
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	**0.001**	**0.0031**	**0.02**	**0.0032**	**0.02**
Perfluoroheptanesulfonic acid	0.1	NSL	<0.001	<0.001	**0.002**	<0.001	**0.0022**
Perfluorooctanesulfonic acid PFOS	0.1	NSL	**0.0004**	**0.001**	**0.067**	**0.0009**	**0.08**
Perfluorodecanesulfonic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	0.2	NSL	<0.02	<0.02	**0.26**	<0.02	**0.25**
Perfluoropentanoic acid	0.2	NSL	**0.01**	<0.004	**1.2**	<0.004	**1.1**
Perfluorohexanoic acid	0.1	NSL	**0.018**	**0.002**	**1.9**	**0.002**	**1.8**
Perfluoroheptanoic acid	0.1	NSL	**0.003**	**0.0008**	**0.37**	**0.0009**	**0.37**
Perfluorooctanoic acid PFOA	0.1	10	**0.0037**	**0.002**	**0.35**	**0.002**	**0.34**
Perfluorononanoic acid	0.1	NSL	<0.001	<0.001	**0.042**	<0.001	**0.05**
Perfluorodecanoic acid	0.5	NSL	<0.002	<0.002	**0.17**	<0.002	**0.16**
Perfluoroundecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	0.5	NSL	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	0.5	NSL	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	5	NSL	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	0.1	NSL	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	0.1	NSL	**0.028**	<0.0004	<0.0004	<0.0004	**0.0004**
8:2 FTS	0.1	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	0.1	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	1	NSL	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	1	NSL	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	1	NSL	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002
Total Positive PFHxS & PFOS	0.1	2	**0.002**	**0.0041**	**0.087**	**0.0041**	**0.1**
Total Positive PFOS & PFOA	0.1	NSL	**0.0041**	**0.0026**	**0.41**	**0.0025**	**0.42**
Total Positive PFAS	0.1	NSL	**0.072**	**0.019**	**4.4**	**0.019**	**4.2**

Positive PFAS result	**Bold**
PFAS result above the SAC	**Bold**

TABLE Q3
SUMMARY OF PFAS FIELD QA/QC IN GROUNDWATER
Units are µg/L unless stated otherwise.

		Perfluorobutanesulfonic acid	Perfluoropentanesulfonic acid	Perfluorohexanesulfonic acid - PFHxS	Perfluoroheptanesulfonic acid	Perfluorooctanesulfonic acid PFOS	Perfluorodecanesulfonic acid	Perfluorobutanoic acid	Perfluoropentanoic acid	Perfluorohexanoic acid	Perfluoroheptanoic acid	Perfluorooctanoic acid PFOA	Perfluorononanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctanesulfon amide	N-Me perfluorooctanesulfonamid oethanol	N-Et perfluorooctanesulfonamid oethanol	MePerfluorooctanesulf-amid oacetic acid	EtPerfluorooctanesulf-amid oacetic acid	Total Positive PFHxS & PFOS	Total Positive PFOS & PFOA	Total Positive PFAS
PQL Envirolab		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.5*	*0.5*	*0.5*	*0.5*	*5*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*1*	*1*	*1*	*5*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.5*	*0.5*	*0.5*	*0.5*	*5*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*1*	*1*	*1*	*5*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	MW13	0.01	<0.001	0.0031	<0.001	0.001	<0.002	<0.02	<0.004	0.002	0.0008	0.002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.0041	0.0026	0.019
	WDUP1 (MW13)	0.01	<0.001	0.0032	<0.001	0.0009	<0.002	<0.02	<0.004	0.002	0.0009	0.002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.0041	0.0025	0.019
	MEAN	0.01	nc	0.0032	nc	0.001	nc	nc	nc	0.002	0.0009	0.002	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.0041	0.0026	0.019
	RPD %	0%	nc	3%	nc	11%	nc	nc	nc	0%	12%	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	4%	0%
Inter laboratory duplicate	MW17	0.012	0.002	0.02	0.002	0.067	<0.002	0.26	1.2	1.9	0.37	0.35	0.042	0.17	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.087	0.41	4.4
	WDUP2 (MW17)	0.011	0.0018	0.02	0.0022	0.08	<0.002	0.25	1.1	1.8	0.37	0.34	0.05	0.16	<0.002	<0.005	<0.01	<0.05	<0.001	0.0004	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.1	0.42	4.2
	MEAN	0.0115	0.0019	0.02	0.0021	0.0735	nc	0.255	1.15	1.85	0.37	0.345	0.046	0.165	nc	nc	nc	nc	nc	0.0252	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.0935	0.415	4.3
	RPD %	9%	11%	0%	10%	18%	nc	4%	9%	5%	0%	3%	17%	6%	nc	nc	nc	nc	nc	197%	nc	nc	nc	nc	nc	nc	nc	nc	nc	14%	2%	5%
Field Blank	TB-W1 9/01/2025	<0.01	-	<0.01	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	<0.01	<0.02	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01

