REMEDIAL ACTION PLAN

PROPOSED SENIORS LIVING DEVELOPMENT
669 - 683 OLD SOUTH HEAD ROAD, VAUCLUSE NSW

PREPARED FOR
OSHR AT VAUCLUSE HOLDINGS PTY LTD
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TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1 PROJECT INFORMATION

1.1 INTRODUCTION

Geo-Environmental Engineering Pty Ltd (GEE) was commissioned by Blare Management, on behalf of OSHR at Vaucluse Holdings Pty Ltd to prepare this Remedial Action Plan (RAP) for the site located at 669 - 683 Old South Head Road, Vaucluse New South Wales 2030 (herein referred to as 'the site'). The site covers an area of approximately 4,350m^2 and encompasses the following legal allotments:

- Lot A and B in Deposited Plan (DP) 324744
- Lot 2 in DP 10314
- Lot 1 in DP 169310
- Lot 4 in DP 192614
- Lot 1 in DP 168877
- Lot 1 in DP 167942
- Lot 1 in DP 666626
- Lot 2 in DP 316716

A site location map is provided as **Figure 1** while a survey plan showing existing site features is provided for reference in **Appendix A**.

The RAP has been prepared to support a Development Application with Waverley Council for a proposed seniors living development and to address the requirements of the *State Environmental Planning Policy (Resilience and Hazards) 2021* (reference 1).

This RAP is based on information contained within a preliminary and detailed site (contamination) investigation report that was completed by GEE in 2023 (reference 2 – and herein referred to the '*PSI and DSI Report*') and relates to surface topsoil/fill material across the site which was found to be sporadically contaminated with metals (lead) at concentrations in excess of those permissible for the proposed land-use, and which could impact the future users of the site.

This RAP addresses the requirements for remediation and validation to ensure that the site will be suitable for the proposed use at the completion of the remedial works described in this RAP. The remediation strategy adopted in this RAP is the off-site removal and disposal of the metal impacted topsoil/fill layer, followed by validation of the surface soils.

The RAP has been prepared in accordance with relevant guidelines endorsed by the NSW Environment Protection Authority (EPA).

1.2 OBJECTIVES

The objectives of this RAP are to:

- ◊ Define the remedial goals that will ensure that the remediated site will be suitable for the proposed land-use as described by the DA,
- ◊ Document the remediation strategy and describe the remediation procedures to be implemented to reduce the contamination risk to an acceptable level for the land-use, including requirements for validating the remedial works,
- ◊ Establish the necessary environmental management procedures to be implemented during the proposed remedial works, and
- ◊ Identify any regulatory approvals or licences required by the proposed works.

1.3 PROPOSED DEVELOPMENT

The proposed development comprises the demolition of the existing low-density residential properties and the construction of a multi-storey seniors living development with a two-level basement for parking and general storage. The ground floor of the development will comprise residential units with accessible garden areas at the southern end of the site and residential shared spaces at the northern end along with associated soft and hard landscaping.

Based on the architectural plans, a copy of which is provided in **Appendix A**, excavation to a depth of between approximately 5.0m and 12.0m will be required for the proposed basement. The outline of the proposed basement level is shown on **Figure 2** along with a copy of the survey plan and **Figure 3** along with a recent aerial photograph.

1.4 SCOPE OF WORKS

The scope of this RAP is as follows:

1. Definition of remediation goals and Remediation Acceptance Criteria (RAC),
2. Evaluate the feasible remediation strategies and options,
3. Detail the preferred remediation option for the site,

4. Preparation of a validation plan to ensure that the RAC are achieved,
5. Preparation of a preliminary Workplace Health & Safety (WHS) plan to minimise the risk of human exposure to contaminants, and
6. Preparation of an environmental management plan to minimise the impact of remediation works on the surrounding environment.

Following the execution and completion of the remediation process, a validation report will be prepared. The objective of the validation report is to detail the remediation methods undertaken, that they have been carried out in accordance with the requirements of the RAP and to confirm the site is suitable for proposed land-use.

2 SITE IDENTIFICATION

A summary of the site location details is provided below, while a site location map is provided as **Figure 1**, while site features are shown on **Figure 2**.

Street Address:	669 - 683 Old South Head Road, Vaucluse NSW 2030
Legal Description:	Lots A and B in Deposited Plan (DP) 324744, Lot 2 in DP 10314, Lot 1 in DP 169310, Lot 4 in DP 192614, Lot 1 in DP 168877, Lot 1 in DP 167942, Lot 1 in DP 666626, Lot 2 in DP316716, Lot 1 of Section 2 in Deposited Plan (DP) 340
Coordinates (MGA 56):	340790 mE, 6251580 mN
Local Government Area:	Waverley Council
Site Area:	Approximately 4,350m^2
Current Zoning:	E1 – Local Centre and R3 – Medium Density Residential[1]
Current Use:	Residential and Retail
Proposed Zoning:	E1 – Local Centre and R3 – Medium Density Residential
Proposed Use:	Residential (Seniors Living)

[1] Waverley Local Environmental Plan 2022.

3 PREVIOUS INVESTIGATIONS

3.1 PSI AND DSI

Between 2021 and 2023, GEE completed a combined PSI and DSI report for the site (reference 2) with the aim of identifying any past or present potentially contaminating activities at the site, identify the potential for site contamination and to determine the suitability of the site for the proposed development. The scope of works for the PSI and DSI included:

- A review of the history of the site and surrounding land, including historical land titles and historical aerial photographs,
- A review of the environmental and physical setting in which the site lies, including geology, hydrogeology and topography,
- A detailed site inspection for potential sources of contamination,
- Preparation of an initial Conceptual Site Model (CSM) including a summary of the potential sources of contamination, areas of environmental concern (AEC) and chemicals of potential concern (CoPC),
- Field investigations including:
  - The drilling of nineteen boreholes (BH301 to BH317 and BH401 and BH402) in accessible areas of the site and targeting areas of environmental concern, and
  - Sampling of soil from the boreholes.
- Laboratory analysis of selected soil samples for a broad suite of potential contaminants, and
- Preparation of this report including the comparison of the laboratory analytical results against relevant NSW EPA endorsed guidelines.

The review of the site's history and the site inspection revealed evidence of some potential contaminating activities that may have resulted in site contamination. Specifically:

- Potential for fill material to be present and when sourced from an unknown origin, the quality of the fill not known and therefore may be contaminated, and
- Potential use of lead-based paints and asbestos containing materials (ACM) on the existing buildings and any renovations or maintenance work over the years, may have resulted in surrounding near surface soils being impacted with lead and/or ACM.

Based on observations made during the field investigations, the sampling and analysis program conducted at the site, the proposed land-use (i.e. residential with accessible soils) and with respect to relevant statutory guidelines, GEE concluded that the near surface topsoil / fill material across the site is sporadically contaminated with lead at concentrations greater than those permissible for the proposed land-use. In this regard, and in accordance with State and local planning guidelines, this Remedial Action Plan (RAP) has been prepared which sets out the proposed remediation measures and the controls that are required to ensure that the site is made suitable for the proposed development and land-use.

The locations of the boreholes are shown on **Figure 4** while the borehole logs are provided in **Appendix B**.

3.2 GEOTECHNICAL INVESTIGATIONS

There have been two previous geotechnical investigations completed at the site or part thereof (see below). These investigations do not provide any specific contamination information, but they do provide useful information on the subsurface conditions across the site.

3.2.1 Crozier Geotechnical Consultants Investigation - 2018

Crozier Geotechnical Consultant completed a geotechnical investigation across part of the site (i.e. 669 – 679 Old South Head Road) in 2018 (reference 5) which included:

- ◊ The drilling of five auger boreholes along with the performance of Dynamic Penetrometer (DCP) testing to investigate the subsurface geology, depth to bedrock and identification of ground water conditions, and
- ◊ Detailed geotechnical mapping of the site and adjacent properties including photographic record of site conditions by an experienced Geotechnical Engineer.

3.2.2 GEE Geotechnical Report - 2021

In August 2021, GEE completed a geotechnical investigation at the site which related to the same proposed development at this preliminary contamination investigation (reference 6). The investigation comprised:

- ◊ The drilling and logging of two boreholes (BH201 and BH202) to better assess the subsurface conditions across the site,
- ◊ The performance of SPT and DCP tests at the borehole locations to assess the consistency and/or relative density of the soil profile.

The approximate locations of the boreholes are shown on **Figure 2** along with a copy of the survey plan and **Figure 3** along with a recent aerial photograph. The borehole logs are provided in **Appendix B**.

4 SITE HISTORY

A summary of the site history information obtained from the *PSI and DSI Report* (reference 2) is provided below:

4.1 THE SITE

Based on a review of the historical information, the allotments which make up the site were formed by subdivision in the 1920s, and the existing dwellings (or part thereof) were likely constructed soon thereafter. Following initial development of the site, several alterations and additions have occurred. A summary of the history of each allotment which makes up the site is provided below:

- No. 669
  The existing corner shop and dwelling with detached garage was built pre-1930 with only minor alterations and/or additions observed.
- No. 671
  The existing brick house was built pre-1930 with additions to the rear occurring between 1961 and 1965. The existing brick building in the rear, north-eastern corner was also constructed pre-1930, while the adjoining garage was constructed between 1961 and 1965 when the house was extended. The existing metal carport located in the rear, south-eastern corner was added between 1970 and 1978. Finally, there was a former structure (likely a shed) in the rear, south-eastern part of the site which was built pre-1930 and demolished in the early 1950s.
- No. 673
  The existing brick house was built pre-1930 along with the existing fibro garage to the north-east of the house. The house was then extended towards the rear between 1951 and 1955. Between 1986 and 1991, an awning was added to the rear of the house and a metal carport along the northern side of the house.
- No. 675
  The existing brick house was built pre-1930 along with a garage to the north-east of the house. The house underwent a significant renovation between 1994 and 2000 which included additions on all sides. At the same time as this renovation, the former garage in the north-eastern part of the site was demolished.
- No. 677
  The existing brick house was built pre-1930 along with a garage in the front, north-western corner. Between 1986 and 1991, the garage was demolished, and the house

was extended towards the rear. Then the existing in-ground swimming pool was added to the rear yard between 2005 and 2011.

◊ No. 679
The existing brick house was built pre-1930 along with two fibro sheds that still remain in the rear yard. The house was renovated between 1956 and 1961 and included additions to the rear, front and southern sides. Elsewhere, there appeared to be a shed (or similar structure) in the rear yard that was built in the 1970s and demolished in the early 2000s.

◊ No. 681
The existing brick house was built pre-1930 along with a relatively small structure (likely a shed) in the rear yard and approximately midway along the northern boundary. The house was extended towards the front in the early 1960s and at the same time, the shed in the rear yard was demolished. Finally, in the late 1980s, the house was extended towards the rear.

◊ No. 683
The existing brick house was built pre-1930 along with a relatively small structure (likely a shed) in the rear yard and adjacent to the southern boundary. Another small structure (likely a shed) was visible in the middle of the rear yard between the late 1940s to early 1950s. There were some additions to the rear of the original house in the 1950s and again in the mid-2010s.

The past and current land-use activities are relatively benign from a site contamination perspective. However, some existing structures on the site, and potentially some of the former structures, have likely included the use of Asbestos Containing Materials (ACM). Furthermore, the age of the original buildings suggests that lead-based paints may have been used. Therefore, any maintenance work over the years may have resulted in elevated lead concentrations, and ACM contamination, in near surface soils surrounding the buildings.

4.2 SURROUNDING LAND

Surrounding land and land-use activities have the potential to cause contamination of the site via groundwater or surface water migration. The historical information determined that there have been, or are, some dry cleaners and a petrol station located within 100m of the site with both of these business types commonly associated with land contamination. However, they are all located down-slope of the site which suggests that any contamination in the groundwater will not impact the site.

5 SITE CONDITION AND SURROUNDING ENVIRONMENT

This section provides a summary of the site features and surrounding environment and has been extracted from the *PSI and DSI Report* (reference 2).

5.1 SITE DESCRIPTION

The site is an irregular parcel of land situated on the eastern side Old South Head Road. At the time of this investigation the site comprised seven residential properties, each containing a house with associated gardens/access pathways, sheds/outbuildings, paved areas and scattered trees. Importantly, an inspection of the surface of the site revealed no adverse staining, odour or obvious Asbestos Containing Material (ACM).

A description of each property is provided below, while photographs of the site are provided for reference in Plates 1 to 14:

669 Old South Head Road (Lot A DP 324744)

This property was occupied by a one and two-storey brick mixed use building, with a fish and party shop on the ground floor that is accessed off Old South Head Road, and the remainder of the building was used for residential purposes. The rear yard of the site was separated from the shopfronts and dedicated to the residents living in the rear portion of the building. This rear yard consisted of a partially retained lawn, some garden beds with paved paths and a double car brick garage in the south-eastern corner. Behind the fish shop and beside the building to the south was a fenced off courtyard that was paved with concrete and used as a storage area.

671 Old South Head Road (Lot B DP 324744 & Lot 2 DP 10314)

Lot 2 of this property was occupied by a 2-storey rendered brick house. At the front and rear of the house were yards comprised lawns, concrete pathways and garden beds. At the rear boundary was a brick shed and a metal clad garage which is accessed via a driveway (Lot B) off Ocean View Avenue to the south. The garage and driveway were sealed by a concrete floor slab.

673 Old South Head Road (Lot 1 DP 169310)

This property was occupied by a single storey brick house located centrally. Attached to the north-eastern corner of the house was a fibro clad garage and a metal carport which is accessed via a concrete driveway along the northern boundary. A metal garden shed with a concrete floor was immediately to the east of the garage and the remainder of the property comprised lawns with some garden beds.

675 Old South Head Road (Lot B DP 324744 & Lot 2 DP 10314)

This property was occupied by a one and two storey brick house located centrally. The remainder of the property comprised lawns, some tiled surfaces and some garden beds at the perimeter. Vehicle access to the site is via a brick paved driveway in the north-western corner which is connected to an internal double garage.

677 Old South Head Road (Lot B DP 324744 & Lot 2 DP 10314)

This property was occupied by a one and two storey brick house located centrally. At the rear was a tiled alfresco area connected to an in-ground swimming pool in the south-eastern corner. A concrete driveway was in the north-western corner which is connected to an internal single car garage. The remainder of the property comprised lawns with some garden beds.

679 Old South Head Road (Lot B DP 324744 & Lot 2 DP 10314)

This property was occupied by a single storey, rendered brick house located centrally. At the front of the house was a concrete and brick paved driveway which connected to a metal clad carport on the south-western corner of the house. At the rear of the property were two detached fibro sheds while the remainder of the property comprised lawns with some garden beds.

681 Old South Head Road (Lot B DP 324744 & Lot 2 DP 10314)

This property was occupied by a single storey, rendered brick house located centrally. In the front, north-western corner was a tiled driveway connected to an internal garage. The remainder of the property comprised lawns with some garden beds.

683 Old South Head Road (Lot B DP 324744 & Lot 2 DP 10314)

This property was occupied by a one and two storey, brick house located centrally. In the front, north-western corner was a concrete driveway connected to an internal garage. The remainder of the property comprised lawns with some garden beds.

Plate 1: Rear yard of No. 669 Old South Head Road

Plate 2: Rear Yard of No. 669 South Head Road

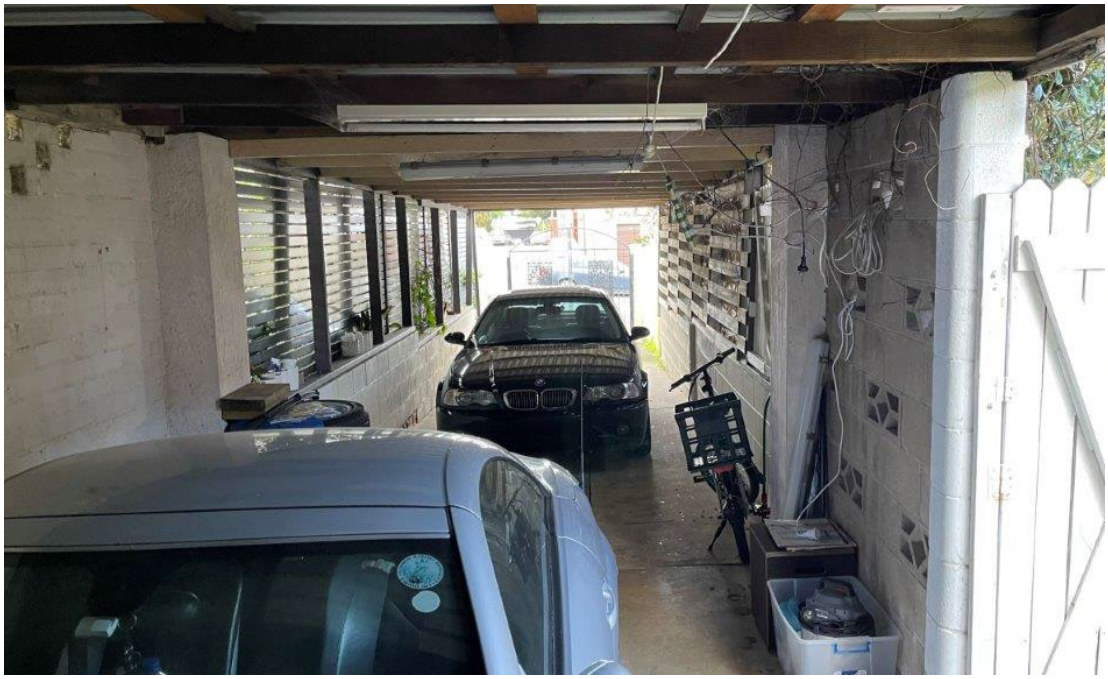

Plate 3: Driveway at the rear of No. 671 Old South Head Road

Plate 4: Rear Yard of No. 671 South Head Road

Plate 5: Front of No. 673 South Head Road

Plate 6: Rear Yard of No. 673 South Head Road

Plate 7: Front of No. 675 Old South Head Road (Source: Google Street View)

Plate 8: Rear yard of No. 675 Old South Head Road

Plate 9: Front of No. 677 Old South Head Road (Source: Google Street View)

Plate 10: Front of No. 679 Old South Head Road (Source: Google Street View)

Plate 11: Rear yard of No. 679 Old South Head Road

Plate 12: Front of No. 681 Old South Head Road (Source: Google Street View)

Plate 13: Rear yard of No. 681 Old South Head Road

Plate 14: Front of No. 683 Old South Head Road (Source: Google Street View)

5.2 Surrounding Land Uses and Activities

Surrounding land uses observed from the aerial photographs and our site inspection are summarised below:

- North: Residential properties.
- South: Mix of commercial and residential properties.
- East: Residential properties.
- West: Mix of commercial and residential properties.

5.3 Topography

The site is located about mid-way on a gentle to moderately north dipping slope. The surface elevation as shown on the survey plans (**Appendix A**) vary between approximately 73m AHD at the southern boundary and 66m AHD at the northern boundary.

5.4 GEOLOGY AND SOILS

5.4.1 Regional

A review of the regional geological map (reference 7) indicates that the site is underlain by the Hawkesbury Sandstone formation, which typically consists of "*…medium to coarse-grained quartz sandstone, very minor shale and laminite lenses*". The map also indicates that the site is within close proximity (~200m) to the Quaternary aged Alluvium formation which comprises"*…medium to fine-grained 'marine' sand with podsols".*

A review of the regional soils map indicates that the site is located within the Lambert Soil Landscape Group (reference 8) which is associated with undulating to rolling rises and low hills on Hawkesbury Sandstone. Local reliefs are up typically 20-120m and slopes are usually less than <20% in gradient, with frequent rock outcrops (>50%). Soils of the Lambert Group typically comprise erosional sands and clays, have seasonally perched water tables and very low soil fertility.

5.4.2 Site Specific

The subsurface conditions, as observed in all the boreholes, typically comprised a layer of topsoil and/or fill material over natural sand soil. Based on the previous geotechnical bores, the natural sand layer is underlain by sandstone bedrock.

Detailed descriptions of the subsurface conditions on site are provided in the borehole logs in **Appendix B**, while a summary of the subsurface conditions encountered across the rear of the site are provided in **Table 1**.

Table 1: Summary of the Subsurface Conditions

Layer / Unit	Description	Depth to the Top of Layer (m)
TOPSOIL / FILL	Predominately SAND with minor gravel and silty content: dark brown and grey, fine to medium grained with roots. Anthropogenic inclusions such as brick, ceramic and concrete were noted in boreholes BH303, BH304, BH307, BH308, BH314.	0.0
NATURAL SOIL	SAND: grey, brown, orange-brown, fine to medium grained with occasional bands of partially indurated nodules.	0.2 to ≥0.95
BEDROCK	SANDSTONE: grey and orange, weathered.	2.0 to >5.8m

5.5 GROUNDWATER

5.5.1 Regional

Based on the geological information it was anticipated that permanent groundwater is likely to be confined or partly confined, discrete, water-bearing zones within the bedrock formation. However, intermittent 'perched' water seepage often occurs at the soil / bedrock interface following heavy and prolonged rainfall events.

A search of registered groundwater bores in the vicinity of the site was completed and this determined that there are over 80 registered bores within 2km of the site and the nearest bore (GW110857) is 777m to the west of the site. Given the distance of this bore, and others, from the site, the information available is not considered relevant to the site.

5.5.2 Site Specific

Permanent groundwater (i.e. the water table) was not encountered during the drilling of the boreholes and such water is expected to be found at depth and confined within the bedrock formation.

5.6 AREAS AND TYPE OF CONTAMINATION

As detailed in the *PSI and DSI Report*, the topsoil/fill layer across the site is contaminated with metals (lead), albeit sporadically. For a contaminant to pose a human health risk, not only does there need to be a source contaminant but there needs to be an exposure pathway (either complete or potential). Essentially, any area which is not covered by a permanent structure or permanent pavement, and therefore will be accessible, will require remediation. However, considering that there will be significant excavation required for the proposed basement, GEE recommends removal of the entire surface topsoil/fill layer.

Based on all our previous boreholes, the depth of the metal impacted topsoil / fill material is estimated to be between 0.2m and 1.0m at the former borehole locations. If assuming an average thickness of 0.5m the volume of contaminated topsoil/fill to be removed from site is approximately 2175m^3 or approximately 3,900 tonnes[2].

[2] Assuming a bulk density of 1.8t/m^3

6 CONCEPTUAL SITE MODEL

The conceptual site model (CSM) is a representation or summary of information obtained regarding potential contamination sources, receptors and exposure pathways between the sources and receptors. The key elements of a CSM include:

- ◊ known and potential sources of contamination and contaminants of concern, including the mechanisms of contamination (such as 'top down' spills or sub-surface releases from corroded tanks or pipes),
- ◊ potentially affected media (such as soil, sediment, groundwater, surface water, indoor and ambient air),
- ◊ human and ecological receptors, and
- ◊ potential and complete exposure pathways.

GEE notes that this CSM is based on existing information and the CSM should be revised if additional site contamination is encountered during remediation works.

6.1 KNOWN CONTAMINANTS OF CONCERN

As detailed in Section 5.6 the near surface soil (topsoil/fill) across the site was found to be sporadically contaminated with metals (lead) and will require remediation. Based on all our previous boreholes, the depth of the metal impacted topsoil / fill material is estimated to be between 0.2m and 1.0m at the former borehole locations. If assuming an average thickness of 0.5m the volume of contaminated topsoil/fill to be removed from site is approximately 2175m^3 or approximately 3,900 tonnes.

6.2 CONTAMINANT SOURCES

The elevated lead concentrations in the near surface soils are attributed to the past use of lead-based paints on the original structures which were constructed in the 1920s or early 1930s. Additionally, there is potential for the lead contamination to have been caused by atmospheric fallout from cars using leaded petrol, particularly given that Old South Head Road is considered to be a major and historic thoroughfare in Sydney.

6.3 POTENTIAL OR KNOWN CONTAMINATED MEDIA

Currently it is assumed that the entire topsoil/fill layer is sporadically contaminated with metals (lead). The deeper natural soil profile is not contaminated and suitable for the proposed land-use.

With respect to groundwater, it is acknowledged that groundwater conditions beneath the site have not been assessed as part of the earlier investigations and is not considered to be necessary for the following reasons:

- ◊ Permanent groundwater was not encountered within the soil profile and is expected to be confined within discrete, water-bearing zones (e.g. joints and defects) within the underlying bedrock formation,
- ◊ The mass hydraulic conductivity of the Hawkesbury sandstone formation is typically very low (in the order of 10^{-7}m/sec – reference 9) and would restrict the vertical migration of contaminants,
- ◊ There were no significant volatile contaminating activities identified during the Stage 2 DSI which could be sufficiently mobile and impact the groundwater, and
- ◊ The natural soil layer which lies between the contaminated surface soils and the groundwater was uncontaminated.

6.4 CONTAMINANT RECEPTORS

Potential receptors to the contamination include:

- ◊ Workers engaged to undertake maintenance and remediation works,
- ◊ Site Visitors,
- ◊ Employees, and
- ◊ Future users of the site.

6.5 POTENTIAL AND COMPLETE EXPOSURE PATHWAYS

At this stage, there is a complete exposure pathway for:

- ◊ Current users of the site,
- ◊ Future workers on site, and
- ◊ Future users of the site.

7 REMEDIATION STRATEGY

This section provides the remediation goal, the extent of remediation required and discusses the remedial options to determine the preferred remedial option.

7.1 REMEDIATION GOAL

The goal of the remediation activities is to render the site suitable for the proposed land-use scenario as defined by NEPM 2013 – Schedule B7 Section 3 (reference 10). The appropriate land-use scenario is residential land-use with accessible soils (including gardens).

7.2 REGULATORY POLICY OF REMEDIATION

According to the National Environment Protection (Assessment of Site Contamination) Measure (amended 2013) (reference 11 and herein referred to as '*ASC NEPM*'), which is endorsed by the NSW EPA and compatible with the CRC Care National Remediation Framework (reference 12), the preferred hierarchy of options for site remediation and management of soil contamination is:

i) On-site remediation of soil contamination, so that the risk associated with the contaminant is reduced to an acceptable level.

ii) Off-site remediation of excavated soil, so that the risk associated with the contaminant is reduced to an acceptable level, after which it is returned to the site.

If it is not possible for either of the above options to be implemented, then other options for consideration can include, for example:

i) Containment of the contamination on-site either in-situ with appropriate controls that reduce the risk to an acceptable level, or in an appropriately designed and managed containment facility.

ii) Removal of contaminated soil to an approved site or facility, and replacement with clean fill where necessary.

iii) Adoption of a less sensitive land use or controls on site activities that will reduce the need for remedial works.

As part of the identification and selection of remediation options, consideration should be given to the hierarchy above so that remedial options are selected that provide a permanent solution without the need for ongoing control, where feasible.

7.3 Assessment of Remediation Options

A summary of the soil remediation options and assessment of the suitability of each is provided in **Table 2**.