Result outside of QA/QC acceptance criteria Value

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

NA: Not Analysed
NC: Not Calculated
NEPM: National Environmental Protection Measure
NSL: No Set Limit
ppm: Parts per million
PCE: Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
PQL: Practical Quantitation Limit
RPD: Relative Percentage Difference
RSL: Regional Screening Levels
SAC: Site Assessment Criteria
TCA: 1,1,1 Trichloroethane (methyl chloroform)
TCE: Trichloroethylene (Trichloroethene)
TRH: Total Recoverable Hydrocarbons
USEPA: United States Environmental Protection Agency
VOC: Volatile Organic Compounds

TABLE SV1
SOIL VAPOUR LABORATORY RESULTS COMPARED TO INTERIM HILs FOR VOCC
All data in ug/m^3 unless stated otherwise

				SV1	SV2	SVDUP1	SVDUP1 [LAB_DUP]
Land Use				**Commercial/Industrial**			
Compound	**PQL**	**NEPM 2013 Site Assessment Criteria (SAC)**	**USEPA****				
Total Recoverable Hydrocarbons (TRH)							
TRH F1	200	680000	See NEPM	<200	<200	<200	<200
TRH F2	40	500000	See NEPM	**490**	**950**	**470**	**490**
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)							
Benzene	1.6	4000	See NEPM	**6**	<8	**5**	**6**
Toluene	1.9	4800000	See NEPM	**43**	**130**	**41**	**43**
Ethylbenzene	2.2	1300000	See NEPM	**400**	**3100**	**410**	**400**
Xylenes	4.3	840000	See NEPM	**710**	**3280**	**720**	**710**
Polycyclic Aromatic Hydrocarbons (PAHs)							
Naphthalene	2.6	3000	See NEPM	**20**	**30**	**20**	**20**
Volatile Organic Compounds (VOCs) (NEPM 2013)							
Trichloroethene	2.7	80	See NEPM	<5.4	<13.5	<5.4	<5.4
1,1,1-Trichloroethane	2.7	230000	See NEPM	<5.4	<13.5	<5.4	<5.4
Tetrachloroethene	3.4	8000	See NEPM	**10**	**42**	**10**	**10**
cis-1,2-Dichloroethene	2	30	See NEPM	<4	<10	<4	<4
Vinyl chloride	1.3	100	See NEPM	<2.6	<6.5	<2.6	<2.6
Other VOCs							
Propylene	0.9	See USEPA	438000	**100**	**110**	**110**	**110**
Ethanol	9	See USEPA	NSL	**30**	<45	**20**	**30**
Acetone	11.9	See USEPA	NSL	**50**	<59.5	**40**	**40**
Isopropyl Alcohol	12	See USEPA	29200	**930**	**220**	**220**	**220**
Carbon Disulfide	16	See USEPA	102000	<32	**160**	<32	<32
Hexane	1.8	See USEPA	102000	**100**	**46**	**51**	**51**
Chloroform	2.4	See USEPA	178	**370**	**220**	**370**	**370**
Cyclohexane	1.7	See USEPA	876000	**4**	**10**	**4**	**4**
Heptane	2	See USEPA	58400	**20**	**35**	**20**	**20**
Bromodichloromethane	3.4	See USEPA	110	**46**	**30**	**46**	**47**
4-ethyl toluene	2.5	See USEPA	NSL	<5	**180**	<5	<5
1,3,5-Trimethylbenzene	2.5	See USEPA	8760	**130**	**590**	**130**	**120**
1,2,4-Trimethylbenzene	2.5	See USEPA	8760	**32**	**49**	**33**	**33**
1,4-Dichlorobenzene	3	See USEPA	372	**58**	**43**	**56**	**56**

Concentration above the SAC **VALUE**
Concentration above PQL **Bold**
** Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-05 or THQ=1)
# VOC data has only been tabulated for key NEPM compounds and compounds that were above the PQLs

TABLE Q4
SOIL VAPOUR QA/QC SUMMARY
All results in µg/m3 unless stated otherwise.

	Intra-laboratory Duplicate		
	SV1	SVDUP1	RPD %
Total Recoverable Hydrocarbons (TRH)			
TRH F1	<200	<200	nc
TRH F2	**490**	**470**	4
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)			
Benzene	**6**	**5**	18
Toluene	**43**	**41**	5
Ethylbenzene	**400**	**410**	2
Xylenes	**710**	**720**	1
Polycyclic Aromatic Hydrocarbons (PAHs)			
Naphthalene	**20**	**20**	0
Volatile Organic Compounds (VOCs), including chlorinated VOCs#			
Trichloroethene	<5.4	<5.4	nc
1,1,1-Trichloroethane	<5.4	<5.4	nc
Tetrachloroethene	**10**	**10**	0
cis-1,2-Dichloroethene	<4	<4	nc
Vinyl chloride	<2.6	<2.6	nc
Propylene	**100**	**110**	10
Ethanol	**30**	**20**	40
Acetone	**50**	**40**	22
Isopropyl Alcohol	**930**	**220**	123
Carbon Disulfide	<32	<32	nc
Hexane	**100**	**51**	65
Chloroform	**370**	**370**	0
Cyclohexane	**4**	**4**	0
Heptane	**20**	**20**	0
Bromodichloromethane	**46**	**46**	0
4-ethyl toluene	<5	<5	nc
1,3,5-Trimethylbenzene	**130**	**130**	0
1,2,4-Trimethylbenzene	**32**	**33**	3
1,4-Dichlorobenzene	**58**	**56**	4

Exceedance of QA/QC criteria — Value

** Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-05 or THQ=1)
# VOC data has only been tabulated for compounds that were above the PQLs

Shroud Leak Test		Isopropanol (Shroud) - from SV1
Isopropanol (ug/m3) in carbon tube (shroud)		520,000
SV1		930
SV2		220
SVDUP1		220
SVDUP1 [LAB_DUP]		220

Result outside of QA/QC acceptance criteria — Value

Borehole Logs

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH1 1/1

SDUP1: 2.4-2.7m

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** PUSH TUBE **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0		-	ASPHALTIC CONCRETE: 30mm.t				
	■		■		■					FILL: Silty gravelly sand, fine to medium grained, dark grey, fine to coarse grained igneous gravel, sub-angular.	D			SCREEN: 3.23kg (<10L) 0.03-0.4m, NO FCF
	■		■		■					FILL: Silty sand, fine to medium grained, brown, trace of igneous gravel.	D			SCREEN: 7.14kg (<10L) 0.4-0.95m, NO FCF
	■		■		■		1			FILL: Silty clay, low to medium plasticity, light brown, trace of ironstone and igneous gravel and ash.	w<PL			SCREEN: 7.92kg (<10L) 0.95-1.6m, NO FCF
	■		■		■				CL-CI	Silty CLAY: low to medium plasticity, orange brown.	w<PL			SCREEN: 9.03kg (<10L) 1.6-2.0m, NO FCF ALLUVIAL
							2							
							3			END OF BOREHOLE AT 3.0m				
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH2** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351