Table 2: Summary of the Soil Remedial Options

Remediation Option	Assessment	Conclusion
1. On-site treatment of the soil	Excavation is necessary for the proposed development, and this will incorporate much (if not all) of the contamination. Therefore, this option is not feasible.	Unfeasible
2. Off-site treatment of excavated soil.	As above.	Unfeasible
3. Containment of the contamination on-site either in-situ.	As above.	Unfeasible
4. Removal of contaminated soil to an approved site or facility.	There are currently suitably licensed waste facilities in the Sydney Metropolitan region capable of accepting the contaminated soil, although waste classification is required in accordance with NSW EPA (2014) *Waste Classification Guidelines* (reference 13). Although this option generates additional truck movements and associated fuel/emissions over option 1 and option 3, it is less than option 2, since materials are not returned to site. This option also generates the highest quantity of waste, since the materials are disposed to landfill rather than treated and reused or retained on Site. Finally, it is also an uncomplicated strategy that is time effective.	Feasible
5. Adoption of a less sensitive land use or controls on site activities that will reduce the need for remedial works.	This would require rezoning of the site and potentially the surrounding areas that were all created following the historic reclamation project.	Unfeasible.

7.4 PREFERRED REMEDIATION OPTION

In consideration of the hierarchy for soil remediation options outlined above, the contaminants of concern, the quantities involved, the proposed redevelopment works which includes excavation and the environmental setting of the site (including proximity to adjoining residential apartments), the preferred remediation option is excavation of the contaminated soil and off-site disposal to a facility licensed to receive the waste.

7.5 EXTENT OF REMEDIATION REQUIRED

Based on all our previous boreholes, the depth of the metal impacted topsoil / fill material is estimated to be between 0.2m and 1.0m at the former borehole locations. If assuming an average thickness of 0.5m the volume of contaminated topsoil/fill to be removed from site is approximately 2175m^3 which equates to approximately 3,900 tonnes at an assumed density of 1.8 tonnes/m^3.

NOTE: The soil volumes included above are estimates based on scaling from the site plan. A more accurate assessment by a quantity surveyor or earthworks contractor is recommended when budgeting the off-site landfill disposal costs.

8 REMEDIATION METHODOLOGY

This section outlines the scope of the remediation works and provides detail of the proposed methodology of each of the required remediation tasks.

8.1 REMEDIATION SCOPE OF WORK

The scope of remediation works that is required to be undertaken on the site under this RAP comprises the following:

1. Obtain necessary approval from the Council,
2. Carry out demolition works,
3. Waste classification sampling and analysis of the contaminated topsoil/fill layer,
4. Controlled excavation and disposal of contaminated topsoil/fill material,
5. Validation of sampling and analysis of Residual Natural Soil Profile,
6. Backfilling of the site with suitable material (if necessary),
7. Validation of imported materials,
8. Preparation of a validation report.

8.2 REMEDIATION METHODOLOGY

The methodologies to be undertaken on the site for the various components of the remediation works are presented in detail in the sections below.

8.2.1 Task 1 - Obtain Council Approval

For remediation work the *State Environmental Planning Policy (Resilience and Hazards) 2021* (reference 1) specifies when development consent is required and when it is not required. Category 1 work requires a separate development consent while Category 2 remediation work does not require development consent; however, Council is required to be notified 30 days prior to commencement of the remediation work.

It is the opinion of GEE that the remediation works described in the RAP would fall under Category 2 remediation work for the following reasons:

◊ The work is not designated development under schedule 3 of the *Environmental Planning and Assessment Act 1979* (NSW) as the treatment of contaminated soil originating exclusively from the site on which the development is located will not exceed 30,000 m^3 of soil and disturb an aggregate area greater than 3 Ha,

- ◊ The land is not identified as critical habitat under the Threatened Species Conservation Act 1995 (NSW);
- ◊ Remediation is not being conducted in an area that requires consideration under s. 5A of the Environmental Planning and & Assessment Act 1979 (NSW); and
- ◊ Remediation is not being performed in an area of environmental significance or which requires consent under another State Environment Planning Policy (SEPP) or a regional environmental plan.

In this regard, Council notification is required 30 days prior to commencing work.

8.2.2 Task 2 - Demolition Work

In order to adequately access the contaminated fill layer, the existing buildings will require demolition in accordance with relevant local and state guidelines and regulations. This includes but is not necessarily limited to conformance with the Australian Standard AS2601 – 2001 – *The Demolition of Structures* and the *Work Health and Safety Regulation 2017.*

Furthermore, care should be taken by the demolition contractor to minimise soil disturbance and damage to adjoining developments and their foundations.

8.2.3 Task 3 – Waste Classification

For the near surface contaminated topsoil/fill material to be disposed at landfill, it must be classified in accordance with NSW EPA (2014) *Waste Classification Guidelines* (reference 13).

The NSW EPA waste classification guidelines do not specify the necessary frequency of sampling, although GEE considers that at least 1 sample per 100m^3 of waste soil should be collected which equates to a total of approximately 15 samples. Samples should be collected and analysed for a total and leachable (TCLP) metals and Polycyclic Aromatic Hydrocarbons (PAHs) to go along with the existing data from the stage 1 and 2 contamination investigation (reference 1).

It is pointed out that waste that is contaminated with lead that originates from residential premises is pre-classified as General Solid Waste (non-putrescible) and therefore TCLP testing of lead is not necessary.

Finally, this task may be completed before or after demolition work (task 2 above).

8.2.4 Task 4 – Controlled Excavation and Disposal of Contaminated Material

In consideration of the proposed earthworks required for the new development, and the risk of future spread of contaminated fill material during construction works, the entire topsoil/fill layer should be removed.

The contaminated fill will be excavated under the direction of an experienced environmental scientist or engineer and immediately placed in trucks for off-site disposal at a landfill licenced to accept the waste. Dockets from tip weighbridges are to be provided as a record of the disposal of the material.

Care should also be taken near the site boundaries to ensure that the footings of the adjoining structures are not disturbed. This includes any adjoining utilities.

8.2.5 Task 5 - Validation Sampling and Analysis of Residual Natural Soil Profile

Following removal of the impacted topsoil /fill material, a program of soil validation will be implemented as described in Section 10. The validation program will include the sampling and analysis of soil from the surface soils following removal of the topsoil layer. The walls will not require validations as the excavation is expected to extend up to site boundaries or within proximity of the existing buildings proposed to remain.

8.2.6 Task 6 - Backfilling of the site with clean fill.

If some backfilling is required, then this should be completed using validated imported fill comprising Virgin Excavated Natural Material (VENM). Excavations may also be reinstated using excavated natural material (ENM), provided the material meets the requirements of the order and exemption issued by NSW EPA for the material. Details of any ENM used on the site, including to the requirements of the exemption and compliance with the exemption, are required to be contained in the Validation Report.

8.2.7 Task 7 - Validation of Imported Clean Fill

Imported fill will be validated as suitable for use on the site by application of the following methods:

- ◊ Imported fill material must be accompanied by documentation, which certifies that it is VENM or ENM. Unless the material is certified quarry material from a recognised provider, the documentation must include laboratory analysis. Additionally, appropriate Quality Assurance/Quality Control samples must be collected as part of the analysis program. VENM supplied material should include analytical results and a copy of the VENM certificate (refer to **Appendix C**). If not, then the material is to be

sampled at the source site prior to delivery by GEE at a rate of one sample per 50m^3 provided the material is homogenous. Concentrations of contaminants must reflect background levels and be indicative of VENM. For ENM, sampling and analysis must be carried out in accordance with the ENM order 2014, a copy of which is provided in **Appendix D**.

- ◊ Documentation is required to demonstrate each truck load of fill is consistent with the source site and does not exhibit signs of potential contamination or anthropogenic materials. This will involve inspections and documentation of the material within each truck load by the remediation contractor and/or GEE (including the truck registration number; a description of the soil, including odour; time; date; who inspected the material; and whether the material is acceptable), and
- ◊ The material used to backfill the excavation should be compacted to a standard required for the proposed site development.

8.2.8 Task 8 – Preparation of a Validation Report

At the completion of the remediation works, a validation report will need to be prepared in accordance with NSW EPA (reference 3) which outlines the results of the remediation works undertaken at the site and an assessment of the suitability of the site for the proposed use.

All waste disposal receipts (or dockets) will need to be included in the validation report.

9 REMEDIATION WORKS CONTINGENCY PLAN

GEE anticipates that remediation methodology described above will ensure that the site is suitable for the proposed commercial land-use. However, the potential issues and proposed actions detailed in **Table 3** will be taken as required.

Table 3: Contingencies

Issue	Action
1. Failure of the validation testing, indicating a greater amount of contamination than anticipated.	Additional excavation and validation sampling.
2. Generation of unacceptable odours from the excavation works.	Refer to section 13.3
3. The generation of unacceptable levels of dust during excavation and reinstatement works.	Refer to section 13.3
4. Generation of unacceptable noise during site works.	Refer to section 13.4
5. Unexpected find of asbestos containing material (ACM), volatile contamination and drums/tanks	Refer to section 9.1

9.1 UNEXPECTED FINDS PROTOCOL

During excavation work an experienced contaminated land consultant should be present to ensure that there is no evidence of other contaminants i.e. discolouration, staining, detectable organic odours, residues, asbestos containing material (e.g. fibrous cement sheeting) or underground storage tanks.

If evidence of contamination is observed, the following procedure should be adopted:

- ◊ Cease disturbance of the material.
- ◊ Contact the Site Foreman or appropriate Manager and their environmental consultant/representative.
- ◊ If the asbestos or tank/drum or volatile odour are suspected, then adopt the protocols in the following sub-sections. Otherwise, conduct a visual assessment of the potential contamination in the presence of the site foreman / sit manager and collected samples

as necessary for analysis by a NATA accredited laboratory. This should include appropriate waste classification if it is to be removed from site,

- ◊ Define the location using a GPS, or measurements from the boundaries or existing structures, which are likely to remain in the long term.
- ◊ While waiting for the results of the assessment, arrange for the area to be barricaded to provide a ten (10) metre exclusion zone. Work can recommence in adjacent areas outside the exclusion zone.
- ◊ Once the results of the assessment are known then the waste material should be removed to a landfill facility licenced to accept the waste.

9.1.1 Asbestos

If Asbestos Containing Material (ACM) such as fibrous cement sheeting is detected beneath the surface slab prior to, or during, site development works the following 'Unexpected Finds Protocol' will apply:

1. Upon discovery of suspected ACM, the site manager is to be notified and the affected area closed off by the use of barrier tape and warning signs. Warning signs shall be specific to Asbestos Hazards and shall comply with the Australian Standard 1319-1994 – *Safety Signs for the Occupational Environment*.
2. An Occupational Hygienist or licenced asbestos assessor is to be notified to inspect the area and confirm the presence of asbestos and to determine the extent of remediation works to be undertaken. A report detailing this information would be compiled by the Occupational Hygienist and provided to the Principal (or their representative) and the site manager.
3. The location of the ACM will be surveyed using a GPS or marked out using measurements from the boundaries or existing structures which are likely to remain in the long term. The asbestos waste will be classified in accordance with the NSW EPA's Waste Classification Guidelines (reference 13) and disposed of, as a minimum, as asbestos contaminated waste to a suitably licensed landfill. In dry and windy conditions, the stockpile would be lightly wetted and covered with plastic sheet whilst awaiting disposal.
4. All work associated with asbestos in soil would be undertaken by a contractor holding a class A Licence. Under this licence, the contractor is required to notify SafeWork NSW five working days before asbestos removal work is commenced.
5. Monitoring for airborne asbestos fibres is to be carried out during the removal of the asbestos waste.

6. Documentary evidence (weighbridge dockets) of correct disposal is to be provided to the Principal (or their representative).
7. At the completion of the excavation, a clearance inspection is to be carried out and written certification is to be provided by an Occupational Hygienist that the area is safe to be accessed and worked. If required, the filling material remaining in the inspected area can be covered/sealed by an appropriate physical barrier layer of non-asbestos containing material prior to sign–off.
8. Validation samples would be collected from the remedial excavation to confirm the complete removal of the asbestos containing materials. If the asbestos pipes/conduits are uncovered, then sampling density would typically comprise one sample per 10-20 linear meter (depending on the length of the pipe). If asbestos debris are found, then the sampling density would typically comprise 1 sample per 5 metre x 5 metre grid.
9. The sampling locations should be surveyed using a GPS or marked out using measurements from the boundaries or existing structures which are likely to remain in the long term.
10. Details are to be recorded in the site record system.
11. Following clearance by an Occupational Hygienist or licenced asbestos assessor, the area may be reopened for further excavation or construction work.

9.1.2 Volatile Contaminants

If significant quantities of volatile compounds are detected, then additional excavation or VOC appropriate gas mitigation strategies may be required.

If impacts due to volatile contaminants are detected in the area to be capped, the nature and extent of the impacts of the volatile contaminants should be established as a first step before an appropriate remedial strategy is to be established. If feasible the source material should be removed for off-site disposal.

9.1.3 Buried Tanks / Drums

In the unlikely event that buried structures such as Underground Storage Tanks (USTs) are encountered during site works, the structure(s) and any associated pipework should be managed / removed as per the following relevant publications:

- ◊ Protection of the Environment Operations (Underground Recoverable Storage Systems) UPSS Regulation 2008.

- AS 4976 (2008): The Removal and Disposal of Underground Recoverable Storage Tanks.
- AS 1940 – 2004: The Storage and Handling of Flammable and Combustible Liquids.

10 VALIDATION PLAN

A validation plan is implemented on the site to ensure that the RAP has been followed and that the remediation goal has been achieved (refer to section 7.1). To ensure that the RAP is implemented, and the remediation goal is achieved, the following work will be completed:

- ◊ Supervision of remediation works by an experienced environmental engineer,
- ◊ Provision of a waste classification report for the contaminated fill (and any other material) disposed off-site,
- ◊ Obtaining waste disposal dockets for material removed from site,
- ◊ Validation sampling of the surface of the natural soil profile following removal of the contaminated topsoil layer,
- ◊ Confirmation that any imported fill meets the VENM or ENM classification and therefore suitable for placement on the site (Refer to the sampling plan in Section 10.1 below), and
- ◊ Preparation of a validation report. The validation report, prepared in accordance with the requirements of EPA guidelines (reference 3), will outline the results of the remediation works undertaken at the site and an assessment of the suitability of the site for the proposed use.

Requirements for the sampling and analytical plan, sampling methodology and quality control/quality assurance procedures to be adopted for the validation works are presented below. Additionally, in accordance with NSW EPA *Contaminated Sites: Guidelines for NSW Site Auditor Scheme* (reference 14) and Appendix B of Schedule B2 of the NEPM (reference 4), the Data Quality Objectives (DQOs) process was used to define the type, quantity and quality of the data needed to support decisions relating to the contamination status of the site. Details of the DQO process adopted for the soil sampling and analysis program is provided in **Appendix E**.

10.1 SAMPLING PLAN

10.1.1 Sampling Locations and Frequency

Natural Soil Profile (Residual Soil)

Following removal of the fill layer and part of the natural soil layer, GEE will inspect the site for any evidence of remaining fill material or other potential contaminants before

collecting validation soil samples from the resulting surface. The samples will be collected at a frequency which is equivalent to the minimum number of sampling points for site characterisation as defined by the NSW EPA (2022) *Contaminated Land Guidelines: Sampling Design – Part 1* (reference 15). Considering that the site area is approximately 4,000m^2, this equates to 11 validation samples and these samples will be positioned evenly across the site. The fill layer is expected to be removed from boundary to boundary and therefore wall samples are not proposed.

Validation soil samples will be collected from the near surface (0 – 200mm) by hand using disposable nitrile gloves and with the assistance of a shovel or excavator, taking care to ensure that the soil sampled had not been in contact with the shovel or excavator bucket.

Imported Fill

As previously mentioned, any imported fill material must be accompanied by documentation, which certifies that it is VENM or ENM. Unless the material is certified quarry material from a recognised provider, the documentation must include laboratory analysis. Additionally, appropriate Quality Assurance/Quality Control samples must be collected as part of the analysis program. VENM supplied material should include analytical results and a copy of the VENM certificate (refer to **Appendix C**). If not, then the material is to be sampled at the source site prior to delivery by GEE at a rate of one sample per 50m^3 provided the material is homogenous. Concentrations of contaminants must reflect background levels and be indicative of VENM. For ENM, sampling and analysis must be carried out in accordance with the ENM order 2014, a copy of which is provided in **Appendix D**.

10.1.2 Handling, Containment and Transport of Samples

The soil sample jars will comprise glass with a Teflon lined lid and be supplied by the laboratory. The jars will be completely filled with soil, sealed, labelled with the job number, date, unique sampling point identification and depth.

The full soil jars will immediately be placed in a cool box in which ice has been added to keep the samples below a temperature of approximately 4^{o}C. At the completion of sampling the samples in the cool box will be transported directly to the laboratory or to the GEE office where more ice will be added until delivered to the laboratory (within one day). Transport of samples to the laboratory will be undertaken through chain-of-custody (COC) procedures. The COC form (provided by the laboratory) will demonstrate that the samples are properly received, documented, processed and stored.

10.1.3 Decontamination of Sampling Equipment

Considering that samples will be collected by hand using a new set of disposable nitrile gloves, decontamination will not be necessary as no re-useable equipment will be used. Additionally, when sampling from an excavator bucket or shovel, care will be taken to ensure that the soil sampled did not come into contact with the excavator bucket.

However, if the assistance of a trowel is required to collect samples, in situations of hard or well compacted ground) then the trowel will be decontaminated by washing with a laboratory grade, biodegradable and phosphate-free detergent followed by rinsing with potable water.

10.2 ANALYTICAL PLAN

Residual Natural Soil Profile

Each validation sample collected from the surface of the natural soil profile will be analysed for the contaminant of concern, which is lead. Although the standard 8 metals will be analysed (i.e. arsenic, cadmium, chromium, copper, nickel, lead, mercury and zinc).

Imported Fill

If required, every source of potential VENM will be analysed for:

- ◊ Metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc and mercury);
- ◊ Polycyclic Aromatic Hydrocarbons (PAHs),
- ◊ Total Petroleum Hydrocarbons (TPH),
- ◊ Benzene, Toluene Ethylbenzene, Xylenes and Naphthalene (BTEXN),
- ◊ Organochlorine Pesticides (OCPs),
- ◊ Organophosphate Pesticides (OPPs)
- ◊ Poly Chlorinated Biphenyls (PCBs),
- ◊ Volatile Organic Compounds (VOCs), and
- ◊ Asbestos.

ENM material will require analysis in accordance with the ENM Order (**Appendix D**).

10.3 QUALITY ASSURANCE

Quality Assurance (QA) involves all of the actions, procedures, checks and decisions undertaken to ensure the representativeness and integrity of samples and accuracy and reliability of analysis results (reference 4).

In accordance with AS4482.1 (reference 16), a series of QA procedures will be integrated within the sampling and analysis plan and include:

- ◊ The collection of Quality Control (QC) samples (i.e., blind replicates, split duplicates, trip blanks and trip spikes).
- ◊ The use of standardised field sampling forms developed by GEE.
- ◊ Documentation of calibration and use of field instruments.

To ensure QA in the field, samples will be collected by experienced and trained personnel using appropriate methods detailed herein, including appropriate sample handling, containment and transport, and calibrated equipment.

To ensure QA in the laboratory, GEE intend to use laboratories that are NATA accredited for the analytical tests carried out, therefore it is reasonable for GEE to rely on the laboratories to be proficient in all tests conducted. This encompasses all actions, procedures, checks and decisions undertaken, to ensure the accuracy and reliability of the analysis results.

To measure the effectiveness of the QA procedures Quality Control (QC) samples will be collected and analysed as described in Section 10.4.

10.4 QUALITY CONTROL

QC involves those parts of QA which serve to monitor and measure the effectiveness of QA procedures. QC samples assess sample integrity, accuracy and precision and can be separated into field and laboratory QC.

Table 4 provides a description and objective of each of the field and laboratory QC samples to be used during the remediation program.

Table 4: QC Sample Types, Descriptions and Frequency of Analysis

Type	Description	Purpose	Recommended Frequency
	FIELD QC SAMPLES		
Blind Replicate	A sample collected at the same time and from the same sampling point as the corresponding primary sample[3], and analysed at the same laboratory. Blind replicates are collected, preserved, stored, transported and analysed in the same manner as the primary sample, with the laboratory having no knowledge of the source of the replicate sample. The assessment of blind replicates samples is undertaken by calculating the Relative Percent Difference (RPD) which is defined as: RPD (%) = 100 x (Result No. 1 – Result No. 2) / Mean Result	Used to evaluate total sampling and analysis precision and, in the case of soil samples, sample variability.	In accordance with AS4482.1 (reference 16) and NEPM (reference 19) it is recommended that 1 blind replicate sample is collected for every 20 primary samples.
Split Duplicate	A sample collected at the same time and from the same sampling point as the corresponding primary sample, and analysed at a separate laboratory. Split duplicates are collected, preserved, stored, transported and analysed in the same manner as the primary sample, with the laboratories having no knowledge of the purpose of the sample. The assessment of split duplicates samples is undertaken by calculating the Relative Percent Difference (RPD) which is defined as: RPD (%) = 100 x (Result No. 1 – Result No. 2) / Mean Result	Used to provide a check on the analytical proficiency of the laboratories and hence precision and comparability.	In accordance with AS4482.1 (reference 16) and NEPM (reference 19) it is recommended that 1 blind replicate sample is collected for every 20 primary samples.
Trip Blank	Trip blanks are laboratory supplied test samples of analyte-free media (either washed sand or de-ionised water) which remain in the sample storage eskies during sampling activities and returned to the laboratory unopened. For soil sampling programs, the trip blank consists of acid-washed quartz sand that has been heated to 400ºC. For water sampling programs trip blanks comprise pre-washed glass vials containing distilled or de-ionised water with appropriate preservatives. The USEPA has shown that cross-contamination only occurs with volatile organics (reference 17), therefore, trip blanks are only analysed for volatile organics.	Used to measure cross-contamination during sampling, transport, sample preparation and analysis.	Industry standard is 1 trip blank per batch of primary samples.

[3] Primary samples are the original representative samples of soil or groundwater collected for analysis to determine aspects of their chemical composition. Primary samples are the original sample taken from a particular location and other samples from the same location are duplicates, replicates or splits.

Table 4 (Continued)**:** QC Sample Types, Descriptions and Frequency of Analysis

Trip Spike	Trip spikes, like trip blanks, are supplied by the primary laboratory using analyte-free media (either washed sand or de-ionised water) and remain in the sample storage eskies during sampling activities and returned to the laboratory unopened. The sample media, however, is spiked with BTEX. For water sampling programs the BTEX concentration is known and standardised by each laboratory, while for soil sampling programs the exact spike concentration is not known, rather two identical jars of sand are spiked the same concentration with one sample becoming the trip-spike and the other becoming a control sample, which remains in a refrigerator at the laboratory. The trip spike is analysed after returning from the field and the % recovery of the known spike (for water sampling programs), or of the control sample (for soil sampling programs), is calculated.	Used to monitor VOC losses during transit.	Industry standard is 1 trip spike per batch of primary samples where volatile concentrations are being measured.
	LABORATORY QC SAMPLES		
Laboratory Duplicate	Laboratory duplicates are field samples which are prepared and analysed in the same manner twice. The assessment of laboratory duplicates is undertaken by calculating the (RPD) which is defined as: $\text{RPD (\%)} = 100 \times \frac{\text{Result No. 1 – Result No. 2}}{\text{Mean Result}}$	Determines analytical precision for a sample batch	NATA specifies 1 per 10 samples for trace element and inorganic analysis
Laboratory Control Sample (LCS)	Laboratory Control Samples (LCS) are analyte-free matrices (de-ionised water or clean sand) spiked with a known concentration of target analytes and carried through the entire preparation and analysis. Assessment of LCS is undertaken by calculating the percent recovery (%R) of the spike which is defined as: $\text{Percent Recovery (\%R)} = 100 \times \frac{\text{Spikes Sample Result (SSR) – Sample Result (SR)}}{\text{Concentration of Spike Added (SA)}}$	Determines analytical accuracy and precision for a batch of samples	NATA specifies 1 per batch of up to 20 samples
Surrogates	Surrogates are organic compounds added to field samples and laboratory QC samples prior to preparation. They are similar in chemical behavior to the target analytes and are not expected to be present in samples. They form part of the laboratory QC for organic analyses and are used to indicate the presence of sample specific interferences. The surrogate is added at the extraction stage then analysed with the batch of samples. Like LCSs, surrogates are assessed by calculating the percent recovery (%R), although the definition is slightly different as shown below: $\text{Percent Recovery (\%R)} = 100 \times \frac{\text{Spiked Sample Result (SSR)}}{\text{Concentration of Spike Added (SA)}}$	Used to demonstrate that the surrogate does not interfere with the target analytes, therefore determines analytical accuracy for each sample	Added to every blank, field and laboratory QC sample

Table 4 (Continued)**:** QC Sample Types, Descriptions and Recommended Frequency of Analysis

Type	Description	Purpose	Recommended Frequency
	LABORATORY QC SAMPLES		
Matrix Spikes	Field samples spiked with a known concentration of a target analytes and carried through the entire preparation and analysis. Matrix spike samples are assessed by calculating the percent recovery (%R) of the spike which is defined as: Percent Recovery (%R) = 100 x $\frac{\text{Spikes Sample Result (SSR) – Sample Result (SR)}}{\text{Concentration of Spike Added (SA)}}$	Determine the effects of matrix interferences on analytical accuracy of a sample.	Performed at least 1 per batch of up to 20 samples.
Method Blank	Method blanks are an analyte-free matrices (reagent water or clean sand) that is carried through the entire preparation and analysis.	Establishes that laboratory contamination does not cause false positives.	Prepared with every batch of up to 20 samples for all organic and inorganic analyses.

10.4.1 Evaluation of QC Sample Results

The QC Acceptance Criteria adopted for this investigation is provided in **Table 5** and is in general accordance with AS4482.1 (reference 16) and NEPM (reference 4).

Table 5: QC Sample Acceptance Criteria

QC Sample	Criteria / Acceptable Range
FIELD QC SAMPLES	
Blind Replicates & Split Duplicates	RPD < 50 % When average concentration is > 10 x LOR/PQL[4] RPD < 75 % When average concentration is 5 to 10 x LOR/PQL RPD < 150 % When average concentration is< 5 x LOR/PQL
Trip Blank	Analytical Result < LOR/PQL
Trip Spike	± 30%
LABORATORY QC SAMPLES	
Laboratory Duplicates	RPD < 30 % When average concentration is > 10 x LOR/PQL RPD < 50 % When average concentration is 4 to 10 x LOR/PQL RPD < 100 % When average concentration is< 4 x LOR/PQL
Laboratory Control Samples	%R of 70 – 130% (General analytes) %R of 50 – 130% (Phenols) %R of 60 – 130% (OCP/OPPs) %R of 62 – 130% (Chromium)
Surrogates	%R of 70 – 130% (General analytes) %R of 50 – 130% (Phenols) %R of 60 – 130% (OCP/OPPs)
Matrix Spikes	%R of 70 – 130% (General analytes) %R of 50 – 130% (Phenols) %R of 60 – 130% (OCP/OPPs) %R of 62 – 130% (Chromium)
Method Blanks	Analytical Results < LOR/PQL

If data does not meet the QC Acceptance Criteria, then a judgement is made as to whether the exceedance is critical in relation to the suitability of the data set. Otherwise, the following steps will be taken:

- ◊ Request that the laboratory re-check or even re-analyse the sample.
- ◊ Inspect the sample for anomalies which may be causing the failure.
- ◊ If necessary, undertake additional sampling and analyses.