Location: -353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** PUSH TUBE **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0		-	ASPHALTIC CONCRETE: 30mm.t	D			SCREEN: 2.98kg (<10L) 0.03-0.2m, NO FCF
	■		■		■					FILL: Silty gravelly sand, fine to medium grained, dark brown, fine to coarse grained igneous gravel, sub-angular.	D			CREOSOTE TYPE ODOUR
										FILL: Silty clayey sand, fine to medium grained, brown, trace of igneous, ironstone and concrete fragments.				SCREEN: 4.73kg (<10L) 0.2-0.8m, NO FCF
							1			END OF BOREHOLE AT 0.8m				PUSH TUBE AND AUGER REFUSAL ON INFERRED CONCRETE SLAB
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH3 **1/1**

SDUP2: 0.6-0.9m

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** PUSH TUBE **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			ASPHALTIC CONCRETE: 150mm.t				
	■		■		■				-	FILL: Silty clay, low to medium plasticity, brown, trace of sand, igneous gravel and ash.	w<PL			SCREEN: 4.52kg (<10L) 0.15-0.3m, NO FCF
	■		■		■									SCREEN: 5.61kg (<10L) 0.3-0.9m, NO FCF
	■				■		1			FILL: Silty clay, low to medium plasticity, brown, trace of igneous gravel.	w<PL			SCREEN: 2.94kg (<10L) 0.9-1.2m, NO FCF
	■		■						CL-CI	Silty sandy CLAY: low to medium plasticity, red brown.	w<PL			ALLUVIAL
							2			END OF BOREHOLE AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH4** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** PUSH TUBE **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0		-	ASPHALTIC CONCRETE: 50mm.t	D			INSUFFICIENT RETURN FOR BULK SCREEN
										FILL: Silty gravelly sand, fine to medium grained, grey brown, igneous gravel and concrete fragments, trace of metal wire.	w<PL			SCREEN: 2.42kg (<10L) 0.15-1.1m, NO FCF
							1			FILL: Silty clay, low to medium plasticity, red brown, trace of igneous and ironstone gravel, concrete and glass fragments and ash.	D			SCREEN: 4.87kg (<10L) 1.1-1.7m, NO FCF
										FILL: Silty sand, fine to medium grained, brown, trace of igneous gravel and glass fragments.				
							2		SM	Silty SAND: fine to medium grained, red brown.	D			ALLUVIAL
							3			END OF BOREHOLE AT 3.0m				
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH/MW5** **1/2**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			CONCRETE: 180mm.t				
									-	FILL: Sandy gravel, fine to coarse grained, igneous, grey, fine to medium grained sand, trace of root fibres.	M			INSUFFICIENT RETURN FOR BULK SCREEN
						N = 25 15,14,11				FILL: Clayey sand, fine to medium grained, orange brown and brown, trace of igneous gravel, concrete and glass fragments and ash.	M			SCREEN: 8.70kg (<10L) 0.3-1.1m, NO FCF
							1			FILL: Silty clayey sand, fine grained, brown, trace of igneous gravel.	M			CREOSOTE TYPE ODOUR
						N = 4 2,2,2								SCREEN: 5.4kg (<10L) 1.1-2.0m, NO FCF
							2		SC	Clayey SAND: fine to medium grained, brown, trace of quartz gravel.				ALLUVIAL
						N = 9 3,4,5	3							
							4							
						N = 19 3,8,11			-	Extremely Weathered sandstone: sandy CLAY, medium to high plasticity, grey.	XW			HAWKESBURY SANDSTONE
							5			SANDSTONE: fine to medium grained, grey.	DW			HIGH 'TC' BIT RESISTANCE
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH/MW5** **2/2**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351-

Location: 353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
										SANDSTONE: fine to medium grained, grey.	DW			
							8			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 8.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 8.0m TO 2.2m. CASING 2.2m TO 0m. 2mm SAND FILTER PACK 8.0m TO 2.0m. BENTONITE SEAL 2.0m TO 1.7m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH6** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351-

Location: 353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■				0		-	CONCRETE: 100mm.t				
									CI-CH	FILL: Gravel, fine to coarse grained, sub-angular igneous, grey, trace of sand.	M w≈PL			INSUFFICIENT RETURN FOR BULK SCREEN
	■		■							Silty CLAY: medium to high plasticity, red brown, trace of sand.				ALLUVIAL
										END OF BOREHOLE AT 0.6m				
							1							
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **BH7** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351

Location: -353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■				0		-	CONCRETE: 80mm.t				
										FILL: Sandy clay, low to medium plasticity, grey and light brown, fine to medium grained sand, trace of sandstone gravel.	w<PL			INSUFFICIENT RETURN FOR BULK SCREEN
	■		■						CI-CH		w≈PL			ALLUVIAL
										Silty CLAY: medium to high plasticity, red brown mottled yellow.				
							1			END OF BOREHOLE AT 0.75m				
							2							
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH8** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■				0			FILL: Gravelly sand, fine to medium grained, grey and brown, fine to coarse grained, sub-angular igneous gravel, trace of concrete fragments.				LEAF COVER
										END OF BOREHOLE AT 0.2m				INSUFFICIENT RETURN FOR BULK SCREEN
							1							HAND AUGER REFUSAL ON OBSTRUCTIONS IN FILL
							2							
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH9** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351-

Location: 353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty sand, fine to medium grained, dark brown, trace of igneous gravel, glass fragments, wood chips, roots and root fibres.	D			MULCH COVER
											D			SCREEN: 10.17kg 0-0.1m, NO FCF
	■		■		■					FILL: Silty gravelly sand, fine to medium grained, brown, igneous and sandstone gravel, trace of root fibres.	w<PL			SCREEN: 6.36kg (<10L) 0.1-0.65m, NO FCF
							1			FILL: Silty clay, low to medium plasticity, brown, with sand and igneous and sandstone gravel, trace of glass fragments.				INSUFFICIENT RETURN FOR BULK SCREEN
	■		■		■					END OF BOREHOLE AT 0.75m				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
							2							
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH10** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		■		0			FILL: Gravelly sand, fine to medium grained, grey and brown, fine to coarse grained, sub-angular igneous gravel, trace of cardboard and concrete fragments, and bark.	D			SCREEN: 7.02kg (<10L) 0-0.2m, NO FCF
										END OF BOREHOLE AT 0.2m				HAND AUGER REFUSAL ON OBSTRUCTIONS IN FILL
							1							
							2							
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH11** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■				0	XXXX		FILL: Gravelly sand, fine to medium grained, grey, fine to coarse grained, sub-angular igneous gravel, trace of concrete fragments.	D			INSUFFICIENT RETURN FOR BULK SCREEN
										END OF BOREHOLE AT 0.1m				HAND AUGER REFUSAL ON OBSTRUCTIONS IN FILL
							1							
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH12** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty sand, fine to medium grained, brown, trace of bark, roots and root fibres.	M			LEAF LITTER COVER
											M			INSUFFICIENT RETURN FOR BULK SCREEN
										FILL: Silty clayey sand, fine to medium grained, brown, trace of igneous and sandstone gravel, concrete fragments and root fibres.				SCREEN: 3.47kg (<10L) 0.1-0.5m, NO FCF
							1			END OF BOREHOLE AT 0.5m				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
							2							
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No.
BH/MW13
1/2