[4] Both the LOR and PQL are interchangeable terms used by laboratories and is defined as the lowest concentration that can be reliably achieved within specific limits of precision and accuracy during routine laboratory operating conditions (Popek, 2003 – reference 19).

10.5 VALIDATION REPORT

Consistent with NSW EPA requirements, a validation report will be prepared at the conclusion of remediation works. The validation report, prepared in accordance with the requirements of EPA guidelines (reference 3), will outline the results of the remediation works undertaken at the site and an assessment of the suitability of the site for the proposed use.

11 REMEDIATION ASSESSMENT CRITERIA

To determine the success of the proposed remediation plan it is necessary to define appropriate Remediation Assessment Criteria (RAC).

For the contaminants of concern (i.e. metals), GEE will compare the analytical results against Health Investigation Levels (HILs) and Health Screening Levels (HSLs), provided in NEPM (2013), *Schedule B(1) – Guidelines on Investigation Levels for Soil and Groundwater* (reference 20). A summary of the RAC for metals is provided in **Table 6.**

Table 6: Soil Remediation Assessment Criteria (RAC)

Analyte	**Health Investigation (HILs)** (mg/kg)	Reference
Total Metals		
Arsenic	100	(HIL-A) Table 1A – Reference 20
Cadmium	20	(HIL-A) Table 1A – Reference 20
Chromium (VI)	100	(HIL-A) Table 1A – Reference 20
Copper	6,000	(HIL-A) Table 1A – Reference 20
Lead	300	(HIL-A) Table 1A – Reference 20
Mercury (inorganic)	40	(HIL-A) Table 1A – Reference 20
Nickel	400	(HIL-A) Table 1A – Reference 20
Zinc	7,400	(HIL-A) Table 1A – Reference 20

11.1 APPLICATION OF SOIL ASSESSMENT CRITERIA

In accordance with the NEPM (2013), *Schedule B(1) – Guidelines on Investigation Levels for Soil and Groundwater* (reference 20), no single summary statistic will fully characterise a site and appropriate consideration of relevant statistical measurements should be used in the data evaluation process.

For soil to be considered as uncontaminated (i.e. not posing an unacceptable risk) all reported concentrations must be below the site remediation criteria. For chemical analysis the following statistical criteria shall be adopted with respect to the health criteria:

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

In addition to the numerical criteria, there should be no visual asbestos containing material (ACM) or adverse aesthetics on the surface or within the subsurface fill/natural soils.

12 INTERIM SITE MANAGEMENT PLAN (SITE PREPARATION)

12.1 SERVICES AND UTILITIES

The location of buried services across the site should be identified and marked to ensure no damage occurs during the remediation work.

12.2 SITE SECURITY, RESTRICTED ACCESS AND SIGNAGE

Access to site will be restricted during site redevelopment works as required by Council Development Application conditions.

12.3 STORMWATER CONTROL MEASURES

No stormwater control measures are proposed during the site preparation phase since it is expected that the transportation of contaminated soil will occur immediately after excavation and there will be no need to form stockpiles for any length of time.

12.4 OCCUPATIONAL HEALTH & SAFETY PLAN

All work associated with the decommissioning and remediation of the site would conform at a minimum, to the requirements of the NSW Occupational Health and Safety Act.

12.5 LICENCES AND APPROVALS

No specific licences are required for the remediation work proposed. However, approval for the work should be granted by Council depending on the category of the remediation work. For Category 1 works, which requires development consent, the proposed remediation work must be advertised for 30 days pursuant to Clause 13 of SEPP 55. For Category 2 works Council should be notified 30 days prior to commencing work.

12.6 COMMUNITY RELATIONS PLAN

A community relations plan is not considered necessary for the site.

13 SITE MANAGEMENT PHASE (OPERATIONAL PHASE)

Remediation works shall be conducted in a manner that minimises environmental impacts and that meets statutory requirements. Site works should comply with the following legislation:

- ◊ Contaminated Land Management Act (1997),
- ◊ Contaminated Land Management Amendment Act (2008),
- ◊ Protection of the Environment Operations Act (1997),
- ◊ Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation (2008),
- ◊ Environmentally Hazardous Chemicals Act (1985),
- ◊ Dangerous Goods Act (1975),
- ◊ Waste Avoidance and Resource Recovery Act (2001),
- ◊ Clean Air (Plant and Equipment) Regulation (1997),
- ◊ Occupational Health and Safety Act (2001), and
- ◊ Local Government Act (1993).

The contractor shall endeavour to:

1. Minimise fugitive dust emissions,
2. Minimise the volume of water containing suspended sediment leaving the site,
3. Prevent vehicles from tracking mud on local roads, and
4. Ensure that noise and vibration levels conform to legislative requirements.

A preliminary site management plan for the operational phase of the remediation works is provided below.

13.1 CONTACT PERSONS

The remediation works shall be managed by a contractor to be announced.

- ◊ Contact: Contact name, Position, TBA
- ◊ Phone: TBA
- ◊ Mobile: TBA
- ◊ Email: TBA

13.2 STORMWATER MANAGEMENT

Stormwater will be diverted away from excavations by a series of bunds to be retained until excavations are backfilled or until permanent stormwater infrastructure is installed on the site. Similarly, low (nominal 0.5m) earthen bund walls will be constructed around stockpiles (where placed in uncovered areas of the site) to prevent the erosion and off site transport of contaminated soil. Management measures for the site will include:

- ◊ Stormwater diversion bunds and appropriate erosion controls around excavations (as required) and stockpiles,
- ◊ Minimising surface disturbance and maximising the retention of existing surface cover (pavements) during the works,
- ◊ Stockpiles to be located away from concentrated stormwater flow paths including drainage lines, gutters or stormwater pits and inlets,
- ◊ No stockpiles to be placed on footpaths unless prior Council approval has been obtained,
- ◊ Construction of sediment controls downstream of diversion bunds, stockpile and traffic areas to minimise the off-site migration of sediment, and
- ◊ Soil, earth and mud shall be removed from the roadway by sweeping, shovelling or a means other than washing on a daily basis or as required.

If required, stormwater at site discharge points will be inspected on each day of discharge. Where necessary, samples will also be collected during the works where necessary. Samples will be analysed for Total Suspended Solids (TSS) and Total Oil and Grease (TOG). Corrective action will be required if concentrations of these parameters exceed 50 and 10 mg/L respectively.

Hay bales will be installed around excavations, stockpiles and stormwater pits in accordance with Landcom (2004) requirements (reference 21). Visually contaminated seepage water in the excavations will be removed by a licensed liquid waste contractor for disposal. Seepage without visible signs of contamination (*e.g.*, oily sheen) may be pumped onto stockpiles for dust suppression or directly into the stormwater system subject to Council approval. Excavation pump-outs must be sampled and analysed for pH, concentrations of TSS, TOG and priority contaminants. Analytical results must comply with relevant EPA and ANZECC standards for water quality prior to discharge. Limit concentrations for TSS and TOG of 50 and 10 mg/L respectively may be adopted. Council may impose additional discharge criteria for water released into the stormwater system at the site.

13.3 CONTROL OF DUST AND ODOUR

The remediation work will be undertaken in a manner that minimises fugitive dust and odour emissions.

Measures to control dust and odour will include:

- ◊ Careful handling of material in a manner that minimises dust emissions,
- ◊ Placement of screening material (*e.g.*, hessian) on perimeter fences adjacent to excavations,
- ◊ Water spraying across dusty areas of the site,
- ◊ Keeping excavations moist (where practical),
- ◊ The use of tarpaulins or similar to cover loads (incoming and outgoing), and
- ◊ The restriction of stockpile heights to less than 2m.

Where visual inspection indicates that dust levels may be unacceptable, work will cease until measures are taken to reduce emissions or until weather conditions improve. The site supervisor will be responsible for dust management.

Local Government requirements state that no odours shall be detected at the site boundary during remedial works by an authorised Council officer relying solely on the sense of smell. The following procedures may be engaged in order to minimise odours:

- ◊ Covering of stockpiles (where practical),
- ◊ Use of fine mist sprays and hydrocarbon mitigating agent on impacted areas and materials, and
- ◊ Adequate maintenance of equipment and machinery to minimise exhaust emissions.

13.4 NOISE CONTROL

Minor increased noise levels may result from the use of machines on site during the course of the project, which is expected to take less than 1 weekday. To mitigate any noise which may arise as a result of site works, all works would be carried out in accordance the EPA NSW *Interim Construction Noise Guideline* (reference 22).

Working hours will be restricted to those specified in the DA consent conditions for the proposed development.

13.5 VIBRATION CONTROL

Excavation proposed as part of the remediation works is unlikely to cause any significant vibrations to be transmitted through the ground and potentially impact on adjoining structures.

13.6 TRAFFIC AND TRANSPORT

Traffic disruptions may potentially be an issue as a result of site remediation works mostly associated with the excavation and disposal of the fill material. Methods such as using a skip or transporting materials to and from site using a barge should be considered in order to alleviate traffic impact.

All machinery will be transported to the site in accordance with regulatory requirements.

All haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site are to be selected to meet the following requirements:

- ◊ Comply with all road traffic rules,
- ◊ Minimise noise, vibration and odour to adjacent properties, and
- ◊ Utilise State Roads and minimise the use of local roads.

The site supervisor shall ensure that all vehicles:

- ◊ Conduct deliveries of soil, materials, equipment of machinery during the allowed hours of remediation work,
- ◊ Securely cover all loads to prevent/minimise any dust or odour emissions during transport, and
- ◊ Do not track soil, mud or sediment onto the roads and footpaths.

13.7 UNDERGROUND SERVICES

All underground services are to be located and either removed or avoided.

13.8 RESTRICTED ACCESS

Contractors only will be allowed on site whilst excavation and removal of soil to trucks is in progress. No members of the public will be allowed on site during this time.

During remediation works, the site will be designated as a construction area. Consequently, access will be restricted to authorised staff and contractors equipped with appropriate

Personal Protective Equipment (PPE). The site supervisor will control site access. All visitors will report to the site supervisor to be inducted into the site safety programme and environmental protection programme prior to entering the site.

14 WORKPLACE HEALTH AND SAFETY PLAN

The purpose of the Workplace Health and Safety (WHS) plan is to ensure that the RAP is conducted in a controlled and safe manner with due regard for potential hazards and safe work practices. The WHS plan will be implemented and enforced by the appointed site supervisor following a brief induction by GEE. The following preliminary plan contains minimum WHS requirements at the site. Contractors must be required to produce their own project-specific Project Safety Plans prior to the commencement of any works at the site, under which their employees are to operate at all times whilst at the site.

14.1 PERSONNEL AND RESPONSIBILITY

All personnel will be made aware of the person responsible for implementing health and safety procedures. All personnel should read and understand the WHS plan prior to commencing work and have signed a statement to verify this understanding. Contractors shall be responsible for ensuring that their employees are aware of and comply with the Project Safety Plans developed for each task and with all relevant statutes and regulations.

14.2 IDENTIFICATION OF POTENTIAL HAZARDS

14.2.1 Contaminant Hazards

Contaminants that may be present at the site include, but are not limited to:

◊ Metals (specifically Lead)

Potential risks to personnel associated with these compounds, if present at the site, include:

1. Ingestion of soil or liquids,
2. Dermal (skin) contact with contaminated soil or liquids, and
3. Inhalation of dust, vapours or aerosols containing contaminants,

14.2.2 Physical Hazards

The following physical hazards may exist at the site:

◊ Heavy equipment (mobile and stationary),

◊ Light vehicles with associated traffic and vehicle hazards,

◊ Excavations,

◊ Heat exposure,

◊ Buried Services,

- ◊ Noise,
- ◊ Dust,
- ◊ Electrical equipment.

Personnel should also be aware of the necessary precautions with respect to hoisting of people, smoking, drugs and alcohol, first aid, privacy of information, environmental considerations, health surveillance, working alone, incident reporting, WHS consultation, discrimination and sexual harassment.

14.3 MEDICAL SURVEILLANCE

It is expected that all personnel on the site have undergone specific training for working on contaminated sites. A site-specific medical surveillance scheme is not considered necessary for this project.

14.4 SITE WORK PRACTICES

14.4.1 Personal hygiene

No smoking, eating or drinking will be permitted on site in areas where the possibility of contamination exists. In particular, smoking will be prohibited in areas were volatile hydrocarbons or other inflammable materials have accumulated. In these areas, a designated clean location should be allocated for smoking and the consumption of food or drink. These areas should be equipped with hand washing facilities which must be used prior to engaging in these activities. Personnel should be made aware of the location of these facilities.

14.4.2 Decontamination

Contaminated equipment should not be removed from the work area to avoid contaminating other parts of the site.

14.4.3 Restricted Access

A perimeter fence exists and will remain during the remediation work. Signs should be erected to notify personnel of the presence of excavations on the site and signs indicating asbestos removal work. Site visitors must report to the site office prior to entering the site.

14.4.4 Personal protection

Personnel will take measures to avoid coming into direct contact with contaminated material. Workers are to ensure that soil, surface water or groundwater are not ingested

or swallowed and that direct contact with skin is avoided. Personnel should wear the following Personal Protective Equipment (PPE):

- ◊ Steel-capped boots meeting AS2210.3 requirements (reference 23),
- ◊ Fluorescent safety vest or other high visibility clothing conforming to AS/NZS 4602:1999 (reference 24),
- ◊ Hard hat meeting AS1801-1981 (reference 25) requirements when working within close proximity to the excavator,
- ◊ Safety glasses or goggles with side shields meeting AS1337.6-2007 (reference 26) requirements as necessary, and
- ◊ Disposable latex gloves for personnel involved in soil or groundwater sampling.

In the unlikely event that personnel are required to work in areas with highly contaminated soil or other hazardous materials, the following additional protection will be required:

- ◊ Disposable coveralls (if necessary) to prevent contact with splashed soil or materials, and
- ◊ Nitrile gloves meeting AS2161-2000 (reference 27) requirements or heavy-duty gauntlet gloves.

14.5 EMERGENCY RESPONSE PLAN

14.5.1 Resources

The following emergency numbers can be called if medical or other emergency services are required:

Hospital: Saint Vincent's Hospital
390 Victoria Street, Darlinghurst NSW 2010
(02) 8382 1111

Police, fire, ambulance: 000

Electrical: Energy Australia
13 13 18

Council: Waverley Council
55 Spring St, Bondi Junction NSW 2022
(02) 9083 8000

Water: Sydney Water
132 090

Gas:	Jemena Gas 131 909
Utilities:	Telstra 1800 653 935

14.5.2 Responsibilities

The site supervisor will be responsible for ensuring that site personnel are aware of emergency services available. A site safety officer must be available during remedial works.

15 REFERENCES

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17. Keith, 1991: *Environmental sampling and Analysis, A practical guide*. Lewis Publishers.
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20. NEPC, 2013: National Environment Protection Council (1999*).* National Environment Protection (Assessment of Site Contamination) Measure. *Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater.*
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22. DECC, 2009: Department of Environment and Climate Change (DECC), 2009: Interim Construction Noise Guideline.
23. Australian / New Zealand Standard (AS/NZS) 4602 (2009): *Occupational protective footwear Part 3: Specification for safety footwear (ISO 20345:2004, MOD).*
24. Australian / New Zealand Standard (AS/NZS) 4602 (1999): *High visibility safety garments.*
25. Australian / New Zealand Standard (AS/NZS) 1801 (1997): *Occupational protective helmets.*
26. Australian / New Zealand Standard (AS/NZS) 1337.6 (2007): *Personal eye protection Part 6: Prescription eye protectors against low and medium impact.*
27. Australian / New Zealand Standard (AS/NZS) 2161.1 (2000): *Occupational protective gloves - Selection, use and maintenance.*

FIGURES

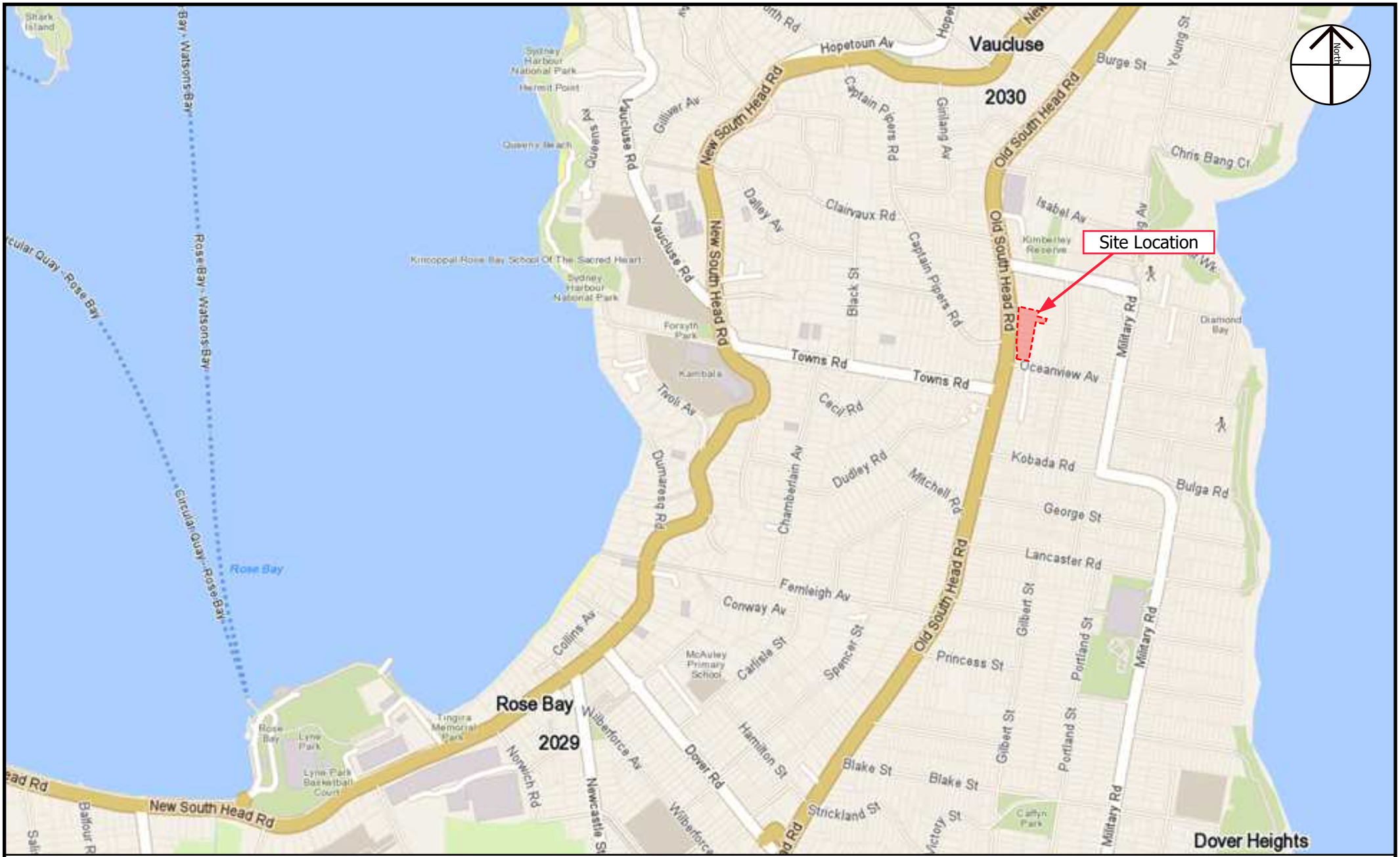

Image Source: www.whereis.com Map data © OpenStreetMap contributors

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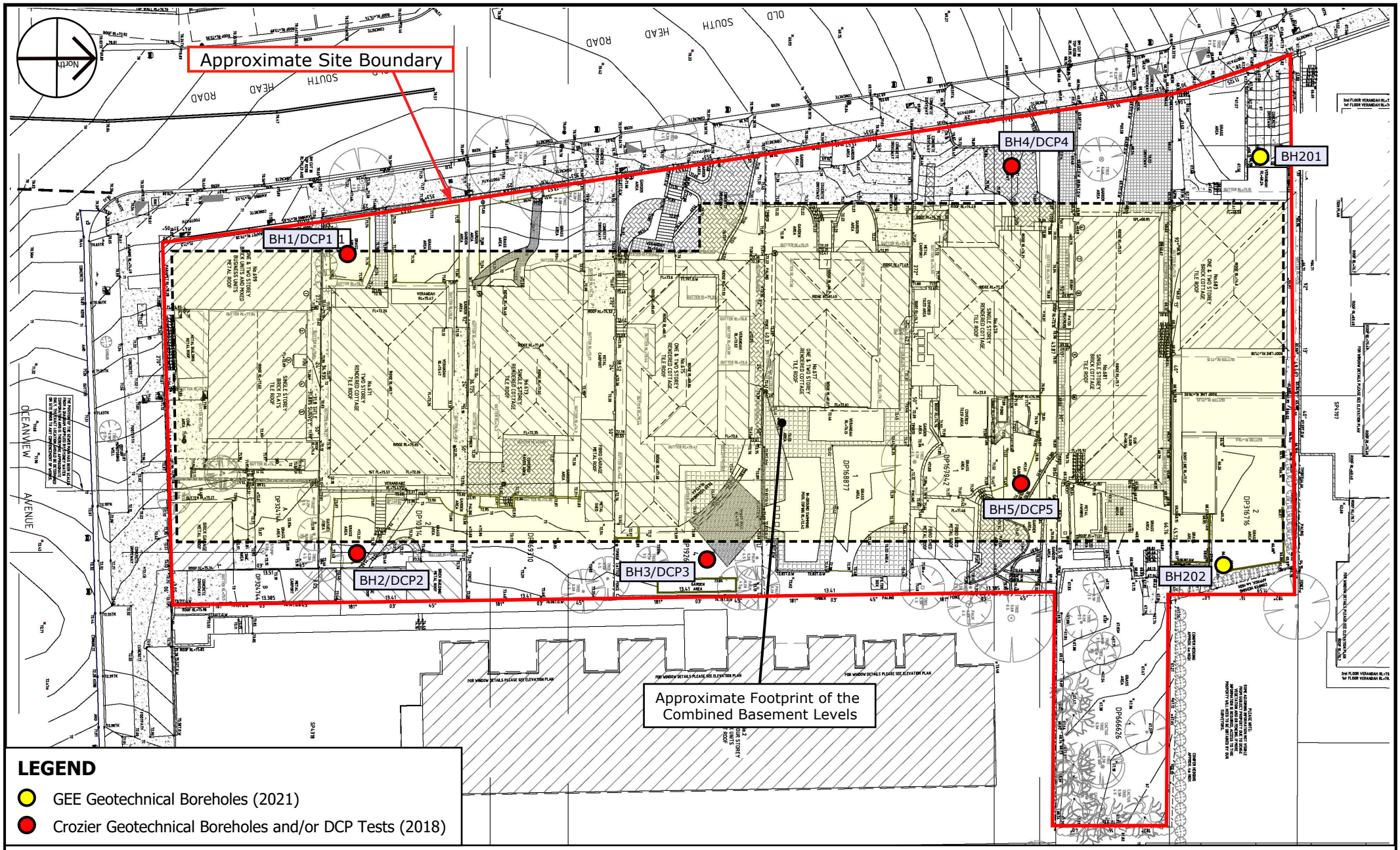
TITLE:	SCALE:	DATE:	FIGURE No.:
SITE LOCATION MAP 669 - 683 Old South Head Road, Vaucluse NSW	**N.T.S**	**10 Nov 2023**	**1**
	DRAWN: **S. McC**	JOB No.: **E23026VAU**	REVISION: **A**



LEGEND

- GEE Geotechnical Boreholes (2021)
- Crozier Geotechnical Boreholes and/or DCP Tests (2018)

Base Image: Plan Showing Detail and Levels Over Lot 2 DP10314 - Lot 1 DP167942 Being 671-679 Old South Head Road Vaucluse. Prepared by Survplan Drawing 1308CO_MHN Revision C Dated 17.11.23

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TITLE: SITE PLAN - SURVEY 669 - 683 Old South Head Road, Vaucluse NSW	SCALE: **N.T.S**	DATE: **16 Dec 2023**	FIGURE No.: **2**
	DRAWN: **S. McC**	JOB No.: **E23026VAU**	REVISION: **A**

Aerial Image Source: Nearmap Limited (www.nearmap.com.au) - Image Date 6 Dec 2020

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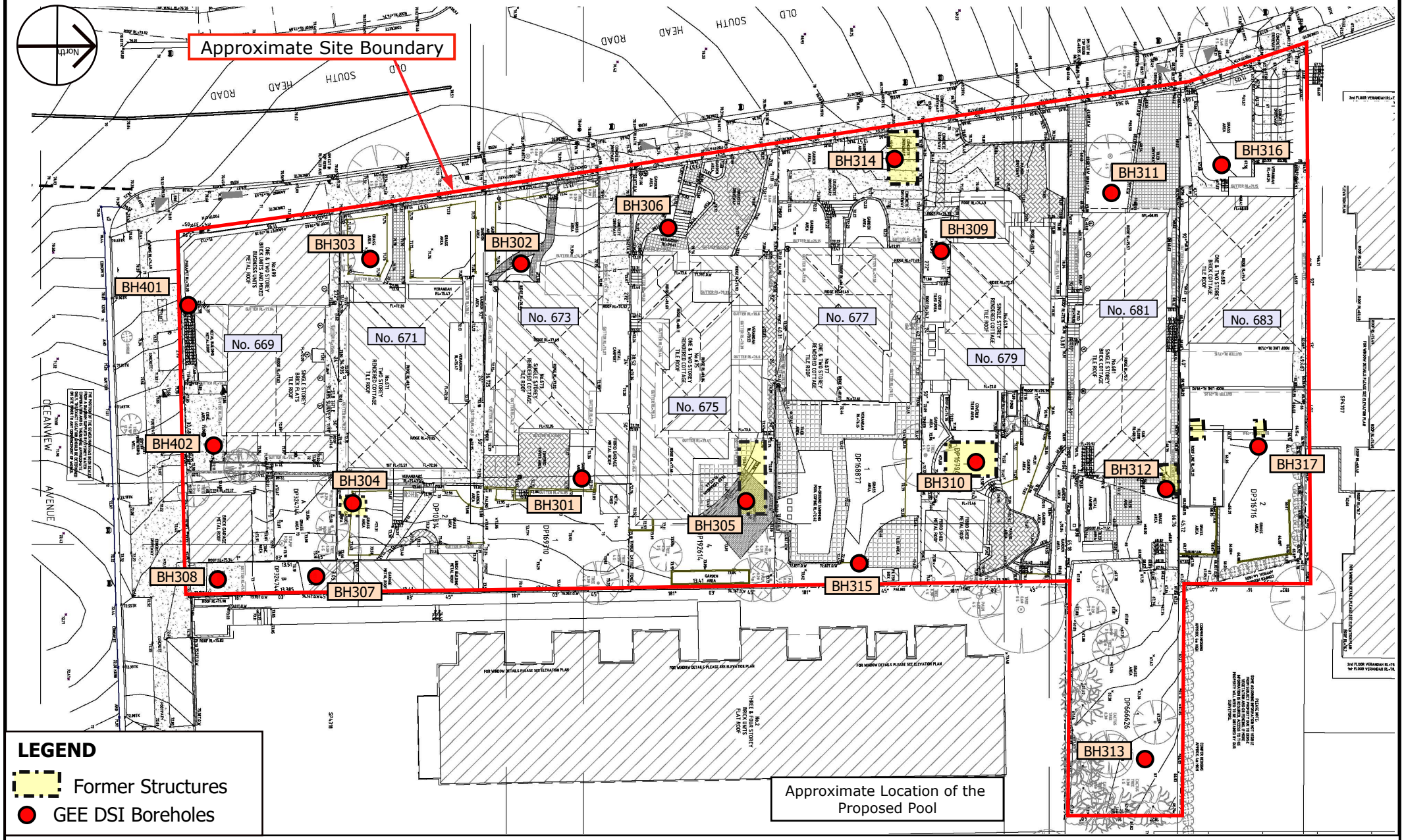
TITLE: SITE PLAN - AERIAL 669 - 683 Old South Head Road, Vaucluse NSW	SCALE: **N.T.S**	DATE: **10 Nov 2023**	FIGURE No.: **3**
	DRAWN: **S. McC**	JOB No.: **E23026VAU**	REVISION: **A**