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351-

Location: 353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							0			BRICK PAVEMENT: 50mm.t over CONCRETE: 60mm.t over CONCRETE: 180mm.t				
						N = 6 4,3,3	1		-	FILL: Clayey sand, fine to medium grained, brown and orange brown, trace of igneous gravel and concrete fragments.	M			SCREEN: 9.47kg (<10L) 0.29-1.2m, NO FCF
						N = 5 2,1,4	2			FILL: Silty clay, low to medium plasticity, light brown, with fine grained sand.	w<PL			HYDROCARBON ODOUR
▼						N = 13 4,5,8	3		CL-CI	Silty CLAY: low to medium plasticity, grey mottled orange.	w≈PL			
▶							4				w>PL			ALLUVIAL
							5		-	SANDSTONE: fine to medium grained, grey.	DW			SPT REFUSED HAWKESBURY SANDSTONE
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No.
BH/MW13
2/2

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
										SANDSTONE: fine to medium grained, grey.	DW			
							8			END OF BOREHOLE AT 7.5m				GROUNDWATER MONITORING WELL INSTALLED TO 7.5m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.5m TO 3.5m. CASING 3.5m TO 0m. 2mm SAND FILTER PACK 7.5m TO 3.0m. BENTONITE SEAL 3.0m TO 2.6m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH14** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** PUSH TUBE **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			BRICK: 100mm.t over CONCRETE: 300mm.t				
									-	FILL: Silty gravelly clay, low to medium plasticity, brown, trace of igneous and sandstone gravel, sand, glass fragments and ash.	w<PL			SCREEN: 2.99kg (<10L) 0.4-1.0m, NO FCF
							1			FILL: Silty clayey sand, fine to medium grained, grey brown, trace of igneous gravel and ash.	M			SCREEN: 3.30kg (10L) 1.0-1.3m, NO FCF
										FILL: Silty clay, low to medium plasticity, brown, trace of igneous gravel, sand and ash.	w≈PL			SCREEN: 6.54kg (<10L) 1.3-2.0m, NO FCF
							2							SCREEN: 6.19kg (<10L) 2.0-2.5m, NO FCF
										FILL: Silty clayey sand, fine to medium grained, brown, trace of ironstone gravel and ash.	W			SCREEN: 3.18kg (<10L) 2.5-2.6m, NO FCF
							3		CL-CI	Silty sandy CLAY: low to medium plasticity, orange brown, trace of ash and root fibres.	w>PL			ALLUVIAL
										END OF BOREHOLE AT 3.5m				
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Log No. **BH15** 1/1

Environmental logs are not to be used for geotechnical purposes

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■				0			FILL: Gravelly sand, fine to medium grained, brown and grey, fine to coarse grained igneous gravel, trace of concrete fragments.	D			INSUFFICIENT RETURN FOR BULK SCREEN
										END OF BOREHOLE AT 0.1m				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
							1							
							2							
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH16** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351

Location: -353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty clayey sand, fine to medium grained, brown and grey, trace of concrete and glass fragments.	D			MULCH COVER SCREEN: 7.80kg (<10L) 0-0.5m, NO FCF
										END OF BOREHOLE AT 0.5m				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
							1							
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No.
BH/MW17
1/1

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER / SPIRAL AUGER **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.D./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							0			FILL: Silty sand, fine to medium grained, brown, trace of igneous and sandstone gravel, concrete and plastic fragments and root fibres.	M			SCREEN: 2.13kg (<10L) 0-0.3m, NO FCF
											w≈PL			SCREEN: 6.90kg (<10L) 0.3-1.0m, NO FCF
							1			FILL: Silty clay, low to medium plasticity, brown, with fine to medium grained sand, trace of igneous and sandstone gravel.				SCREEN: 2.10kg (<10L) 1.0-1.7m, NO FCF
						N = 3 4,2,1			SM	Silty SAND: fine to medium grained, brown and grey.	M			ALLUVIAL
▶							2				W			
▼														
						N = 0 4,0,0	3		CL-CI	Silty CLAY: low to medium plasticity, dark brown, trace of sand.	w>PL			RESIDUAL
						SUNK 300mm			-	Extremely Weathered sandstone: silty SAND: fine to medium grained, grey.	XW			HAWKESBURY SANDSTONE
							4			SANDSTONE: fine to medium grained, grey.	DW			GROUNDWATER MONITORING WELL INSTALLED TO 6.5m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6.5m TO 2.0m. CASING 2.0m TO 0m. 2mm SAND FILTER PACK 6.5m TO 1.9m. BENTONITE SEAL 1.9m TO 1.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							5							
							6							
							7			END OF BOREHOLE AT 6.5m				