Base Image: Plan Showing Detail and Levels Over Lot 2 DP10314 - Lot 1 DP167942 Being 671-679 Old South Head Road Vaucluse. Prepared by Survplan Drawing 1308CO_MHN Revision C Dated 17.11.23

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TITLE:	SCALE:	DATE:	FIGURE No.:
DSI Sampling Points	N.T.S	15 Dec 2023	4
	DRAWN: S. McC	JOB No.: E23026VAU	REVISION: A

APPENDIX A

Site Survey and Architectural Plans

A1

L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

DIAL 1100 BEFORE YOU DIG
www.1100.com.au

ORIGIN OF LEVELS :
SSM 60860 RL=65.336 (AHD) FOUND NEAR THE INTERSECTION OF MILITARY ROAD & OLD SOUTH HEAD ROAD.
ACCURACY OF ORIGIN : ± 0.001m

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
1	75.5	1.54	0.92	CLEAR
2	73.01	1.1	1.07	CLEAR
3	72.1	2.05	0.85	DOOR
4	73.01	1.1	1.1	CLEAR
5	73.01	1.1	1.2	CLEAR
6	69.8	2.1	1.1	DOOR
7	71.72	1.46	2.8	CLEAR
8	71.72	1.46	2.8	CLEAR
9	71.0	2.18	1.9	CLEAR
10	71.0	2.18	1.9	CLEAR
11	70.83	2.5	4.53	CLEAR
12	70.83	2.5	4.53	CLEAR
13	70.99	2.28	7.96	CLEAR
14	73.87	1.2	2	CLEAR
15	77.3	1.6	1.9	CLEAR
16	77.3	1.6	1.9	CLEAR
17	74.18	0.94	2.18	CLEAR
18	73.3	1.14	1.2	CLEAR
19	71.97	1.24	1	CLEAR
20	73.07	1.22	2.16	CLEAR
21	73.07	1.22	2.16	CLEAR

LEGEND

- TELSTRA PILLAR
- TELSTRA MARKER POST
- TELSTRA PIT
- POWER POLE
- ELECTRICAL PILLAR
- POWER LIGHT POLE
- LIGHT POLE
- GAS METER
- GAS DIRECTION MARKER
- WATER MAIN
- HYDRANT
- RECYCLED WATER
- WATER METER
- STOP VALVE
- WATER TAP
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- VEHICLE CROSSING
- TREE: Ø DIAMETER S SPREAD
- SEWER MANHOLE
- SEWER VENT
- SEWER LAMPHOLE
- STORMWATER PIT
- STORMWATER GRATE
- SURFACE INLET PIT
- STORMWATER PIPE INCLUDING PIPE SIZE (Ø 0.225)
- HEADWALL
- CLOTHES LINE
- E — OVERHEAD ELECTRICITY LINE
- T — OVERHEAD TELECOM LINE
- S — SEWER LINE

VAUGHAN WADY
REGISTERED SURVEYOR #8684
Surveyor Registered under the
Surveying and Spatial Information Act 2002

AREA LOT B VIDE DP 324744: 37.9 m² BY CALC : 40.98 m²	AREA LOT 4 VIDE DP 192614: 524.8 m² BY CALC : 528.4 m²	AREA LOT A VIDE DP 324744: 436.3 m² BY CALC : 437. m²
AREA LOT 2 VIDE DP 10314: 474.2 m² BY CALC : 480.3 m²	AREA LOT 1 VIDE DP 168877: 550.1 m² BY CALC : 552.4 m²	AREA LOT 2 VIDE DP 316716: 550.1 m² BY CALC : 550.5 m²
AREA LOT 1 VIDE DP 169310: 499.5 m² BY CALC : 504.3 m²	AREA LOT 1 VIDE DP 167942: 569.1 m² BY CALC : 573.2 m²	AREA LOT 1 VIDE DP 666626: 670.2 m² BY CALC : 678.0 m²

SURVPLAN SURVEYING // PLANNING // DESIGN
ABN 83 914 613 296
PO BOX 242 HELENSBURGH NSW 2508
PH 0420 944 413 Email: matt@survplan.com.au

PLAN SHOWING DETAIL AND LEVELS OVER LOT 2 DP10314 - LOT 1 DP167942 BEING No.671-683 OLD SOUTH HEAD RD VAUCLUSE FOR DESIGN PURPOSES AND TO SUPPORT A DEVELOPMENT APPLICATION

Rev.	Amendments	Date
A	ADJ.BUILDING DESCRIPTION	17.09.18
B	ADDITIONAL SURVEY INFORMATION	12.04.21
C	UPDATE SURVEY INFORMATION	17.11.23

JOB No. 1308		YOUR REF: MEISSEN PROPERTIES	
DRAWING No. 1308CO_MHN.dwg		CLIENT: MHN DESIGN UNION	
SCALE: 1:250 (A1)	SURVEYED M.S. DATE: 5.12.17	DRAWN M.S. DATE: 11.12.17	CHECKED M.S. DATE: 14.12.17
DATUM:A.H.D.			
SHEET: 1 OF 9			

WARNING:

1. SURVPLAN OWNS THE RIGHTS TO THIS SURVEY AND RELATED DOCUMENTS. THE INFORMATION PROVIDED IN THIS DOCUMENT IS FOR THE CLIENT NAMED WITHIN. USE OF THIS PLAN BY ANY OTHER PERSON/S IS NOT PERMITTED UNLESS WRITTEN CONSENT IS PROVIDED BY SURVPLAN.
2. THE BOUNDARIES SHOWN HAVE BEEN COMPILED FROM THE INFORMATION SUPPLIED BY THE DEPARTMENT OF LANDS AND THEREFORE THE DIMENSIONS, AREA AND LOCATION OF EASEMENTS ARE SUBJECT TO A IDENTIFICATION SURVEY.
3. ALL DETAILS AND FEATURES SHOWN HAVE BEEN PLOTTED IN RELATION TO THE OCCUPATIONS, FENCING AND/OR OLD BRICK/RENDERED WALLS. AND ARE APPROXIMATE ONLY. A BOUNDARY SURVEY SHOULD BE DONE TO DETERMINE THE POSITIONS ACCURATELY.
4. SERVICES SHOWN HEREON ARE THOSE THAT WERE VISIBLE AT THE TIME OF SURVEY AND HAVE BEEN LOCATED BY FIELD SURVEY. FURTHER SERVICES MAY BE PRESENT. PRIOR TO ANY CONSTRUCTION OR EXCAVATION ON SITE THE RELEVANT AUTHORITIES SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES. DIAL BEFORE YOU DIG!
5. THIS SURVEY SHOULD NOT BE USED TO SETOUT BOUNDARY FENCING OR BUILDING WORKS NEAR OR ON THE BOUNDARIES. A SETOUT PLACING ACCURATE MAKES SHOULD BE CARRIED OUT PRIOR TO ANY BUILDING WORKS.
6. THE CONTOUR INTERVAL IS 0.2m. UNLESS SHOWN OTHERWISE. THE CONTOURS HAVE BEEN PLOTTED FROM INTERPOLATION METHODS.

A1

L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

0 1 2 3 4 5 10m
1 : 100

OLD SOUTH HEAD ROAD

No.26-28
SINGLE STOREY
BRICK COTTAGE/SHOP
TILE ROOF

No.22-24
SINGLE STOREY
BRICK COTTAGE/SHOP
TILE ROOF

No.18-20
THREE STOREY
RENDERED UNITS
/COMMERCIAL SHOP
FLAT ROOF

No.671
TWO STOREY
RENDERED COTTAGE
TILE ROOF

No.699
ONE & TWO STOREY
BRICK UNITS AND MIXED
BUSINESS UNITS
METAL ROOF

SINGLE STOREY
BRICK FLATS
TILE ROOF

~31.8 TITLE
~31.885 SURVEY

A
DP324744

B
DP324744

GARAGE
METAL ROOF

METAL
CARPORT

BRICK GARAGE
METAL ROOF

METAL BUILDING
METAL ROOF

CONCRETE
DRIVEWAY

GRASS
AREA

GARDEN
AREA

FOOTPATH

CONCRETE

No.667A
TWO STOREY
BRICK UNITS
FLAT ROOF

OCEANVIEW AVENUE

THE POSITION OF THE SEWER MAIN HAS BEEN SCALED FROM A DIAGRAM SUPPLIED BY SYDNEY WATER CORPORATION AND IS THEREFORE APPROXIMATE ONLY. THE EXACT LOCATION SHOULD BE DETERMINED ON SITE PRIOR TO ANY COMMENCEMENT OF WORKS.

DIAGRAM:
N.T.S.

APPROX TN
12.593°
M.M.

FOR BASIX PURPOSES

N

DIAL 1100
BEFORE YOU DIG
www.1100.com.au

ORIGIN OF LEVELS :
SSM 60860 RL=65.336 (AHD) FOUND NEAR THE INTERSECTION OF MILITARY ROAD & OLD SOUTH HEAD ROAD.
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- TELSTRA MARKER POST
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- POWER POLE
- ELECTRICAL PILLAR
- POWER LIGHT POLE
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- WATER TAP
- STREET SIGN
- PRAM CROSSING
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- TREE: Ø DIAMETER S SPREAD
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- STORMWATER GRATE
- SURFACE INLET PIT
- STORMWATER PIPE INCLUDING PIPE SIZE
- HEADWALL
- CLOTHES LINE
- E — OVERHEAD ELECTRICITY LINE
- T — OVERHEAD TELECOM LINE
- S — SEWER LINE

SURVPLAN
SURVEYING // PLANNING // DESIGN
ABN 83 914 613 296
PO BOX 242 HELENSBURGH NSW 2508
PH 0420 944 413 Email: matt@survplan.com.au

PLAN SHOWING DETAIL AND LEVELS OVER LOT 2 DP10314 - LOT 1 DP167942 BEING No.671-683 OLD SOUTH HEAD RD VAUCLUSE FOR DESIGN PURPOSES AND TO SUPPORT A DEVELOPMENT APPLICATION

Rev.	Amendments	Date
A	ADJ.BUILDING DESCRIPTION	17.09.18
B	ADDITIONAL SURVEY INFORMATION	12.04.21
C	UPDATE SURVEY INFORMATION	17.11.23

JOB No. 1308		YOUR REF: MEISSEN PROPERTIES	
DRAWING No. 1308CO_MHN.dwg		CLIENT: MHN DESIGN UNION	
SCALE: 1:100 (A1)	SURVEYED M.S. DATE: 5.12.17	DRAWN M.S. DATE: 11.12.17	CHECKED M.S. DATE: 14.12.17
DATUM: A.H.D.			
SHEET: 2 OF 9			

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6. THE CONTOUR INTERVAL IS 0.2m. UNLESS SHOWN OTHERWISE. THE CONTOURS HAVE BEEN PLOTTED FROM INTERPOLATION METHODS.

A1 0 1 2 3 4 5 10m

1 : 100

L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

DIAGRAM: N.T.S.

APPROX TN M.M. 12.593°

FOR BASIX PURPOSES

No.36 SINGLE STOREY RENDERED COTTAGE TILE ROOF

No.34 ONE & TWO STOREY RENDERED COTTAGE TILE ROOF

RENDERED GARAGE

BRICK GARAGE

No.32 SINGLE STOREY BRICK COTTAGE TILE ROOF

No.30 ONE & TWO STOREY BRICK COTTAGE TILE ROOF

No.679 SINGLE STOREY RENDERED COTTAGE TILE ROOF

No.677 ONE & TWO STOREY RENDERED COTTAGE TILE ROOF

No.675 ONE & TWO STOREY RENDERED COTTAGE TILE ROOF

No.673 SINGLE STOREY RENDERED COTTAGE

OLD SOUTH HEAD ROAD

CAPTAIN PIPERS ROAD

DP167942

DP168877

DIAL 1100 BEFORE YOU DIG www.1100.com.au

ORIGIN OF LEVELS :
SSM 60860 RL=65.336 (AHD) FOUND NEAR THE INTERSECTION OF MILITARY ROAD & OLD SOUTH HEAD ROAD.
ACCURACY OF ORIGIN : ± 0.001m

AREA LOT A
VIDE DP 324744: 436.3 m²
BY CALC : 437. m²

AREA LOT B
VIDE DP 324744: 37.9 m²
BY CALC : 40.98 m²

AREA LOT 4
VIDE DP 192614: 524.8 m²
BY CALC : 528.4 m²

AREA LOT 2
VIDE DP 10314: 474.2 m²
BY CALC : 480.3 m²

AREA LOT 1
VIDE DP 168877: 550.1 m²
BY CALC : 552.4 m²

AREA LOT 2
VIDE DP 316716: 550.1 m²
BY CALC : 550.5 m²

AREA LOT 1
VIDE DP 169310: 499.5 m²
BY CALC : 504.3 m²

AREA LOT 1
VIDE DP 167942: 569.1 m²
BY CALC : 573.2 m²

AREA LOT 1
VIDE DP 666626: 670.2 m²
BY CALC : 678.0 m²

VAUGHAN WADY
REGISTERED SURVEYOR #8684
Surveyor Registered under the Surveying and Spatial Information Act 2002

Rev.	Amendments	Date
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JOB No. 1308		YOUR REF: MEISSEN PROPERTIES	
DRAWING No. 1308CO_MHN.dwg		CLIENT: MHN DESIGN UNION	
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DATUM: A.H.D.			
SHEET: 3 OF 9			

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WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
1	75.5	1.54	0.92	CLEAR
2	73.01	1.1	1.07	CLEAR
3	72.1	2.05	0.85	DOOR
4	73.01	1.1	1.1	CLEAR
5	73.01	1.1	1.2	CLEAR
6	69.8	2.1	1.1	DOOR
7	71.72	1.46	2.8	CLEAR
8	71.72	1.46	2.8	CLEAR
9	71.0	2.18	1.9	CLEAR
10	71.0	2.18	1.9	CLEAR
11	70.83	2.5	4.53	CLEAR

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
11	70.83	2.5	4.53	CLEAR
12	70.83	2.5	4.53	CLEAR
13	70.99	2.28	7.96	CLEAR
14	73.87	1.2	2	CLEAR
15	77.3	1.6	1.9	CLEAR
16	77.3	1.6	1.9	CLEAR
17	74.18	0.94	2.18	CLEAR
18	73.3	1.14	1.2	CLEAR
19	71.97	1.24	1	CLEAR
20	73.07	1.22	2.16	CLEAR
21	73.07	1.22	2.16	CLEAR

LEGEND

- TELSTRA PILLAR
- TELSTRA MARKER POST
- TELSTRA PIT
- POWER POLE
- ELECTRICAL PILLAR
- POWER LIGHT POLE
- LIGHT POLE
- GM GAS METER
- G GAS DIRECTION MARKER
- W WATER MAIN
- H HYDRANT
- R RECYCLED WATER
- WATER METER
- STOP VALVE
- WATER TAP
- STREET SIGN
- PRAM CROSSING
- VEHICLE CROSSING
- TREE: Ø DIAMETER S SPREAD
- SEWER MANHOLE
- SEWER VENT
- SEWER LAMPHOLE
- STORMWATER PIT
- STORMWATER GRATE
- SURFACE INLET PIT
- STORMWATER PIPE INCLUDING PIPE SIZE Ø 0.225
- HEADWALL
- CLOTHES LINE
- E OVERHEAD ELECTRICITY LINE
- T OVERHEAD TELECOM LINE
- S SEWER LINE

A1

L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

0 1 2 3 4 5 10m
1 : 100

No.44
SINGLE STOREY
RENDERED COTTAGE
TILE ROOF
RIDGE RL=75.48
RIDGE RL=75.04
GUTTER RL=70.68
GUTTER RL=70.52

No.42
SINGLE STOREY
RENDERED COTTAGE
TILE ROOF
RIDGE RL=74.15
GUTTER RL=70.98
GUTTER RL=70.98

DIAGRAM: N.T.S.
APPROX TN M.M.
12.593°
FOR BASIX PURPOSES

No.40
ONE & TWO STOREY
RENDERED COTTAGE
TILE ROOF
GUTTER RL=74.85
RIDGE RL=76.22
RIDGE RL=73.08
RIDGE RL=77.07
RIDGE RL=74.08
GUTTER RL=74.66
GFL=67.87
ROOF RL=70.99
GUTTER RL=72.2
GUTTER RL=71.57

No.38
SINGLE STOREY
RENDERED COTTAGE
RIDGE RL=74.62
RIDGE RL=73.48

OLD SOUTH HEAD ROAD

CONCRETE DRIVEWAY
FOOTPATH
GRASS AREA
TILED AREA
TILED DRIVEWAY
GARDEN AREA
VERANDAH RL=68.24
TREE 0.4Ø 8 S
TREE 0.2Ø 4 S
TREE 0.4Ø 4 S
BM CUT IN TOP KERB RL=68.95 AHD

No.685
THREE – FIVE S
BRICK UNI
FLAT RO(
ROOF RL=76.7
ROOF RL=75.49
ROOF RL=69.48
2nd FLOOR VERANDAH RL=73.45
1st FLOOR VERANDAH RL=70.72
FOR WINDOW DETAILS PLEASE SEE ELEVATION PLAN

No.683
ONE & TWO STOREY
BRICK COTTAGE
TILE ROOF
RIDGE RL=74.0
ROOF LINE RL=71.38
GUTTER RL=71.15
ROOF LINE RL=70.92
GUTTER RL=71.12
GUTTER RL=70.29

No.681
SINGLE STOREY
BRICK COTTAGE
TILE ROOF
RIDGE RL=75.57
RIDGE RL=75.7

92° 13' 49.467
92° 13' 40"

VAUGHAN WADY
REGISTERED SURVEYOR #8684
Surveyor Registered under the
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DIAL 1100 BEFORE YOU DIG
www.1100.com.au

ORIGIN OF LEVELS :
SSM 60860 RL=65.336 (AHD) FOUND NEAR THE INTERSECTION OF MILITARY ROAD & OLD SOUTH HEAD ROAD.
ACCURACY OF ORIGIN : ± 0.001m

AREA LOT B VIDE DP 324744: 37.9 m² BY CALC : 40.98 m²	AREA LOT 4 VIDE DP 192614: 524.8 m² BY CALC : 528.4 m²	AREA LOT A VIDE DP 324744: 436.3 m² BY CALC : 437. m²
AREA LOT 2 VIDE DP 10314: 474.2 m² BY CALC : 480.3 m²	AREA LOT 1 VIDE DP 168877: 550.1 m² BY CALC : 552.4 m²	AREA LOT 2 VIDE DP 316716: 550.1 m² BY CALC : 550.5 m²
AREA LOT 1 VIDE DP 169310: 499.5 m² BY CALC : 504.3 m²	AREA LOT 1 VIDE DP 167942: 569.1 m² BY CALC : 573.2 m²	AREA LOT 1 VIDE DP 666626: 670.2 m² BY CALC : 678.0 m²

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5	73.01	1.1	1.2	CLEAR
6	69.8	2.1	1.1	DOOR
7	71.72	1.46	2.8	CLEAR
8	71.72	1.46	2.8	CLEAR
9	71.0	2.18	1.9	CLEAR
10	71.0	2.18	1.9	CLEAR
11	70.83	2.5	4.53	CLEAR

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
11	70.83	2.5	4.53	CLEAR
12	70.83	2.5	4.53	CLEAR
13	70.99	2.28	7.96	CLEAR
14	73.87	1.2	2	CLEAR
15	77.3	1.6	1.9	CLEAR
16	77.3	1.6	1.9	CLEAR
17	74.18	0.94	2.18	CLEAR
18	73.3	1.14	1.2	CLEAR
19	71.97	1.24	1	CLEAR
20	73.07	1.22	2.16	CLEAR
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LEGEND

- TELSTRA PILLAR
- TELSTRA MARKER POST
- TELSTRA PIT
- POWER POLE
- ELECTRICAL PILLAR
- POWER LIGHT POLE
- LIGHT POLE
- GAS METER
- GAS DIRECTION MARKER
- WATER MAIN
- HYDRANT
- RECYCLED WATER
- WATER METER
- STOP VALVE
- WATER TAP
- STREET SIGN
- PRAM CROSSING
- VEHICLE CROSSING
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- SEWER VENT
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- STORMWATER PIT
- STORMWATER GRATE
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- HEADWALL
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A1

L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

0 1 2 3 4 5 10m
1 : 100

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DIAGRAM: N.T.S.
APPROX TN
M.M. 12.593°
FOR BASIX PURPOSES

No.685
THREE - FIVE STOREY
BRICK UNITS
FLAT ROOF

ROOF RL=76.67
ROOF RL=76.7
ROOF RL=75.49
ROOF RL=69.48
ROOF RL=69.49
FOR WINDOW DETAILS PLEASE SEE ELEVATION PLAN
2nd FLOOR VERANDAH RL=73.45
1st FLOOR VERANDAH RL=70.72

SP4707

No.683
ONE & TWO STOREY
BRICK COTTAGE
TILE ROOF

RIDGE RL=74.0
RIDGE RL=75.57
RIDGE RL=75.7
ROOF LINE RL=71.38
ROOF LINE RL=70.92
ROOF LINE RL=71.21
GUTTER RL=71.15
GUTTER RL=71.12
GUTTER RL=71.25
GUTTER RL=70.9
VERANDAH RL=68.24
SUB FLOOR RL=68.56
GFL=68.85

No.681
SINGLE STOREY
BRICK COTTAGE
TILE ROOF

2 DP316716
1 DP666626

No.9
ONE & TWO STOREY
RENDERED COTTAGE
TILE ROOF
FOR WINDOW DETAILS PLEASE SEE ELEVATION PLAN
VERANDAH RL=66.91
RIDGE RL=71.17

No.11
ONE & TWO STOREY
RENDERED COTTAGE
TILE ROOF
RIDGE RL=72.23
RIDGE RL=72
GUTTER RL=71.03

TILED AREA
TILED DRIVEWAY
GARDEN AREA
GRASS AREA
METAL AWNING
TIMBER
PALING
FENCE
CONIFER HEDGING APPROX. 4m HIGH
THICK HEDGE TOP RL=69.82

PLEASE NOTE:
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LEGEND

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- WATER MAIN
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- WATER TAP
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- SURFACE INLET PIT
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A1

L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

0 1 2 3 4 5 10m

1 : 100

VAUGHAN WADY
REGISTERED SURVEYOR #8684
Surveyor Registered under the
Surveying and Spatial Information Act 2002

DIAGRAM: N.T.S.

APPROX TN M.M. 12.593°

FOR BASIX PURPOSES

FOR WINDOW DETAILS PLEASE SEE ELEVATION PLAN

No.679
SINGLE STOREY
RENDERED COTTAGE
TILE ROOF

No.677
ONE & TWO STOREY
RENDERED COTTAGE
TILE ROOF

No.675
ONE & TWO STOREY
RENDERED COTTAGE
TILE ROOF

No.673
SINGLE STOREY

No.2
THREE & FOUR STOREY
BRICK UNITS
FLAT ROOF

1 DP167942
1 DP168877
4 DP192614
1 DP169310

AREA LOT B VIDE DP 324744: 37.9 m² BY CALC : 40.98 m²	AREA LOT 4 VIDE DP 192614: 524.8 m² BY CALC : 528.4 m²	AREA LOT A VIDE DP 324744: 436.3 m² BY CALC : 437. m²
AREA LOT 2 VIDE DP 10314: 474.2 m² BY CALC : 480.3 m²	AREA LOT 1 VIDE DP 168877: 550.1 m² BY CALC : 552.4 m²	AREA LOT 2 VIDE DP 316716: 550.1 m² BY CALC : 550.5 m²
AREA LOT 1 VIDE DP 169310: 499.5 m² BY CALC : 504.3 m²	AREA LOT 1 VIDE DP 167942: 569.1 m² BY CALC : 573.2 m²	AREA LOT 1 VIDE DP 666626: 670.2 m² BY CALC : 678.0 m²

ORIGIN OF LEVELS :
SSM 60860 RL=65.336 (AHD) FOUND NEAR THE INTERSECTION OF MILITARY ROAD & OLD SOUTH HEAD ROAD.
ACCURACY OF ORIGIN : ± 0.001m

DIAL 1100 BEFORE YOU DIG
www.1100.com.au

LEGEND

- TELSTRA PILLAR
- TELSTRA MARKER POST
- TELSTRA PIT
- POWER POLE
- ELECTRICAL PILLAR
- POWER LIGHT POLE
- LIGHT POLE
- GAS METER
- GAS DIRECTION MARKER
- WATER MAIN
- HYDRANT
- RECYCLED WATER
- WATER METER
- STOP VALVE
- WATER TAP
- STREET SIGN
- PRAM CROSSING
- VEHICLE CROSSING
- TREE: Ø DIAMETER S SPREAD
- SEWER MANHOLE
- SEWER VENT
- SEWER LAMPHOLE
- STORMWATER PIT
- STORMWATER GRATE
- SURFACE INLET PIT
- STORMWATER PIPE INCLUDING PIPE SIZE
- HEADWALL
- CLOTHES LINE
- E — OVERHEAD ELECTRICITY LINE
- T — OVERHEAD TELECOM LINE
- S — SEWER LINE

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
1	75.5	1.54	0.92	CLEAR
2	73.01	1.1	1.07	CLEAR
3	72.1	2.05	0.85	DOOR
4	73.01	1.1	1.1	CLEAR
5	73.01	1.1	1.2	CLEAR
6	69.8	2.1	1.1	DOOR
7	71.72	1.46	2.8	CLEAR
8	71.72	1.46	2.8	CLEAR
9	71.0	2.18	1.9	CLEAR
10	71.0	2.18	1.9	CLEAR
11	70.83	2.5	4.53	CLEAR

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
11	70.83	2.5	4.53	CLEAR
12	70.83	2.5	4.53	CLEAR
13	70.99	2.28	7.96	CLEAR
14	73.87	1.2	2	CLEAR
15	77.3	1.6	1.9	CLEAR
16	77.3	1.6	1.9	CLEAR
17	74.18	0.94	2.18	CLEAR
18	73.3	1.14	1.2	CLEAR
19	71.97	1.24	1	CLEAR
20	73.07	1.22	2.16	CLEAR
21	73.07	1.22	2.16	CLEAR

SURVPLAN SURVEYING // PLANNING // DESIGN
ABN 83 914 613 296
PO BOX 242 HELENSBURGH NSW 2508
PH 0420 944 413 Email: matt@survplan.com.au

Rev.	Amendments	Date
A	ADJ.BUILDING DESCRIPTION	17.09.18
B	ADDITIONAL SURVEY INFORMATION	12.04.21
C	UPDATE SURVEY INFORMATION	17.11.23

PLAN SHOWING DETAIL AND LEVELS OVER LOT 2 DP10314 - LOT 1 DP167942 BEING No.671-683 OLD SOUTH HEAD RD VAUCLUSE FOR DESIGN PURPOSES AND TO SUPPORT A DEVELOPMENT APPLICATION

JOB No. 1308		YOUR REF: MEISSEN PROPERTIES	
DRAWING No. 1308CO_MHN.dwg		CLIENT: MHN DESIGN UNION	
SCALE: 1:100 (A1)	SURVEYED M.S. DATE: 5.12.17	DRAWN M.S. DATE: 11.12.17	CHECKED M.S. DATE: 14.12.17
DATUM: A.H.D.			
SHEET: 6 OF 9			

WARNING:

1. SURVPLAN OWNS THE RIGHTS TO THIS SURVEY AND RELATED DOCUMENTS. THE INFORMATION PROVIDED IN THIS DOCUMENT IS FOR THE CLIENT NAMED WITHIN. USE OF THIS PLAN BY ANY OTHER PERSON/S IS NOT PERMITTED UNLESS WRITTEN CONSENT IS PROVIDED BY SURVPLAN.
2. THE BOUNDARIES SHOWN HAVE BEEN COMPILED FROM THE INFORMATION SUPPLIED BY THE DEPARTMENT OF LANDS AND THEREFORE THE DIMENSIONS, AREA AND LOCATION OF EASEMENTS ARE SUBJECT TO A IDENTIFICATION SURVEY.
3. ALL DETAILS AND FEATURES SHOWN HAVE BEEN PLOTTED IN RELATION TO THE OCCUPATIONS, FENCING AND/OR OLD BRICK/RENDERED WALLS. AND ARE APPROXIMATE ONLY. A BOUNDARY SURVEY SHOULD BE DONE TO DETERMINE THE POSITIONS ACCURATELY.
4. SERVICES SHOWN HEREON ARE THOSE THAT WERE VISIBLE AT THE TIME OF SURVEY AND HAVE BEEN LOCATED BY FIELD SURVEY. FURTHER SERVICES MAY BE PRESENT. PRIOR TO ANY CONSTRUCTION OR EXCAVATION ON SITE THE RELEVANT AUTHORITIES SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES. DIAL BEFORE YOU DIG!
5. THIS SURVEY SHOULD NOT BE USED TO SETOUT BOUNDARY FENCING OR BUILDING WORKS NEAR OR ON THE BOUNDARIES. A SETOUT PLACING ACCURATE MAKES SHOULD BE CARRIED OUT PRIOR TO ANY BUILDING WORKS.
6. THE CONTOUR INTERVAL IS 0.2m. UNLESS SHOWN OTHERWISE. THE CONTOURS HAVE BEEN PLOTTED FROM INTERPOLATION METHODS.

A1

L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

0 1 2 3 4 5 10m
1 : 100

No.671
TWO STOREY
RENDERED COTTAGE
TILE ROOF

No.699
ONE & TWO STOREY
BRICK UNITS AND MIXED
BUSINESS UNITS
METAL ROOF

SINGLE STOREY
BRICK FLATS
TILE ROOF

~31.8 TITLE
~31.885 SURVEY

VERANDAH RL=75.47
FL=72.26
RIDGE RL=80.7
RIDGE RL=79.65
1ST FL=75.57
VERANDAH RL=75.45
RIDGE RL=77.63
PARAPET RL=79.28
ROOF RL=74.6
ROOF RL=78.62
AWNING RL=74.65
AWNING RL=74.49
GUTTER RL=78.3
GUTTER RL=78.27
GUTTER RL=75.17
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OLD SOUTH HEAD ROAD
OCEANVIEW AVENUE
FOOTPATH
CONCRETE
KERB
AND
GUTTER
CONCRETE DRIVEWAY
METAL BUILDING
METAL ROOF
BRICK BUILDING
METAL ROOF
GARAGE
METAL ROOF
METAL
CARPORT
BRICK GARAGE
METAL ROOF
CONCRETE
DRIVEWAY
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TIMBER
PALING
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BUILDING
METAL ROOF
VERANDAH
RL=75.47
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SP4318

DIAGRAM:
N.T.S.

APPROX TN 1
12.593°
M.M.

FOR BASIX PURPOSES

N

DIAL 1100
BEFORE YOU DIG
www.1100.com.au

THE POSITION OF THE SEWER MAIN HAS BEEN SCALED FROM A DIAGRAM SUPPLIED BY SYDNEY WATER CORPORATION AND IS THEREFORE APPROXIMATE ONLY. THE EXACT LOCATION SHOULD BE DETERMINED ON SITE PRIOR TO ANY COMMENCEMENT OF WORKS.

ORIGIN OF LEVELS :
SSM 60860 RL=65.336 (AHD) FOUND NEAR THE INTERSECTION OF MILITARY ROAD & OLD SOUTH HEAD ROAD.
ACCURACY OF ORIGIN : ± 0.001m

VAUGHAN WADY
REGISTERED SURVEYOR #8684
Surveyor Registered under the
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LEGEND

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- POWER POLE
- ELECTRICAL PILLAR
- POWER LIGHT POLE
- LIGHT POLE
- GAS METER
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- WATER TAP
- STREET SIGN
- PRAM CROSSING
- VEHICLE CROSSING
- TREE: Ø DIAMETER S SPREAD
- SEWER MANHOLE
- SEWER VENT
- SEWER LAMPHOLE
- STORMWATER PIT
- STORMWATER GRATE
- SURFACE INLET PIT
- STORMWATER PIPE INCLUDING PIPE SIZE
- HEADWALL
- CLOTHES LINE
- E OVERHEAD ELECTRICITY LINE
- T OVERHEAD TELECOM LINES
- S SEWER LINE

AREA LOT B	AREA LOT 4	AREA LOT A
VIDE DP 324744: 37.9 m²	VIDE DP 192614: 524.8 m²	VIDE DP 324744: 436.3 m²
BY CALC : 40.98 m²	BY CALC : 528.4 m²	BY CALC : 437. m²
AREA LOT 2	**AREA LOT 1**	**AREA LOT 2**
VIDE DP 10314: 474.2 m²	VIDE DP 168877: 550.1 m²	VIDE DP 316716: 550.1 m²
BY CALC : 480.3 m²	BY CALC : 552.4 m²	BY CALC : 550.5 m²
AREA LOT 1	**AREA LOT 1**	**AREA LOT 1**
VIDE DP 169310: 499.5 m²	VIDE DP 167942: 569.1 m²	VIDE DP 666626: 670.2 m²
BY CALC : 504.3 m²	BY CALC : 573.2 m²	BY CALC : 678.0 m²

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
1	75.5	1.54	0.92	CLEAR
2	73.01	1.1	1.07	CLEAR
3	72.1	2.05	0.85	DOOR
4	73.01	1.1	1.1	CLEAR
5	73.01	1.1	1.2	CLEAR
6	69.8	2.1	1.1	DOOR
7	71.72	1.46	2.8	CLEAR
8	71.72	1.46	2.8	CLEAR
9	71.0	2.18	1.9	CLEAR
10	71.0	2.18	1.9	CLEAR
11	70.83	2.5	4.53	CLEAR

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
11	70.83	2.5	4.53	CLEAR
12	70.83	2.5	4.53	CLEAR
13	70.99	2.28	7.96	CLEAR
14	73.87	1.2	2	CLEAR
15	77.3	1.6	1.9	CLEAR
16	77.3	1.6	1.9	CLEAR
17	74.18	0.94	2.18	CLEAR
18	73.3	1.14	1.2	CLEAR
19	71.97	1.24	1	CLEAR
20	73.07	1.22	2.16	CLEAR
21	73.07	1.22	2.16	CLEAR

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ABN 83 914 613 296
PO BOX 242 HELENSBURGH NSW 2508
PH 0420 944 413 Email: matt@survplan.com.au

Rev.	Amendments	Date
A	ADJ.BUILDING DESCRIPTION	17.09.18
B	ADDITIONAL SURVEY INFORMATION	12.04.21
C	UPDATE SURVEY INFORMATION	17.11.23

PLAN SHOWING DETAIL AND LEVELS OVER LOT 2 DP10314 - LOT 1 DP167942 BEING No.671-683 OLD SOUTH HEAD RD VAUCLUSE FOR DESIGN PURPOSES AND TO SUPPORT A DEVELOPMENT APPLICATION

JOB No. 1308		YOUR REF: MEISSEN PROPERTIES	
DRAWING No. 1308CO_MHN.dwg		CLIENT: MHN DESIGN UNION	
SCALE: 1:100 (A1)	SURVEYED M.S. DATE: 5.12.17	DRAWN M.S. DATE: 11.12.17	CHECKED M.S. DATE: 14.12.17
DATUM: A.H.D.			
SHEET: 7 OF 9			

WARNING:

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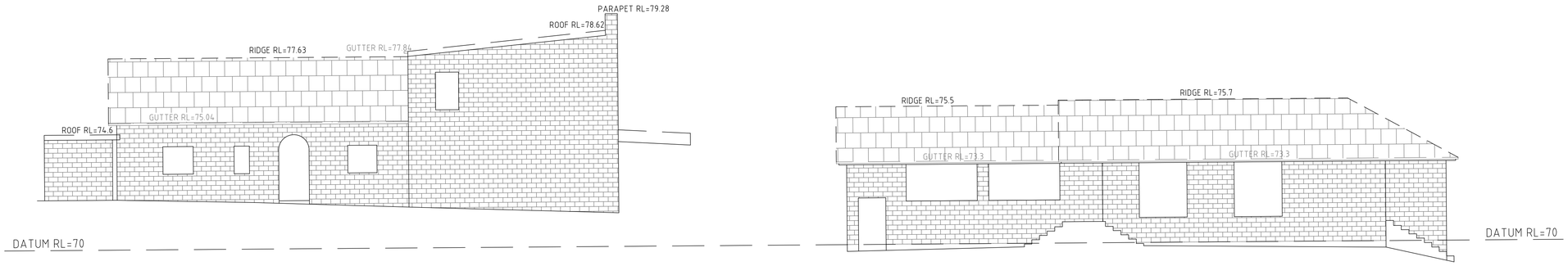
5. THIS SURVEY SHOULD NOT BE USED TO SETOUT BOUNDARY FENCING OR BUILDING WORKS NEAR OR ON THE BOUNDARIES. A SETOUT PLACING ACCURATE MAKES SHOULD BE CARRIED OUT PRIOR TO ANY BUILDING WORKS.
6. THE CONTOUR INTERVAL IS 0.2m. UNLESS SHOWN OTHERWISE. THE CONTOURS HAVE BEEN PLOTTED FROM INTERPOLATION METHODS.

A1

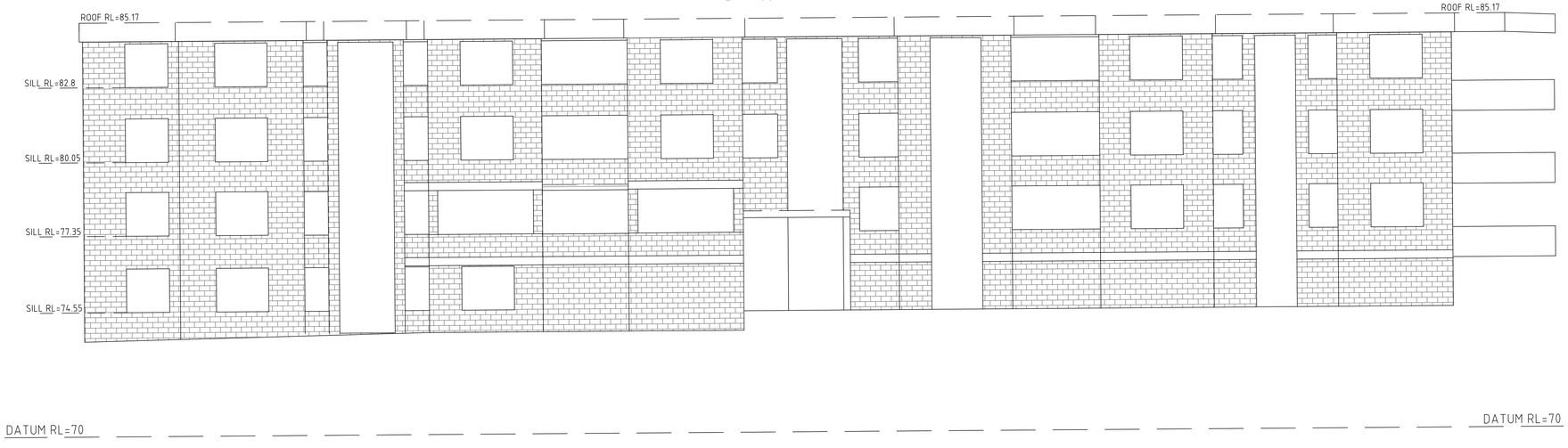
L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

0 1 2 3 4 5 10m
1 : 100

ADJOINING ELEVATIONS



No.2
THREE & FOUR STOREY
BRICK UNITS
FLAT ROOF



DIAL 1100 BEFORE YOU DIG
www.1100.com.au

ORIGIN OF LEVELS :
SSM 60860 RL=65.336 (AHD) FOUND NEAR THE INTERSECTION OF MILITARY ROAD & OLD SOUTH HEAD ROAD.
ACCURACY OF ORIGIN : ± 0.001m

VAUGHAN WADY
REGISTERED SURVEYOR #8684
Surveyor Registered under the
Surveying and Spatial Information Act 2002

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Rev.	Amendments	Date
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JOB No. 1308		YOUR REF: MEISSEN PROPERTIES	
DRAWING No. 1308CO_MHN.dwg		CLIENT: MHN DESIGN UNION	
SCALE: 1:100 (A1)	SURVEYED M.S. DATE: 5.12.17	DRAWN M.S. DATE: 11.12.17	CHECKED M.S. DATE: 14.12.17
DATUM: A.H.D.			
SHEET: 8 OF 9			

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1	75.5	1.54	0.92	CLEAR
2	73.01	1.1	1.07	CLEAR
3	72.1	2.05	0.85	DOOR
4	73.01	1.1	1.1	CLEAR
5	73.01	1.1	1.2	CLEAR
6	69.8	2.1	1.1	DOOR
7	71.72	1.46	2.8	CLEAR
8	71.72	1.46	2.8	CLEAR
9	71.0	2.18	1.9	CLEAR
10	71.0	2.18	1.9	CLEAR
11	70.83	2.5	4.53	CLEAR

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
11	70.83	2.5	4.53	CLEAR
12	70.83	2.5	4.53	CLEAR
13	70.99	2.28	7.96	CLEAR
14	73.87	1.2	2	CLEAR
15	77.3	1.6	1.9	CLEAR
16	77.3	1.6	1.9	CLEAR
17	74.18	0.94	2.18	CLEAR
18	73.3	1.14	1.2	CLEAR
19	71.97	1.24	1	CLEAR
20	73.07	1.22	2.16	CLEAR
21	73.07	1.22	2.16	CLEAR

LEGEND

- TELSTRA PILLAR
- TELSTRA MARKER POST
- TELSTRA PIT
- POWER POLE
- ELECTRICAL PILLAR
- POWER LIGHT POLE
- LIGHT POLE
- GAS METER
- GAS DIRECTION MARKER
- WATER MAIN
- HYDRANT
- RECYCLED WATER
- WATER METER
- STOP VALVE
- WATER TAP
- STREET SIGN
- PRAM CROSSING
- VEHICLE CROSSING
- TREE: Ø DIAMETER S SPREAD
- SEWER MANHOLE
- SEWER VENT
- SEWER LAMPHOLE
- STORMWATER PIT
- STORMWATER GRATE
- SURFACE INLET PIT
- Ø 225 STORMWATER PIPE INCLUDING PIPE SIZE
- HEADWALL
- CLOTHES LINE
- E OVERHEAD ELECTRICITY LINE
- T OVERHEAD TELECOM LINE
- S SEWER LINE

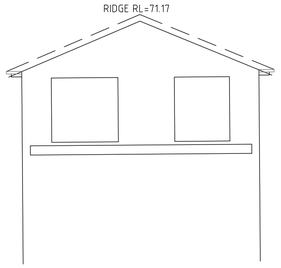
A1

L.G.A. : WAVERLEY
PARISH : ALEXANDRIA
COUNTY : CUMBERLAND

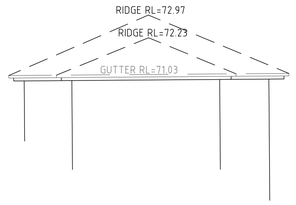
0 1 2 3 4 5 10m
1 : 100

ADJOINING ELEVATIONS

No.9
ONE & TWO STOREY
RENDERED COTTAGE
TILE ROOF
RIDGE RL=71.17

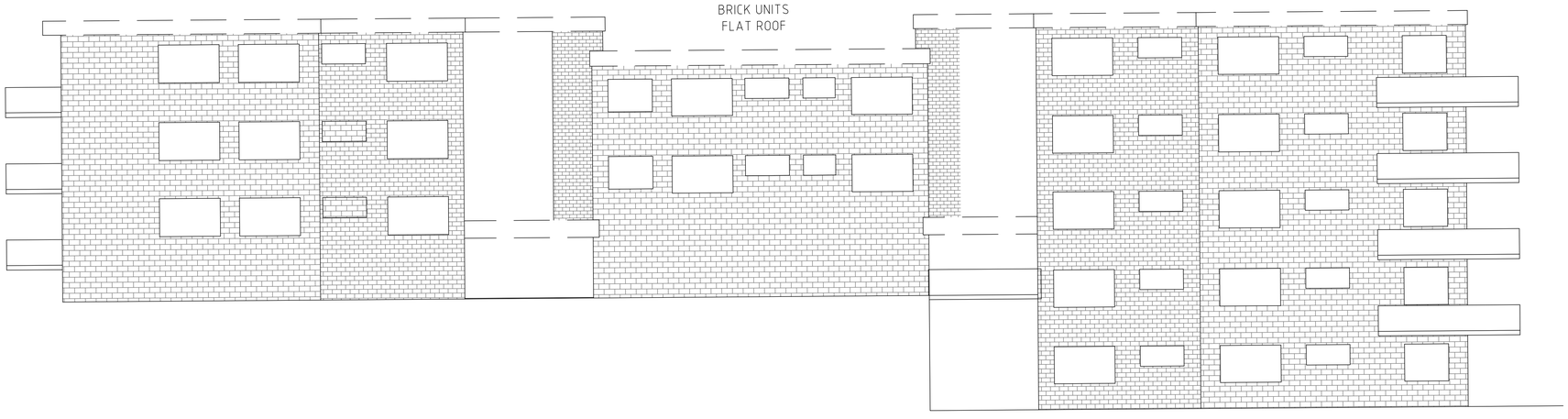


No.11
ONE & TWO STOREY
RENDERED COTTAGE
TILE ROOF



DATUM RL=60

No.685
THREE - FIVE STOREY
BRICK UNITS
FLAT ROOF



DATUM RL=60

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DRAWING No. 1308CO_MHN.dwg		CLIENT: MHN DESIGN UNION		
SCALE: 1:100 (A1)	SURVEYED M.S. DATE: 5.12.17	DRAWN M.S. DATE: 11.12.17	CHECKED M.S. DATE: 14.12.17	
DATUM: A.H.D.				
SHEET: 9 OF 9				

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6	69.8	2.1	1.1	DOOR
7	71.72	1.46	2.8	CLEAR
8	71.72	1.46	2.8	CLEAR
9	71.0	2.18	1.9	CLEAR
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11	70.83	2.5	4.53	CLEAR

WINDOW	SILL RL	HEIGHT	WIDTH	GLASS TYPE
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15	77.3	1.6	1.9	CLEAR
16	77.3	1.6	1.9	CLEAR
17	74.18	0.94	2.18	CLEAR
18	73.3	1.14	1.2	CLEAR
19	71.97	1.24	1	CLEAR
20	73.07	1.22	2.16	CLEAR
21	73.07	1.22	2.16	CLEAR

LEGEND

- TELSTRA PILLAR
- TELSTRA MARKER POST
- TELSTRA PIT
- POWER POLE
- ELECTRICAL PILLAR
- POWER LIGHT POLE
- LIGHT POLE
- GAS METER
- GAS DIRECTION MARKER
- WATER MAIN
- HYDRANT
- RECYCLED WATER
- WATER METER
- STOP VALVE
- WATER TAP
- STREET SIGN
- PRAM CROSSING
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- TREE: Ø DIAMETER S SPREAD
- SEWER MANHOLE
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- STORMWATER PIT
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- SURFACE INLET PIT
- STORMWATER PIPE INCLUDING PIPE SIZE (Ø 0.225)
- HEADWALL
- CLOTHES LINE
- E OVERHEAD ELECTRICITY LINE
- T OVERHEAD TELECOM LINE
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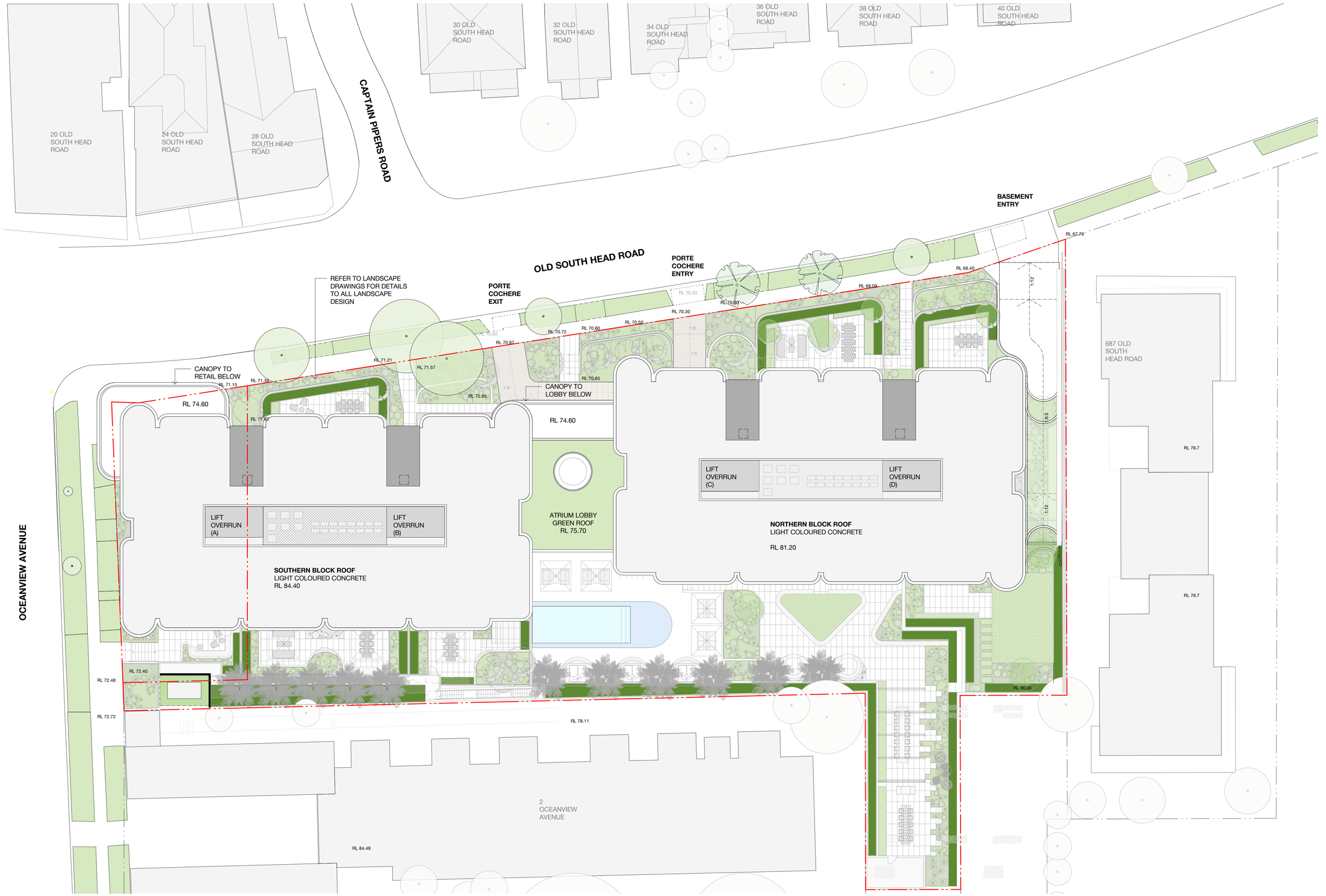

DA ISSUE

c:\temp\VAUCLUSE_BS_ARCH_R2023_sheuQHNP.rvt

OSHR AT VAUCLUSE
HOLDINGS PTY LTD

VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA01
SITE PLAN

Revision	Date	Description	Initial	Checked
A	23.12.15	ISSUE FOR DA	SH	
2	23.11.08	ISSUE FOR INFORMATION	SH	
1	23.11.30	ISSUE FOR INFORMATION	SH	

Scale	1 : 200	@ A1	
Drawn	SH	Checked	SH
Project no.	S12551		
Status	DEVELOPMENT APPLICATION		
Plot Date	15/12/2023 10:08:23 AM		
Drawing no.		Revision	
DA01.003		A	

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Melbourne VIC 3000 Australia
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email mel@batessmart.com.au
http://www.batessmart.com.au