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH18** **1/1**

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** PUSH TUBE **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			TILE: 60mm.t over CONCRETE: 100mm.t				
									-	FILL: Silty sandy clay, low to medium plasticity, trace of igneous, ironstone and sandstone gravel, ash and slag.	w<PL			SCREEN: 6.97kg (<10L) 0.16-1.16m, NO FCF
	■		■		■		1							SCREEN: 7.34kg (<10L) 1.16-1.8m, NO FCF
	■		■		■					FILL: Silty clay, low to medium plasticity, orange brown, trace of ironstone and igneous gravel and ash.	w<PL			SCREEN: 5.14kg (<10L) 1.8-2.5m, NO FCF
	■		■		■		2			as above, but trace of sandstone gravel and sand.	w<PL			SCREEN: 3.01kg (<10L) 2.5-2.8m, NO FCF
	■		■						CL-CI	Silty sandy CLAY: low to medium plasticity, orange brown, trace of ash.	w≈PL			ALLUVIAL
							3			END OF BOREHOLE AT 3.4m				
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH19** **1/1**

SDUP3: 0-0.1m

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■	■	■		0			FILL: Silty sand, fine to medium grained, brown, trace of igneous and sandstone gravel and root fibres.	M			GRASS COVER
											w<PL			SCREEN: 10.07kg 0-0.1m, NO FCF
										FILL: Silty clay, low to medium plasticity, brown, trace of igneous gravel and sand.				SCREEN: 7.42kg (<10L) 0.1-0.25m, NO FCF
										END OF BOREHOLE AT 0.5m				SCREEN: 5.68kg (<10L) 0.25-0.5m, NO FCF
							1							HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH20** **1/1**

SDUP4: 0-0.1m

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT

Location: 351-353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 7/1/25 **Datum:** -

Plant Type: - **Logged/Checked by:** C.B./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty sand, fine to medium grained, brown, trace of igneous and sandstone gravel, concrete fragments and root fibres.	D			GRASS COVER
											w<PL			SCREEN: 11.12kg 0-0.1m, NO FCF
										FILL: Silty clay, low to medium plasticity, brown, trace of igneous gravel and sand.				SCREEN: 5.43kg (<10L) 0.1-0.3m, NO FCF
							1			END OF BOREHOLE AT 0.5m				INSUFFICIENT RETURN FOR BULK SCREEN
														HAND AUGER REFUSAL
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **SV1** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351-

Location: 353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			CONCRETE: 150mm.t				
									-	FILL: Sandy gravel, fine to coarse grained, igneous, grey, fine to medium grained sand, trace of root fibres.	M			
										FILL: Clayey sand, fine to medium grained, orange brown and brown, trace of igneous gravel and concrete fragments.	M			
							1							
										END OF BOREHOLE AT 1.2m				SV WELL INSTALLED TO 1.2m. 2mm SAND FILTER PACK 1.2m TO 0.9m. BENTONITE SEAL 0.9m TO 0.6m. BACKFILLED WITH SAND TO 0.2m. COMPLETED WITH A CONCRETED GATIC COVER FROM 0.2m TO SURFACE.
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **SV2** 1/1