Sydney 43 Brisbane Street
Surry Hills NSW 2010 Australia
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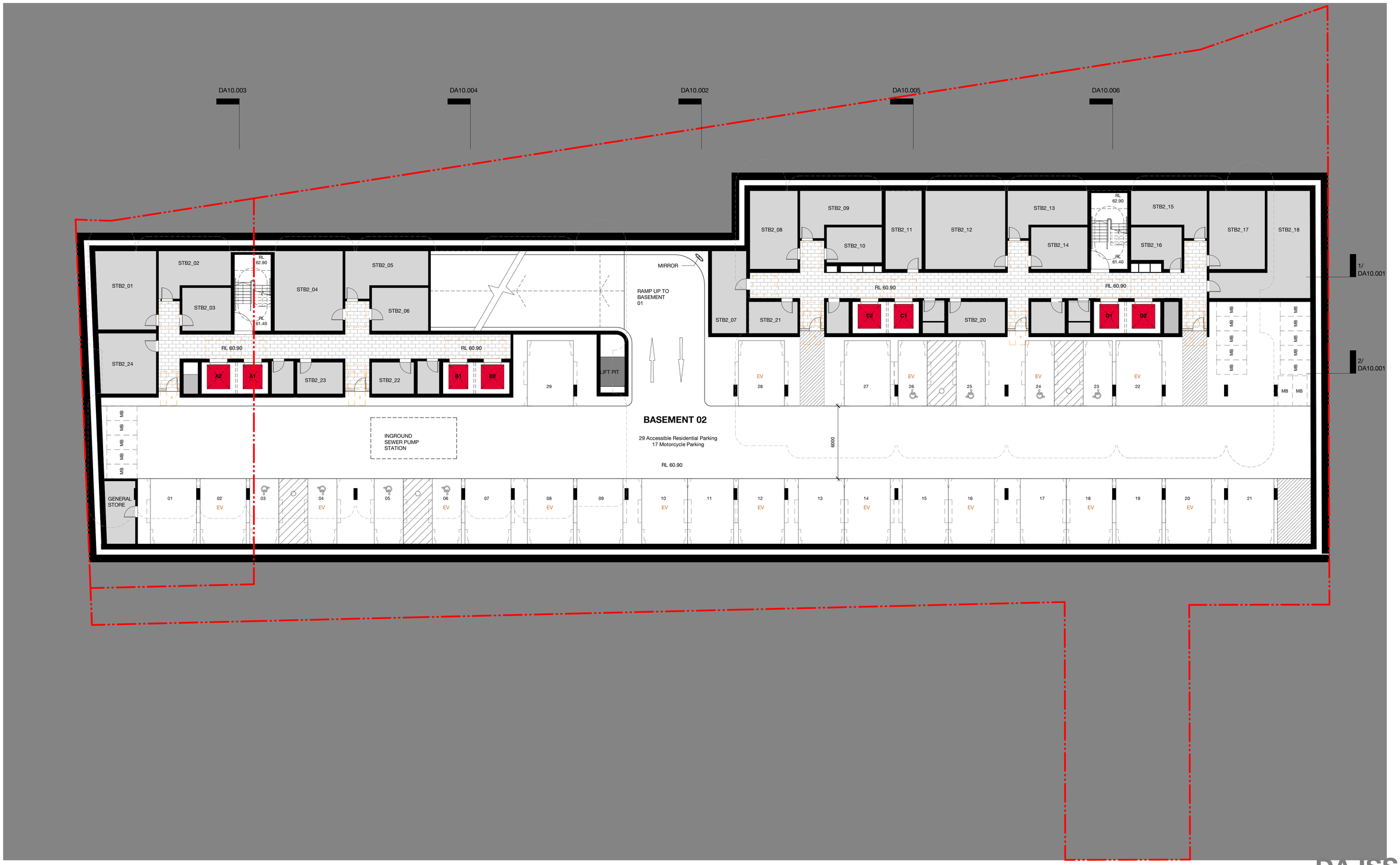
email syd@batessmart.com.au
http://www.batessmart.com.au

Bates Smart Architects Pty Ltd ABN 68 094 740 986
NSW Nominated Responsible Architects: Kellie Payne Reg. 6454 / Philip Vivian Reg. 6696 / Guy Lake Reg. 7119 / Matthew Allen Reg. 8498

BATESSMART



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OSHR AT VAUCLUSE
HOLDINGS PTY LTD

VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA03
BASEMENT 02

Revision	Date	Description	Initial	Checked
A	23.12.15	ISSUE FOR DA	SH	
3	23.11.08	ISSUE FOR INFORMATION	SH	
2	23.11.21	ISSUE FOR INFORMATION	SH	
1	23.10.25	ISSUE FOR INFORMATION	SH	

Scale	1 : 150 @ A1
Drawn	SH
Checked	SH
Project no.	S12551
Status	DEVELOPMENT APPLICATION
Plot Date	15/12/2023 10:08:29 AM
Drawing no.	DA03.001
Revision	A

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NSW Nominated Responsible Architects: Kellie Payne Reg. 6454 / Philip Vivian Reg. 6696 / Guy Lake Reg. 7119 / Matthew Allen Reg. 8498

BATESSMART

DA10.003
DA10.004
DA10.002
DA10.005
DA10.006
RAINWATER TANK B
STB1_01
STB1_02
STB1_03
RETAIL STORAGE
RL 65.90
RL 64.40
STORE
MIRROR
RAMP DOWN TO BASEMENT 02
RL 63.90
A2
A1
GB RM
GB STORE
B1
B2
BICYCLE STORAGE (38)
LOADING ZONE
BULK STORAGE
DOCK-MASTER
COLD WATER PUMP ROOM
HOT WATER PLANT ROOM
FIRE PUMP ROOM & SPR VALVE ROOM
RAINWATER TANK
RAINWATER FILTRATION TANK
GENERAL STORE
COMMS ROOM
C2
C1
D1
D2
CAR SHARE 01
CAR SHARE 02
EV
LOADING ZONE FOR BLOCK C
GB STORE
V01
BLOCK D LOADING
V02
1:6.5
1:12
1/ DA10.001
2/ DA10.001
MIRROR & TRAFFIC SIGNAL
6000
BASEMENT 01
11 Accessible Residential Parking
6 Accessible Visitor Parking
RL 63.90
MIRRORS
01
02
03
04
05
06
07
POOL SERVICES TO POOL ABOVE
08
09
10
11
V06
V05
V04
V03
GENERAL STORE

DA ISSUE

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OSHR AT VAUCLUSE
HOLDINGS PTY LTD

Revision	Date	Description	Initial	Checked
A	23.12.15	ISSUE FOR DA	SH	
2	23.11.21	ISSUE FOR INFORMATION	SH	
1	23.10.25	ISSUE FOR INFORMATION	SH	

VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA03
BASEMENT 01

Scale	1 : 150 @ A1
Drawn	SH
Checked	SH
Project no.	S12551
Status	DEVELOPMENT APPLICATION
Plot Date	15/12/2023 10:08:35 AM
Drawing no.	DA03.002
Revision	A

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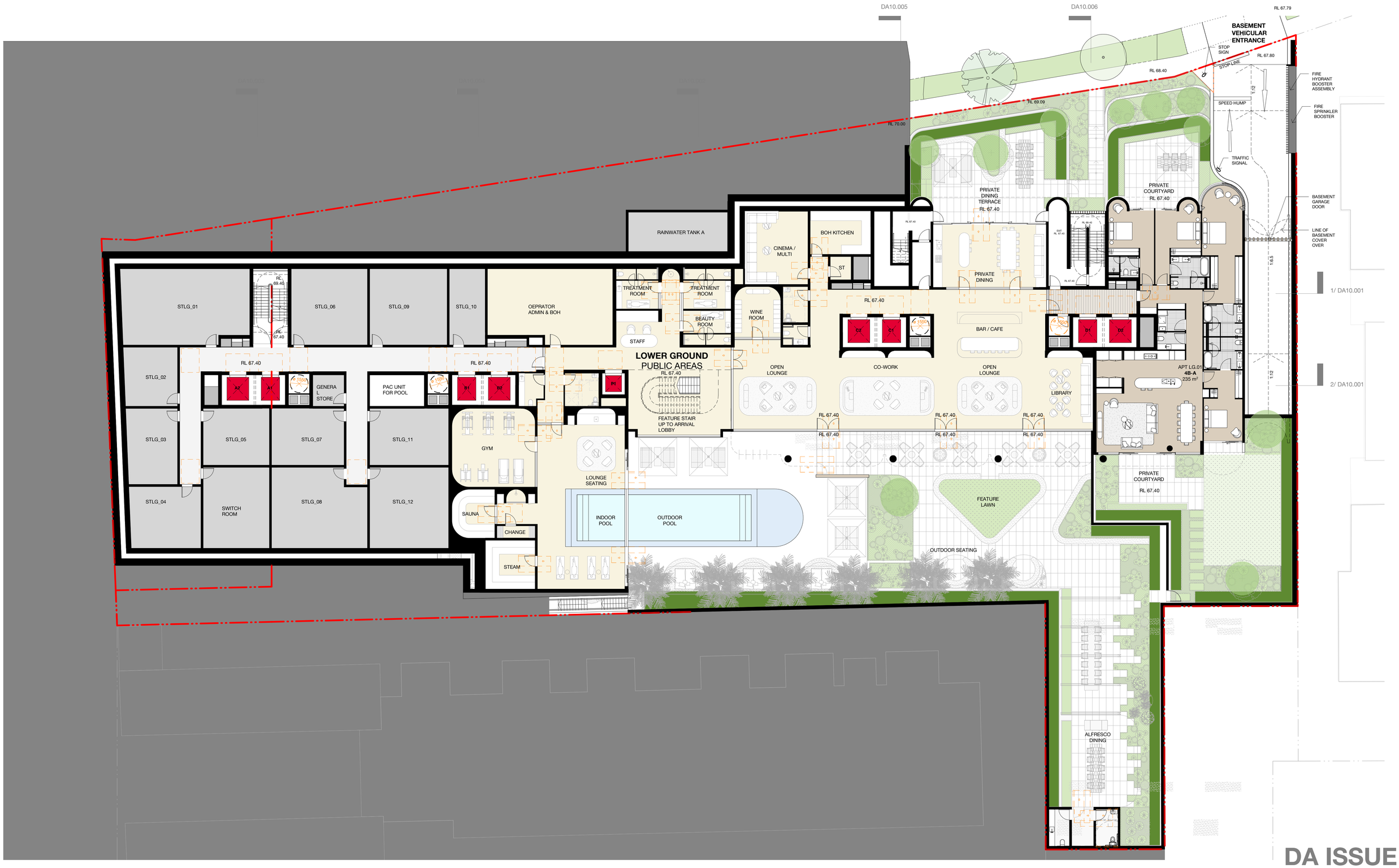
BATESSMART



DA ISSUE

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OSHR AT VAUCLUSE
HOLDINGS PTY LTD

Revision	Date	Description	Initial	Checked
A	23.12.15	ISSUE FOR DA	SH	
2	23.11.21	ISSUE FOR INFORMATION	SH	
1	23.10.25	ISSUE FOR INFORMATION	SH	

VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA03
GROUND LOWER PLAN

Scale	1 : 150 @ A1
Drawn	SH
Checked	SH
Project no.	S12551
Status	DEVELOPMENT APPLICATION
Plot Date	15/12/2023 10:08:43 AM
Drawing no.	DA03.003
Revision	A

Melbourne 1 Nicholson Street
Melbourne VIC 3000 Australia
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Sydney 43 Brisbane Street
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Bates Smart Architects Pty Ltd ABN 68 094 740 986

NSW Nominated Responsible Architects: Kellie Payne Reg. 6454 / Philip Vivian Reg. 6696 / Guy Lake Reg. 7119 / Matthew Allen Reg. 8498

BATESSMART

OCEANVIEW AVENUE

OLD SOUTH HEAD ROAD

DA10.003 DA10.004 DA10.002 DA10.005 DA10.006

BASEMENT ENTRY

PORTE COCHERE ENTRY

PORTE COCHERE EXIT

PEDESTRIAN ACCESS

REFER TO LANDSCAPE DRAWINGS FOR DETAILS TO ALL LANDSCAPE DESIGN

687 OLD SOUTH HEAD ROAD

1/ DA10.001

2/ DA10.001

RETAIL
225m²
RL 71.00

RETAIL COURTYARD
RL 71.00

SUBSTATION

APT UG.07
2B-E.2
106m²

APT UG.06
3B-E
157m²

APT UG.05
2B-F
111m²

APT UG.04
2B-E
103m²

APT UG.03
3B-D
160m²

APT UG.02
3B-C
137m²

APT UG.01
3B-A
187m²

LINE OF CANOPY ABOVE

LINE OF FLOOR ABOVE

LINE OF OCULUS SKYLIGHT ABOVE

MEETING ROOM

BOARD ROOM

RECEPTION

ARRIVAL LOBBY

UPPER GROUND
RESIDENTIAL LOBBY

VOID TO PUBLIC AREAS BELOW

MAIL

PARCEL

COURTYARD TO LOWER GROUND BELOW

RL 70.80 RL 70.84 RL 71.15 RL 71.39 RL 71.21 RL 71.57 RL 70.80 RL 70.72 RL 70.60 RL 70.50 RL 70.30 RL 70.30 RL 70.00 RL 69.09 RL 68.40 RL 67.79 RL 71.83 RL 70.85 RL 71.25 RL 71.40 RL 72.40 RL 72.48 RL 72.72 RL 78.11 RL 84.49 RL 66.08 RL 67.05

1:8 1:6 1:8 1:8 1:12

2
OCEANVIEW
AVENUE

DA ISSUE

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OSHR AT VAUCLUSE
HOLDINGS PTY LTD

Revision	Date	Description	Initial	Checked
A	23.12.15	ISSUE FOR DA	SH	
2	23.11.21	ISSUE FOR INFORMATION	SH	
1	23.10.25	ISSUE FOR INFORMATION	SH	

VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA03
GROUND UPPER PLAN

Scale	1 : 150 @ A1
Drawn	SH
Checked	SH
Project no.	S12551
Status	DEVELOPMENT APPLICATION
Plot Date	15/12/2023 10:08:52 AM
Drawing no.	DA03.004
Revision	A

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NSW Nominated Responsible Architects: Kellie Payne Reg. 6454 / Philip Vivian Reg. 6696 / Guy Lake Reg. 7119 / Matthew Allen Reg. 8498

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Revision	Date	Description	Initial	Checked
A	23.12.15	ISSUE FOR DA	SH	
2	23.11.21	ISSUE FOR INFORMATION	SH	
1	23.10.25	ISSUE FOR INFORMATION	SH	

VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA03
LEVEL 01 PLAN

Scale	1 : 150	@ A1	
Drawn	SH	Checked	SH
Project no.	S12551		
Status	DEVELOPMENT APPLICATION		
Plot Date	15/12/2023 10:09:00 AM		
Drawing no.	DA03.005	Revision	A

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OSHR AT VAUCLUSE
HOLDINGS PTY LTD

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A	23.12.15	ISSUE FOR DA	SH	
2	23.11.21	ISSUE FOR INFORMATION	SH	
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VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA03
LEVEL 02 PLAN

Scale	1 : 150	@ A1	
Drawn	SH	Checked	SH
Project no.	S12551		
Status	DEVELOPMENT APPLICATION		
Plot Date	15/12/2023 10:09:07 AM		
Drawing no.		Revision	
DA03.006		A	

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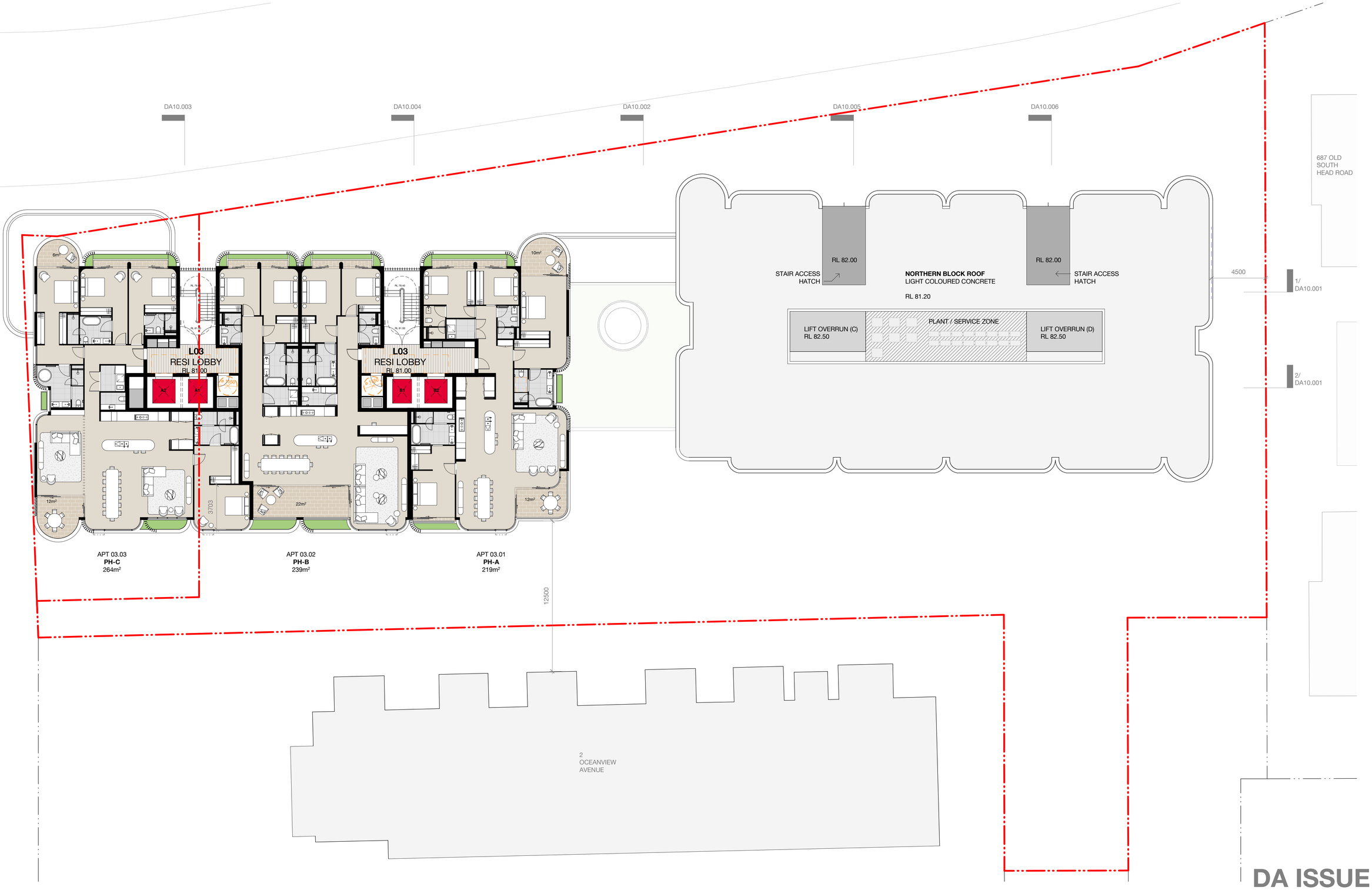

DA ISSUE

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OSHR AT VAUCLUSE
HOLDINGS PTY LTD

Revision	Date	Description	Initial	Checked
A	23.12.15	ISSUE FOR DA	SH	
2	23.11.21	ISSUE FOR INFORMATION	SH	
1	23.10.25	ISSUE FOR INFORMATION	SH	

VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA03
LEVEL 03 PLAN

Scale	1 : 150	@ A1	
Drawn	SH	Checked	SH
Project no.	S12551		
Status	DEVELOPMENT APPLICATION		
Plot Date	15/12/2023 10:09:14 AM		
Drawing no.	DA03.007	Revision	A

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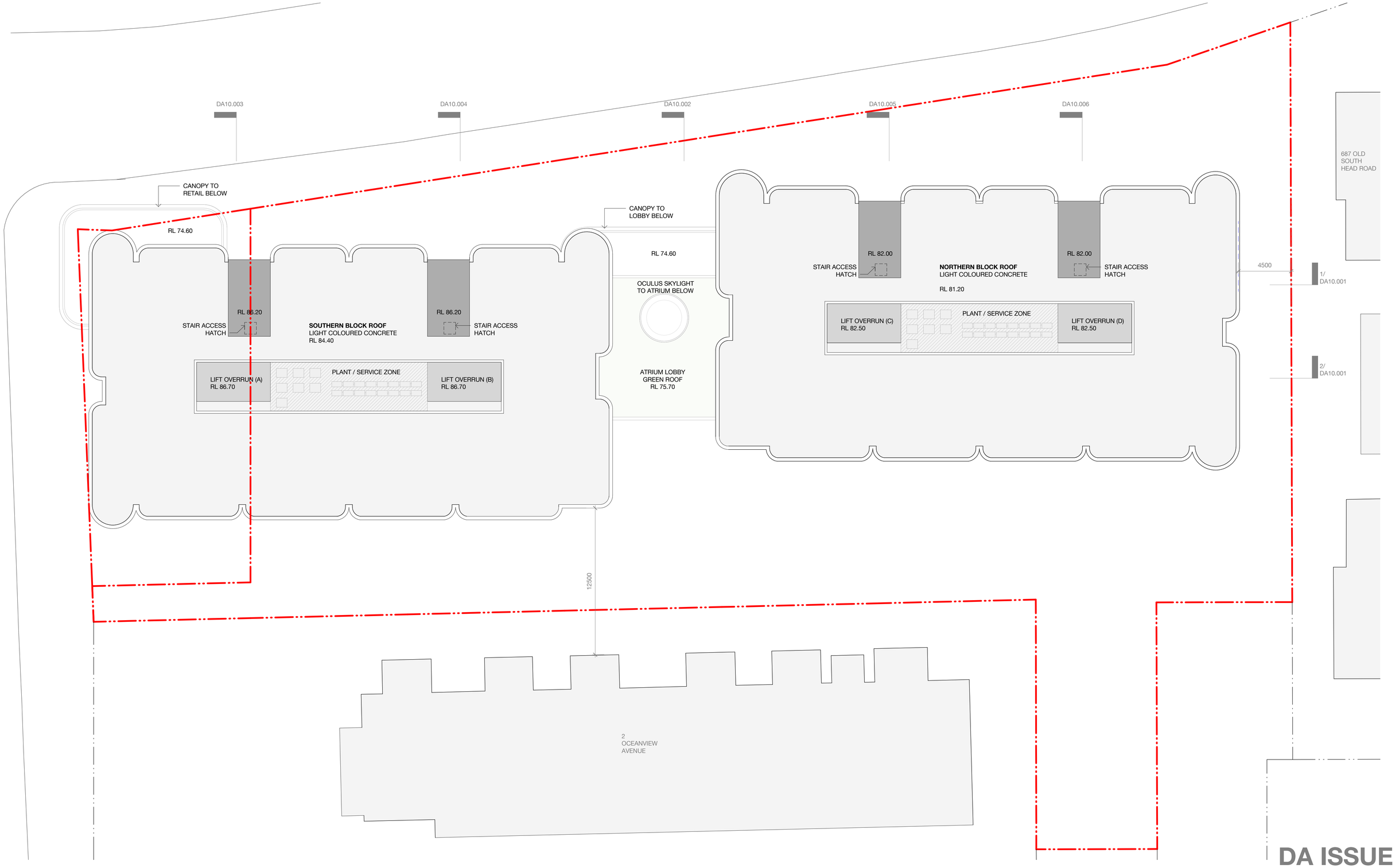

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OSHR AT VAUCLUSE
HOLDINGS PTY LTD

Revision	Date	Description	Initial	Checked
A	23.12.15	ISSUE FOR DA	SH	
2	23.11.21	ISSUE FOR INFORMATION	SH	
1	23.10.25	ISSUE FOR INFORMATION	SH	

VAUCLUSE SENIORS LIVING
669- 683 OSH RD VAUCLUSE

DA03
ROOF PLAN

Scale	1 : 150 @ A1
Drawn	SH Checked SH
Project no.	S12551
Status	DEVELOPMENT APPLICATION
Plot Date	15/12/2023 10:08:14 AM
Drawing no.	Revision

DA03.008 A

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NSW Nominated Responsible Architects: Kellie Payne Reg. 6454 / Philip Vivian Reg. 6696 / Guy Lake Reg. 7119 / Matthew Allen Reg. 8498

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APPENDIX B

Former Borehole Logs

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH301**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL73m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger					SP	Fill	**FILL / TOPSOIL**- Sand, dark grey, fine to medium grained, with roots.	m	SM060922-01 /100 0.05-0.2m	
					SP	Natural	**SAND**- grey, fine to medium grained. become light grey from 0.6m.	m	SM060922-02 0.2-0.4m SM060922-03 1.0-1.2m	
		1.0	72.0				**Hole Terminated at 1.20m** Target reached			

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:42 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH302**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL72m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Pebbles			
Hand Auger					SP	Fill	**FILL**- Pebbles (20mm). **FILL / TOPSOIL**- Sand, dark brown, brown, fine to medium grained, trace gravel and roots.	m	SM060922-04 0.05-0.2m	
					SP	Natural	**SAND**- grey, fine to medium grained. become light grey from 0.6m.	m	SM060922-05 0.3-0.5m SM060922-06 1.0-1.2m	
		1.0	71.0				**Hole Terminated at 1.20m** Target reached			

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

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Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH303**
Hole Depth: **1.10 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL71.7m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger			71.0		SP	Fill	**FILL**- Sandy Gravel, dark grey, medium to coarse gravel and fine to medium sand.	m	SM060922-07 0.05-0.2m	
							Brick Paver At 0.4m.		SM060922-08 0.7-0.8m	
		1.0			SP	Natural	**SAND**- grey, fine to medium grained.	m	SM060922-09 0.9-1.0m	
							Hole Terminated at 1.10m Target reached			bore partially collapsing at 1.1m

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:44 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
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Hole ID. **BH304**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL73.3m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger			73.0		SP	Fill	**FILL**- Sand, dark brown, grey, fine to medium grained, trace silt with brick, concrete.	m	SM060922-10 / 101 0.05-0.2m	
		1.0			SP	Natural	**SAND**- grey, fine to medium grained. become pale grey from 0.8m.	m	SM060922-11 0.5-0.7m SM060922-12 1.0-1.2m	
			72.0				**Hole Terminated at 1.20m** Target reached			

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:45 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH305**
Hole Depth: **1.10 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL73m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger					SP	Fill	**FILL / TOPSOIL**- Sand, brown, fine to medium grained, with silt, trace fine to medium gravels and roots.	m	SM060922-13 0.05-0.2m	
		1.0	72.0		SP	Natural	**SAND**- grey, fine to medium grained, trace roots. become dark brown / brown at 0.9m.	m	SM060922-14 0.5-0.7m SM060922-15 0.9-1.1m	
		2.0	71.0				**Hole Terminated at 1.10m** Target reached			

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22** Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:45 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH306**
Hole Depth: **1.30 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL71.85m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Brick			
Hand Auger						Fill	**FILL**- Brick Paver (50mm).			
					GP	Fill	**FILL**- Sandy Gravel, brown, fine to coarse sand and fine to coarse gravel, with roots.	m	SM060922-16 0.05-0.25m	
		1.0	71.0		SP	Natural	**SAND**- brown, fine to medium grained.	m	SM060922-17 0.5-0.7m	
									SM060922-18 1.2-1.3m	
		2.0	70.0				**Hole Terminated at 1.30m** Target reached			

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:46 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH307**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL73.2m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Concrete			
Hand Auger						Fill	**CONCRETE (60mm)**.			
			73.0		SP	Fill	**FILL**- Sand, grey, fine to medium grained, with some ceramic fragment.	m	SM060922-19 / 102 0.06-0.2m	
		1.0	72.0		SP	Natural	**SAND**- orange-brown, fine to medium grained. become light orange-brown from 0.7m.	d	SM060922-20 0.3-0.5m SM060922-21 1.0-1.2m	
		2.0					**Hole Terminated at 1.20m** Target reached			

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

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Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
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Hole ID. **BH308**
Hole Depth: **1.00 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL73m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Concrete			
Hand Auger						Fill	**CONCRETE (60mm)**.			
					SP	Fill	**FILL**- Sand, grey, fine to medium grained, with trace ceramic and sandstone fragment.	m	SM060922-22 / 103 0.06-0.2m	
					SP	Natural	**SAND**- orange-brown, fine to medium grained.	m	SM060922-23 0.3-0.5m	
		1.0	72.0				become light orange-brown from 0.6m.			
		2.0	71.0				**Hole Terminated at 1.00m** Target reached			

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

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Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
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Hole ID. **BH309**
Hole Depth: **1.10 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL71.5m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Brick			
Hand Auger						Fill	**BRICK**.			
							CONCRETE.			
					SP		**SAND**- grey, brown, with fine to coarse gravel.	m	SM060922-27 0.15-0.3m	
			71.0		SP	Natural	**SAND**- pale grey, fine to medium grained.	m	SM060922-28 0.3-0.5m	
		1.0					become dark orange / brown from 0.7m to 0.9m.		SM060922-29 0.7-0.9m	
							become orange-brown from 0.9m.			
			70.0				**Hole Terminated at 1.10m** Target reached			
		2.0								

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

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Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH310**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL71.85m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger					SM	Fill	**FILL / TOPSOIL**- Silty Sand, dark grey, with trace roots and gravel.	m	SM060922-24 0.05-0.2m	
		1.0	71.0		SP	Natural	**SAND**- grey, fine to medium grained. become pale grey from 0.7m.	m	SM060922-25 0.3-0.5m SM060922-26 1.0-1.2m	
		2.0	70.0				**Hole Terminated at 1.20m** Target reached			

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

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Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
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Hole ID. **BH311**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL69.8m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger					SP	Fill	**FILL**- Gravelly Sand, brown, fine to medium grained, with fine to coarse gravel, trace roots.	m	SM060922-30 0.05-0.2m	
			69.0		SP	Natural	**SAND**- brown, fine to medium grained.	m	SM060922-31 0.3-0.5m	
		1.0							SM060922-32 1.0-1.2m	
			68.0				**Hole Terminated at 1.20m** Target reached			
		2.0								

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:49 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH312**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL66.8m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger					SP	Fill	**FILL / TOPSOIL**- Sand, dark grey, fine to medium grained, trace roots.	m	SM060922-33 0.05-0.2m	
			66.0		SP	Natural	**SAND**- grey, fine to medium grained. become pale grey from 0.6m.	m	SM060922-34 0.3-0.5m	
		1.0							SM060922-35 1.0-1.2m	
			65.0				**Hole Terminated at 1.20m** Target reached			
		2.0								

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:50 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH313**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL67m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger					SP	Fill	**FILL / TOPSOIL**- Sand, dark grey, fine to medium grained, trace roots.	m	SM060922-36 0.05-0.2m	
					SP	Natural	**SAND**- grey, fine to medium grained. become pale grey from 0.6m.	m	SM060922-37 0.3-0.5m SM060922-38 1.0-1.2m	
		1.0	66.0							
		2.0	65.0				**Hole Terminated at 1.20m** Target reached			

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:51 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH314**
Hole Depth: **0.95 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL71.25m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Concrete			
Hand Auger							**CONCRETE (100mm)**.			
			71.0		SP	Fill	**FILL**- Sand, grey, fine to medium grained, with ceramic, tile fragments and brick, concrete.	m	SM060922-39 0.10-0.3m SM060922-40 0.4-0.6m SM060922-41 0.7-0.9m	
		1.0	70.0				**Hole Terminated at 0.95m** Target reached			Refusal on a brick at 0.95m
		2.0								

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:51 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH315**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **06-SEP-22** Ground Level: **RL72.5m** (approx)
Drill Method: **Hand Auger** Date Completed: **06-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger					SM	Fill	**FILL / TOPSOIL**- Silty Sand, dark grey, fine to medium grained, with roots.	m	SM060922-42 0.05-0.2m	
		1.0	72.0		SP	Natural	**SAND**- grey, fine to medium grained, trace roots. become orange-brown from 0.8m.	m	SM060922-43 0.3-0.5m SM060922-44 1.0-1.2m	
		2.0	71.0				**Hole Terminated at 1.20m** Target reached			

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **06-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:52 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH316**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **07-SEP-22** Ground Level: **RL67.5m** (approx)
Drill Method: **Hand Auger** Date Completed: **07-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger					SP	Fill	**FILL / TOPSOIL**- Gravelly Sand, brown, fine to coarse gravel and fine to medium sand.	m	SM070922-45 0.05-0.2m	
			67.0							
					SP	Natural	**SAND**- grey, brown, fine to medium grained.	m	SM070922-46 0.6-0.8m	
		1.0					become pale grey from 1m.		SM070922-47 1.0-1.2m	
			66.0				**Hole Terminated at 1.20m** Target reached			
		2.0								

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **07-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:53 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH317**
Hole Depth: **1.20 m**
Sheet: **1 of 1**

Project Name: **Stage 2 DSI** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **07-SEP-22** Ground Level: **RL66.25m** (approx)
Drill Method: **Hand Auger** Date Completed: **07-SEP-22** Latitude: **----------**
Equipment: **Manual** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Grass			
Hand Auger			66.0		SP	Fill	**FILL / TOPSOIL**- Gravelly Sand, dark grey, fine to medium sand and fine to coarse gravel.	m	SM070922-48 0.05-0.2m	
		1.0	65.0		SP	Natural	**SAND**- grey, fine to medium grained.	m	SM070922-49 0.5-0.7m SM070922-50 1.0-1.2m	
		2.0					**Hole Terminated at 1.20m** Target reached			

Moisture	
D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **07-Sep-22**
Checked By: **Stephen McCormack** Date: **08-SEP-22**

GEE DAVIES BH LOG G21071VAU.GPJ GEE LOG 2.GDT 13-9-22 6:07:53 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH401**
Hole Depth: **1.00 m**
Sheet: **1 of 1**

Project Name: **Contamination Investigation**
Project Number: **E23026VAU**
Location / Site: **669 - 683 Old South Head Road, Vaucluse NSW**
Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering**
Date Started: **31/10/2023**
Ground Level: **RL71.9m** (approx)
Drill Method: **Hand Auger**
Date Completed: **31/10/2023**
Easting: ----------
Equipment: **Manual**
Northing: ----------

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Fill			
Hand Auger					SP	Fill	**FILL**- Sand, brown, fine to medium grained, trace fine to coarse gravel, with anthropogenic inclusions (metal bolt, nails, crushed concrete, glass).	dp	ZZ311023-01/100 0.05-0.20m	
			71.0		SP	Natural	**SAND**- grey, white, fine to medium grained.	m	ZZ311023-02 0.5-0.6m	
		1.0								
			70.0				**Hole Terminated at 1.00m** Target Reached			Borehole dry upon completion
		2.0								

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Zachary Ziesel** Date: **31/10/2023**
Checked By: **Stephen McCormack** Date: **10/11/2023**

GEE DAVIES BH LOG E23026VAU.GPJ GEE.GDT 16/11/23 2:32:40 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH402**
Hole Depth: **1.00 m**
Sheet: **1 of 1**

Project Name: **Contamination Investigation** Project Number: **E23026VAU**
Location / Site: **669 - 683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering** Date Started: **31/10/2023** Ground Level: **RL71.9m** (approx)
Drill Method: **Hand Auger** Date Completed: **31/10/2023** Easting: **----------**
Equipment: **Manual** Northing: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Moisture	Samples / Tests ID No.	Observations / Comments
							Surface: Fill			
Hand Auger					SP	Fill	**FILL**- Sand, grey, fine to medium grained, trace fine to medium gravel and rootlets, some anthropogenic material noted (foam, timber, plastic,).	d	ZZ311023-03 0.05-0.2m	
					SP	Natural	**SAND**- grey/white, fine to medium grained.	m	ZZ311023-04/101 0.4-0.5m	
		1.0	71.0				turn orange brown, at 0.6m.		ZZ311023-05 0.9-1.0m	
		2.0	70.0				**Hole Terminated at 1.00m** Target Reached			Borehole dry upon completion

Moisture		Additional Comments
D	Dry	
Dp	Damp	
SM	Slightly Moist	
M	Moist	
VM	Very Moist	
W	Wet	
Sd	Saturated	

Logged By: **Zachary Ziesel** Date: **31/10/2023** Checked By: **Stephen McCormack** Date: **10/11/2023**

GEE DAVIES BH LOG E23026VAU.GPJ GEE.GDT 16/11/23 2:32:41 PM

Geo Environmental Engineering
82 Bridge Street
Lane Cove NSW 2066
E info@geoenvironmental.com.au

Log Report Legen

MATERIAL SYMBOL


FILL


CONCRETE


ASPHALT


TOPSOIL


ORGANICS


ESTUARINE MUD


CLAY


SAND


SILT


GRAVEL


Sandy CLAY


Clayey SAND


Clayey SILT


Clayey GRAVEL


Silty CLAY


Silty SAND


Sandy SILT


Sandy GRAVEL


Gravelly CLAY


Gravelly SAND


Gravelly SILT


Silty GRAVEL


CLAY & SAND


SAND & CLAY


SILT & CLAY


GRAVEL & CLAY


CLAY & SILT


SAND & SILT


SILT & SAND


GRAVEL & SAND


CLAY & GRAVEL


SAND & GRAVEL


SILT & GRAVEL


GRAVEL & SILT


Sandy Silty CLAY


Clayey Silty SAND


Sandy Clayey SILT


Sandy Clayey GRAVEL


Silty Sandy CLAY


Silty Clayey SAND


Clayey Sandy SILT


Clayey Sandy GRAVEL


Sandy Gravelly CLAY


Clayey Gravelly SAND


Sandy Gravelly SILT


Silty Clayey GRAVEL


Silty Gravelly CLAY


Silty Gravelly SAND


Clayey Gravelly SILT


Clayey Silty GRAVEL


Gravelly Silty CLAY


Gravelly Silty SAND


Gravelly Clayey SILT


Sandy Silty GRAVEL


Gravelly Sandy CLAY


Gravelly Clayey SAND


Gravelly Sandy SILT


Silty Sandy GRAVEL


SANDSTONE


SHALE


GRANITE


BASALT


SHALE / SANDSTONE


PORCELLANITE


GNEISS


SHALE / CLAYSTONE


MUDSTONE


CLAYSTONE


MUDSTONE / CLAYSTONE


SHALE / SILTSTONE


IRONSTONE

ATER LEVELS


Encountered Water

Standing Water

ABBREVIATIONS

PT	Pushtube
SFA	Solid Flight Auger
PWS	Percussion Window Sampler
HA	Hand Auger
HFA	Hollow Flight Auger

ELL RAPHICS


Cuttings


Bentonite


Screen


Gravel Pack


Grout


Cave-in

GEE LEGEND * * 29/10/09 5:04:07 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH201**
Hole Depth: **2.20 m**
Sheet: **1 of 1**

Project Name: **Geotechnical Investigation** Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW** Client: **Blare Management**

Drilling Company: **FICO Group** Date Started: **19-AUG-21** Ground Level: **RL66.1m** (approx)
Drill Method: **SFA** Date Completed: **19-AUG-21** Latitude: **----------**
Equipment: **Ute Mounted** Longitude: **----------**

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Consistency / Density	Moisture	Samples / Tests ID No.	Samples / Tests SPT	Observations / Comments
							Surface: Grass					
Solid Flight Auger	1.9m seepage 19-Aug-21	0.0	66.0		SP	Natural	**TOPSOIL**- Sand, dark brown, fine to medium grained, trace silt and roots.	loose	m			
							SAND- grey-brown, fine to medium grained.	loose	m			
		1.0	65.0		SP					BH201 1.0-1.45m	2 6 9 N=15	
					SP		**SAND**- orange-brown and brown, fine to medium grained, with trace silt and partially indurated nodules.	medium dense	m			
					SP		**SAND**- dark brown and brown, fine to coarse grained.	medium dense	m	BH201 1.6-1.8m		
		2.0	64.0			Bedrock	**SANDSTONE**- grey and orange, fine to coarse grained, likely highly weathered and estimated to be low to medium strength.		wet			seepage water noted
							Refusal at 2.20m					
		3.0	63.0									
		4.0	62.0									
		5.0										

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **19-Aug-21**
Checked By: **Stephen McCormack** Date: **05-SEP-21**

GEE DAVIES BH LOG G21071VAU.GPJ GEE.GDT 5-9-21 2:20:31 PM

Borehole Log Report

Geo Environmental Engineering Pty Ltd
82 Bridge Street
Lane Cove NSW 2066
T 02 9420 3361

Hole ID. **BH202**
Hole Depth: **3.95 m**
Sheet: **1 of 1**

Project Name: **Geotechnical Investigation**
Project Number: **G21071VAU**
Location / Site: **671-683 Old South Head Road, Vaucluse NSW**
Client: **Blare Management**

Drilling Company: **Geo Environmental Engineering**
Date Started: **19-AUG-21**
Ground Level: **RL66.05m** (approx)
Drill Method: **Hand Auger**
Date Completed: **19-AUG-21**
Latitude: ----------
Equipment: **Manual**
Longitude: ----------

Method	Water Level	Depth (m)	RL (m)	Graphic Log	USCS Symbol	Material Type	Material Description	Consistency / Density	Moisture	Samples / Tests: ID No.	Samples / Tests: DCP blows/100mm	Observations / Comments
							Surface: Grass				5 10 15	
Hand Auger		0.0	66.0		SP	Natural	**TOPSOIL**- Sand, dark brown and grey, fine to medium grained, with trace roots and silt.	very loose to loose	m			
							SAND- mid-grey, fine to medium grained.	loose	m			
							becoming pale grey from 0.7m.					
		1.0	65.0		SP					BH202 1.2-1.5m		
		2.0	64.0									
					SP		**SAND**- dark brown/brown, fine to medium grained, trace silt and some indurated nodules.	medium dense to dense	m	BH202 2.3-2.5m		
							SAND- orange-brown, fine to coarse grained.	medium dense to dense	m			
	3.8m Seepage 19-Aug-21	3.0	63.0		SP					BH202 3.3-3.5m		
		4.0	62.0					dense	wet			Seepage noted
							Refusal at 3.95m **Caused by sandstone bedrock**					DCP bouncing refusal at 4.1m depth
		5.0										

Moisture

D	Dry
Dp	Damp
SM	Slightly Moist
M	Moist
VM	Very Moist
W	Wet
Sd	Saturated

Additional Comments

Logged By: **Stephen McCormack** Date: **19-Aug-21**
Checked By: **Stephen McCormack** Date: **05-SEP-21**

GEE DAVIES BH LOG G21071VAU.GPJ GEE.GDT 5-9-21 2:20:31 PM

Geo Environmental Engineering
82 Bridge Street
Lane Cove NSW 2066
E info@geoenvironmental.com.au

Log Report Legen

MATERIAL SYMBOL


FILL


CONCRETE


ASPHALT


TOPSOIL


ORGANICS


ESTUARINE MUD


CLAY


SAND


SILT


GRAVEL


Sandy CLAY


Clayey SAND


Clayey SILT


Clayey GRAVEL


Silty CLAY


Silty SAND


Sandy SILT


Sandy GRAVEL


Gravelly CLAY


Gravelly SAND


Gravelly SILT


Silty GRAVEL


CLAY & SAND


SAND & CLAY


SILT & CLAY


GRAVEL & CLAY


CLAY & SILT


SAND & SILT


SILT & SAND


GRAVEL & SAND


CLAY & GRAVEL


SAND & GRAVEL


SILT & GRAVEL


GRAVEL & SILT


Sandy Silty CLAY


Clayey Silty SAND


Sandy Clayey SILT


Sandy Clayey GRAVEL


Silty Sandy CLAY


Silty Clayey SAND


Clayey Sandy SILT


Clayey Sandy GRAVEL


Sandy Gravelly CLAY


Clayey Gravelly SAND


Sandy Gravelly SILT


Silty Clayey GRAVEL


Silty Gravelly CLAY


Silty Gravelly SAND


Clayey Gravelly SILT


Clayey Silty GRAVEL


Gravelly Silty CLAY


Gravelly Silty SAND


Gravelly Clayey SILT


Sandy Silty GRAVEL


Gravelly Sandy CLAY


Gravelly Clayey SAND


Gravelly Sandy SILT


Silty Sandy GRAVEL


SANDSTONE


SHALE


GRANITE


BASALT


SHALE / SANDSTONE


PORCELLANITE


GNEISS


SHALE / CLAYSTONE


MUDSTONE


CLAYSTONE


MUDSTONE / CLAYSTONE


SHALE / SILTSTONE


IRONSTONE

ATER LEVELS


Encountered Water

Standing Water

ABBREVIATIONS

PT	Pushtube
SFA	Solid Flight Auger
PWS	Percussion Window Sampler
HA	Hand Auger
HFA	Hollow Flight Auger

ELL RAPHICS


Cuttings


Bentonite


Screen


Gravel Pack


Grout


Cave-in

GEE LEGEND * * 29/10/09 5:04:07 PM

BOREHOLE REPORT

CLIENT: OSHR AT VAUCLUSE HOLDING PTY LTY **DATE:** 28/06/2018 **BORE No.:** 1

PROJECT: 4 LEVEL RESIDENTIAL DEVELOPMENT **PROJECT No.:** 2018-106 **SHEET:** 1 of 1

LOCATION: 671-679 OLD SOUTH HEAD ROAD, VAUCLUSE **SURFACE LEVEL:** RL å 71.80m

Depth (m)	Description of Strata	Sampling		In Situ Testing		
	PRIMARY SOIL - strength/density, colour, grainsize/plasticity, moisture, soil type incl. secondary constituents, other remarks	Type	Depth (m)	Type	Results	
0.00						
0.20	TOPSOIL: Dark brown					
0.70	FILL: Brown, fine to medium grained, sand fill					
1.00	SAND (SP): Loose, pale grey, fine to medium grained, moist sand (Superficial Soil)					
1.80	* became medium dense below 1.80m depth					
2.00						
2.60						
2.80	Gravelly SAND (SW): Medium dense, brown, medium grained, sand, medium to course ground sub-rounded to rounded gravel, moist (Superficial Soil)	D	2.63-2.80			
3.00	Sandy CLAY (CL): Firm, orange, low plasticity, moist sandy clay (Residual Soil)	D	2.80-2.88			
	* became very stiff to hard below 3.00m depth	D	3.30-3.40			
3.60						
3.80	Sandstone (EW) Extremely low strength, orange brown, fine grained (Hawksbury Sandstone)					
4.00	HAND AUGER REFUSUAL @3.80m depth in interpreted hard sandy clay to extremely low strength sandstone					

RIG: None DRILLER: CL LOGGED: JY

METHOD: Hand Auger

GROUND WATER OBSERVATIONS: no free ground water found

REMARKS: CHECKED:

BOREHOLE REPORT

CLIENT: OSHR AT VAUCLUSE HOLDING PTY LTY

DATE: 28/06/2018

BORE No.: 2

PROJECT: 4 LEVEL RESIDENTIAL DEVELOPMENT

PROJECT No.: 2018-106

SHEET: 1 of 1

LOCATION: 671-679 OLD SOUTH HEAD ROAD, VAUCLUSE

SURFACE LEVEL: RL å 73.30m

Depth (m)	Description of Strata	Sampling		In Situ Testing		
	PRIMARY SOIL - strength/density, colour, grainsize/plasticity, moisture, soil type incl. secondary constituents, other remarks	Type	Depth (m)	Type	Results	
0.00						
	TOPSOIL: Dark brown					
0.20						
	FILL: Brown, fine to medium grained, sand fill					
0.70						
	SAND (SP): Loose, pale grey, fine to medium grained, moist sand (Superficial Soil)					
1.00						
1.35	* became medium dense, orange brown and iron cemented between 1.35m to 1.75m depth					
1.75	* became orange yellow below 1.75m depth					
2.00						
2.85	* became dense below 2.85m depth					
3.00						
3.60	* became very dense below 3.60m depth					
4.00						
5.00						
5.20						
	HAND AUGER DISCONTINUED @5.20m depth					

RIG: None

DRILLER: CL

LOGGED: JY

METHOD: Hand Auger

GROUND WATER OBSERVATIONS: no free ground water found

REMARKS:

CHECKED:

BOREHOLE REPORT

CLIENT: OSHR AT VAUCLUSE HOLDING PTY LTY

DATE: 28/06/2018

BORE No.: 3

PROJECT: 4 LEVEL RESIDENTIAL DEVELOPMENT

PROJECT No.: 2018-106

SHEET: 1 of 1

LOCATION: 671-679 OLD SOUTH HEAD ROAD, VAUCLUSE

SURFACE LEVEL: RL å 73.00m

Depth (m)	Description of Strata	Sampling		In Situ Testing		
	PRIMARY SOIL - strength/density, colour, grainsize/plasticity, moisture, soil type incl. secondary constituents, other remarks	Type	Depth (m)	Type	Results	
0.00						
0.20	TOPSOIL: Dark brown					
0.45	FILL: Brown, fine to medium grained, sand fill					
1.00	SAND (SP) : Very loose to loose, pale grey, fine to medium grained, moist sand (Superficial Soil) * became medium dense, brown orange and iron cemented below 1.00m depth					
1.20	HAND AUGER DISCONTINUED @1.20m depth in medium dense sand					
2.00						
3.00						
4.00						
5.00						

RIG: None

DRILLER: CL

LOGGED: JY

METHOD: Hand Auger

GROUND WATER OBSERVATIONS: no free ground water found

REMARKS:

CHECKED:

BOREHOLE REPORT

CLIENT: OSHR AT VAUCLUSE HOLDING PTY LTY

DATE: 28/06/2018

BORE No.: 4

PROJECT: 4 LEVEL RESIDENTIAL DEVELOPMENT

PROJECT No.: 2018-106

SHEET: 1 of 1

LOCATION: 671-679 OLD SOUTH HEAD ROAD, VAUCLUSE

SURFACE LEVEL: RL å 71.00m

Depth (m)	Description of Strata	Sampling		In Situ Testing		
	PRIMARY SOIL - strength/density, colour, grainsize/plasticity, moisture, soil type incl. secondary constituents, other remarks	Type	Depth (m)	Type	Results	
0.00						
0.15	TILE overlaying BEDDING SAND					
	FILL: Brown, fine to medium grained, sand fill					
0.95						
1.00	SAND (SP): Loose, pale grey, fine to medium grained, moist sand (Superficial Soil)					
1.40	* became medium dense, red brown and iron cemented below 1.40m					
1.65	* became very dense between 1.65m to 1.95m depth					
1.95	* became medium dense, orange yellow below 1.95m depth					
2.00						
3.00						
4.00	* became dense below 4.05m depth					
5.00						
	HAND AUGER DISCONTINUED @5.00m depth					

RIG: None

DRILLER: CL

LOGGED: JY

METHOD: Hand Auger

GROUND WATER OBSERVATIONS: no free ground water found

REMARKS:

CHECKED:

BOREHOLE REPORT

CLIENT: OSHR AT VAUCLUSE HOLDING PTY LTY

DATE: 28/06/2018

BORE No.: 5

PROJECT: 4 LEVEL RESIDENTIAL DEVELOPMENT

PROJECT No.: 2018-106

SHEET: 1 of 1

LOCATION: 671-679 OLD SOUTH HEAD ROAD, VAUCLUSE

SURFACE LEVEL: RL å 71.00m

Depth (m)	Description of Strata PRIMARY SOIL - strength/density, colour, grainsize/plasticity, moisture, soil type incl. secondary constituents, other remarks	Sampling		In Situ Testing		
		Type	Depth (m)	Type	Results	
0.00						
	FILL: Brown, fine to medium grained, sand fill					
0.55						
	SAND (SP): Very loose, pale grey, fine to medium grained, moist sand (Superficial Soil)					
1.00						
1.20	* became loose below 1.20m depth					
1.75	* became medium dense, red brown and iron cemented below 1.75m depth					
2.00	* became dense to very dense between 1.95m to 2.25m depth					
2.35	* became medium desne and orange yellow below 2.35m depth					
3.00						
3.45	* became dense below 3.45m depth					
3.75	* became very dense below 3.75m depth					
4.00						
5.00						
5.80						
	HAND AUGER DISCONTINUED @5.80m depth					
6.00						

RIG: None

DRILLER: CL

LOGGED: JY

METHOD: Hand Auger

GROUND WATER OBSERVATIONS: no free ground water found

REMARKS:

CHECKED:

DYNAMIC PENETROMETER TEST RESULTS SHEET

CLIENT: OSHR AT VAUCLUSE HOLDIN **DATE:** 28/06/2018

PROJECT: 4 LEVEL RESIDENTIAL DEVEI **PROJECT No.:** 2018-106

LOCATION: 671-679 OLD SOUTH HEAD ROAD, VAUCLUSE **SHEET: 1 of 1**

	Test Location								
Depth (m)	DCP1	DCP1a	DCP2	DCP2a	DCP3	DCP4	DCP4a	DCP5	DCP5a
0.00 - 0.15	1	--	1	--	2	13	--	--	--
0.15 - 0.30	1	--	2	--	1	2	--	--	--
0.30 - 0.45	1	--	2	--	0	3	--	--	--
0.45 - 0.60	1	--	2	--	0	3	--	1	--
0.60 - 0.75	1	--	2	--	2	2	--	1	--
0.75 - 0.90	2	--	2	--	2	2	--	1	--
0.90 - 1.05	2	--	2	--	4	2	--	1	--
1.05 - 1.20	2	--	2	--	6	2	--	1	--
1.20 - 1.35	2	--	3	--	5	3	--	2	--
1.35 - 1.50	2	--	5	--	3	3	--	2	--
1.50 - 1.65	3	--	4	--	4	3	--	2	--
1.65 - 1.80	3	--	4	--	4	16	--	5	--
1.80 - 1.95	4	--	3	--	5	12	--	6	--
1.95 - 2.10	4	--	4	--	6	7	--	14	--
2.10 - 2.25	5	--	4	--	7	6	--	17	--
2.25 - 2.40	6	--	5	--	8	7	--	9	--
2.40 - 2.55		--		--			--		--
2.55 - 2.70		--		--			--		--
2.70 - 2.85		8		7			5		--
2.85 - 3.00		3		14			5		--
3.00 - 3.15		7		12			4		--
3.15 - 3.30		18		13			3		4
3.30 - 3.45		29		12			4		10
3.45 - 3.60		40		14			3		14
3.60 - 3.75				19			3		14
3.75 - 3.90				19			6		17
3.90 - 4.05				22			9		18
4.05 - 4.20							11		21
4.20 - 4.35									

TEST METHOD: AS 1289. F3.2, CONE PENETROMETER -- DCP2a, 4a
AS 1289. F3.3, PERTH SAND PENETROMETER -- DCP1, 2, 3, 4, 5, 1a, 5a

REMARKS: **(B)** Test hammer bouncing upon refusal on solid object
-- No test undertaken at this level due to prior excavation of soils

APPENDIX C

VENM Certificate

Certification:
Virgin e ca ate natural material

1. I *[full name]*

   of *[organisation and address]*

   certify that the waste as set out in section 2 of this notice is Virgin Excavated Natural Material (VENM) as defined in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

   This certification is made on behalf of the waste generator *[fill out if applicable]*

   being *[full name]*

   of *[organisation and address]*

2. The waste was generated at:

   Street address:

   Title reference (Lot/DP, etc.):

   The amount of waste (by volume or weight) is:

3. I have made the determination that the waste is VENM because:

   - ☐ I have assessed the historical and current land use of the site at which the waste was generated.
   - ☐ The waste is not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities.
   - ☐ The waste does not contain any sulfidic ores or soils.
   - ☐ The waste does not contain any other waste.
   - ☐ The waste does not contain asbestos in any form.

Note: that all sections of this form must be completed including all boxes checked in Section 3 above and signed below for any material to be certified as VENM.

Signature(s) . . . . . .

Name(s) (printed)

Date

arning: There are significant penalties under s.144AA of the *Protection of the Environment Operations Act 1997* for a person who supplies (whether knowingly or not) information that is false or misleading in a material respect about waste.

This certificate is intended to assist waste generators, contractors and/or receivers of VENM to have confidence that a range of relevant factors have been considered in the classification of a waste material as VENM.

Published by:
Environment Protection Authority, 59–61 Goulburn Street, Sydney South 1232
Ph: 131 555. TTY users: phone 133 677, then ask for 131 555
Speak and listen users: phone 1300 555 727, then ask for 131 555
Email: info@environment.nsw.gov.au; Web: www.epa.nsw.gov.au
Report pollution an en ironmental inci ents: Environment Line: 131 555 (NSW only)
EPA 2013/0693; September 2013

APPENDIX D

ENM Order and Exemption

Protection of the En ironment Operations (aste) Regulation 2005 eneral E emption Un er Part 6 Clause 51 an 51A

The e ca ate natural material e emption 2012

Name

1. This exemption is to be known as 'The excavated natural material exemption 2012'.

Commencement

2. This exemption commences on 19 October 2012. 'The excavated natural material exemption 2008' which commenced 25 July 2008 is revoked from 19 October 2012.

Duration

3. This exemption is valid until revoked by the Environment Protection Authority (EPA) by notice published in the Government Gazette.

Legislation

4. Under the *Protection of the Environment Operations (Waste) Regulation 2005* (the Regulation):

4.1. Clause 51 (2) authorises the EPA to grant an exemption in relation to any matter or thing including an activity or class of activities, and

4.2. Clause 51A authorises the EPA to exempt a person from any of the following provisions in relation to an activity or class of activities relating to certain waste that is to be land applied or used as a fuel:

- the provisions of sections 47 to 49 and 88 of the *Protection of the Environment Operations Act 1997* (the Act),
- the provisions of Schedule 1 to the Act, either in total or as they apply to a particular activity, and
- the provisions of Part 3 and clauses 45 and 47 of the Regulation.

E emption

5. In this Notice of Exemption:

5.1. The responsible person listed in Column 1 of Table 1 is exempt from the provision/s listed in Column 2 of that table but only:

- in relation to activities involving the relevant waste, and
- where the responsible person complies with the conditions referred to in Column 3 of the table, and
- in the case of a consumer, in relation to the premises where the waste is applied to land as permitted by clause 7.2.

However, this Notice of Exemption does not exempt the responsible person from the provisions specified in Column 2 where the relevant waste is received at premises that are, despite this exemption, required to be licensed for waste disposal (application to land) activities under the provisions of the Act.

5.2. Where a responsible person complies with the conditions of this Notice of Exemption, the activity referred to in Schedule 1 from which that person is exempt is taken to be a non-scheduled activity for the purposes of the Act.

Ta le 1

Column 1	Column 2	Column 3
Responsi le person	**Pro isions from hich the responsi le person is e empt**	**Con itions to e met y the responsi le person**
Generator	section 48 of the Act in respect of clause 39 of Schedule 1 to the Act	all requirements specified in section 7 and 8
Consumer	section 48 of the Act in respect of clauses 39 and 42 of Schedule 1 to the Act section 88 of the Act clause 47 of the Regulation	all requirements specified in section 7 and 9

This Notice of Exemption is a general exemption for the purposes of clause 51(3) of the Regulation.

Definitions

6. In this Notice of Exemption:

Bgl means below ground level, referring to soil at depth beneath the ground surface.
Characterisation means sampling and testing that must be conducted on the material for the range of chemicals and other attributes listed in Column 1 of Table 2.
Composite sample means a sample that combines 5 sub-samples of equal size into a single sample for the purpose of analysis.
Consumer means a person who applies, causes, or permits the application to land of excavated natural material within the definitions of "application to land" in accordance with the Act. The consumer may be the landholder responsible for the land to which excavated natural material is applied.
Discrete sample means a sample collected and analysed individually that will not be composited.
E ca ate natural material is naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

a) been excavated from the ground, and
b) contains at least 98% (by weight) natural material, and
c) does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.
enerator means a person who generates excavated natural material for supply to a consumer.
Hotspot means a cylindrical volume which extends through the soil profile from the ground surface to the proposed depth of excavation, where the level of any contaminant listed in Column 1 of Table 2 is greater than the absolute maximum concentration in Column 3 of Table 2.
***In situ* material** means material that exists on or below the ground level. It does not include stockpiled material.
***In situ* sampling** means sampling undertaken on *in situ* material.
Rele ant aste means excavated natural material that meets the requirements of Section 7.
Stoc pile material means material that has been excavated from the ground and temporarily stored on the ground prior to use.

Systematic sampling means sampling at points that are selected at even intervals and are statistically unbiased.
Vali ation means ensuring that test results comply with the conditions of this exemption prior to material being supplied to a consumer.

eneral con itions

7. This Notice of Exemption is subject to the following conditions:

7.1. The chemical concentration or other attribute of the excavated natural material listed in Column 1 of Table 2 must not exceed any of the following:
   7.1.1. For characterisation tests, the maximum average (based on the arithmetic mean) concentration or value listed in Column 2 of Table 2, and
   7.1.2. The absolute maximum concentration or value listed in Column 3 of Table 2.
7.2. The excavated natural material can only be applied to land as engineering fill or used in earthworks.

enerator responsi ilities

8. The following conditions must be met by the generator for this exemption to apply:

8.1. The generator must prepare a written sampling plan which includes information on sample preparation and storage. The plan must be kept for a period of three years;
8.2. The generator must undertake sampling and analysis of the material for Acid Sulfate Soil (ASS) and Potential Acid Sulfate Soil (PASS), in accordance with the *NSW Acid Sulfate Soil Manual*, Acid Sulfate Soils Management Advisory Council, 1998 and the updated *Laboratory Methods Guidelines version 2.1 – June 2004* where:
   8.2.1. the pH measured in the material is below 5, and/or
   8.2.2. the review of the applicable Acid Sulfate Soil Risk Maps (published by the former Department of Land and Water Conservation and available at http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm) indicates the potential presence of Acid Sulfate Soils (ASS).
8.3. For stockpiled material, the generator must:
   8.3.1. undertake sampling in accordance with Australian Standard 1141.3.1-1996 *Methods for sampling and testing aggregates* – Sampling – Aggregates (or equivalent);
   8.3.2. undertake characterisation according to the requirements listed in Columns 1 and 2 of Table 3 for the range of chemicals and other attributes listed in Column 1 of Table 2; and
   8.3.3. store the excavated natural material appropriately until the characterisation test results are validated (i.e. obtained and assessed as compliant with this exemption).
8.4. For *in situ* material, the generator must:
   8.4.1. undertake characterisation for the range of chemicals and other attributes listed in Column 1 of Table 2 according to the requirements listed in Columns 1, 2, and 3 of Table 4. When the ground surface is not comprised of soil (e.g. concrete slab), samples must be taken at the depth at which the soil commences.
   8.4.2. undertake sampling at depth according to Column 1 of Table 5.
   8.4.3. collect additional soil samples (and analyse them for the range of chemicals and other attributes listed in Column 1 of Table 2), at any

depth exhibiting discolouration, staining, odour or other indicators of contamination inconsistent with soil samples collected at the depth intervals indicated in Table 5.

8.4.4. segregate and exclude hotspots identified in accordance with Table 4, from material excavated for reuse under this exemption.

8.5. For both stockpiled and *in situ* material the generator must:

8.5.1. keep a written record of all characterisation test results, volume of excavated material, and detected hotspot material for a period of three years; and

8.5.2. provide a written statement of compliance to the consumer with each transaction, certifying that the excavated natural material complies with the relevant conditions of this exemption.

Consumer responsi ilities

9. The following conditions must be met by the consumer for this exemption to apply:

9.1. The consumer must ensure that the excavated natural material is fit for purpose and poses minimal risk of harm to human health or the environment.

9.2. The consumer must keep records of the quantity of the excavated natural material received as well as the suppliers' name and address, for a period of three years.

9.3. The consumer must land apply the relevant waste within a reasonable period of time.

Chemical an other material property re uirements

10. This Notice of Exemption only applies to excavated natural material where the chemical and other attributes listed in Column 1 of Table 2 comply with the chemical concentrations and other values listed in Column 2 and Column 3 of Table 2, when analysed according to test methods specified in Column 4 of Table 2.

Ta le 2

Column 1	**Column 2**	**Column 3**	**Column 4**
Chemicals an other attri utes	**Ma imum a erage concentration for characterisation** (mg/kg 'dry weight' unless otherwise specified)	**A solute ma imum concentration** (mg/kg 'dry weight' unless otherwise specified)	**Test metho specifie ithin Section**
1. Mercury	0.5	1	12.1
2. Cadmium	0.5	1	12.2
3. Lead	50	100	12.2
4. Arsenic	20	40	12.2
5. Chromium (total)	75	150	12.2
6. Copper	100	200	12.2
7. Nickel	30	60	12.2
8. Zinc	150	300	12.2
9. Electrical Conductivity	1.5 dS/m	3 dS/m	12.3
10. pH *	5 to 9	4.5 to 10	12.3
11. Total Polycyclic Aromatic Hydrocarbons	20	40	12.4

Column 1	Column 2	Column 3	Column 4
Chemicals an other attri utes	**Ma imum a erage concentration for characterisation** (mg/kg 'dry weight' unless otherwise specified)	**A solute ma imum concentration** (mg/kg 'dry weight' unless otherwise specified)	**Test metho specifie ithin Section**
(PAHs)			
12. Benzo(a)pyrene	0.5	1	12.4
13. Benzene	NA	0.5	12.5
14. Toluene	NA	65	12.5
15. Ethyl-benzene	NA	25	12.5
16. Xylene	NA	15	12.5
17. Total Petroleum Hydrocarbons C_{10}-C_{36}	250	500	12.6
18. Rubber, plastic, bitumen, paper, cloth, paint and wood	0.05%	0.10%	12.7

* The ranges given for pH are for the minimum and maximum acceptable pH values in the excavated natural material.

Sampling re uirements

11. This Notice of Exemption only applies to excavated natural material sampled according to the requirements in Tables 3, 4 and 5.

11.1. Stockpiled excavated natural material must be sampled as per the requirements in Table 3.

11.1.1. Composite sampling must be undertaken for analysis of attributes 1 to 10 and 18 in Column 1 of Table 2. Discrete sampling must be undertaken for analysis of attributes 11 to 17 in Column 1 of Table 2.

11.1.2. Sampling must be undertaken in a manner that ensures all parts of the stockpile are equally accessible for representative sampling.

11.1.3. For stockpiles greater than 4,000 tonnes the number of samples described in Table 3 must be repeated.

Ta le 3

Sampling of Stoc pile Material		
Column 1	**Column 2**	**Column 3**
uantity (tonnes)	**Num er of samples**	**Vali ation**
<500	3	Required
500 – 1,000	4	
1,000 – 2,000	5	
2,000 – 3,000	7	
3,000 – 4,000	10	

11.2. *In situ* material must be sampled by collecting discrete samples as per the requirements of Tables 4 and 5.

11.2.1. Sites larger than 50,000 m^2 should be subdivided into smaller areas and sampled as per Table 4.

Ta le 4

***In Situ* Sampling at surface**				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Si e of *in situ* area (m^2)	**Num er of systematic sampling points recommen e**	**Distance et een t o sampling points** (m)	**Diameter of the hot spot that can e etecte ith 5 confi ence** (m)	**Vali ation**
500	5	10.0	11.8	Required
1000	6	12.9	15.2	
2000	7	16.9	19.9	
3000	9	18.2	21.5	
4000	11	19.1	22.5	
5000	13	19.6	23.1	
6000	15	20.0	23.6	
7000	17	20.3	23.9	
8000	19	20.5	24.2	
9000	20	21.2	25.0	
10,000	21	21.8	25.7	
15,000	25	25.0	28.9	
20,000	30	25.8	30.5	
25,000	35	26.7	31.5	
30,000	40	27.5	32.4	
35,000	45	27.9	32.9	
40,000	50	28.3	33.4	
45,000	52	29.3	34.6	
50,000	55	30.2	35.6	

Table 4 has been taken from NSW EPA 1995, *Contaminated Sites Sampling Design Guidelines*, NSW Environment Protection Authority.

Ta le 5

***In Situ* Sampling at Depth**	
Column 1	**Column 2**
Sampling Re uirements	**Vali ation**
1 soil sample at 1.0 m bgl from each surface sampling point followed by 1 soil sample for every metre thereafter. From 1.0 m bgl, sample at the next metre interval until the proposed depth of excavation of the material is reached. If the proposed depth of excavation is between 0.5 to 0.9 m after the last metre interval, sample at the base of the proposed depth of excavation.	Required if the depth of excavation is equal to or greater than 1.0 m bgl

* Refer to Notes for examples

Test metho

12. All testing must be undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA), or equivalent. All chemicals and other attributes listed in Column 1 of Table 2 must be measured in accordance with the test methods specified below:

12.1. Test methods for measuring the mercury concentration.
- 12.1.1. Particle size reduction & sample splitting may be required.
- 12.1.2. Analysis using USEPA SW-846 Method 7471B Mercury in solid or semisolid waste (manual cold vapour technique), or an equivalent analytical method with a detection limit < 20% of the stated absolute maximum concentration in Column 3 of Table 2 (i.e. 0.20 mg/kg dry weight).
- 12.1.3. Report as mg/kg dry weight.

12.2. Test methods for measuring chemicals 2 to 8 in Column 1 of Table 2.
- 12.2.1. Particle size reduction & sample splitting may be required.
- 12.2.2. Sample preparation by digesting using USEPA SW-846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils (or an equivalent analytical method).
- 12.2.3. Analysis using USEPA SW-846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with a detection limit < 10% of the stated absolute maximum concentration in Column 3 of Table 2, (e.g. 10 mg/kg dry weight for lead).
- 12.2.4. Report as mg/kg dry weight.

12.3. Test methods for measuring electrical conductivity and pH.
- 12.3.1. Sample preparation by mixing 1 part excavated natural material with 5 parts distilled water.
- 12.3.2. Analysis using Method 103 (pH) and 104 (Electrical Conductivity). *In* Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).
- 12.3.3. Report electrical conductivity in deciSiemens per metre (dS/m).

12.4. Test method for measuring Polynuclear Aromatic Hydrocarbons (PAHs) and benzo(a)pyrene.
- 12.4.1. Analysis using USEPA SW-846 Method 8100 Polynuclear Aromatic Hydrocarbons (or an equivalent analytical method).
- 12.4.2. Calculate the sum of all 16 PAHs for total PAHs.
- 12.4.3. Report total PAHs as mg/kg dry weight.
- 12.4.4. Report benzo(a)pyrene as mg/kg.

12.5. Test method for measuring benzene, toluene, ethylbenzene and xylenes (BTEX).
- 12.5.1. Method 501 (Volatile Alkanes and Monocyclic Aromatic Hydrocarbons). In Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).
- 12.5.2. Report BTEX as mg/kg.

12.6. Test method for measuring Total Petroleum Hydrocarbons (TPH).

12.6.1. Method 506 (Petroleum Hydrocarbons). In Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).

12.6.2. Report as mg/kg dry weight.

12.7. Test method for measuring rubber, plastic, bitumen, paper, cloth, paint and wood.

12.7.1. NSW Roads & Traffic Authority Test Method T276 Foreign Materials Content of Recycled Crushed Concrete (or an equivalent method).

12.7.2. Report as percent.

E emption rante

Christopher McEl ain
Manager aste an Resource Strategy
En ironment Protection Authority
y elegation

Notes

The EPA may amend or revoke this exemption at any time. It is the responsibility of the generator and the consumer to ensure that they comply with all relevant requirements of the most current exemption. The current version of an exemption will be available on the EPA website: www.epa.nsw.gov.au.

In gazetting this general exemption, the EPA is exempting the relevant waste from the specific requirements of the Act and Regulations as stated in this exemption. The EPA is not in any way endorsing the use of this substance or guaranteeing that the substance will confer benefit.

The use of exempted material remains subject to other relevant environmental regulations within the Act and Regulations. For example, a person who pollutes land (s142A) or water (s120), or does not meet the special requirements for asbestos waste (clause 42), regardless of having an exemption, is guilty of an offence and subject to prosecution.

For the purposes of arrangements between a generator and a consumer, a 'transaction' is taken to mean the contractual agreement between the two parties which specifies the exchange of waste material from one party to another. A 'statement of compliance' must be in writing and be provided with each transaction.

The conditions set out in this exemption are designed to minimise the risk of potential harm to the environment, human health or agriculture, however, neither this exemption nor these conditions guarantee that the environment, human health or agriculture will not be harmed.

The consumer should assess whether or not the exempted material is fit for the purpose for which the material is proposed to be used and whether this use will cause harm. The consumer may need to seek expert engineering or technical advice.

This exemption does not apply to any material received at premises that are required to be licensed for waste disposal (application to land) activities under the provisions of the Act. This exemption does not remove the need for a site at which processing occurs to be licensed, if required under Schedule 1 of the Act.

This exemption does not alter the requirements of any other relevant legislation that must be met in utilising this material, including for example, the need to prepare a Material Safety Data Sheet (MSDS).

Regardless of any exemption provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with the development consent requirements of the land.
All records required to be kept under this exemption must be made available to authorised officers of the EPA upon request.

Failure to comply with the conditions of this Notice of Exemption may constitute an offence under clause 51 of the Regulation and the responsible person will be required to comply with the normal regulatory provisions.

E amples

In situ sampling at epth

Example 1.
If the proposed depth of ENM excavation is between 1 m bgl and 1.4 m bgl, then:

- 1 sample on surface (as per the requirements of Table 4).
- 1 sample at 1 m bgl.
- No further depth sampling after 1 m bgl, unless required under section 8.4.3.

Example 2.
If the proposed depth of ENM excavation is at 1.75 m bgl, then:

- 1 sample on surface (as per the requirements of Table 4).
- 1 sample at 1 m bgl.
- 1 sample at 1.75 m bgl.
- No further depth sampling after 1.75 m bgl, unless required under section 8.4.3.

Example 3.
If the proposed depth of ENM excavation is at 2.25 m bgl, then:

- 1 sample on surface (as per the requirements of Table 4).
- 1 sample at 1 m bgl.
- 1 sample at 2 m bgl.
- No further depth sampling after 2 m bgl, unless required under section 8.4.3.

Resource Reco ery E emption un er Part Clauses 1 an 2 of the Protection of the En ironment Operations (aste) Regulation 2014

The e ca ate natural material e emption 2014

Intro uction

This exemption:

- is issued by the Environment Protection Authority (EPA) under clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation); and
- exempts a consumer of excavated natural material from certain requirements under the *Protection of the Environment Operations Act 1997* (POEO Act) and the Waste Regulation in relation to the application of that waste to land, provided the consumer complies with the conditions of this exemption.

This exemption should be read in conjunction with 'the excavated natural material order 2014'.

1. aste to hich this e emption applies

1.1. This exemption applies to excavated natural material that is, or is intended to be, applied to land as engineering fill or for use in earthworks.

1.2. Excavated natural material is naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

a) been excavated from the ground, and
b) contains at least 98% (by weight) natural material, and
c) does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.

2. Persons to hom this e emption applies

2.1. This exemption applies to any person who applies or intends to apply excavated natural material to land as set out in 1.1.

3. Duration

3.1. This exemption commences on 24 November 2014 and is valid until revoked by the EPA by notice published in the Government Gazette.

4. Premises to hich this e emption applies

4.1. This exemption applies to the premises at which the consumer's actual or intended application of excavated natural material is carried out.

5. Re ocation

5.1. 'The excavated natural material exemption 2012' which commenced 19 October 2012 is revoked from 24 November 2014.

6. E emption

6.1. Subject to the conditions of this exemption, the EPA exempts each consumer from the following provisions of the POEO Act and the Waste Regulation in relation to the consumer's actual or intended application of excavated natural material to land as engineering fill or for use in earthworks at the premises:

- section 48 of the POEO Act in respect of the scheduled activities described in clauses 39 of Schedule 1 of the POEO Act;
- Part 4 of the Waste Regulation;
- section 88 of the POEO Act; and
- clause 109 and 110 of the Waste Regulation.

6.2. The exemption does not apply in circumstances where excavated natural material is received at the premises for which the consumer holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land) or clause 40 'waste disposal' (thermal treatment) of Schedule 1 of the POEO Act.

. Con itions of e emption

The exemption is subject to the following conditions:

7.1. At the time the excavated natural material is received at the premises, the material must meet all chemical and other material requirements for excavated natural material which are required on or before the supply of excavated natural material under 'the excavated natural material order 2014'.

7.2. The excavated natural material can only be applied to land as engineering fill or for use in earthworks.

7.3. The consumer must keep a written record of the following for a period of six years:

- the quantity of any excavated natural material received; and
- the name and address of the supplier of the excavated natural material received.

7.4. The consumer must make any records required to be kept under this exemption available to authorised officers of the EPA on request.

7.5. The consumer must ensure that any application of excavated natural material to land must occur within a reasonable period of time after its receipt.

. Definitions

In this exemption:

application or apply to lan means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

consumer means a person who applies, or intends to apply excavated natural material to land.

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Notes

The EPA may amend or revoke this exemption at any time. It is the responsibility of the consumer to ensure they comply with all relevant requirements of the most current exemption The current version of this exemption will be available on www.epa.nsw.gov.au

In gazetting or otherwise issuing this exemption, the EPA is not in any way endorsing the use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this exemption are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this exemption nor the accompanying order guarantee that the environment, human health or agriculture will not be harmed.

The consumer should assess whether or not the excavated natural material is fit for the purpose the material is proposed to be used for, and whether this use will cause harm. The consumer may need to seek expert engineering or technical advice.

Regardless of any exemption provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The receipt of excavated natural material remains subject to other relevant environmental regulations in the POEO Act and the Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of having an exemption, is guilty of an offence and subject to prosecution.

This exemption does not alter the requirements of any other relevant legislation that must be met in utilising this material, including for example, the need to prepare a Safety Data Sheet (SDS).

Failure to comply with the conditions of this exemption constitutes an offence under clause 91 of the Waste Regulation.

APPENDIX E

Data Quality Objectives (DQO) – Validation Program

INTRODUCTION

The Data Quality Objectives (DQOs) process was used to define the type, quantity and quality of the data needed to support decisions relating to the environmental condition of a site (reference 1). The process consists of seven steps, with the output from each step influencing the choices that will be made later in the process.

According to USEPA (reference 2), DQOs are qualitative and quantitative statements, derived from the first six steps of the process, that:

- ◊ Clarify the study objective,
- ◊ Define the most appropriate type of data to collect,
- ◊ Determine the most appropriate conditions from which to collect the data, and
- ◊ Specify tolerable limits on decision errors which will be used as the basis for establishing the quantity and quality of data needed to support the decision.

The DQOs are then used to develop a scientific and resource-effective data collection design.

STEP 1 - STATE THE PROBLEM

The topsoil/ fill layer beneath the site has been found to be sporadically contaminated with lead at concentrations in excess of those permissible for the proposed land-use, and which could impact upon anticipated receiving environments and the future users of the site. This layer will be excavated from site and validation sampling is required to confirm that the remaining soil and any imported soil is not contaminated.

STEP 2 - IDENTIFY THE DECISION STATEMENT

The following decision were required to be made:

- ◊ Has the contaminated fill layer been completely removed from site and disposed to a facility licenced by NSW EPA to accept the waste?
- ◊ Do the concentrations of contaminants in the remaining soil profile (following remediation works) exceed acceptable levels for the proposed land-use?

- ◊ Is the imported fill (if any) classified as Virgin Excavated Natural Material (VENM), or material granted appropriate Resource Recovery Exemptions by the NSW EPA (e.g. Excavated Natural Material (ENM)?
- ◊ Are there any aesthetic issues relating to the remaining natural soil profile or the imported fill material that would make it unsuitable for the proposed land-use?

STEP 3 - IDENTIFY INPUTS TO THE DECISION

The following information inputs are required to resolve the decision statement:

- ◊ Obtain Council approval for remediation works.
- ◊ Demolish existing structures.
- ◊ Waste classification of the fill to facilitate off-site disposal of waste fill material.
- ◊ Disposal of the contaminated topsoil/fill layer at a landfill licenced to accept the waste.
- ◊ Waste disposal receipts / dockets.
- ◊ Site inspection and photographs following removal of the fill to assess any potential aesthetic issues and confirm that all the fill has been removed.
- ◊ Collection of validation soil samples from the surface of remaining natural soil profile after remediation works using appropriate methods.
- ◊ Analysis of the validation samples from contaminants of concern (metals).
- ◊ Definition of appropriate Remediation Assessment Criteria (RAC) for the proposed development and land-use scenario.
- ◊ Accurate measurements of sample locations to allow for accurate mapping and contouring of contamination (if identified).
- ◊ Confirmation that the imported fill is ENM or VENM.
- ◊ Quality Assurance and Quality Control (QA/QC) data.

STEP 4 - DEFINE THE BOUNDARIES OF THE STUDY

The site covers an approximate area of approximately 4,350m^2 and encompasses the following legal allotments:

- ◊ Lots A and B in Deposited Plan (DP) 324744

- Lot 2 in DP 10314
- Lot 1 in DP 169310
- Lot 4 in DP 192614
- Lot 1 in DP 168877
- Lot 1 in DP 167942
- Lot 1 in DP 666626
- Lot 2 in DP 316716

The lateral extent of the study is the boundaries of the site. The horizontal extent of the study is ensuring that the surface of the natural soil is exposed. However, if the validation samples identify contamination, then more excavation will need to occur, and new validation samples will need to be collected until the contamination has been successfully removed.

STEP 5 - DEVELOP A DECISION RULE

- If a site inspection confirms that all the topsoil/fill layer has not been completely removed from site and disposed of to a facility licensed by NSW EPA to accept the waste, then additional remediation will be required,
- If a site inspection confirms that all the topsoil/fill layer has been removed from site and disposed of to a facility licensed by NSW EPA to accept the waste, then the site will be considered to be validated (subject to validation sampling results),
- If it is determined that the validation data generated through this investigation are reliable, the data will be compared against the adopted Remediation Assessment Criteria (RAC),
- If all the validation data meets the adopted RAC then the site will be considered to be validated and suitable for the proposed development and land-use,
- If all the validation data do not meet the adopted SAC, then further remediation and validation testing to be completed. Further investigations may include:
    - Additional soil or groundwater sampling points to delineate localised contamination,
    - Analysis of soil for additional analytes/CoPC,
    - Undertaking soil vapour investigations, and/or

- Undertaking a human health and/or ecological risk assessment to assess site suitability and, if not suitable, assess the requirement for remediation and/or management.

STEP 6 - SPECIFY ACCEPTABLE LIMITS ON DECISION ERRORS

The field sampling methodology, sample preservation techniques, and laboratory analytical procedures must be appropriate to provide confidence in data quality so that any comparison against RAC can be considered reliable. This is achieved by defining and comparing results against the Data Quality Indicators (DQIs).

STEP 7 - OPTIMISING THE DESIGN FOR OBTAINING DATA

This is achieved by referencing regulatory guidelines for sample design in consideration of the likely nature of contaminant distribution.

References

1. NSW EPA (2017) *Contaminated Land Management: Guidelines for NSW Site Auditor Scheme (3rd Edition).*
2. USEPA, 2000: *Guidance for Data Quality Objectives Process*. EPA QA/G-4.