Environmental logs are not to be used for geotechnical purposes

Client: CITY OF PARRAMATTA COUNCIL

Project: PROPOSED RIVERSIDE THEATRES REDEVELOPMENT 351

Location: -353 CHURCH STREET, PARRAMATTA, NSW

Job No.: E37231PT **Method:** PUSH TUBE **R.L. Surface:** N/A

Date: 6/1/25 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** C.B./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0		-	TILES: 60mm.t over CONCRETE: 50mm.t	w<PL			
							1			FILL: Silty sandy clay, medium plasticity, brown, fine to medium grained sand, trace of igneous and sandstone gravel, concrete and plastic fragments.				
										END OF BOREHOLE AT 1.2m				SV WELL INSTALLED TO 1.2m. 2mm SAND FILTER PACK 1.2m TO 0.8m. BENTONITE SEAL 0.8m TO 0.3m. BACKFILLED WITH SAND TO 0.2m. COMPLETED WITH A CONCRETED GATIC COVER FROM 0.2m TO SURFACE.
							2							
							3							
							4							
							5							
							6							
							7							

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
ine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\,D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

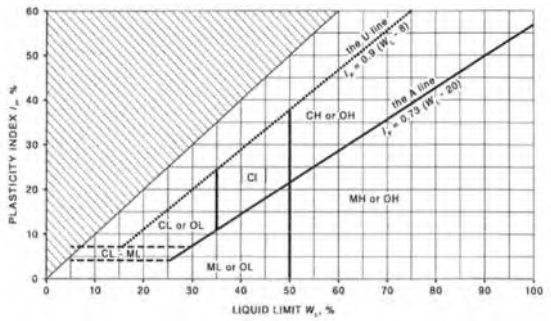
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

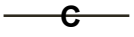
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL $w \approx$ PL w < PL $w \approx$ LL w > LL	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.

Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Appendix D: GPS Co-Orindates for DGI Sample Locations

E	N	No
315209.9399	6257130.7864	TP101
315201.4900	6257125.2775	TP102
315205.5337	6257116.4024	TP103
315196.6157	6257109.0575	TP104
315201.5934	6257101.3194	TP105
315193.8499	6257094.8455	TP106
315189.3770	6257078.9102	TP107
315194.7698	6257074.1422	TP108
315213.8339	6257072.3091	TP109
315223.7117	6257072.4072	TP110
315231.5614	6257074.1267	TP111
315251.7350	6257066.7292	TP112
315271.7802	6257065.7587	TP113
315290.5005	6257065.6065	TP114
315189.7374	6257068.4697	TP115
315202.0204	6257067.0047	TP116
315211.6030	6257065.4538	TP117
315186.7404	6257059.1275	TP118
315198.9989	6257057.5549	TP119
315209.5384	6257056.2930	TP120
315181.1139	6257045.1590	TP121
315194.7826	6257045.8055	TP122
315206.7600	6257046.0492	TP123
315296.0436	6257059.5644	TP124
315273.8728	6257108.4436	TP125
315306.1495	6257109.7332	TP126
315269.7043	6257085.1373	TP127
315298.4760	6257085.7794	TP128
315287.1508	6257098.3969	BH/MW129

Appendix E: Examples of Imported Materials and Waste Tracking Registers

Imported Materials Register

Supplier	Date	Docket/Invoice #	Product Type	Quantity (specify m3 or tonnes)	Area where Material was Placed

Exported (Waste) Materials Register

Load	Date	Material Type / Classification	Site Area where Waste was Generated	Waste Classification Report Reference	Disposal Facility	Tipping Receipt/Docket Number	Tracking Number (where relevant)	Tonnage

Appendix F: Report Explanatory Notes

QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[14] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[15]. The NEPM (2013) is consistent with these documents.

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;

[14] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[15] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

- All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix G: Guidelines and Reference Documents

Contaminated Land Management Act 1997 (NSW)

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

NSW EPA, (2022). *Sampling design part 1 - application*, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy (Resilience and Hazards) 2021 (NSW)

Western Australia Department of Health, (2021). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia