ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

ROYAL RANDWICK RACECOURSE, LEGER LAWN

22 OCTOBER 2019
P0005973
DRAFT ACHAR FOR TOA
PREPARED FOR THE AUSTRALIAN TURF CLUB LIMITED

URBIS

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Project Code	P0005973
Report Number	DRAFT for TOA

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EXECUTIVE SUMMARY

Urbis Pty Ltd (Urbis) was commissioned by the Australian Turf Club (ATC) (the proponent) to prepare an Aboriginal Cultural Heritage Assessment Report (ACHAR). This report presents the finding of an Aboriginal Cultural Heritage Assessment (ACHA) of the proposed development of a new public multipurpose facility (the project) for the Leger Lawn in the north-western section of Lot 2009 DP 1169042, within the grounds of the Royal Randwick Racecourse, Randwick NSW

This report has been prepared for the proposed development of a new public multipurpose facility in the location of the current Leger Lawn in the north-western section of Lot 2009 DP 1169042, within the grounds of the Royal Randwick Racecourse (hereafter referred to as 'the subject area').

The ACHA is required to inform the Environmental Impact Statement (EIS) which will be submitted to support a State Significance Development Application (SSDA). The ACHA addresses the relevant requirements of the Department of Planning's Secretary's Environmental Assessment Requirements (SEARs).

This ACHAR was prepared as per the relevant section of the *National Parks and Wildlife Act 1974* (NPW Act) and the *National Parks and Wildlife Regulations 2009* (NPW Reg) and in accordance to the following guidelines:

- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water (DECCW), 2010) (the Consultation Guidelines);
- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage 2011) (the Assessment Guidelines);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010); and
- The Burra Charter, 2013 (Burra Charter).

The ACHA process included the:

- Comprehensive background research of all available archaeological and cultural heritage information for the subject area in context with the scope of the Project;
- Analysis and interpretation of the background research;
- Consultation with the Registered Aboriginal Parties (RAPs);
- Summarising of results and providing recommendations for the proposed development in relation to Aboriginal cultural heritage and archaeological resources.

The ACHAR concluded that:

- There are no registered Aboriginal objects and/or archaeological sites within the subject area;
- The original landscape is covered by approximately 1 to 1.5 m imported fill and the ground surface visibility is zero within the subject area.
- There are landscape features, including the consolidated aeolian sand body that part of the Tuggerah Soil Landscape and locally the Botany Bay sands, with potential for Aboriginal objects or archaeological deposits located within the subject area;
- Additional investigation is warranted in the form of subsurface archaeological test or staged/salvage excavation to establish the presence or absence of Aboriginal objects and archaeological resources within the subject area.
- No Aboriginal cultural heritage values have been identified by the RAPs.
- The RAPs have expressed their support for the proposed recommendations and additional works.

Based on the above conclusions, the following recommendations are provided:

- The Proponent should continue to consult with the Aboriginal community in regard to the Project;

- A geomorphological assessment should be carried out prior to construction to investigate the underlaying sand body to provide further information of the accumulation processes and inform the detailed Archaeological Research Design and Methodology.
- Additional Geophysical investigation need to be carried out after the removal of the temporary stables from the western section of the subject area to supplement exiting information.
- Prior to construction subsurface archaeological investigation must be carried out informed by an Archaeological Research Design and Methodology that will drive the sub-surface investigation of the identified landscape features and their potential for retaining Aboriginal objects and archaeological resources including:
    - Archaeological monitoring of the removal of the imported fill around the selected pylon locations for the staged salvage excavation;
    - Archaeological staged salvage excavation to confirm the presence or absence of Aboriginal objects and archaeological resources at the selected pylon locations within the subject area.
    - Should Aboriginal objects and/or archaeological resources identified at the selected locations, additional pylon locations are to be excavated to identify the spatial distribution of the archaeological resource.
    - Protocol for the handling of any Aboriginal objects and archaeological resources that might be uncovered during the monitoring and the archaeological test excavation.
- The archaeological monitoring and staged salvage excavation should be designed to correspond the stages of the proposed development, including site preparation and construction phases.
- The archaeological monitoring and staged salvage excavation should be undertaken before construction and according to the developed Archaeological Research Design and Methodology and with the participation of the nominated Aboriginal RAPs and appropriately qualified archaeologists.

1. INTRODUCTION

Urbis Pty Ltd (Urbis) was commissioned by the Australian Turf Club (ATC) (the proponent) to prepare an Aboriginal Cultural Heritage Assessment Report (ACHAR). This report presents the finding of an Aboriginal Cultural Heritage Assessment (ACHA) of the proposed development of a new public multipurpose facility (the project) for the Leger Lawn in the north-western section of Lot 2009 DP 1169042, within the grounds of the Royal Randwick Racecourse , Randwick NSW (hereafter referred to as 'the subject area'), (see Figure 1 and Figure 2).

The proposed development is located in the current Leger Lawn in the north-western section of Lot 2009 DP 1169042, within the grounds of the Royal Randwick Racecourse. The subject area is within the bounds of Randwick City Council local government area (LGA), NSW. The subject area is bordered by the Grandstand to the north, race circuit from east, a temporary race stall to the south and permanent multi-level carpark to the west. The subject area covers an area of approximately 8,000 square metres (m²) and situated on an entirely cleared, levelled and landscaped area. There is a temporary race-stall located on the southern portion of the subject area. The subject area has been designed to include all aspects of the proposed development.

The proposed works will involve the construction of a new public, multipurpose facility, will be known as the Winx Stand at the site. The construction of the new facility will involve the construction of pylons that will penetrate the existing ground surface to the depth of 10 m, excavation and site preparation works, construction of facilities and associated utilities, landscaping and terrace planting (Figure 3). The Winx Stand will include:

- Ground floor including multi use hall, food and beverage facilities, amenities, entries and circulation and back of house facilities.
- Upper level including multi use hall, food and beverage facilities, amenities, entries and circulation, back of house facilities, landscape balcony and bridge link to Queen Elisabeth II Stand.
- Non trafficable roof including capacity for future floor.
- External landscaping.

The construction activities associated with the proposed development will have direct, localised impact on the existing ground surface and particularly on the underlaying, natural sand dunes.

1.1. STATUORY CONTROLS

Management of Aboriginal objects is under the statutory control of the *National Parks and Wildlife Act 1974 (NPW Act)* further regulation of the process is outlined in the *National Parks and Wildlife Regulations 2009 (NPW Reg).* This ACHA has been carried out in accordance to Part 6 of the NPW Act and Part 8A of the NPW Reg. The ACHAR was prepared the statutory guidelines under the NPW Act including:

- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water (DECCW), 2010) (the Consultation Guidelines);
- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage 2011) (the Assessment Guidelines);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010).
- *The Australia ICOMOS Charter for Places of Cultural Significance, The Burra Charter, 2013 (Burra Charter*

The ACHA is required to inform the Environmental Impact Statement (EIS) which will be submitted to support a State Significance Development Application (SSDA). The ACHA is to be carried out in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011)*. The ACHA will also address the relevant requirements of the Department of Planning's Secretary's Environmental Assessment Requirements (SEARs).

The ACHAR was prepared in accordance to the relevant requirements of the Department of Planning's Secretary's Environmental Assessment Requirements (SEARs) issued under Section 4.12(8) of the

Environmental Planning and Assessment Act 1979 and Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

1.1.1. Response to SEARs

The ACHAR is guided by the Secretary's Environmental Assessment Requirements (SEARs) for the State Significant Development (SSD 10285). Table 1 identifies the relevant SEARs and the corresponding sections of the ACHAR. The Office of Environment and Heritage (OEH) (now known as the Department of Planning Industry and Environment - DPIE) provided a standard SEARS with no project-specific requirements outlined in the accompanying letter from DPIE.

Table 1 – SEARs and relevant report sections

SEARs Item 8 Heritage and Archaeology	Report section
• Include an Aboriginal Cultural Heritage Assessment Report (ACHAR) that identifies and describes Aboriginal cultural heritage values that existing across the area affected by the development, prepared in accordance with the *Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW*, and guided by *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW*	Section 2, Section 4, Section 5
• Document consultation with Aboriginal people undertaken and documented in accordance with the Aboriginal Cultural heritage consultation requirements for proponents 2010 (DECCW)	Section 3

1.2. OBJECTIVES OF THE ACHA

The objectives of this ACHA are to:

- Investigate the presence, or absence of Aboriginal objects and/or places within and in close proximity to the subject area, and whether those objects and/or places would be harmed by the project;
- Investigate the presence, or absence of any landscape features that may have the potential to contain Aboriginal objects and/or sites and whether those objects and/or sites would be harmed by the project;
- Document the nature, extent and significance of any Aboriginal objects and/or place and sites that may located within the subject area;
- Document consultation with the Registered Aboriginal Parties (RAPs) with the aim to identify any spiritual, traditional, historical or contemporary associations or attachments to the subject area and any Aboriginal objects and/or places that might be identified within the subject area;
- Provide management strategies for any identified Aboriginal objects and/or places or cultural heritage values;
- Provide recommendation for the implementation of the identified management strategies; and
- Prepare a final Aboriginal Cultural Heritage Assessment Report (ACHAR) to be included in the EIS for the project.

1.3. AUTHORSHIP

This ACHAR has been prepared by Meggan Walker, Urbis Consultant Archaeologist, and Andrew Crisp, Urbis Senior Archaeologist, with review and quality control undertaken by Balazs Hansel, Urbis Associate Director Archaeology.

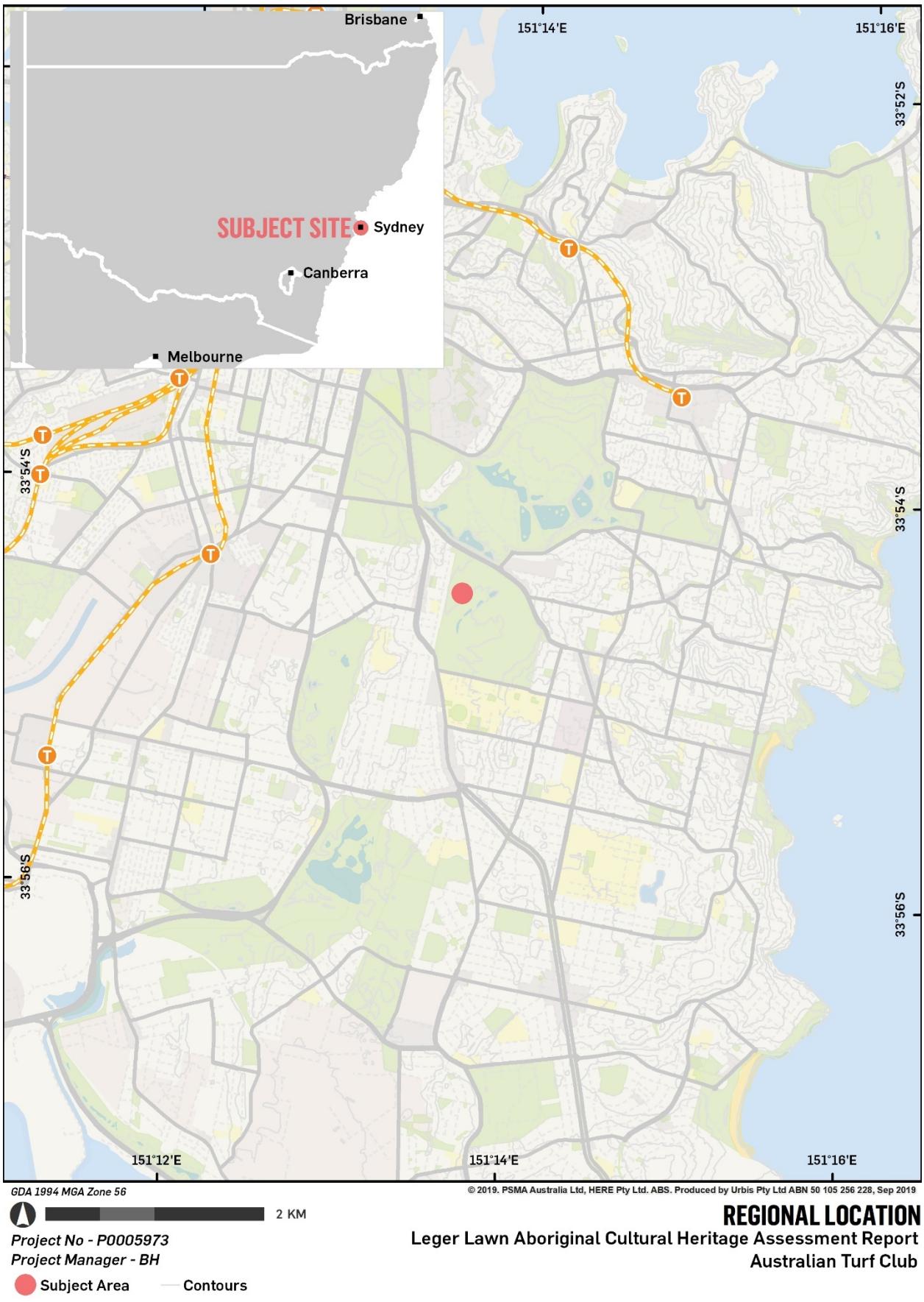


Figure 1 – Regional Location

Figure 2 – Location of the Subject Area

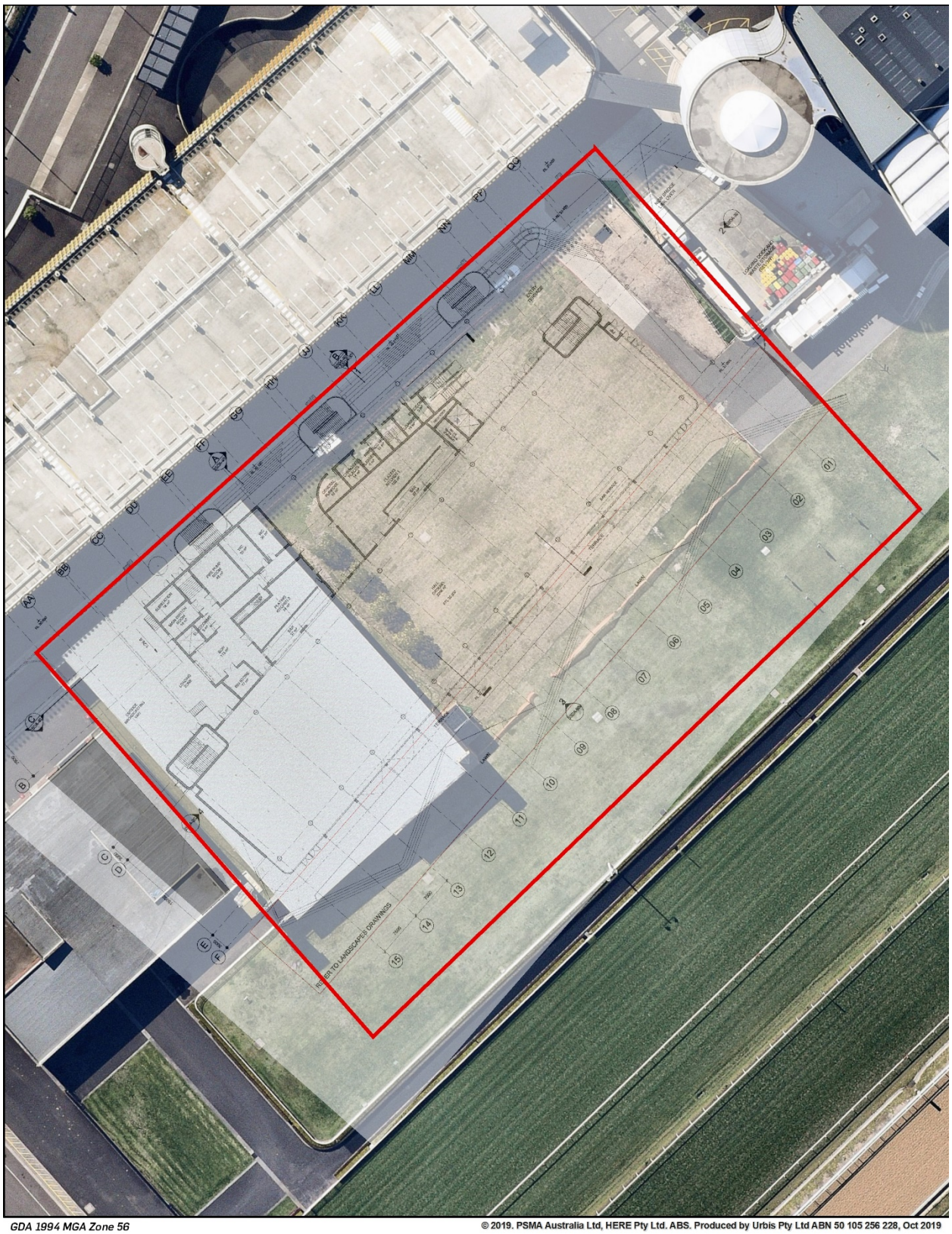


Figure 3 – Proposed Development Footprint

2. ARCHAEOLOGICAL CONTEXT

2.1. LOCATION

The subject area is located on the Leger Lawn in the north-western section of Lot 2009 DP 1169042, within the grounds of the Royal Randwick Racecourse, within the bounds of Randwick City Council Local Government Area (LGA), NSW.

The subject area is located approximately 4km south east of Sydney CBD and is within the Sydney basin bioregion, atop the natural sand dunes of the Botany Lowlands dune system, in close proximity to the former Lachlan Swamplands area no known as the Centennial Parklands. The subject area is approximately 3km west of Coogee Beach. The subject area is bordered by the Grandstand to the north, race circuit from east, a temporary race stall to the south and permanent multi-level carpark to the west. The subject area covers an area of approximately 8,000 square metres (m²) and situated on an entirely cleared, levelled and landscaped area. There is a temporary race-stall located on the southern portion of the subject area.

2.2. ABORIGINAL ARCHAEOLOGICAL BACKGROUND

This section comprises the summary of the archaeological background research completed to date for Aboriginal cultural heritage resources including the search of the Aboriginal Heritage Information Management System (AHIMS), preliminary landscape analysis and additional archaeological background information.

2.2.1. Aboriginal Heritage Information Management System (AHIMS)

The AHIMS database comprises previously registered Aboriginal archaeological objects and cultural heritage places in NSW and it is managed by the Department of Planning, Industry and Environment (DPIE) under Section 90Q of the *National Parks and Wildlife Act 1974* (NPW Act).

The search of the AHIMS register was carried out on 18 April 2019 (AHIMS Client Service ID: 416161) for an area of approximately 6 kilometre (km) by 6 km. Altogether 31 Aboriginal sites were identified by the AHIMS search with one site duplicated. The search found no registered Aboriginal objects and/or places within or in close proximity to the subject area.

The two closest registered Aboriginal sites are associated with the Stabling Yards complex of the Sydney Light Rail, approximately 300 to 400 m north-west of the subject area (Figure 4). These sites are known as ‘Doncaster Avenue PAD’ (AHIMS ID#45-6-3245) and ‘RSY1’ (AHIMS ID#45-6-3246).

Details of the AHIMS search are provided in Table 2, Table 3 and Figure 4 below and the original AHIMS extensive search is included in Appendix A.

Table 2: Registered Aboriginal sites located within the vicinity of the subject area

Site ID	Site name	Context	Site type(s)	Distance from subject area
45-6-3245	Doncaster Ave PAD	Open site	Potential Archaeological Deposit	400 m
45-6-3246	RSY 1	Open site	Stone Artefact Site	400 m
45-6-2495	Prince of Wales Hospital Aboriginal Hearth	Open site	Open Camp site	1,5 km
45-6-3155	Moore Park AS1	Open site	Stone Artefact Site	1,5 km
45-6-0647	Centennial Park	Open site	Rock Engraving	1,8 km
45-6-2896	Queens Park PADs	Open site	Potential Archaeological Deposit	2,5 km

Table 3 – Results of AHIMS search (Client Service ID: 416161)

Site type	Context	Total	Percentage
PAD	Open	8	28%
Rock Engraving	Open	7	24%
Artefact Scatter	Open	4	13%
Isolated find	Open	3	10%
Shelter with Art	Closed	2	7%
Artefact Scatter with PAD	Open	1	3%
Axe Grinding Grooves	Open	1	3%
Hearth	Open	1	3%
Shell Midden	Open	1	3%
Shelter with PAD	Closed	1	3%
Aboriginal Gathering (Tent Embassy)	Open	1	3%
Total	N/A	30	100%

Overwhelming majority of sites identified by the AHIMS search are open sites (n=27) while only three sites are associated with closed context being shelters with art or Potential Archaeological Deposit (PAD). Open sites include rock engravings and axe grinding grooves associated with the outcrops of the sandstone bedrock (n=8), various number of stone artefacts (n=8) identified on exposed soil profiles, PADs (n=9) identified on potential landscape features, accumulation of shell (n=1) known also as 'shell midden' and one hearth. On one occasion the PAD is associated with a single surface artefact. The variety of site types represent the most common site types within the wider region. Identified sites that are located on similar landscape features and environmental settings to the subject area such as the Botany Lowlands sand dune systems comprise stone artefact scatters in exposed soil profiles or in sub-surface context and PADs. No outcrops of the Hawkesbury Sandstone geological formation were identified within the subject area. Additional information for the geology, soils and landscape context of the subject area is provided in Section 2.3, 2.4, 2.5 and 2.6.

The impact of the expanding urban development in the Eastern Suburbs of Sydney had a major impact on the survival of Aboriginal archaeological resources. It is safe to assume that a large number of Aboriginal archaeological sites have been destroyed before the legislative protection of Aboriginal objects and places was introduced in 1974 and the registration of Aboriginal archaeological resources was made statutory.

It should be noted that the AHIMS register does not represent a comprehensive list of all Aboriginal objects or sites in a specified area as it lists recorded sites only identified during previous archaeological survey effort. The wider surroundings of the subject area and in general the Randwick area have been the subject of various levels and intensity of archaeological investigations during the last few decades. Most of the registered sites have been identified through targeted, pre-development surveys for infrastructure and maintenance works, with the restrictions on extent and scope of those developments. Some of these assessments are discussed in Table 4 below.

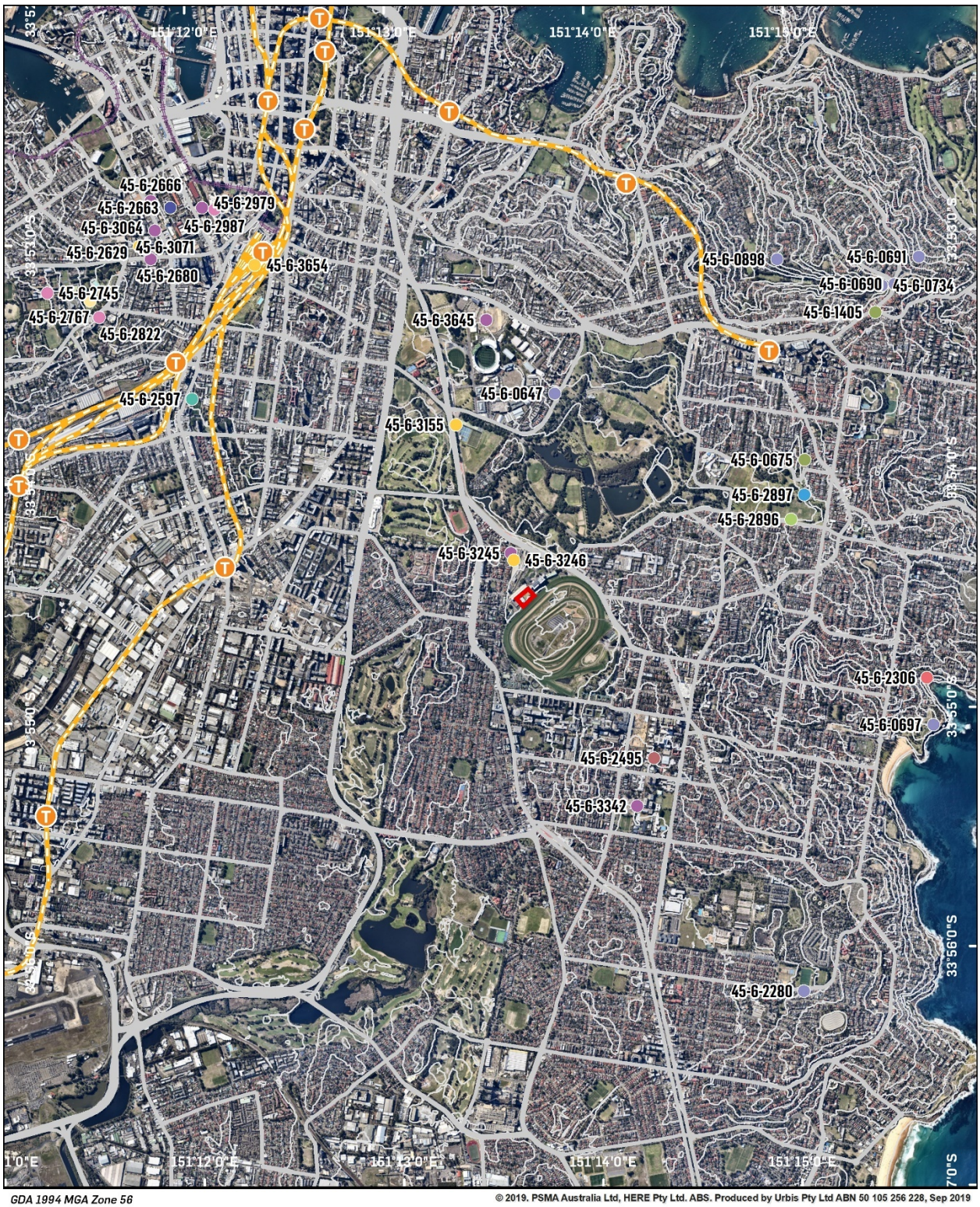


Figure 4 – Aboriginal Cultural Heritage Sites

2.2.2. Previous archaeological works

The subject area has been the subject of ten (10) previous archaeological investigations with the wider Eastern Sydney Region has been the subject of considerable number of archaeological investigations. For clarity and brevity previous archaeological investigations conducted either within the subject area or immediately adjacent are presented below in Section 2.2.2.1. Section 2.2.2.2 Regional archaeological context expands beyond the immediate subject area to present archaeological investigations of the Eastern Sydney region.

2.2.2.1. Local archaeological context

The following ten archaeological investigations have been undertaken either within or immediately adjacent to the current subject area:

- Australian Museum Business Services, 2002. *Pre-colonial Aboriginal Land and Resource Use in Centennial, Moore and Queens Parks—Assessment of Historical and Archaeological Evidence for Centennial Parklands Conservation Management Plan*;
- Conybeare Morrison & Partners, 2003. *Centennial Parklands Conservation Management Plan*;
- Dominic Steele Consulting Archaeology, 2006. *Aboriginal Archaeological Heritage Impact Assessment, Randwick Racecourse, NSW*;
- Godden Mackay Logan, 2006. *Randwick Racecourse Conservation Management Plan*;
- AHMS, 2010. *Royal Randwick Racecourse Spectator Precinct Aboriginal Heritage Impact Assessment*;
- Godden Mackay Logan, 2013. *CSLER Technical Paper 5 – Heritage Impact Assessment*;
- Godden Mackay Logan, 2015. *CBD and South East Light Rail. Aboriginal Cultural Heritage Assessment and Aboriginal Technical Report*;
- Casey & Lowe Archaeology & Heritage, 2016. *Royal Randwick Racecourse – Temporary Race Day Stalls Footings of St Leger Stand – Archaeological Requirements SSI-6042*;
- Godden Mackay Logan, 2016. Currently unavailable archaeological technical report regarding the test/salvage excavation of site RSY 1; and
- Godden Mackay Logan, 2017. *4-18 Doncaster Avenue, Kensington, Aboriginal Cultural Heritage Assessment Report*.

Table 4 – Previous archaeological investigations within or immediately adjacent to the subject area

Report	Summary	Relevance to subject area
Australian Museum Business Services (AMBS), January 2002, *Pre-colonial Aboriginal Land and Resource Use in Centennial, Moore and Queens Parks—Assessment of Historical and Archaeological Evidence for Centennial Parklands Conservation Management Plan*	An assessment of historical and archaeological evidence of Aboriginal land and resource utilisation in Centennial, Moore and Queens Park to inform the preparation of the Centennial Parklands CMP. The investigation resulted in the identification of a rock shelter in Queens Park, approximately 2 km northeast of the current subject area, with 27 hand stencils. This report developed a predictive model for the park lands based on soil landscape, with the Tuggerah soil landscape (present in the current subject area) identified as having nil surface potential in areas with buildings, roads and tracks. The investigation did state that within the Tuggerah soil landscape that there remains low-medium subsurface potential beneath disturbance levels. AMBS made the following recommendations: '*With regard to the presence and likely distribution of potential archaeological deposits, existing data held by the Centennial Park Trust and elsewhere (e.g. geotechnical reports and libraries), about the evolution and nature of the sand hills and wetland complex, as well as the land surface before the sand hills formed, needs to be collated and assessed. In addition, information about the impacts that post-1788 developments have had on the sand hills and wetlands within the Parklands, and the depths to which they extend, is necessary. To fully assess the potential for the existence of buried archaeological evidence further geological/geomorphological investigations may be necessary.*'	• In close proximity to the subject area and within the same Tuggerah soil landscape. • Identified a predictive model for the Tuggerah soil landscape, with nil surface potential in areas of disturbance and moderate subsurface potential where disturbance is low-moderate. • The study predicted (based on the archaeological knowledge of the Eastern Sydney region at the time) that major Aboriginal campsites would have been more likely to be located along the coast, with short term or possibly overnight campsites located in the sand-hills and wetlands situated away from the coast and would most likely consist largely or exclusively of stone artefacts due to poor organic preservation of food remains such as shell and bone and other non-durable components of Aboriginal material culture. • The study also raised the possibility that deeper, older deposits relating to past Aboriginal campsites used before or during the formation of the dunes may also survive and therefore may be identified within the context of future development circumstances.

Report	Summary	Relevance to subject area
Conybeare Morrison & Partners, 2003. *Centennial Parklands Conservation Management Plan*.	The Centennial Parklands CMP was prepared in 2003 and discussed Indigenous heritage within the parklands area. The CMP makes specific reference to the water bodies and their use by Indigenous people, acknowledging that the resources available within the Lachlan Swamplands would have made it an attractive location for rest, resource gathering, tool manufacture and hunting with overnight and longer camps. The CMP discusses archaeological potential in relation to periods. Pre-colonial archaeological potential was considered low-medium for the potential of high significance evidence in the Tuggerah soil landscape, in areas where disturbance does not extend to bedrock. Post-contact archaeological potential is considered minimal.	• In proximity to the subject area and within the same Tuggerah soil landscape. • Discusses the use of the Lachlan Swamplands by local Indigenous groups, and the importance of the swamps and surrounding areas for resource extraction. • Considers archaeological potential as low-moderate in areas with low levels of disturbance.
Dominic Steele Consulting Archaeology, 2006. *Aboriginal Archaeological Heritage Impact Assessment, Randwick Racecourse, NSW.*	Dominic Steele Consulting Archaeology prepared an Aboriginal Archaeological Heritage Impact Assessment for Godden Mackay Logan on behalf of the Australian Jockey Club. The assessment was used to guide further planning at the Randwick Racecourse. The current subject area was covered by the Dominic Steel assessment. The following recommendations were made by the assessment: • No previous documented Aboriginal archaeological sites/objects are known to occur in the site. • The majority of the subject land was assessed to possess 'Low Aboriginal Archaeological Sensitivity' based upon the evaluation that the environmental context of the place (in that it originally comprised part of a largely low-lying swampy landscape), and	• The assessment covers the current subject area. • Identified that archaeological materials can occur in sand dunes at depth despite extant surface disturbance and argued that archaeological potential was high, in contrast to contemporary archaeological assessments, given the presence of the sand dune complex. • Stated that the area considered to have 'Low Aboriginal Archaeological Sensitivity' has no 'clear and obvious' Aboriginal cultural heritage constraints to any future development works. • Stated that few specific locations on the subject land itself would have represented particularly attractive campsite locations resulting in visits of any long-term duration that may have resulted in

Report	Summary	Relevance to subject area
	also from a consideration of the combined impacts that have occurred over time from ongoing historic land use practices dating from at least 1830s that have seemingly served to significantly modify the original local topography. • Much of the local landscape of which the study area forms a part is therefore predicted to have potentially been used by Aboriginal people (perhaps repeatedly) in the past for a range of resource gathering and maintenance activities, but that these visits are likely to have been short-term in nature as people between more favourable camping locations. • It was predicted that the archaeological evidence potentially associated with this low-lying swampy landscape is likely to occur in the form of low-intensity distributions of flaked stone artefacts related to at best successive short term camping stopovers that will have been largely disturbed, disperse and/or destroyed as a result of successive phases of post-Contact land clearance/modification, construction and use. • One specific area of the racecourse (located in the south east corner) appears to retain potentially 'High Aboriginal Archaeological Sensitivity'. • The 'High Aboriginal Archaeological Sensitivity' area consists of what appears to be a (moderately) unmodified sand dune context with the potential to contain deeply buried Aboriginal archaeological deposits/features of possibly high significance. These may contain human burial sites, and	the creation of substantial archaeological deposits.

Report	Summary	Relevance to subject area
	Aboriginal occupation evidence that may date back to considerable periods prior to European Contact.	
Godden Mackay Logan, 2006. *Randwick Racecourse Conservation Management Plan*.	The Randwick Racecourse CMP analysed the significance of the Randwick Racecourse lands, and the constraints and opportunities going forward. The current subject area is included in the area analysed for the CMP. Regarding Aboriginal archaeological potential, GML identified the landscape of the subject area as restrictive for Aboriginal settlement, due to the swamps. They acknowledge it is likely that the area was utilised for resource gathering. This CMP identifies the majority of the racecourse as having low Aboriginal archaeological sensitivity, excluding the southeast sandhills which were assessed as having high Aboriginal archaeological sensitivity. However, this CMP did not fully consider the nature of the archaeological background and Aboriginal utilisation of the land. The CMP acknowledges that the original landscape of the Randwick region was inaccessible, with few roads or tracks (GML, 2006 pg. 12). However, this is based off European utilisation of the land, where roads and tracks were necessary. Local Aboriginal groups were likely familiar with the terrain and not as reliant on the existence of tracks and paths to make their way through the region. Furthermore, the CMP argues that the swampland nature of the Randwick Racecourse area would have likely made it uninhabitable, while neglecting the fact that the abundant resources would have positioned the area as a favourable location for camps on the banks of the swamps. More recent archaeological research in the immediate vicinity of Randwick Racecourse has resulted in the identification of	• The subject area was included in this assessment and was determined to have low Aboriginal archaeological sensitivity, based on the assumption that the swamplands were unsuitable for extended periods of inhabitation. • The above statement of potential and significance has since been revised to moderate to high for Aboriginal archaeological resources by GML based on the results of the archaeological excavations within the SLR Stabling Yards, located approximately 300 m north of the subject area.

Report	Summary	Relevance to subject area
	high-density artefact scatters (see GML, 2015), supporting the current interpretation of landscape factors and Aboriginal archaeological potential.	
AHMS 2010: *Royal Randwick Racecourse Spectator Precinct Aboriginal Heritage Impact Assessment*	The AHIA was carried out to assess the extent and significance of any Aboriginal archaeological resources within the Spectator Precinct, which includes the current subject area. The assessment stated that the Spectator Precinct would not have been ideal for habitation, in line with the presumptions made by GML in 2006. AHMS argued that use of the area is likely to have been transitory, with minimal lasting evidence. They also stated that disturbance is likely to have removed any archaeological materials, thus maintaining a determination of low potential. The entire Spectator Precinct was assessed as having low archaeological sensitivity. If any evidence of past Aboriginal occupation of the area were to be located it would, according to AHMS, be likely to be ephemeral in nature and of low scientific and educational significance.	• The subject area was included in this assessment and was determined to have low Aboriginal archaeological sensitivity, based on the assumption that the swamplands were unsuitable for extended periods of inhabitation. • Identified low archaeological potential within the subject area on the basis of presumed inhabitability and disturbance. • The Lachlan swamplands are considered of high cultural significance.
Godden Mackay Logan, 2013. *CSLER Technical Paper 5 – Heritage Impact Assessment*.	Archaeological assessment including an assessment of archaeological potential at Moore Park, approximately 1.5km north west of the current subject area. Acknowledged the extensive modification of Moore Park and the importation of fill to stabilise naturally swampy areas. However, given the depth of sands present GML note that there is still archaeological potential across portions of the area.	• In close proximity to the current subject area. • In similar sand dune landform to that within the current subject area • Noted that despite heavy disturbance involving importation of fill, archaeological potential remains due to the depth of soils

Report	Summary	Relevance to subject area
Godden Mackay Logan, 2015. *CBD and South East Light Rail. Aboriginal Cultural Heritage Assessment and Aboriginal Technical Report*	Aboriginal cultural heritage and archaeological assessment for the CBD and South East Light Rail. Determined that the whole Moore Park precinct contains a high level of Aboriginal archaeological potential for dispersed, low frequency sites, given the existence of sand dune systems. The predictive model for the Lachlan Swamps continued to be influenced by the GML CMP (2006) which surmised that archaeological potential within the swamp system was low owing to the inhabitability of the terrain. As a consequence of non-focused long-term low-density Aboriginal occupation of the entire dune system, moderate historic period impacts and limited archaeological investigations in the surrounding area, no specific Aboriginal archaeological patterning can be determined for the Randwick precinct. However, deeper intact soil profiles may have potential for Aboriginal archaeological evidence to be present, such as stone objects and/or hearths. Organic remains such as middens or burials may be present, if environmental conditions permit—for example, if pH is close to neutral, if there are very desiccated conditions or, conversely, if there are low fluvial but anaerobic and waterlogged conditions. As a result of the above assessment the whole Randwick precinct is assumed to have some level of Aboriginal archaeological potential.	• Where present, sites in the extensive sand dunes can be anticipated to be small in extent but high in level of integrity and condition • Sand dunes have archaeological potential owing to Aboriginal utilisation over the past 10,000 years with remnant evidence including hearths and stone artefact sites. • Identified sites may be of high significance both culturally and scientifically, representing Aboriginal adaptation of European materials. • No specific Aboriginal archaeological patterning can be determined for the subject area and surrounds.
Casey & Lowe Archaeology & Heritage 2016: *Royal Randwick Racecourse – Temporary Race Day Stalls Footings of*	CLAH was commissioned to provide heritage management advice on some sub-surface structures that were uncovered during earthworks at Randwick Racecourse, adjacent to the current subject area. The advice was to stop excavation in the area and raise the	• In close proximity to the subject area. • Historical archaeological potential exists within the subject area.

Report	Summary	Relevance to subject area
St Leger Stand – Archaeological Requirements SSI-6042	level of sub-surface impact to avoid any impacts of the possible footings of the demolished St Leger Stand. No assessment of Aboriginal archaeological resources was included.	
Godden Mackay Logan, 2016 - ongoing. RSY 1 Archaeological Technical; Report. Unpublished and currently unavailable. and Godden Mackay Logan, 2017. *4-18 Doncaster Avenue, Kensington, Aboriginal Cultural Heritage Assessment Report.*	The following information has been sourced from the GML website, a phone conversation with Tim Owen (Principal Archaeologist, GML, 27 August 2019) and the *4-18 Doncaster Avenue, Kensington Aboriginal Cultural Heritage Assessment Report* (GML 2017). GML undertook an Aboriginal Cultural Heritage Assessment for 4-18 Doncaster Avenue, approximately 250m northwest of the current subject area. This study resulted in the identification of one site, Doncaster Avenue PAD (AHIMS #45-6-3245). The Doncaster Avenue investigation was undertaken post-investigation of the stone artefact site RSY1 (AHIMS #45-6-3246) located partially within and to the southeast of the Doncaster Avenue subject area. Recommendation for salvage excavation under AHIP #C0003723 was made, which had provisions for the protection of artefacts associated with RSY1 and includes a dedicated no harm area around this site. GML is currently in the process of finalising the Archaeological Technical Report regarding the test/salvage excavation of site RSY 1 (AHIMS #45-6-3246). Urbis' current understanding of the Aboriginal archaeological excavations at RSY 1 is that they were conducted as part of the development for the Sydney Light Rail Project. Initial test excavations found that the southern	• In close proximity to the subject area, approximately 250m north west. • Identified the high archaeological potential of sand dune complexes to contain archaeological material of significant age at depth. • In discussing the Randwick Racecourse in general, this report identifies the high potential for archaeological evidence to survive deep in sand dune contexts and be of significant age. They also acknowledge that sand bodies contain potential to contain burials, generally between 0.5-2m in proximity to bays and harbours. • A detailed geomorphological understanding and investigation of sand dune landforms is required to determine the presence of remnant dune topsoil and/or archaeological deposits.

Report	Summary	Relevance to subject area
	half of the development area was highly disturbed; being composed of deeply stratified deposits made from locally derived fill materials, but which had been historically displaced. However, the northern half of the development area, beneath a unit of historical fill, was found to be composed of intact sand dune profiles with a partially truncated surface horizon. The surface horizon was characteristically dark as a result of the presence of decomposed organic materials. RSY 1 was identified within the truncated but intact dune surface horizon. The depth of the stratified deposit at RSY 1 exceeding 4 m in portions of the site. When the depth of the deposit was combined with the fragility of the sand substrate it was determined by GML that standard archaeological methods were untenable due to safety concerns (section collapse etc). It was stated by GML that '*the fragility of the substrate would have benefitted from a single-stage excavation approach*' (GML 2017 p.17). GML developed a geomorphological model of the RSY 1 site based on the field investigation and with reference to available geological literature. The model stated that: '*Aeolian sands had accreted through the Pleistocene and into the Holocene forming longitudinal dunes with local topographic peaks and troughs. After cessation of aeolian accretion sometime in the Holocene, Aboriginal objects became concentrated at the surface of the dune landform. During subsequent development of the area by British colonists the dune topography was levelled by displacement of dune peaks into the troughs. Some pre-European ground surfaces would therefore have been*	

Report	Summary	Relevance to subject area
	preserved by this procedure including some lower dune peaks' (GML 2017 p.17-18). The boundary of RSY 1 was characterised by GML through extensive geomorphological/archaeological work and extrapolated into the Doncaster Avenue study area. RSY 1 is characterised as a discrete deposit, which does not spread across the wider landscape. As such, any further Aboriginal objects, that may have been identified within the Doncaster PAD, were likely to be representative of separate deposition events to that which resulted in the formation of RSY 1. At RSY 1 Aboriginal objects were identified in an ancient sandy topsoil that represented the ground-surface after the aeolian accretion processes had stopped yet prior to European landscape modification. As the intact soil profile was so characteristic a strategy of borehole investigation was able to trace the profile across the Doncaster Avenue subject area. A methodology of mechanical removal of fill followed by 1 m2 test pits was utilised to sample the upper dune layers. No further Aboriginal objects were identified through the subsequent test excavations.	

2.2.2.2. Regional archaeological context

The following eleven archaeological investigations have been undertaken in the Sydney central business district and the wider Eastern Sydney region:

- Rich, E. 1983. *Hermitage Foreshore Reserve, Vaucluse: Archaeological survey for Aboriginal Sites Along Proposed Walkway*;
- Rich. E. 1986. Yarra Point Site 45-6-292, Archaeological Investigation;
- KSA, 2001. *Cliff Walk Dover Heights to Vaucluse Indigenous Heritage Survey*;
- Dominic Steele Consulting Archaeology, 2002. *Salvage Excavation Potential Aboriginal Site*;
- Jo McDonald CHM 2006. Sydney University Campus 2010, Test Excavations at the University of Sydney Central Site;
- Dominic Steele Consulting Archaeology, 2009. *Waverly Aboriginal Cultural Heritage Study*;
- AMBS, 2010. *Sydney Light Rail Extension Stage 1 Heritage Impact Assessment*;
- Jo McDonald CHM, 2010. *Archaeological Subsurface investigations at the Royal Sydney Golf Club, Rose Bay*;
- Biosis, 2012. *The Quay Project, Haymarket: Archaeological Report*;
- Biosis, 2012. *The Quay Project, Haymarket: Aboriginal Cultural Heritage Assessment Final Report*;
- Biosis, 2012. *445-473 Wattle Street, Ultimo: Proposed Student Accommodation Development Aboriginal Cultural Heritage Assessment Report*; and
- Godden Mackay Logan, 2014*. 200 George Street, Sydney. Aboriginal Archaeological Excavation*.

Table 5 – Previous archaeological investigations within the Eastern Sydney Region

Report	Summary	Relevance to subject area
Rich, E. 1983. *Hermitage Foreshore Reserve, Vaucluse: Archaeological survey for Aboriginal Sites Along Proposed Walkway.*	Archaeological assessment involving survey of proposed walkway alignment in Vaucluse, approximately 6.5km north east of the current subject area. The survey resulted in the identification of three open middens and one grinding groove site, reflecting the coastal sandstone environment of the survey area.	• Attests to the type of sites likely to appear on coastal sandstone terrain.
Rich. E. 1986. *Yarra Point Site 45-6-292, Archaeological Investigation*	Excavation report for shell midden at Yarra Point. Identified flaked ceramic within the deposit and concluded that this identifies the site as a contact site.	• In proximity to the subject area • Provides archaeological evidence of contact in Eastern Sydney and the importance of a holistic archaeological approach.
KSA, 2001. *Cliff Walk Dover Heights to Vaucluse Indigenous Heritage Survey*	Archaeological assessment involving survey of the alignment of the Cliff Top Walk, approximately 6km from the current subject area. Resulted in the identification of one shelter with PAD and one midden associated with earthenware pottery.	• Attests to the type of sites likely to appear on coastal sandstone terrain. • Provides archaeological evidence of contact in Eastern Sydney and the importance of a holistic archaeological approach.
Dominic Steele Consulting Archaeology, 2002. *Salvage Excavation Potential Aboriginal Site.*	Salvage Excavation report for a potential midden site, AHIMS #45-6-2637, approximately 5.5km north west of current subject area. No associated Aboriginal archaeological features were found with the shell; and as such they were determined not to be of	• Provides precedent for determining origin of potential midden sites – concludes lack of correlated Aboriginal objects suggests non-Aboriginal origins for shell deposits.

Report	Summary	Relevance to subject area
	Aboriginal origin, but instead reflective of European use of the site.	
Jo McDonald CHM 2006. *Sydney University Campus 2010, Test Excavations at the University of Sydney Central Site.*	Archaeological assessment involving test excavation on the Darlington campus of the University of Sydney, approximately 4km west of the current subject area. Determined that natural soils were buried under imported fill across the majority of the subject area. Resulted in the identification of one silcrete stone artefact, and no other archaeological materials.	• Disturbance does not always remove archaeological potential, and other factors must be taken into consideration. Archaeological material can occur in natural soils buried below imported fill.
Dominic Steele Consulting Archaeology, 2009. *Waverly Aboriginal Cultural Heritage Study*.	Regional archaeological study identifying Aboriginal cultural heritage sites across the Waverly LGA, to the north of the subject area. Resulted in the identification of eleven sites including rock engravings, shelters with art and PAD as well as open artefact scatters. The study concluded that archaeological evidence in the Centennial Parklands/Lachlan Swamps areas will likely represent short-term campsites and would likely consist of largely stone artefacts due to poor organic preservation in the dunes.	• In close proximity to the subject area. • Provided regional predictive model relevant to the current subject area. • Suggests archaeological materials in the Lachlan Swamps area will be indicative of short-term campsites.

Report	Summary	Relevance to subject area
AMBS, 2010. *Sydney Light Rail Extension Stage 1 Heritage Impact Assessment.*	Heritage Impact Assessment in relation to Indigenous and non-Indigenous heritage on the Stage 1 Sydney light rail alignment. No Aboriginal sites, places or objects were identified, nor were any areas of potential, with specific reference to the impact of disturbance and development on the capacity to identify archaeological materials through survey.	• Similar environment to the current subject area, that has been subject to disturbance and development. However, the soil profile was much shallower. • Suggests Aboriginal occupation would most likely intensify around the creeks and rivers in the region.
Jo McDonald CHM, 2010. *Archaeological Subsurface investigations at the Royal Sydney Golf Club, Rose Bay.*	Archaeological investigation involving test excavation, approximately 4.5km northeast of current subject area. Resulted in the identification of skeletal remains of at least three individuals, all three of which were determined to be Likely of Aboriginal origin, from pre-contact periods. The study also resulted in the identification of an extensive scatter with more than 5,700 stone artefacts. These materials were uncovered from a disturbed context, and the test excavation programme was determined to have removed all Aboriginal archaeological materials.	• Test excavation conducted within a correlating sand dune landscape to that of the current subject area. • Identified that archaeological materials can occur in sand dunes at depth despite extant surface disturbance. • Illustrates the potential for dune systems to contain Aboriginal burials and extensive artefact deposits.

Report	Summary	Relevance to subject area
Biosis, 2012. *The Quay Project, Haymarket: Archaeological Report.*	Aboriginal Due Diligence Assessment in Haymarket, involving site survey, approximately 6km north west of current subject area. No Aboriginal objects or sites were identified, and it was determined that despite the likelihood of Aboriginal utilisation of the region prior to European occupation, disturbance related to this occupation will have removed any remnant evidence of Aboriginal utilisation through removal of topsoil.	• Suggests that subsurface deposits in highly developed areas are unlikely due to the removal of topsoil during construction. However, this does not apply to the current subject area given the depth of soils.
Biosis, 2012. *The Quay Project, Haymarket: Aboriginal Cultural Heritage Assessment Final Report.*	Aboriginal Cultural Heritage Assessment resulting from the identification of intact topsoil during historic salvage excavations, approximately 6km north west of current subject area. Test excavation was undertaken, resulting in the identification of no artefacts and the confirmation of low archaeological potential of the area. One stone artefact was identified during the historic salvage excavation, in highly disturbed context.	• Intact topsoil may remain even in highly developed areas. • Aboriginal objects may occur in areas of high disturbance.
Biosis, 2012. *445-473 Wattle Street, Ultimo: Proposed Student Accommodation Development Aboriginal Cultural Heritage Assessment Report*	Aboriginal Cultural Heritage Assessment in relation to the potential for Aboriginal objects or areas of sensitivity in Ultimo, approximately 5.5km north west of the current	• Suggests artefact bearing soils may still be present despite the presence of development and imported fill

Report	Summary	Relevance to subject area
	subject area. Suggested that artefact bearing deposits may be present in alluvial soils below imported European fill.	
Godden Mackay Logan, 2014. *200 George Street, Sydney. Aboriginal Archaeological Excavation.*	Aboriginal archaeological excavation report for test excavation undertaken on an area of identified PAD at 200 George Street, approximately 7km north west of the current subject area. No Aboriginal objects or sites were identified during test excavation. This is suggested to be the result of unsuitable original landscape and environmental conditions.	• While intact natural soils may be present within urban environments, that does not mean that they will necessarily contain Aboriginal archaeological objects, with environmental and landscape factors playing a decisive role in Aboriginal utilisation of the land prior to European occupation.

2.2.2.3. Summary of previous archaeological investigations

The summary of the above listed archaeological reports provides a changing context of assessing Aboriginal archaeological potential and significance within the subject area and its immediate vicinity. The acceleration of development within and near the subject area has accumulated a large amount of data and information on Aboriginal and historic archaeological resources. Moreover, the latest geomorphological assessment of the soil landscape of the Centennial Parklands previously known as the Lachlan Swamps have further developed the understanding of impact caused by European colonisation on Aboriginal archaeological resources within the sand dunes of the Botany Bay Lowlands. The latest results of archaeological assessment – particularly the archaeological excavations carried out by GML – provided a more detailed and in-depth understanding of how Aboriginal people utilised the area during the Holocene.

The majority of the reports explored above, utilised the predictive model of the Godden Mackay Logan (GML) 2006 CMP for the Randwick Racecourse. The GML CMP made assumptions that the Lachlan Swamps would have been utilised as a resource gathering region but would have had restricted potential for settlement due to the swampy nature of the terrain. The following excerpt from the GML CMP outlines the generally accepted level of archaeological potential within the wider Royal Randwick Racecourse property boundary.

There are no documented Aboriginal archaeological sites/objects known to occur at the site. The majority of the site is assessed as having 'Low Aboriginal Archaeological Sensitivity', apart from the sandy hills in the southeast corner that are assessed as having 'High Aboriginal Archaeological Sensitivity'. This area consists of a (moderately) modified sand dune, which has potential to contain Aboriginal deposits/features, which may include archaeological evidence of Aboriginal occupation of the area that dates back to considerable periods prior to European Contact (GML 2006 p.68).

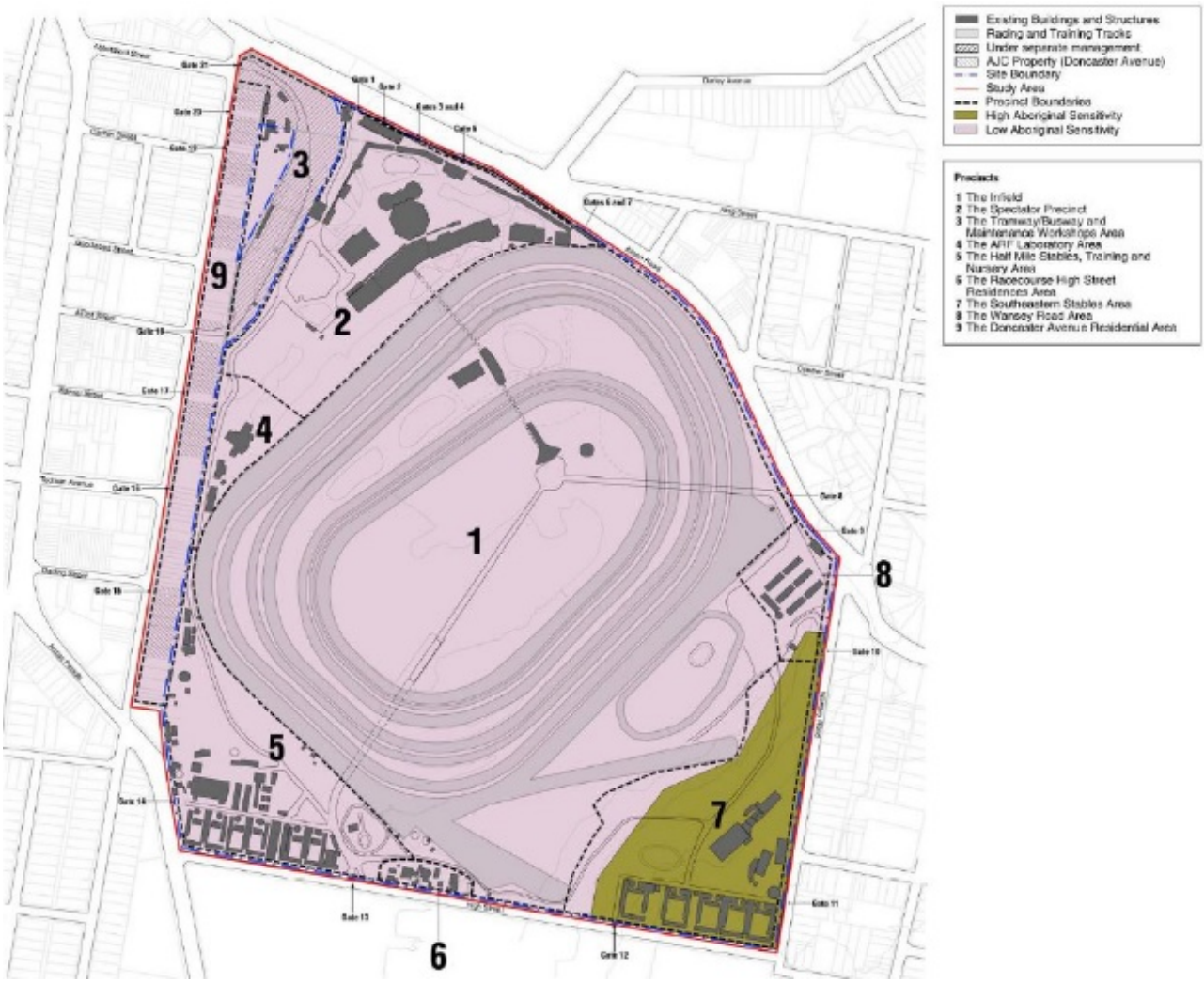


Figure 5 – 'Areas of Potential Aboriginal Archaeological Values' identified by GML's 2006 CMP

Source: GML - Royal Randwick Racecourse – Conservation Management Plan – Volume 1: Main Report – Final Draft, December 2006

Recent archaeological investigation by GML at RSY 1 and Doncaster Avenue PAD have shown that this predictive model is subject to more nuanced localised areas of potential.

Whereas previous assessments had made determinations of archaeological potential on the basis of the above understanding, combined with the level of disturbance within the subject area, this is no longer sufficient in light of the recent archaeological investigations within similar landforms in the Eastern Sydney area. Of particular importance are the archaeological excavations undertaken by GML of RSY 1 (AHIMS #45-6-3246) as part of the development for the Sydney Light Rail project and Doncaster Avenue Pad (AHIMS #45-6-3245) as part of a proposed residential/accommodation development.

The subject area can now be considered to be of moderate to high archaeological potential, given the proximity of the stabling yard site and the landscape features present within the subject area.

The conclusions from the archaeological background research are the following:

- Sand dunes have moderate to high archaeological potential owing to Aboriginal utilisation over the past 10,000 years with remnant evidence including hearths, burials and stone artefact sites;
- Significant archaeological resources can occur in a disturbed context;
- Disturbance does not necessarily remove archaeological potential, especially in sand dune complexes. While disturbance does reduce surface potential, subsurface potential remains moderate-high due to the restricted vertical impact of previous developments, depth of soils and the potential for the accumulation of archaeological resources within the soil profile;

- Archaeological materials can occur at depth below imported fill and disturbed levels;
- Major Aboriginal campsites have been located primarily along the coast; however recent archaeological excavation has also provided evidence for high-density archaeological sites within the Lachlan Swamps in contrast to previously accepted understanding of Aboriginal land use;
- Aboriginal material within the sandhills would most likely consist largely of stone artefacts due to poor organic preservation of food remains such as shell and bone and other non-durable components of Aboriginal material culture;
- Potential remains for other archaeological resources such as shell middens and burials within the sand dune landform;
- The sand dune complex extends far deeper than the numerous types of identified historical disturbances and thus Aboriginal archaeological potential remains. The level of archaeological potential within the sand dune landform within the current subject area can only be quantified following detailed archaeological and geomorphological investigation.

2.3. GEOLOGY AND SOILS

The main geological formation that underlays the subject area is Hawkesbury Sandstone, and outcrops can be found along the coast and in the Centennial Parklands located north-west of the subject area. Sandstone outcrops do not occur within the current subject area, removing the potential for Aboriginal archaeological site types including shelters, grinding groove and engraving sites to occur.

The soils of the subject area consist of consolidated aeolian sand dunes that are a part of the Tuggerah Soil Landscape and locally form a part of the Botany Lowlands. The Quaternary wind-blown sand dunes have been overlain by imported fill used extensively within the grounds of the racecourse to level the original undulating terrain. The marking of the area as 'Disturbed Terrain' (Figure 6) based on the extensive modification of the original natural landscape since the start of European occupation and especially the development of the Royal Randwick Racecourse. As per the results of the archaeological background research provided in Section 2.2 above, the surface disturbance and placement of imported fill did not have significant impact on deeper sand deposits that have the potential to retain archaeological objects and deposits. In fact, on some occasions the placement of imported fill provided a buffer between the original landscape features and later impact of historic land use and might have preserved the archaeological resources on or close to the original surface.

The Tuggerah soil landscape is a dune system that exists upon the Botany Lowlands and the coastline of the north eastern suburbs of Sydney. Soils are described as deep (>200 cm) podzols (Uc2.31, Uc2.32, Uc2.34) on dunes and podzols/humus podzol intergrades (Uc2.23, Uc2.21, Uc2.3, Uc4.33) on swales. Dominant soil materials include loose speckled grey-brown loamy sand, bleached loose sand, grey-brown mottled sand, black soft sandy organic pan, brown soft sandy iron pan and yellow massive sand.

The Tuggerah Soil Landscape has the potential for Aboriginal objects both in surface and subsurface context. Given the surface level disturbance and landscaping at the subject area, it is unlikely that surface materials will be identified, but subsurface archaeological potential remains high.

2.4. VEGETATION

The native vegetation of the subject area has been entirely cleared. Vegetation within the swamp environment to the west of the subject area (now the Centennial Parklands) would have been dominated by woody heath and she-oaks. Eastern Banksia Scrub communities which include heath, scrub and low forest communities presently inhabit sand environs and as such are likely to have been present within the subject area prior to European colonisation.

2.5. GEOTECHNICAL ANALYSIS

The subject area has been the subject of geotechnical analysis. There were four cone penetration test (CPT) bore locations within the subject area. The results for CPT 307 and 309 of this analysis are located in Table 6 and Appendix C.

Table 6 – Geotechnical analysis

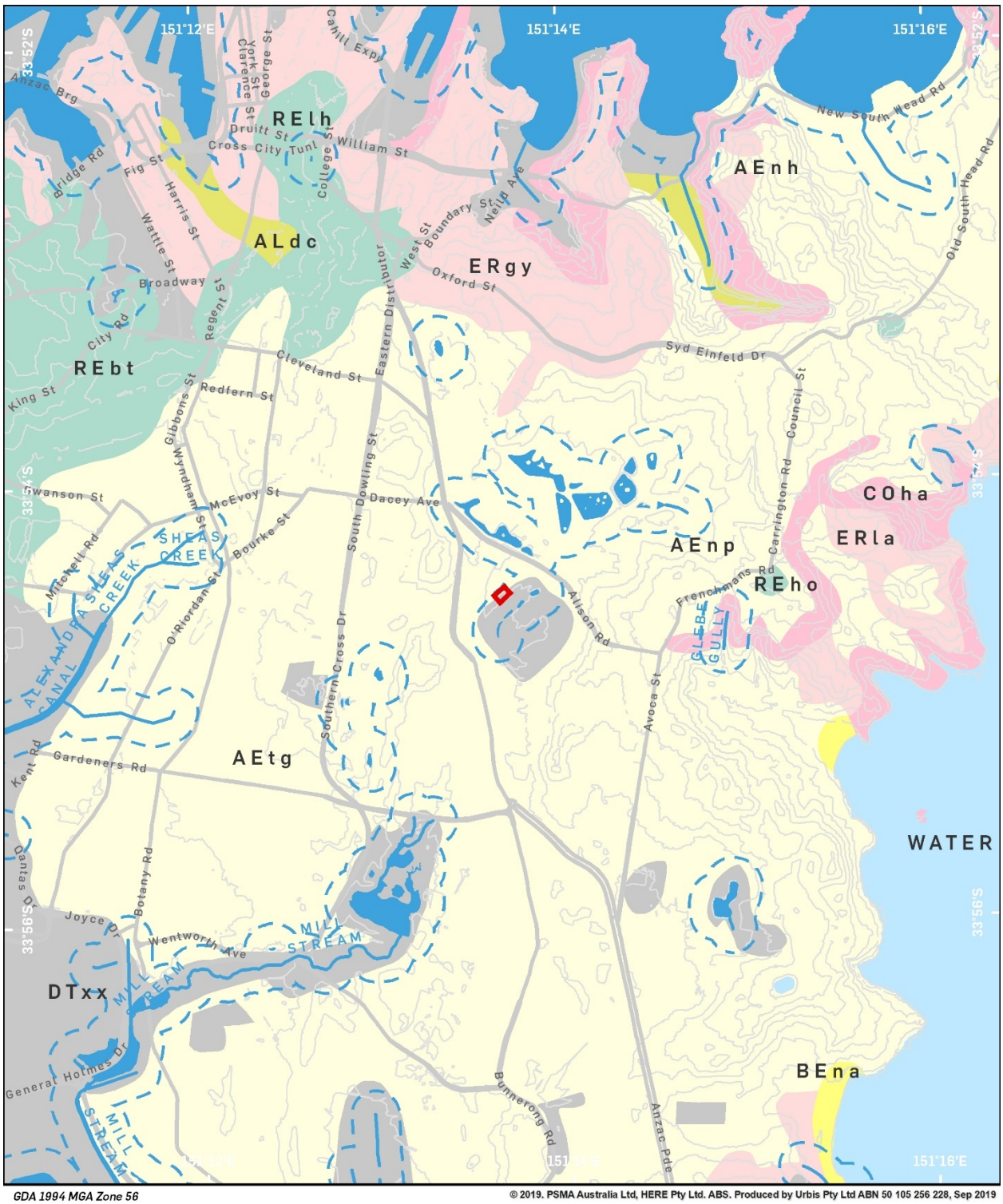
Test Location	Depth	Results
CPT 307	15m	• Filing (sand, clayey sand and possible cemented layers materials). Refusal encountered at 1.2 m • Void. • Medium-dense, dense sand between 1.5-4.9 m • Dense to very dense sand between depth 4.9-9.6m • Very dense to 9.6-15 m
CPT 309	15m	• Filing (sand and gravel) to 1.5 m • Filing (sand very loose to loose) between1.5-3.08 m

Test Location	Depth	Results
		• Loose sand between 3.08-4.45 m • Medium dense-dense sand between 4.45-6.13 m • Dense-very dense sand between 6.13-9.5 m • Very dense sand between9.5-15 m

The geotechnical survey confirmed that there is an imported fill situated on top of the original sand dunes extending between 1.1-3 m relative depth. The depth of the imported fill is uneven, and it seems it was used to fill-up and level the original undulating sandy landscape. The geotechnical analysis also confirmed that the original sand dune system is highly consolidated and extends down to considerable depths beyond the 15 m reach of the geotechnical drilling. There was no indication from the geotechnical analysis that major disturbance or the complete removal of soils has taken place, with disturbance existing exclusively in the first 3m including the fill and associated impacts.

2.6. HYDROLOGY

There are no natural surface water sources exist in and the immediate vicinity of the subject area. The subject area forms part of what once was the Lachlan Swamplands, although intense land modification has occurred since European colonisation. Impacts included the clearing of vegetation, the dredging of the swamplands, realigning local waterways, placement of imported fill, levelling, potentially the quarrying of sand and levelling the surface and the construction of various structures and infrastructure of the racecourse. The sandy substrate associated with the Botany Sands has such high permeability that the frequency of surface stream channels would have been low prior to European impacts. Accordingly, surface water was largely localised to the low-lying swamplands now characterised by the formalised ponds within the centre of the racecourse and Centennial Park 300 m north of the subject area.



GDA 1994 MGA Zone 56

800 M

Project No - P0005973
Project Manager - BH

SOIL LANDSCAPES AND HYDROLOGY
Leger Lawn Aboriginal Cultural Heritage Assessment Report
Australian Turf Club

- Subject Area
- Hydrology
- Hydrology 200m Buffer
- Contours
- Aeolian (AEnh)
- Aeolian (AEnp)
- Aeolian (AEtg)
- Aeolian (AEww)
- Alluvial (ALdc)
- Beach (BEna)
- Colluvial (COha)
- Disturbed Terrain (DTxx)
- Erosional (ERgy)
- Erosional (ERla)
- Residual (REbt)
- Residual (REho)
- Residual (RElh)
- Water

Figure 6 – Soil Landscapes and Hydrology

2.7. PAST ABORIGINAL LAND USE

Aboriginal occupation of the region is known to have extended from at least 20 000 years ago, but the lack of histories written in the area during the early years of European occupation, prior to the impacts of the European diseases and conflicts on the population numbers, has presented difficulties in understanding the pre-contact culture in the area. The population of Aboriginal people around Sydney has been estimated at between 2000 and 3000 people, with the greater Sydney region estimated at somewhere between 4000 and 8000. The changing belief systems, social organisation and ritual are difficult to fully understand, as behaviours recorded by Europeans may have been impacted by the presence of those same Europeans (Attenbrow 2010:17).

The Randwick racecourse area forms part of the traditional lands of the Gadigal people, with the dune systems and wetlands incredibly important for subsistence and the exploitation of resources. The permanent freshwater supply of the Lachlan Swamplands to the north in the area that is now Centennial Parklands, was fundamental to camping and resource gathering in the region. The swamps are also recorded to have provided food sources to the local Aboriginal people, who ate roots dug up from the swamplands (Tench, 1789). This area would also have provided good hunting grounds and aquatic resources, including fish and eels.

Shell, stone artefacts and bone are the most common material remains of land use, however a range of other materials including wood and other organic materials would also have been utilised. The nature of soils and in the area makes the preservation of these organic materials unlikely. There is also evidence in the area of the adaptation of European materials including ceramic and flint by local Indigenous groups.

The region was dissected by a series of pathways which connected various parts of Gadigal lands, including areas beyond for hunting and resource collection, trade, and social and ceremonial activities.

Approximately 4.5km north east of the current subject area is Bondi beach. Situated in the former sandhills now covered by Campbell Parade, with the centre near what is now the North Bondi Surf Life Saving Club, a large artefact scatter was registered on AHIMS in 1990. This was located in the 1900s following a series of gales which exposed thousands of stone flakes and other tools, with local knowledge suggesting the whole of the back of the beach was covered in stone artefacts accumulated over thousands of years (AHIMS site card #45-6-2169). The distinctive ‘backed’ points collected from this extensive scatter have since become the type-name for this artefact type, which is located across sites throughout south-eastern Australia – the Bondi Point.

High density archaeological sites have also been recently located adjacent to the subject area during the CSELR works, within the Randwick Racecourse Stabling Yards. These included tens of thousands of flint artefacts, with scientific analysis demonstrating that this flint was sourced from the banks of the River Thames in London and transported to Sydney on passenger ships as ballast. Local Aboriginal groups adopted the material quickly, recognising its potential for knapping, resulting in the cache of artefacts located at the Stabling Yards (GML, in preparation).

2.8. HISTORICAL LAND USE

The subject area and surrounds have been subject to varying level of disturbance since the time of first European colonisation. Significant disturbance, including clearing of vegetation, the construction of buildings, roads, stables, racetrack, associated infrastructure and the constant development of the Royal Randwick Racecourse have changed the original environment and resulted in an artificial landscape in most parts of the racecourse.

Furthermore, the geotechnical investigation carried out by Douglas Partners Pty Ltd has confirmed that there is approximately 1m to 3 m of imported fill overlaying the original sand dunes (Douglas Partners, 2016). The depth of the fill is shown on the extracts from the geotechnical report discussed in Section 2.4 and included as Appendix C. Another way of assessing historical land use is the analysis of historical aerial photos and the changing layout of the racecourse. Summary of the analysis of the historical aerials is provided in Table 7.

The history of the subject area has been extracted primarily from the Randwick Racecourse Conservation Management Plan prepared by Godden Mackay Logan (GML) in 2006. Additional information has been

kindly provided by Hannah Hibert Archivist of the ATC, especially for the history of the St Leger Stand and other structures that had previously existed within the current subject area.

2.8.1. Prior to the 1830's

European settlement within and to the east of the Lachlan Swamps was sparse in the early years of the colony due to the low-lying swampy conditions. By approximately 1817 the first roads in the area had been constructed to enable access from the Sydney settlement to the watchtower at Botany Bay. This early colonial road (now established as Frenchman's Road and Anzac Parade) is assumed to have follow an established Aboriginal route through the swamplands.

2.8.2. The Sandy Course and its abandonment 1832-1858

In 1832 a Committee was formed to oversee the establishment of a formal racecourse under the direction of the Surveyor General Major Thomas Mitchell and assistant surveyor Mortimer Lewis. The site chosen for the racecourse, at an unknown date, had previously been cleared and improved as a training track. The earliest plan of the Randwick Racecourse (Figure 7) shows a convict constructed oval course with associated early structure. The particulars of this early structure are not known and the plan itself was produced by later colonial architect Mortimer Lewis in 1832. From the location of the structure in the 1832 plan it would appear that it was located within or in the close vicinity of the current subject area.

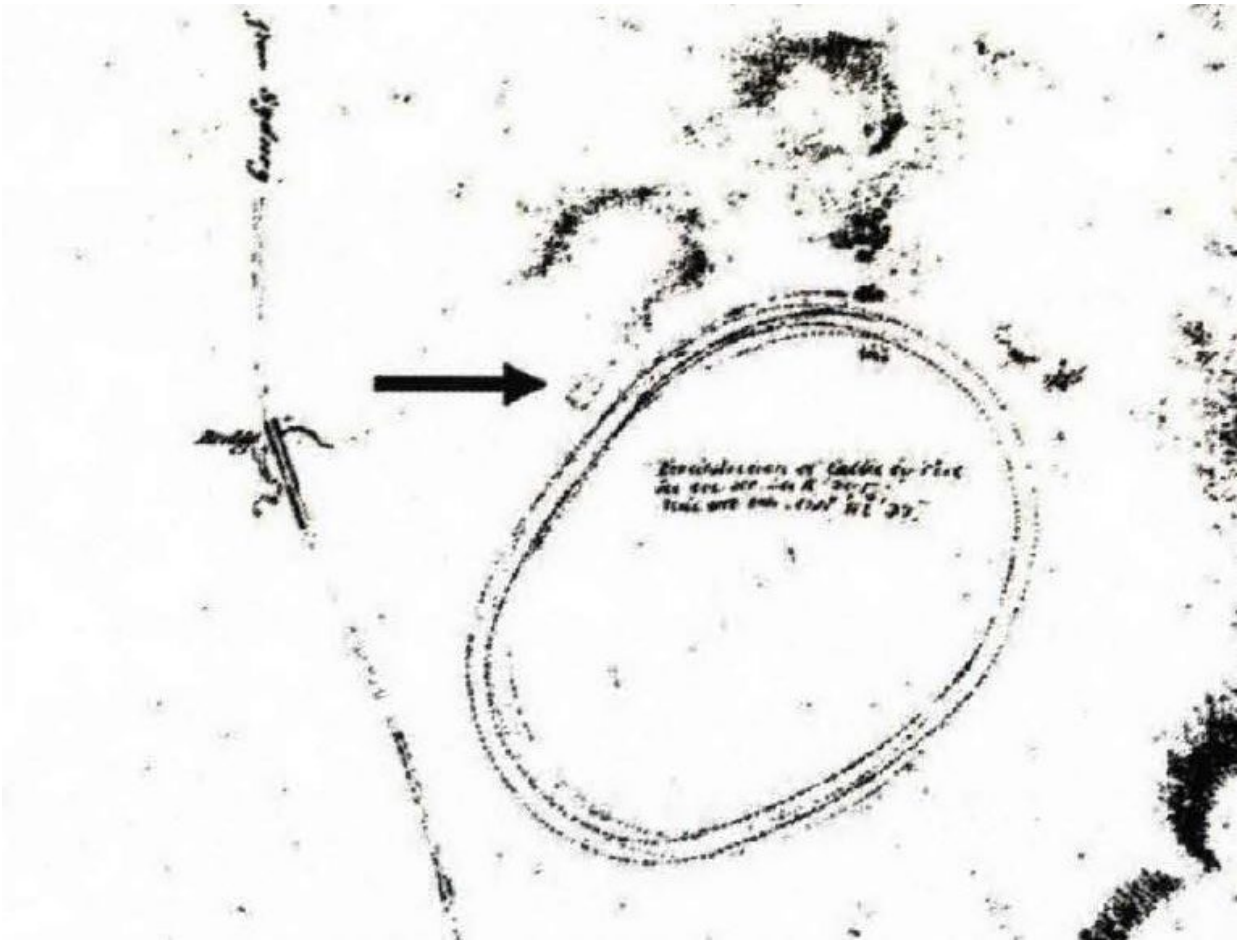


Figure 7 – Plan of oval racecourse and early structure.

Source: Plan by later colonial architect Mortimer Lewis, 1832, State Records Map No. 5538

The 'sandy course' was not conducive to racing and quickly fell into disrepair. The track was abandoned by 1838 due to the inability to maintain a good quality racing on the sandy, deteriorating track. Randwick Racecourse remained unutilised and in disrepair until refurbishment and further development commenced in the 1950s.

During the period of the Sandy Course, no structures are known to have existed within the subject area.

2.8.3. The revitalisation period 1858-1899

In the second half of the 1800s, the racecourse underwent a transformation. Growth of interest in horse racing in the colony led to the establishment of better facilities at Randwick, with further land grants in 1863 allowing the Australian Jockey Club (AJC) to feel secure in their tenure. This resulted in the formalising of the track and construction of spectator facilities including grandstands, amenities, refreshment rooms and bars. This had a cyclical affect, with improved facilities increasing interest in racing in the colony and increased interest leading to more security and thus the establishment of further facilities. In 1873, the AJC was given permission to charge admission to the racecourse, resulting in the construction of perimeter fences, walls and gates.

Overall, this was a period of widespread development for the entire racecourse. Within the subject area, this period saw the construction of the original St Leger Stands, both of which were built out of wood. The first stand was constructed in 1867 and demolished in 1882 to make way for the second St Leger Stand, which survived until 1910.

This period of development at the racecourse not only established its supremacy in the colony as a recreational facility, but also opened up the areas of Randwick and Kensington, with improved roads and transport including the original steam tram required for transporting race-goers to and from the racecourse, and racing specific industry popping up within these area.

2.8.4. Consolidation and renovation, 1900-1930

The 1900s saw further development at Randwick Racecourse, and consolidation of existing structures and facilities. In 1902, the grandstands including those in the subject area underwent renovations to include sewers, allowing for the establishment of bathrooms facilities. It is not clear from the historical record where privies may have been located prior to the establishment of the sewer line. The refurbishment program created uniformity across the various grandstand and spectator facilities, and by 1920 Randwick Racecourse was capable of accommodating crowds of up to 70,000.

The subject area underwent significant transformation in this period. In 1911 the third and final St Leger Stand was constructed, this time from brick and steel. The St Leger Stand embankment was also increased in the 1920s, with capacity to accommodate another 7,000 people. Another small structure, possibly a scratching tower was also constructed within the subject area, in between the St Leger Stand and the Queen's Stand (1930 and 1961 aerial on Figure 8).

The early 1900s was a time of prosperity and boom for the Randwick Racecourse, with the expansion and improvement of spectator facilities. However, despite the absence of impact from World War 1 during this period, the great Depression and World War 2 had a substantial impact to the racing industry and activities at the Royal Randwick.

2.8.5. War and repercussions at the Royal Randwick Racecourse, 1930-1960s

The Great Depression and World War 2 had significant impacts on the economy of the racing industry in Sydney. Several competing Racecourses were shutdown, with land resumed by the military for training and operations. Randwick Racecourse was also resumed but remained operational although the racing schedule was reduced.

The subject area experienced no documented changes during this period, and thus archaeological evidence is not anticipated.

2.8.6. The Leger Lawn, 1970s-present

The Leger Stand was last renovated in the 1970s, at a cost of $99,000. This included the renovation of the interior of the stand and the two liquor bars within it. In 1984, discussions commenced regarding the demolition of the Leger Stand, which had by this point fallen into disrepair.

The demolition of the St Leger Stand has potential implications for the level of disturbance within the subject area. The St Leger Stand was demolished in the 1980s, using unclear methods. A variety of proposed methodologies were submitted to the then Australian Jockey Club (AJC) from 1984-1987. In April 1986, G & H Todd Pty Ltd provided a letter to the AJC general manager regarding the demolition, stating:

> *"G & H Todd Pty Ltd are prepared to demolish the Ledger Stand at Randwick Racecourse, at no cost to the ALC provided that all waste materials in the form of rubble can be buried in a prepared hole in front of the Stand" (G & H Todd Pty Ltd, 1986a)*

This has concerning implications for disturbance within the subject area. If this proposal was accepted, as a further letter from July 1986 suggests (G & H Todd Pty Ltd, 1986b), then this will have involved the complete excavation of sands in front of the stand to water table depth and then the filling of this hole with rubble and waste materials, resulting in high levels of disturbance across large portions of the subject area. However, subsequent quotes provided by G & H Todd Pty Ltd to the AJC in 1987 for further demolition works suggest that rubble was removed and disposed of in a pit at High Street Hill (G & H Todd Pty Ltd, 1987). There is also a letter provided to AJC by G & H Todd Pty Ltd in 1988 which discusses the works carried out in Stages 2 and 3. This letter suggests materials were removed to a 'waster area' (presumably High Street Hill). It also suggests that the footings of the Ledger Stand were removed, with voids up to 2m deep around the footings excavated and filled with imported sands to level the area (G & H Todd Pty Ltd, 1988). There is ambiguity surrounding whether this activity actually took place, and if not then the footings may still be present within the subject area. In 2016, CLAH undertook an historic archaeological assessment to identify if the footings of the Leger Stand remained. This study identified evidence for footings and a concrete ground slab 150mm below bulk fill. They thus recommended excavation in the area cease and subsurface activities raised to avoid impacts to these items (CLAH, 2016).

The geotechnical investigation does not provide evidence of any large-scale excavations and placement of imported fill to the above-mentioned depths within the subject area

Regardless of how the demolition took place, the stand was at least partially removed, and no surface evidence of the stand exists within the subject area. The subject area was subsequently landscaped, and temporary race day structures erected, with the turfed area used for spectators and temporary race stalls.

Table 7 – Summary of analysis of historical aerials.

Year	Observation
1930	In the 1930 aerial, the entire subject area has already been subject to vegetation clearance and other disturbance activities associated with the racecourse. This includes concreting, lawn landscaping and the construction of the Grandstand, the Queen's Stand and the St Leger Stand. There is also a small building visible between the St Leger Stand and the Queen's Stand that has potentially been identified as a scratching tower.
1961	The 1961 aerial shows no great changes apart from the extending concreted area that was used as a car park in front of the St Leger Stand.
1986	The 1986 aerial shows some minor changes. The scratching tower has been demolished and the concreted area in front of the St Leger Stand has been scaled back and only covers the gap between the stands.
2005	Between 1986 and 2005 the St Leger Stand, the Queen's Stand and the nearby Totalisator were demolished, and the entire area has been since covered by fill and turf.

The demolition of the St Leger Stand has potential implications for the level of disturbance within part of the subject area. The St Leger Stand was demolished in the 1980s, using methods that are unclear. A variety of proposed methodologies were submitted to the then Australian Jockey Club (AJC) from 1984-1987. In April 1986, G & H Todd Pty Ltd provided a letter to the AJC general manager regarding the demolition, stating:

> *"G & H Todd Pty Ltd are prepared to demolish the Ledger Stand at Randwick Racecourse, at no cost to the ALC provided that all waste materials in the form of rubble can be buried in a prepared hole in front of the Stand" (G & H Todd Pty Ltd, 1986a)*

This has concerning implications for disturbance within the subject area. If this proposal was accepted, as a further letter from July 1986 suggests (G & H Todd Pty Ltd, 1986b), then this will have involved the complete excavation of sands in front of the stand to water table depth and then the filling of this hole with rubble and waste materials, removing Aboriginal archaeological potential in that area. However, subsequent quotes provided by G & H Todd Pty Ltd to the AJC in 1987 for further demolition works suggest that rubble was removed and disposed of in a pit at High Street Hill (G & H Todd Pty Ltd, 1987). There is also a letter provided to AJC by G & H Todd Pty Ltd in 1988 which discusses the works carried out in Stages 2 and 3.

This letter suggests materials were removed to a ‘waster area’ (presumably High Street Hill). It also suggests that during the removal of the Ledger Stand footings, voids of up to 2m deep were excavated and sands from near the waste area were imported to fill these and level the area (G & H Todd Pty Ltd, 1988). This has implications for the level of disturbance at the subject area, with imported sands anticipated to be encountered across the subject area as a result of these works. In 2016 CLAH undertook an historic archaeological assessment to identify if the remains of the footings of the Leger Stand remained. The results of this study are unclear, however they recommended excavation stop in the area and sub-surface impacts be raised so as to avoid impacts to the possible footings (CLAH, 2016). The potential identification of footings of the Leger stand would suggest that the works associated with footing removal never actually took place, limiting disturbance levels within the subject area. Further archaeological investigation in the form of excavation is required to assess if the remains of the Leger Stand are present and if the integrity of the soil profile within the subject area has been impacted by this work.

In summary, the subject area has been subject to high level of disturbance but the vertical extent of the disturbance and its impact on the underlaying Quaternary sand bodies cannot be clearly established at this stage. It is clear that the vertical impact could have been restricted to Additional background research and staged salvage excavation will provide more information during the course of the investigation.

2.8.7. Geophysical Survey

A geophysical survey was carried out by Mala GPR Australia on the 2 July 2019. The survey was carried out to identify any subsurface structures that may exist within the subject area. The survey covered approximately 60% of the subject area, between the temporary race stalls and the Grandstand and data quality was assessed as favourable all through the survey area as high contrast anomalies were present. The survey interpreted anomalies that can be matched with elements of previously existing structures such as the scratching tower and the Queen’s Stand. Figure 8 shows the context of the results of the geotechnical survey and historical aerials. Further information in relation to the analysis of the data and its implications for historic archaeological potential will be provided in the Historic Archaeology Report. The survey has also identified readings and anomalies to a variety of subsurface items including possible active and redundant utilities.

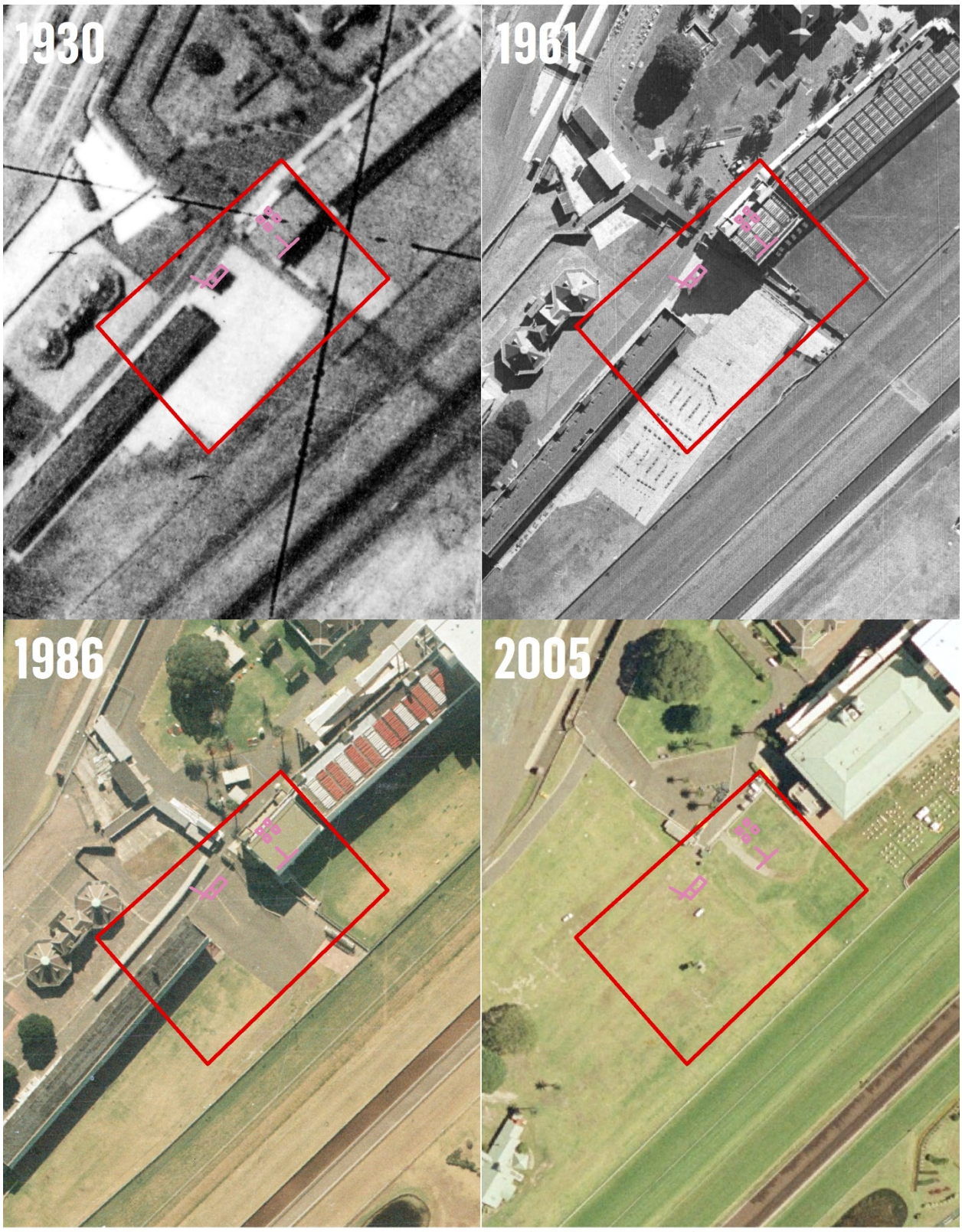


Figure 8 – Historic Aerial Imagery

3. CONSULTATION PROCESS

In administering its statutory functions under Part 6 of the *NSW National Parks and Wildlife Act 1974*, the Department of Planning, Industry and the Environment (DPIE) requires that Proponent consult with Aboriginal people about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and/or places within any given development area in accordance with Clause 80c of the NSW National Parks and Wildlife Regulation, 2009.

The DPIE maintains that the objective of consultation with Aboriginal communities about the cultural heritage values of Aboriginal objects and places is to ensure that Aboriginal people have the opportunity to improve ACHA outcomes by (DECCW 2010a):

- providing relevant information about the cultural significance and values of Aboriginal objects and/or places.
- influencing the design of the method to assess cultural and scientific significance of Aboriginal objects and/or places.
- actively contributing to the development of cultural heritage management options and recommendations for any Aboriginal objects and/or places within the proposed subject area, and
- commenting on draft assessment reports before they are submitted by the Proponent to the DPIE.

Consultation in the form outlined in the Consultation Requirements (DECCW 2010) is a formal requirement where a Proponent is aware that their development activity has the potential to harm Aboriginal objects or places. The DPIE also recommends that these requirements be used when the certainty of harm is not yet established but a Proponent has, through some formal development mechanism, been required to undertake a cultural heritage assessment to establish the potential harm their proposal may have on Aboriginal objects and places.

Consultation for this assessment, has been undertaken in accordance with the Consultation Requirements as these meet the fundamental tenants of the 2004 consultation requirements (NSW Department of Environment and Conservation [DEC] 2004), while meeting current industry standards for community consultation.

The Consultation Requirements outline a four-stage consultation process that includes the following:

- Stage 1 – Notification of Project proposal and registration of interest.
- Stage 2 - Presentation of information about the proposed Project.
- Stage 3 - Gathering information about the cultural significance.
- Stage 4 – Review of draft cultural heritage assessment report.

The document also outlines the roles and responsibilities of the DPIE, Registered Aboriginal Parties (RAPs) including Local and State Aboriginal Land Councils, and Proponents throughout the consultation process.

To meet the requirements of consultation it is expected that Proponents will:

- Bring the Registered Aboriginal Parties (RAPs), or their nominated representatives, together and be responsible for ensuring appropriate administration and management of the consultation process.
- Consider the cultural perspectives, views, knowledge and advice of the RAPs involved in the consultation process in assessing cultural significance and developing any heritage management outcomes for Aboriginal objects(s) and/or places(s).
- Provide evidence to the DPIE of consultation by including information relevant to the cultural perspectives, views, knowledge and advice provided by the RAPs.
- Accurately record and clearly articulate all consultation findings in the final cultural heritage assessment report, and
- Provide copies of their cultural heritage assessment report to the RAPs who have been consulted.

The consultation process undertaken to seek active involvement from relevant Aboriginal representatives for the Project followed the current NSW statutory guideline, namely, the Consultation Requirements. Section 1.3 of the Consultation Requirements describes the guiding principles of the document. The principles have been derived directly from the principles section of the *Australian Heritage Commission's Ask First: A guide to respecting Indigenous heritage places and values* (Australian Heritage Commission 2002). Both documents share the aim of creating a system where free prior informed advice can be sought from the Aboriginal community.

The following outlines the process and results of the consultation conducted during this assessment to ascertain and reflect the Aboriginal cultural heritage values of the subject area, further information in regard to the Aboriginal community consultation processed is outlined in Appendix B.

3.1. STAGE 1 – NOTIFICATION AND REGISTRATION OF INTEREST

Notification was initiated on 10 April 2019 to all relevant organisations named under Section 4.1.2 of the Consultation Requirements to identify Aboriginal people who may have cultural knowledge relevant to the subject area and may have interest in the proposed project. The list of the contacted organisations is provided in Table 8.

Table 8 – List of agencies contacted during Stage 1.

Name of Organisation	Date of Notification sent	Date of response received
NSW Office Of Environment and Heritage, Sydney	10 April 2019	12 April 2019
La Perouse Local Aboriginal Land Council	10 April 2019	No response received
Local Land Services- Greater Sydney Region	10 April 2019	No response received
National Native Title Tribunal	10 April 2019	No response received
NTS Corp Limited	10 April 2019	No response received
Office of the Registrar, Aboriginal Land Rights Act 1983	10 April 2019	18 April 2019
Randwick City Council	10 April 2019	24 April 2019

The template for the emails sent to the above-mentioned organisations is at Appendix B. A total of 26 Aboriginal groups and individuals with an interest in the subject area were identified following this stage, and this is presented at Section 3.1.1 below.

3.1.1. Registration of interest

In accordance with Section 4.1.3 of the Consultation Guidelines, letters were sent to the 21 Aboriginal groups and individuals on 14th May 2019, via email. The letters afforded a response time of 14 days (being 14th August 2019), in accordance with the 14-day minimum requirement. The letter template is shown at Appendix B and includes a brief introduction to the project and the project location. A newspaper advertisement was also placed in the Southern Courier on 14 May 2019 to provide additional opportunity for Aboriginal people who may be interested in the project to come forth. A copy of the advertisement and the notification letter are included in Appendix B.

A total of seven individuals and/or organisations registered interest in the project as a result of this phase within the nominated time frame (refer to Table 9). Acknowledgement emails or telephone calls were made by Urbis to respondents, to confirm registration had been received.

Table 9 – List of RAPs

Organisation/Individual	Contact Person
A1 Indigenous Services (A1)	Carolyn Hickey
Barraby Cultural Services (BCS)	Lee Field
Butucarbin Aboriginal Corporation (BAC)	Jennifer Beale
Darug Land Observations (DLO)	Jamie and Anna Workman
La Perouse Local Aboriginal Land Council (GLALC)	Chris Ingrey
Yurrandaali Cultural Services (Yurrandaali CS)	Bo Field
Yulay Cultural Services (Yulay CS)	Arika Jalomaki

3.2. STAGE 2 – PRESENTATION OF INFORMATION

The aim of Stage 2 is to provide registered Aboriginal parties with information about the scope of the proposed project, and the proposed cultural heritage assessment process. A Stage 2 Information Pack, parties including a brief introduction to the project, the project location, and AHIMS search result to provide understanding of the registered cultural sites in the local area, was sent to registered Aboriginal parties via email on the 28th June 2019. Request for response to the Stage 2/3 Information Packet was set to 29th July 2019.

The Information Pack was prepared as a combination of Stage 2 and 3 of the Consultation Guidelines, and included the following information:

- Project overview, location and purpose.
- Proposed works
- Brief environmental and historical background.
- Protocol of gathering information on cultural heritage significance.
- Request for comment on methodology and recommendations for site investigation, and request for any cultural information the respondent wished to share.

The letter is provided in Appendix B of this report. Site inspection was not proposed at this stage due to the fact that there is no surface visibility of the original sand dunes and that the entire subject area is a landscaped, filled area and also the area being prepared for the Spring Carnival. A site meeting with the RAPs as part of the recommended archaeological test excavation will be held later in the project as per the recommendations of this ACHAR.

Altogether, 3 responses on the Stage 2/3 Information Pack were received and are presented below at Section 3.3.

3.3. STAGE 3: GATHERING INFORMATION ABOUT CULTURAL SIGNIFICANCE

Stage 3 is concerned with gathering feedback on a project, proposed methodologies, and obtaining any cultural information that registered Aboriginal parties wish to share. This may include ethno-historical information, or identification of significant sites or places in the local area.

The responses received on the Information Park (Stage 2/3) are summarised at Table 10 below, and written responses are included at Appendix B.

Table 10 – Stage 2/3 Responses

RAP	Response	Urbis Response
BCS	Read and agreed with the methodology and would like to participate in fieldwork	Acknowledged, thanked for response and filed
YCS	Read and agreed with the methodology and would like to participate in fieldwork	Acknowledged, thanked for response and filed
Yurrandaali CS	Read and agreed with the methodology and would like to participate in fieldwork	Acknowledged, thanked for response and filed

Additional efforts were made to contact all RAPs via phone calls and emails to gather feedback and information primary from those RAPs who did not respond and also to those who commented to ensure that all aspects of the project are discussed. Details of the efforts are outline in the Consultation Log.

3.4. STAGE 4: REVIEW OF DRAFT CULTURAL HERITAGE ASSESSMENT REPORT

The aim of Stage 4 is to prepare and finalise an ACHAR with input from registered Aboriginal Parties.

This Draft ACHAR will be provided to all groups who registered, and a minimum 28 days is stipulated for receiving submissions. It is noted that the time allowed for comment should reflect the size and complexity of the project. Submissions may be made in writing, or verbally, and are to be included in the final ACHAR. Responses from the proponent are also required to be included in a final ACHAR in Appendix B.

Following inclusion of comments from the Aboriginal Parties, the final ACHAR is to be provided to DPIE, in conjunction with an AHIP application as required.

4. SUMMARY AND ANALYSIS OF BACKGROUND INFORMATION

There are no Aboriginal objects and/or archaeological sites registered with AHIMS within or adjacent to the subject area.

The closest registered Aboriginal sites are located within the Stabling Yards complex of the Sydney Light Rail, approximately 300-400 m from the subject area (Figure 4). These sites are Doncaster Avenue PAD (AHIMS ID#45-6-3245) and RSY1 (AHIMS ID#45-6-3246). Information regarding these sites is currently restricted owing to confidentiality issues, however the artefact scatter (AHIMS ID#45-6-3246) is noted as being of high density with over 30,000 flint flakes identified. The discovery of this cache of artefacts have necessitated a review of prior predictive models for the Randwick Racecourse area, where archaeological potential was determined to be low on the basis of the perceived inhabitability of the Lachlan Swamplands area.

The landscape of the subject area is conducive to the preservation of Aboriginal objects and/or archaeological sites. The Tuggerah soil landscape is a dune system that exists upon the Botany Lowlands and the coastline of the north eastern suburbs of Sydney and is present in the subject area. The Tuggerah Soil Landscape has the potential for Aboriginal objects both in surface and subsurface context.

Given the surface level disturbance and landscaping at the subject area, it is unlikely that surface materials will be identified, but subsurface archaeological potential remains. The geotechnical analysis confirms the intact sand profile below 1-3m of fill at various points across the subject area, with soils extending to 18m. However, previous historic land use activities including the demolition of the Leger Stand may have resulted in high disturbance to the level of the water table, thus further invasive analysis was determined to be required in order to assess levels of disturbance.

Likely archaeological remains of the Aboriginal utilisation of the land, both post and pre-European colonisation, can include artefact scatters and other objects associated with camping events. It is unlikely that sites which occur on sandstone will be present given the absence of sandstone overhangs or outcrops within the subject area.

Further archaeological investigation will be necessary to understand the subsurface potential and significance of Aboriginal archaeological resources that may exist within the original quaternary sand dunes covered by the imported fill the subject area

5. CULTURAL HERITAGE VALUES AND STATEMENT OF SIGNIFICANCE

5.1. METHODS OF ASSESSING HERITAGE SIGNIFICANCE

Heritage significance is assessed by considering each cultural, or archaeological site, against the significance criteria set out in the Assessment Guidelines. In all case, the assessment of significance detailed below is informed by the Aboriginal community, which is documented in this report. If any culturally sensitive values were identified they would not be specifically included in the report, or made publicly available, but would be documented and lodged with the knowledge holder providing the information.

5.2. ASSESSMENT FRAMEWORK

The Burra Charter (Australia ICOMOS 1999) defines the basic principles and procedure to be observed in the conservation of important places. It provided the primary framework within which decisions about the management of heritage sites should be made. The Burra Charter defines cultural significance as being derived from the values listed below.

5.2.1. Social or cultural value

Social or cultural value refers to the spiritual, traditional, historical or contemporary associations and attachments the place or area has for Aboriginal people. Social or cultural values are how people express their connection with a place and the meaning that place has for them.

Places of social or cultural value have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods, or events. Communities can experience a sense of loss should a place of social or cultural value be damaged or destroyed.

There is not always a consensus about a place's social or cultural value. When identifying values, it is not necessary to agree with or acknowledge the validity of each other's values, but it is necessary to document the range of values identified.

Social or cultural values can only be identified through consultation with Aboriginal people. They could involve a range of methodologies, such as cultural mapping, oral histories, archival documentation and specific information provided by Aboriginal people specifically for the investigation.

When recording oral history:

- Identify who was interviewed and why
- Document the time, place and date the interview was conducted
- Describe the interview arrangements (the number of people present, recording arrangements, information access arrangements)
- Provide a summary of the information provided to the person being interviewed
- Summarise the information provided by each person interviewed.

More information on conducting oral history projects can be found in the DPIE's publication *Talking history: oral history guidelines*.

Occasionally information about social value may not be forthcoming. In these circumstances, document the consultation process but make it clear in the discussions and conclusions about social value that this was the case.

5.2.2. Historic value

Historic value refers to the associations of a place with a historically important person, event, phase or activity in an Aboriginal community. Historic places do not always have physical evidence of their historical importance (such as structures, planted vegetation or landscape modifications). They may have 'shared' historic values with other (non-Aboriginal) communities.

Places of post-contact Aboriginal history have generally been poorly recognised in investigations of Aboriginal heritage. Consequently, the Aboriginal involvement and contribution to important regional historical themes is often missing from accepted historical narratives. This means it is often necessary to collect oral histories along with archival or documentary research to gain a sufficient understanding of historic values.

5.2.3. Scientific (Archaeological) value

This refers to the importance of a landscape, area, place or object because of its rarity, representativeness and the extent to which this may contribute to further understanding and information (Australian ICOMOS 1988).

Information about scientific values will be gathered through any archaeological investigation undertaken. Archaeological investigations must be carried out according to OEH's *Code of practice for archaeological investigation of Aboriginal objects in NSW*.

5.2.4. Aesthetic value

This refers to sensory, scenic, architectural, and creative aspects of the place. It is often closely linked with the social values. It may consider form, scale, colour, texture and material of the fabric or landscape, and the smell and sounds associated with the place and its use (Australian ICOMOS 1988).

5.3. IDENTIFYING VALUES

The information collected in the background review of the project can be used to help identify these values. The review of background information and information gained through consultation with Aboriginal people should provide insight into past events. These include how the landscape was used and why any identified Aboriginal objects are in this location, along with contemporary uses of the land.

Information gaps are not uncommon and should be acknowledged. They may require further investigation to adequately identify the values present across the subject area. It may be helpful to prepare a preliminary values map that identifies, to the extent of information available, the:

- Known places of social, spiritual, cultural value, including natural resources of significance;
- Known historic places;
- Known Aboriginal objects and/or declared Aboriginal places; and
- Potential places/areas of social, spiritual, cultural value, including natural resources, historic or archaeological significance.

Places of potential value that are not fully identified or defined should be included as 'sensitive' areas to target further investigation.

5.4. ASSESSING VALUES AND SIGNIFICANCE

This stage is used to assess and discuss the cultural significance of the values identified during the identification and assessment of cultural significance by consulting Aboriginal people and to prepare a statement of significance. The assessment of values is a discussion of what is significant and why. An assessment of values is more than simply restating the evidence collected during the background review and identification of values stages of the project. Rather, the assessment should lead to a statement of significance that sets out a succinct summary of the salient values that have been identified.

The assessment and justification in the statement of significance must discuss whether any value meets the following criteria (NSW Heritage Office 2001):

- Does the subject area have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons? – social value
- Is the subject area important to the cultural or natural history of the local area and/or region and/or state? – historic value
- Does the subject area have potential to yield information that will contribute to an understanding of the cultural or natural history of the local area and/or region and/or state? – scientific (archaeological) value

- Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state? – aesthetic value.

Assessment of each of the criteria (above) should be graded in terms that allow the significance to be described and compared; for example, as high, moderate, or low. In applying these criteria, consideration should be given to:

- Research potential: does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state's natural and cultural history?
- Representativeness: how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?
- Rarity: is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?
- Education potential: does the subject area contain teaching sites or sites that might have teaching potential?

Then discuss what is significance and why – this should be summarised into a statement of significance. Thus, the statement of significance is a succinct summary of the salient values drawn from the identification of values.

5.5. IDENTIFIED VALUES

There have been no cultural heritage values identified for the subject area either by the RAPs or the evaluation of the background information during the ACHA process. Consequently, the assessment of values was not warranted for the subject area.

The ACHA has been carried out in consultation with the RAPs and Urbis have provided multiple opportunities for them to provide cultural heritage knowledge in relation to the subject area. There have been no social-cultural or historical values identified for the subject area either by the RAPs or the evaluation of the background information during the ACHA process. The ACHA has identified that additional investigation in the form of archaeological test excavation is needed to further investigate the scientific (archaeological) and cultural value of the subject area.

Summary of the identified values are provided in Table 11 below.

Table 11 – Summary of identified values

Criteria	Assessment
Social or Cultural Value	No specific social or cultural values have been identified by the RAPs in relation to the subject area. Consequently, the overall social or cultural value of the subject area is low to nil. This will be re-assessed following the completion of the test excavation program.
Historic Value	No specific historic value of the subject area has been identified by the RAPs. Consequently, the overall historic value of the subject area is low to nil.
Scientific (archaeological) Value	The scientific (archaeological) value cannot be assessed at this stage due to the lack of sufficient information on the presence or absence of Aboriginal objects and archaeological resources within the subject are. The landscape feature (consolidated aeolian sand dune system) that is located under the imported fill has been assessed as having moderate to high potential for Aboriginal

Criteria	Assessment
	objects and archaeological resources. Further investigation in the form of subsurface test or staged salvage excavation is warranted to identify the level of potential of Aboriginal objects and if found the significance of those objects.
Aesthetic Value	The overall Aesthetic Value of the subject area has been rated as low due to the lack of presence of any elements that are listed under the relevant criteria. The results of the archaeological sub-surface excavation might alter this assessment and provide additional information for the aesthetic values of the subject area.

6. IMPACT ASSESSMENT

6.1. THE PROPOSED ACTIVITY

The proposed activity involves the development of new facilities including

- Ground floor including multi use hall, food and beverage facilities, amenities, entries and circulation and back of house facilities.
- Upper level including multi use hall, food and beverage facilities, amenities, entries and circulation, back of house facilities, landscape balcony and bridge link to Queen Elisabeth II Stand.
- Non trafficable roof including capacity for future floor.
- External landscaping.

The construction will involve:

- Minor excavation and site preparation work.
- Construction of approximately 28 pylons to a depth of approximately 10 m.

The construction activities associated with the proposed development will have direct, localised impact on the existing ground surface and particularly on the underlaying, natural sand dunes.

6.2. POTENTIAL HARM

This section identifies the potential impacts to cultural heritage arising from the proposal, including demolition, excavation, and construction phases. Harm can be direct or indirect, defined by the Assessment Guidelines as:

- Direct harm – may occur as the result of any activity which disturbs the ground including, but not limited to, site preparation activities, installation of services and infrastructure, roadworks, excavation, flood mitigation measures; and
- Indirect harm – may affect sites or features located immediately beyond or within the area of the proposed activity. Examples include, but are not limited to, increased impact on art in a shelter from increased visitation, destruction from increased erosion and changes in access to wild food resources.

It is noted that no Aboriginal objects or cultural sites have been identified within, or in close proximity to, the subject area.

The nature, extent and level of harm (indirect or direct) cannot be identified at this stage due to the lack of sufficient information on the presence or absence of Aboriginal objects and archaeological resources within the subject area. This ACHA has concluded that there is potential for Aboriginal objects in a subsurface context, given the subject area is situated on a sensitive landform being the aeolian Botany Sands.

The level, nature and extent of potential harm cannot be ascertained until detailed geomorphological investigation and archaeological excavation is undertaken. This level of investigation can only be undertaken before the construction of the proposed Winx Stand.

6.3. LIKELY IMPACTED VALUES

The level of archaeological potential of subsurface Aboriginal objects and archaeological resources that still may exist within the subject area can only be further assessed by archaeological test excavation and geomorphological investigation of the sand body. Any potential Aboriginal objects and/or sites will occur below the current level of historical disturbance.

These potential Aboriginal objects and/or sites may represent various scale camping events and Aboriginal utilisation of the land in the form of hearth, stone artefacts and shells. Aboriginal sites of varying densities may occur, and if they do, they are anticipated to be high in integrity. Previous archaeological investigations within Eastern Sydney sand dune systems have identified the potential for human burials as well.

6.4. JUSTIFICATION

The original environment and consequently the attached values including cultural heritage values have been already partially impacted by the development of the Royal Randwick Racecourse during the last 150 years. Impacts included the large-scale modification of the original environment with clearing, placement of imported fill and eventually the creation of an artificial landscape within and near the subject area. The proposed development will be an integral part of the infrastructure and logistics of the racecourse. The proposed archaeological test and/or staged salvage excavation will provide an opportunity to ensure that the capped original landscape features and their archaeological potential is properly investigated, and any identified archaeological resources are managed and salvaged should harm can't be avoided. The analysis and interpretation of any identified Aboriginal archaeological resources would provide opportunity for the Aboriginal and the general community to understand and appreciate the history of the area.

7. AVOIDING AND MINIMISING HARM

The nature, extent and level of harm (indirect or direct) cannot be identified at this stage due to the lack of sufficient information on the presence or absence of Aboriginal objects and archaeological resources within the subject area. The ACHA concluded that there is potential for subsurface Aboriginal objects and archaeological resources within the underlaying sand body and recommended additional investigation in the form of subsurface testing and/or staged salvage excavation to establish the potential and significance of Aboriginal objects and archaeological resources that may be present. There is moderate to high possibility of the presence of un-registered Aboriginal objects and/or archaeological sites within the subject area, due to the presence of the Tuggerah soil landscape, and the identification of the subject area as suitable for Aboriginal occupation. As identified by geotechnical analysis (discussed in Section 2.4), soils depths in the subject area extend to a minimum of 18m and there is limited evidence of subsurface disturbance at depth.

The nature and complexity of mitigation measures to avoid and/or minimise harm to any Aboriginal objects and archaeological resources that might be identified will be provided in context of the nature, extent and significance of those resources.

8. CONCLUSIONS

This ACHAR was prepared as per the relevant section of the *National Parks and Wildlife Act 1974* (NPW Act) and the *National Parks and Wildlife Regulations 2009* (NPW Reg) and in accordance to the following guidelines:

- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water (DECCW), 2010) (the Consultation Guidelines);
- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage 2011) (the Assessment Guidelines);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010); and
- The Burra Charter, 2013 (Burra Charter).

The ACHA process included the:

- Comprehensive background research of all available archaeological and cultural heritage information for the subject area in context with the scope of the Project;
- Analysis and interpretation of the background research;
- Consultation with the Registered Aboriginal Parties (RAPs);
- Summarising of results and providing recommendations for the proposed development in relation to Aboriginal cultural heritage and archaeological resources.

The ACHAR concluded that:

- There are no registered Aboriginal objects and/or archaeological sites within the subject area;
- The original landscape is covered by approximately 1 to 1.5 m imported fill and the ground surface visibility is zero within the subject area.
- There are landscape features, including the consolidated aeolian sand body that part of the Tuggerah Soil Landscape and locally the Botany Bay sands, with potential for Aboriginal objects or archaeological deposits located within the subject area;
- Additional investigation is warranted in the form of subsurface archaeological test or staged/salvage excavation to establish the presence or absence of Aboriginal objects and archaeological resources within the subject area.
- No Aboriginal cultural heritage values have been identified by the RAPs.
- The RAPs have expressed their support for the proposed recommendations and additional works.

9. RECOMMENDATIONS

- The Proponent should continue to consult with the Aboriginal community in regard to the Project;
- A geomorphological assessment should be carried out prior to construction to investigate the underlaying sand body to provide further information of the accumulation processes and inform the detailed Archaeological Research Design and Methodology.
- Additional Geophysical investigation need to be carried out after the removal of the temporary stables from the western section of the subject area to supplement exiting information.
- Prior to construction subsurface archaeological investigation must be carried out informed by an Archaeological Research Design and Methodology that will drive the sub-surface investigation of the identified landscape features and their potential for retaining Aboriginal objects and archaeological resources including:
    - Archaeological monitoring of the removal of the imported fill around the selected pylon locations for the staged salvage excavation;
    - Archaeological staged salvage excavation to confirm the presence or absence of Aboriginal objects and archaeological resources at the selected pylon locations within the subject area.
    - Should Aboriginal objects and/or archaeological resources identified at the selected locations, additional pylon locations are to be excavated to identify the spatial distribution of the archaeological resource.
    - Protocol for the handling of any Aboriginal objects and archaeological resources that might be uncovered during the monitoring and the archaeological test excavation.
- The archaeological monitoring and staged salvage excavation should be designed to correspond the stages of the proposed development, including site preparation and construction phases.
- The archaeological monitoring and staged salvage excavation should be undertaken before construction and according to the developed Archaeological Research Design and Methodology and with the participation of the nominated Aboriginal RAPs and appropriately qualified archaeologists.

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APPENDIX A AHIMS BASIC AND EXTENSIVE

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : P5973/1

Client Service ID : 416161

Urbis Pty Ltd - 201 Sussex St Sydney

L23, Tower 2 201 sussex St
Sydney New South Wales 2000

Attention: Balazs Hansel

Email: bhansel@urbis.com.au

Date: 18 April 2019

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 333332 - 338381, Northings : 6244157 - 6248795 with a Buffer of 1000 meters, conducted by Balazs Hansel on 18 April 2019.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

31	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : P5973/1

Client Service ID : 416161

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-6-2597	Wynyard St Midden	AGD	56	333469	6247920	Open site	Valid	Shell : -, Artefact : -	Midden	102494,102763,102765
	Contact	**Recorders**	Mr.D Coe					**Permits**		
45-6-2280	Jensen Place;Lurline Bay South Coogee;	AGD	56	338200	6243340	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	**Recorders**	J Storey					**Permits**		
45-6-2306	Gordons Bay	GDA	56	339255	6245955	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,W Hayes,Ms.Tamika Goward					**Permits**		
45-6-2666	Wattle Street PAD 1	AGD	56	333150	6249450	Open site	Valid	Potential Archaeological Deposit (PAD) : -		102494,102763,102765
	Contact	**Recorders**	Dominic Steele Archaeological Consulting					**Permits**	1738	
45-6-2663	Mountain Street Ultimo	AGD	56	333300	6249400	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		102494,102763,102765
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists					**Permits**	1719	
45-6-2680	Broadway Picture Theatre PAD 1	AGD	56	333150	6249000	Open site	Valid	Potential Archaeological Deposit (PAD) : -		102142,102494,102763,102765
	Contact	**Recorders**	Jim Wheeler					**Permits**	1854	
45-6-2979	UTS PAD 1 14-28 Ultimo Rd Syd	GDA	56	333650	6249590	Open site	Valid	Potential Archaeological Deposit (PAD) : -		102494,102763,102765
	Contact	**Recorders**	Dominic Steele Archaeological Consulting,Mr.Dominic Steele					**Permits**	3458	
45-6-0690	Cooper Park;Bellevue Hill;	AGD	56	338900	6248810	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	**Recorders**	Unknown Author					**Permits**		
45-6-0691	Woollahra;Bellevue Hill;	AGD	56	339088	6249021	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	**Recorders**	Unknown Author					**Permits**		
45-6-0697	Coogee Bay;Randwick;	AGD	56	339200	6245400	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	**Recorders**	Ms.Lisa Campbell,W Newell					**Permits**		
45-6-0647	Centennial Park	AGD	56	336273	6247961	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	**Recorders**	ASRSYS					**Permits**		
45-6-2495	Prince of Wales Hospital Aboriginal;Hearth;	AGD	56	337040	6245140	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists					**Permits**	1055,4386	

Report generated by AHIMS Web Service on 18/04/2019 for Balazs Hansel for the following area at Datum :GDA, Zone : 56, Eastings : 333332 - 338381, Northings : 6244157 - 6248795 with a Buffer of 1000 meters. Additional Info : confirm site data. Number of Aboriginal sites and Aboriginal objects found is 31

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : P5973/1

Client Service ID : 416161

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-6-1405	Bellevue Hill;Cooper Park;	AGD	56	338750	6248590	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
Contact		Recorders	W Newell					Permits		
45-6-0734	Bellevue Hill;Cooper Park;	AGD	56	338800	6248800	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
Contact		Recorders	W Newell					Permits		
45-6-0675	Randwick Queen's Park Waverley	AGD	56	338204	6247450	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
Contact		Recorders	Michael Guider					Permits		
45-6-0898	Woollahra;	AGD	56	337991	6249000	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
Contact		Recorders	Unknown Author					Permits		
45-6-2745	University of Sydney Law Building PAD	AGD	56	332350	6248740	Open site	Valid	Potential Archaeological Deposit (PAD) : -		102201,102494,102763,102765
Contact		Recorders	Doctor.Jo McDonald					Permits	2153,2320,2443	
45-6-2897	Queens Park PAD (duplicate see 45-6-2896)	AGD	56	338203	6247179	Closed site	Valid	Potential Archaeological Deposit (PAD) : 1		
Contact		Recorders	Mr.Paul Irish					Permits		
45-6-2896	Queens Park PADs	GDA	56	338203	6247179	Open site	Valid	Habitation Structure : 1, Potential Archaeological Deposit (PAD) : 1		
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits		
45-6-3071	445-473 Wattle Street PAD	GDA	56	333285	6249412	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
Contact		Recorders	Biosis Pty Ltd - Sydney					Permits		
45-6-2987	Poultry Market 1	GDA	56	333746	6249575	Open site	Valid	Artefact : 1		102494,102763
Contact		Recorders	Ms.Samantha Higgs,Biosis Pty Ltd - Canberra					Permits	3506	
45-6-3064	445-473 WATTLE ST PAD	GDA	56	333285	6249412	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		102763
Contact		Recorders	Biosis Pty Ltd - Sydney					Permits		
45-6-3155	Moore Park AS1	GDA	56	335613	6247909	Open site	Destroyed	Artefact : -		
Contact		Recorders	Artefact - Cultural Heritage Management ,Mr.Josh Symons,Mr.Alex Timms					Permits	4019	

Report generated by AHIMS Web Service on 18/04/2019 for Balazs Hansel for the following area at Datum :GDA, Zone : 56, Eastings : 333332 - 338381, Northings : 6244157 - 6248795 with a Buffer of 1000 meters. Additional Info : confirm site data. Number of Aboriginal sites and Aboriginal objects found is 31

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : P5973/1

Client Service ID : 416161

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-6-3645	SFS-PAD	GDA	56	335846	6248721	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Miss.Sam Cooling,Curio Projects Pty Ltd					**Permits**		
45-6-3654	CRS AS 01 (Central Railway Station Artefact scatter 01)	GDA	56	334055	6249146	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Artefact - Cultural Heritage Management ,Miss.Jennifer Norfolk					**Permits**		
45-6-2629	Broadway 1	AGD	56	333060	6249100	Open site	Valid	Artefact : -		102494,102763,102765
	Contact	**Recorders**	Dominic Steele Archaeological Consulting					**Permits**	1299	
45-6-2767	Tent Embassy	AGD	56	332680	6248680	Open site	Valid	Aboriginal Resource and Gathering : 1		102494,102763,102765
	Contact T Russell	**Recorders**	Bill Lord					**Permits**		
45-6-2822	USYD: Central	AGD	56	332750	6248550	Open site	Valid	Artefact : -		100302,102494,102763,102765
	Contact	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**	2554	
45-6-3342	Not a site	GDA	56	337014	6244960	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Ms.Tamika Goward					**Permits**	4183	
45-6-3245	Doncaster Ave PAD	GDA	56	336037	6246916	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	GML Heritage Pty Ltd + Context - Surry Hills,Doctor.Tim Owen					**Permits**	4188	
45-6-3246	RSY 1	GDA	56	336060	6246862	Open site	Valid	Artefact : -		
	Contact	**Recorders**	GML Heritage Pty Ltd + Context - Surry Hills,GML Heritage Pty Ltd + Context - Surry					**Permits**	4188	

Report generated by AHIMS Web Service on 18/04/2019 for Balazs Hansel for the following area at Datum :GDA, Zone : 56, Eastings : 333332 - 338381, Northings : 6244157 - 6248795 with a Buffer of 1000 meters. Additional Info : confirm site data. Number of Aboriginal sites and Aboriginal objects found is 31

APPENDIX B CONSULTATION PROCESS

APPENDIX C GEOTECHNICAL REPORT

Geophysical Survey
Royal Randwick Racecourse, Sydney NSW

CLIENT	Mostyn Copper		
ADDRESS	Suite 2, Level 8 60 Pitt Street Sydney NSW 2000	**TELEPHONE**	0401 440 962
CLIENT CONTACT	Emily Lynch		
EMAIL	elynch@mostyncopper.com.au		
JOB SITE	Leger Lawn Royal Randwick Racecourse		
PROJECT ID #	GNX19254		
ONSITE CONTACT	Hayden Kegg		
SURVEY DATE	02 July, 2019	**METHODS**	[x] 3D GPR
REPORT DATE	15 July, 2019		

COMPILED BY

James Meintjes (B.Sci)
Geophysicist

REVIEWED BY

William Barber (B.Sci)
Geophysicist

TABLE OF CONTENTS

SPECIFICATIONS and SURVEY AREA

The undertaking of a geophysical survey over a dedicated area of grounds located within Royal Randwick Race Course. The survey area is known as the 'Leger Lawn'. The geophysical method utilised was 400Mhz 3D Ground Penetrating Radar (GPR), a method that was requested by the client.

The survey primarily aims to identify areas containing subsurface footings or foundations (up to 2.5m depth) to understand their approximate depth and orientation. Identification of individual anomalies and utilities/redundant utilities was not in the scope of work. A 400Mhz 3D GPR was used in order to achieve maximum depth penetration and resolution to easily identify the survey targets.

The survey was conducted on the morning of July 02, 2019. The 3D GPR instrument was manouvered on a John Deere ride-on utility vehicle. The Leger Lawn area is approximately 4000 sqm. One third of the area contains an existing dwelling with the remainder of the area open for survey. The area was grassed, relatively level and completely open and unobstructed (with the exception of a tree line bordering the survey area and existing dwelling. Survey lines were conducted with an approach to achieve the maximum level of data coverage possible. Survey lines were run parallel to the roadway/racetrack between the existing dwelling and large grandstand. This direction of collection was completed in anticipation of crossing any existing subsurface linear footings at a perpendicular angle to achieve maximum potential for results. GPR lines were run in one direction only (away from the main grandstand) to eliminate potential for GPS offsets within the data that may occur from a bidirectional survey.

The site characterisation information and detail which aims to contribute to existing site plans; thereby providing a safer working environment and detail for informed decision making. The survey provides a .dxf file displaying identified features which can be used as a layer overlay in CAD.

Figure 1: Approximate survey area (outlined in red) within the Legder Lawn area.

GROUND PENETRATING RADAR (GPR)

Ground penetrating radar (GPR) is a geophysical method that uses radar pulses to image the subsurface (figure 2). GPR uses transmitting and receiving antennas. The transmitting antenna radiates short pulses of high-frequency radio waves into the ground/material. When the wave hits a buried object or a boundary with different dielectric constants, the receiving antenna records variations in the reflected return signal. The depth range of GPR is limited by the electrical conductivity of the ground. As ground conductivity increases, the signal penetration depth decreases. This is caused when the electromagnetic pulse emitted by a GPR transmitter is more quickly dissipated into heat, causing a loss in signal strength at depth.

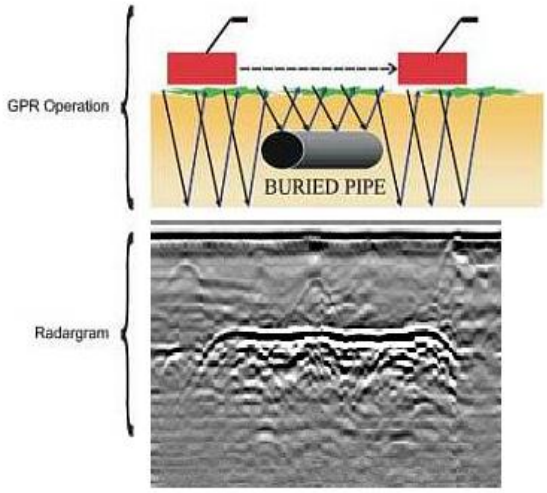

Figure 2: GPR operation and the reflection profile across the length of a buried pipe. A similar anomaly would be presented due to a subsurface footing/foundation.

INSTRUMENTS USED

The area was surveyed using the following systems

- MALA 400Mhz 3D MIRA system - 16 Channel
- MALA Widerange HDR 670/160MHz

MALA GPR Imaging Radar Array (MIRA) is the most technically advanced GPR system on the market. It is the only system of its kind that integrates acquisition, processing, QA/QC, positioning data, interpretation and export of ground penetrating radar data (figure 3).

The MIRA instrument has the ability to quickly and easily gather full 3D data in broad paths, called "swats" using 16 channels. This allows for data collection in one pass (i.e. a swat needs to be covered only once, in singular direction) as opposed to single channel systems which require multiple passes in multiple directions. The MIRA system is an efficient and effective solution for large scale ground penetrating radar mapping and subsurface object identification. Results are processed in 3D depth slices and are displayed and interpreted through a dedicated software package (rSlicer) and then exported into suitable GIS or CAD data formats (.dxf).

A 2D GPR was tested over the site however depth penetration did not exceed that achieved from the 3D GPR, therefore data was not acquired for the investigation.

Figure 3: MALA 400MHz 3D MIRA acquiring data on site.

POSITIONING

Positioning information for the MIRA 3D GPR system was tracked using high accuracy RTK GPS (Hemisphere s321 rover) which aimed to offer ~100mm horizontal accuracy by using a rover antenna (mounted above the GPR antenna) being tracked by GNSS correction satellites. A Hemisphere s321 rover was used.

In order to obtain high accuracy positioning, clear vision to the sky/open satellites was a requirement and therefore areas with tree/building cover limited the survey area. All of the survey area obtained an RTK fix to allow for very favourable GPS positioning.

Survey line positioning/spacing was controlled using spray chalk paint marks on the ground to aid GPR navigation. Horizontal chainage was calculated by the use of an optical distance encoder wheel mounted to the front wheel of the John Deere acquisition vehicle.

No local survey markers were provided to MALA GPR therefore fixed objects within the survey area and surrounds (manhole pit covers) were surveyed into the project to allow for repositioning if required. The coordinate system used in conjunction with the survey was UTM WGS84 Zone 56s.

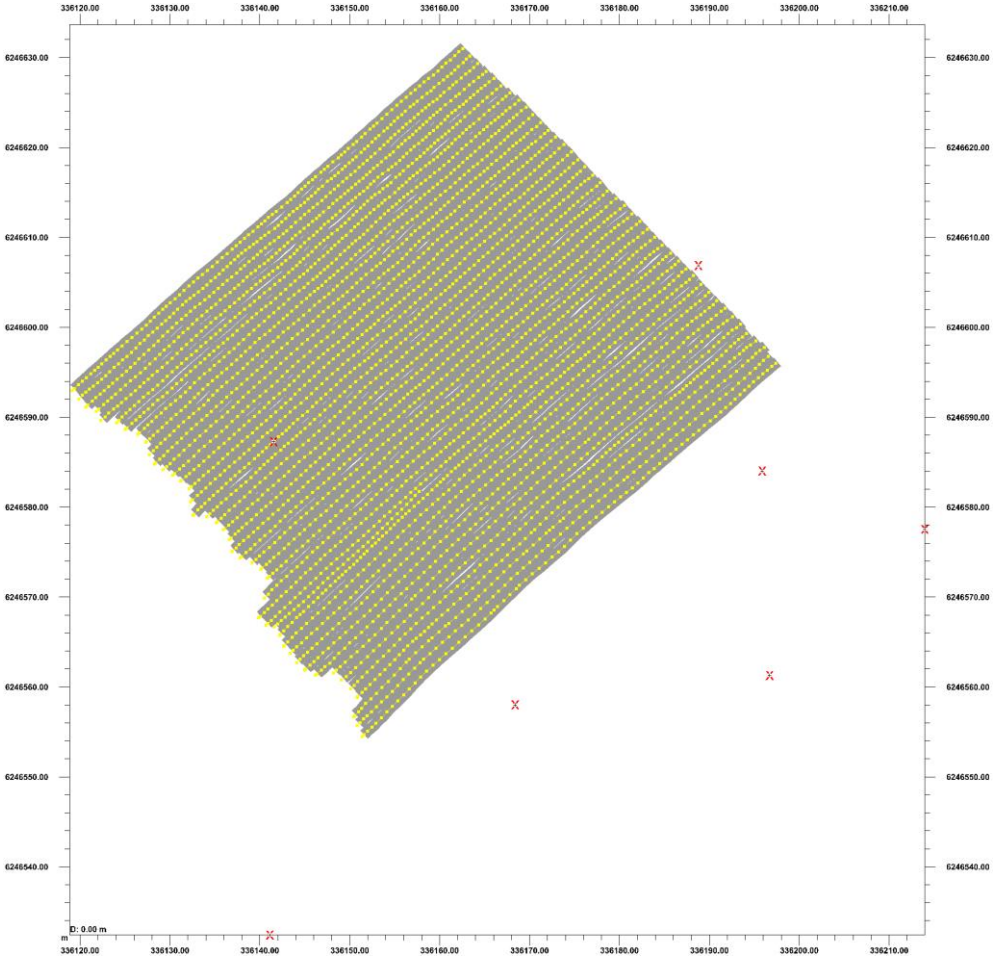

Figure 4: Yellow dots and lines indicate Individual GPS points and GPR lines conducted, respectively. The survey achieved 100% site coverage. Red 'X' markers indicate manhole pit covers that were surveyed into the dataset.

STAFFING

The data acquisitioning was performed by Geophysicist James Meintjes (B.Sci) and Senior Geophysicist Mads Toft (M.Geo) of MALA GPR Australia. Data processing and reporting was performed by James Meintjes and reviewed by William Barber.

SURVEY PARAMETERS

Data was collected using the MALA MIRA 400Mhz antenna array Data sampling was triggered with an encoder wheel connected to the John Deere rear wheel. The table below outlines the collection parameters used for the survey.

Collection Parameters	400Mhz MIRA Array
Samples per trace	408
Trace Sampling Frequency	4096.55 MHz
Frequency Steps	116
Distance Interval	0.066 m
Antennas	400MHz Shielded
Antenna Separation	0.28 m
Time Window	99.59 ns
Stacks	4

DATA PROCESSING

The data processing strategy deployed for the targets was as follows:

First the data was imported into our proprietary 3D processing package rSlicer. In that process the time-zero level is established, adjusted for the antenna separation and the DC filter is applies in order to normalise the individual GPR traces.

After the data was successfully imported minor adjustments were made to the array geometry in which bad GPS points were deleted. GPS was very good therefore minimal geometry adjustments were made. Upon saving the survey geometry the pre-processing routine was deployed. The following filters were used in the pre-processing step:

Amplitude Muting: Traces with abnormal amplitudes are removed from further processing in order to reduce striping in the data.

Amplitude Correction: A Spherical Divergence Correction and a centered 29ns Automatic Gain Control window was applied to the data.

Predictive Deconvolution is an algorithm-based process used to reverse the effects of convolution on recorded data. The concept of deconvolution is widely used in the techniques of signal processing and image processing. For GPR data it is used to recover as much ground signal as possible by separating it from the transmitted signal.

Antenna Ringdown Removal is applied to the data in order to reduce the ringing of the signal. It is effectively a trailing subtraction of the average trace over a certain distance, in this case 500 traces.

Band Pass Filtering is applied to reduce signal noise outside our transmitted frequency spectrum. The parameters used in this case were:
Low Cut: 76MHz
Low Pass: 203MHz
High Pass: 609MHz
High Cut: 1218MHz

After the pre-processing is complete the data is Chunked, interpolated at 80mm, and x1 slice averaging is applied. These steps are applied in order to facilitate for a more manageable dataset which can be loaded fully into RAM on the processing station.

Data Migration is the process by which GPR targets are geometrically re-located in either space or time to the real position of the target rather than the location that it was recorded at the surface, thereby creating a more accurate image of the subsurface. Migration moves dipping reflectors to their true subsurface positions and collapses diffractions, resulting in a migrated image that typically has an increased spatial resolution and resolves areas of complex structure much better than non-migrated images. The migration velocity used for the dataset was 10cm/µs and subsequently this velocity was used for the time-depth transformation of the data.

Amplitude Envelope is a parameter-less filter used to highlight high amplitude features within a dataset. It is particular useful in 3D GPR data sets in plan view.

RESULT OF SURVEY

Initial observations made from the data were those regarding data quality and depth penetration. The MIRA survey achieved 100% coverage of the open survey area with the exception of a strip of grass behind and between the tree line near the existing dwelling. Data quality appeared favourable and clear as there were high contrast anomalies present, mainly those representing linear features. Depth penetration was also very acceptable and was noted to reach a maximum depth of ~ 2500mm (considering a soil velocity of 10cm/µs). With the 400MHz frequency antenna used this depth penetration that was achieved is indicative of a suitable subsurface material for GPR technology. The subsurface material was described by MostynCopper as being of sand composition, this being evident through the quality of the data and depth penetration achieved.

Many anomalies were evident within the processed dataset, mainly those of linear nature. For each anomaly detected, interpretation markers (polylines) were inserted into the dataset at different depths. Different interpretation colours represent different interpreted targets and are discussed further in detail below Figure 5 below displays all interpretations mads within the dataset. Note all plots within the report are North facing.

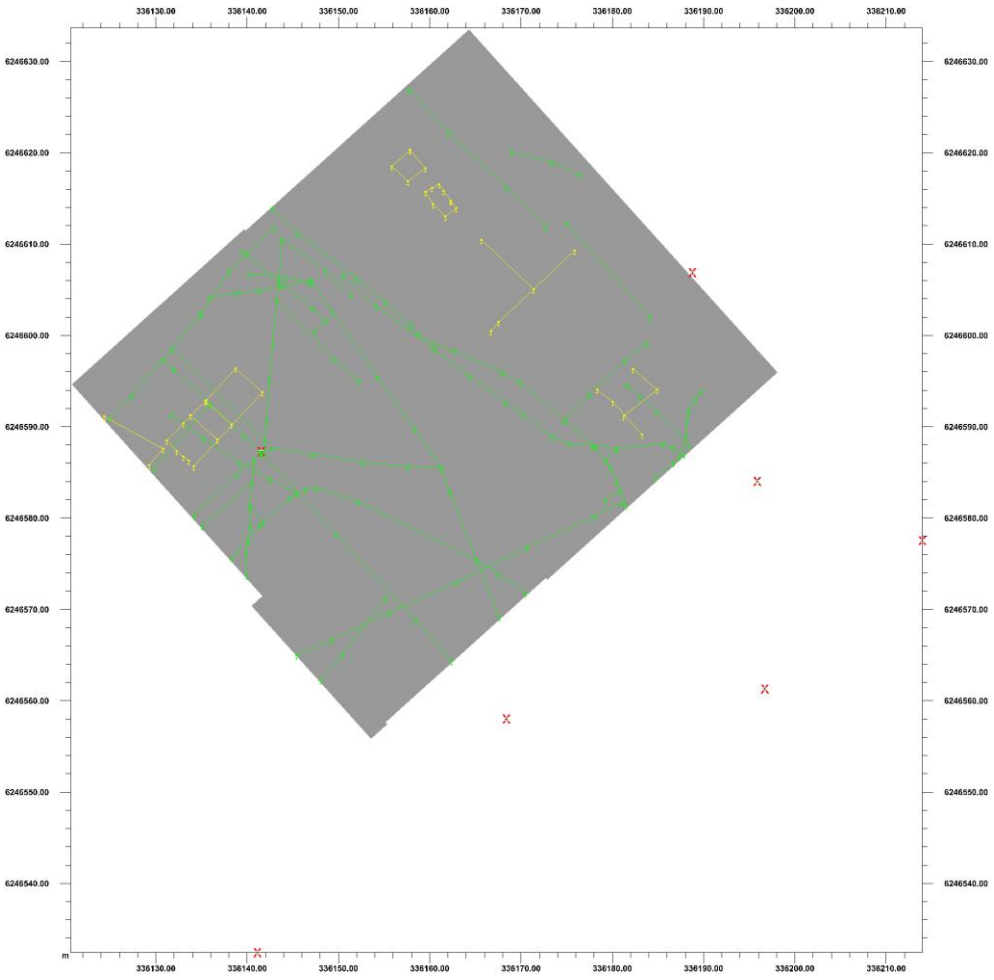

Figure 5: Plan view displaying every interpretation marker inserted into the dataset. (Green = Potential service/redundant service; Yellow = Potential footing/foundation).

YELLOW Interpretation Marker – Interpreted Footing/Foundation

The target for the survey focuses on linear anomalies that could represent subsurface foundations or footings. Such linear anomalies evident in the dataset contained high contrast resolution and appeared of a larger relative size to other anomalies detected, that may represent services and utilities (pipes, cables, etc). These anomalies appear to display a distinct pattern, such as square/rectangular orientations, in line with existing buildings and dwellings. Figure 6 below shows ALL anomalies interpreted as potential subsurface footings/foundations.

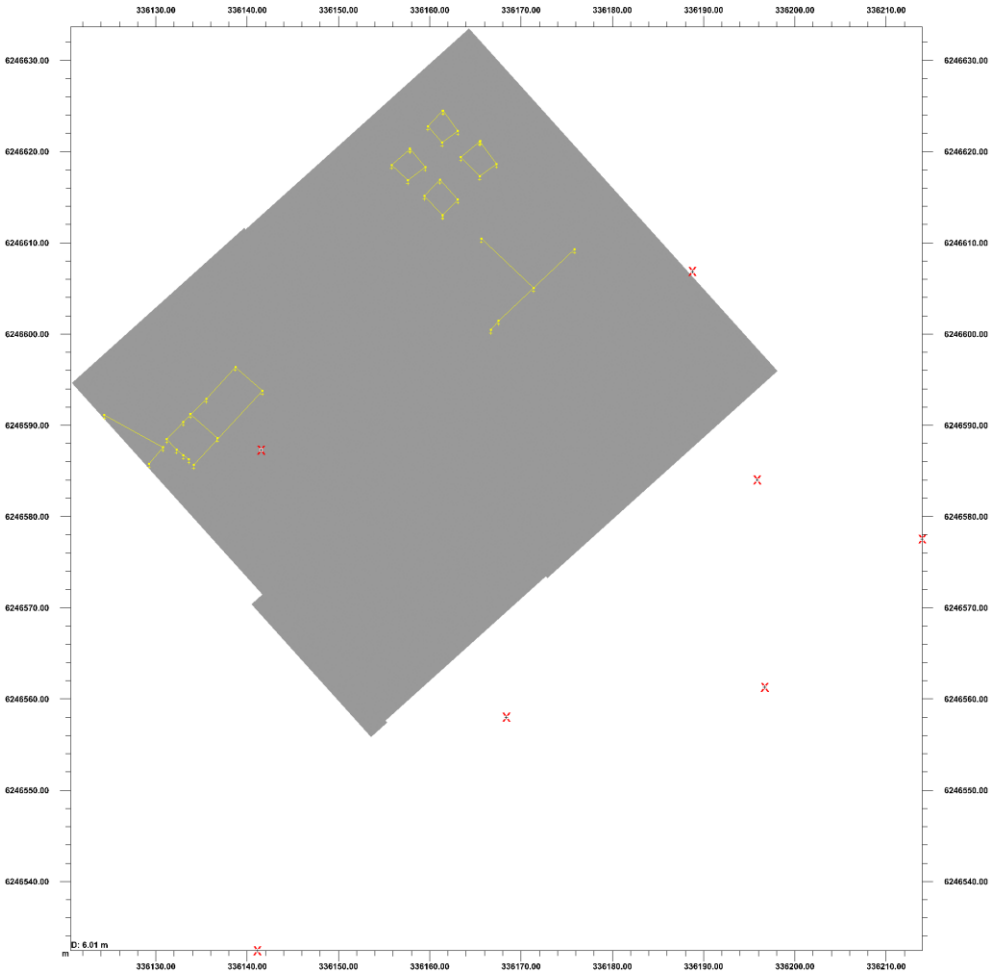

Figure 6: Yellow polylines indicated areas where subsurface anomalies were detected that were interpreted as potential subsurface footings/foundations. Note the anomalies occur at different depths and this plan view is an overall visual only.

There were three zones within the survey area that displayed anomalies/features indicating those of potential subsurface footings or foundations. They will be discussed further in detail individually below. Each figure below displays two images, with the top image containing yellow interpretation polylines over the detected anomaly and the bottom image containing migrated processed GPR data. This is for reference to the reader/viewer to comfortably visualise the anomaly being discussed.

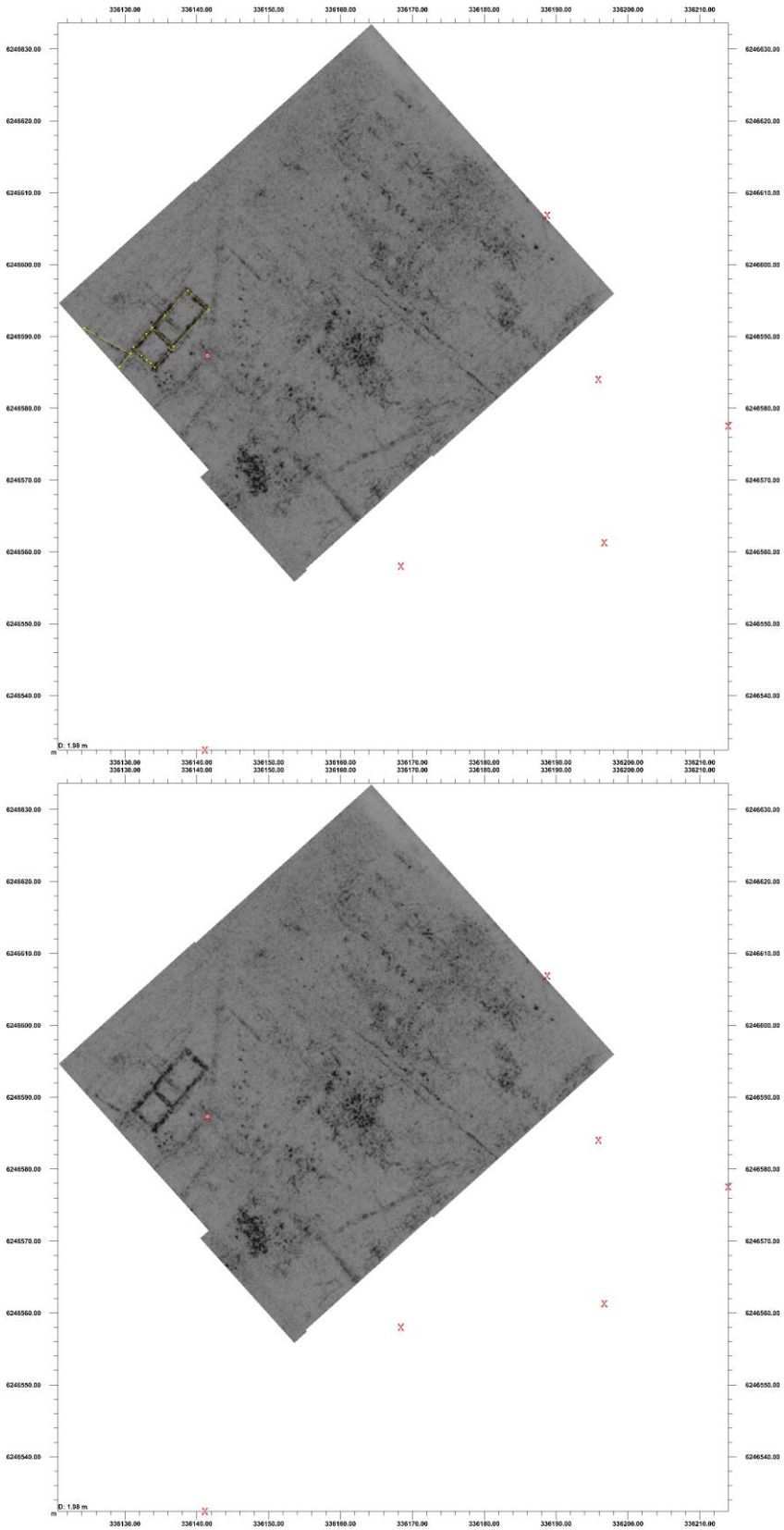

Figure 7: Zone 1 anomaly; Both images displaying a depth slice of migrated data at ~1.98m depth.

Figure 7 above displays an anomaly detected at ~1.98m depth. The anomaly is of extremely high contrast and takes the pattern of a foundation (rectangular feature). The relative size of the anomaly differs greatly to surrounding linear anomalies that may represent services and utilities. This anomaly has high confidence from the interpreter towards being a foundation/footing feature.

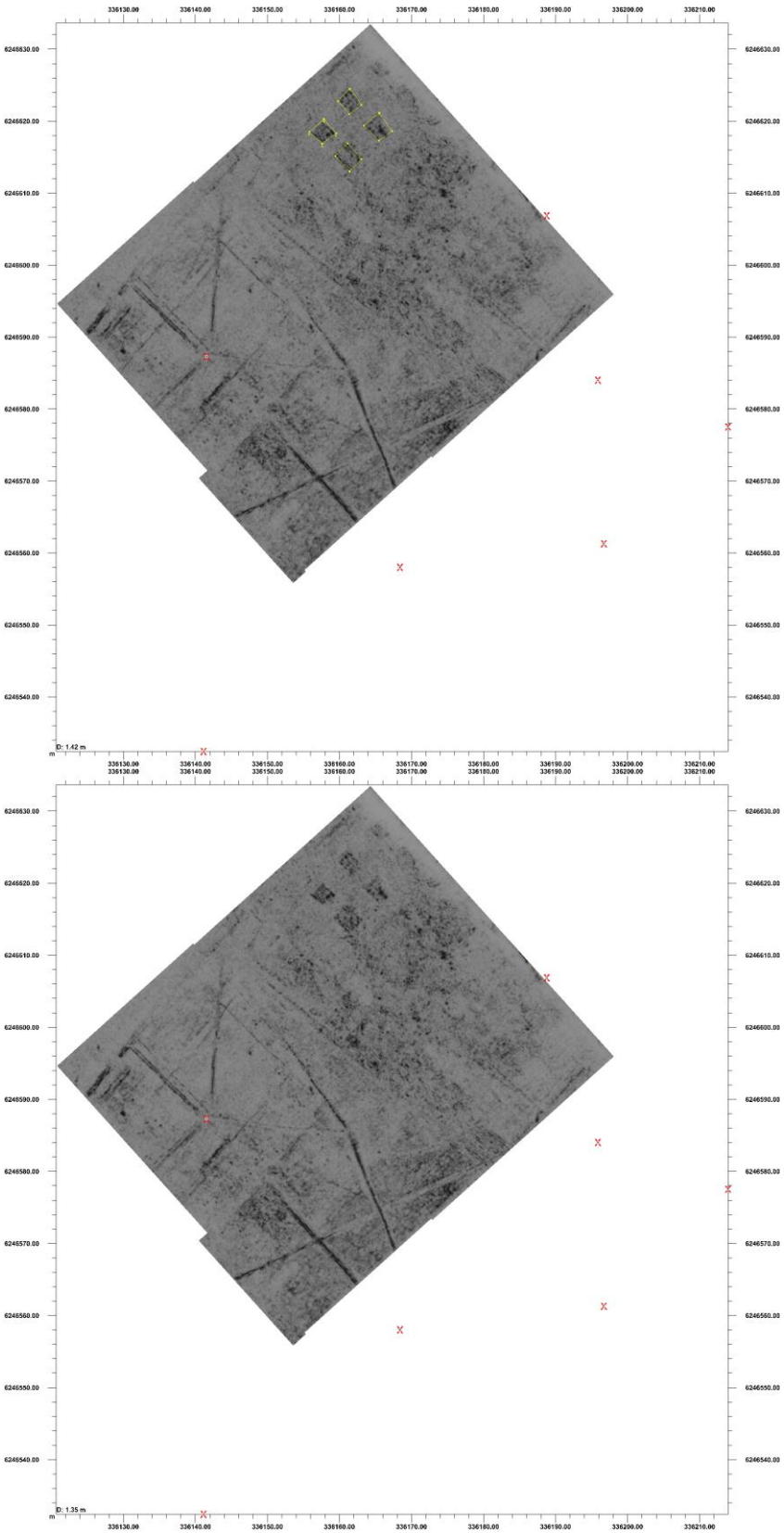

Figure 8: Zone 2 anomaly; Both images displaying a depth slice of migrated data at ~1.42m depth.

Figure 8 above displays four anomalies at ~1.42m depth. The anomalies are of different nature to that discussed in Zone 1, being of lower contrast and more of a localised shape, not a linear anomaly. They do however occur in a 'group' with some form of pattern visible. This anomaly has medium confidence from the interpreter towards being a foundation/footing feature.

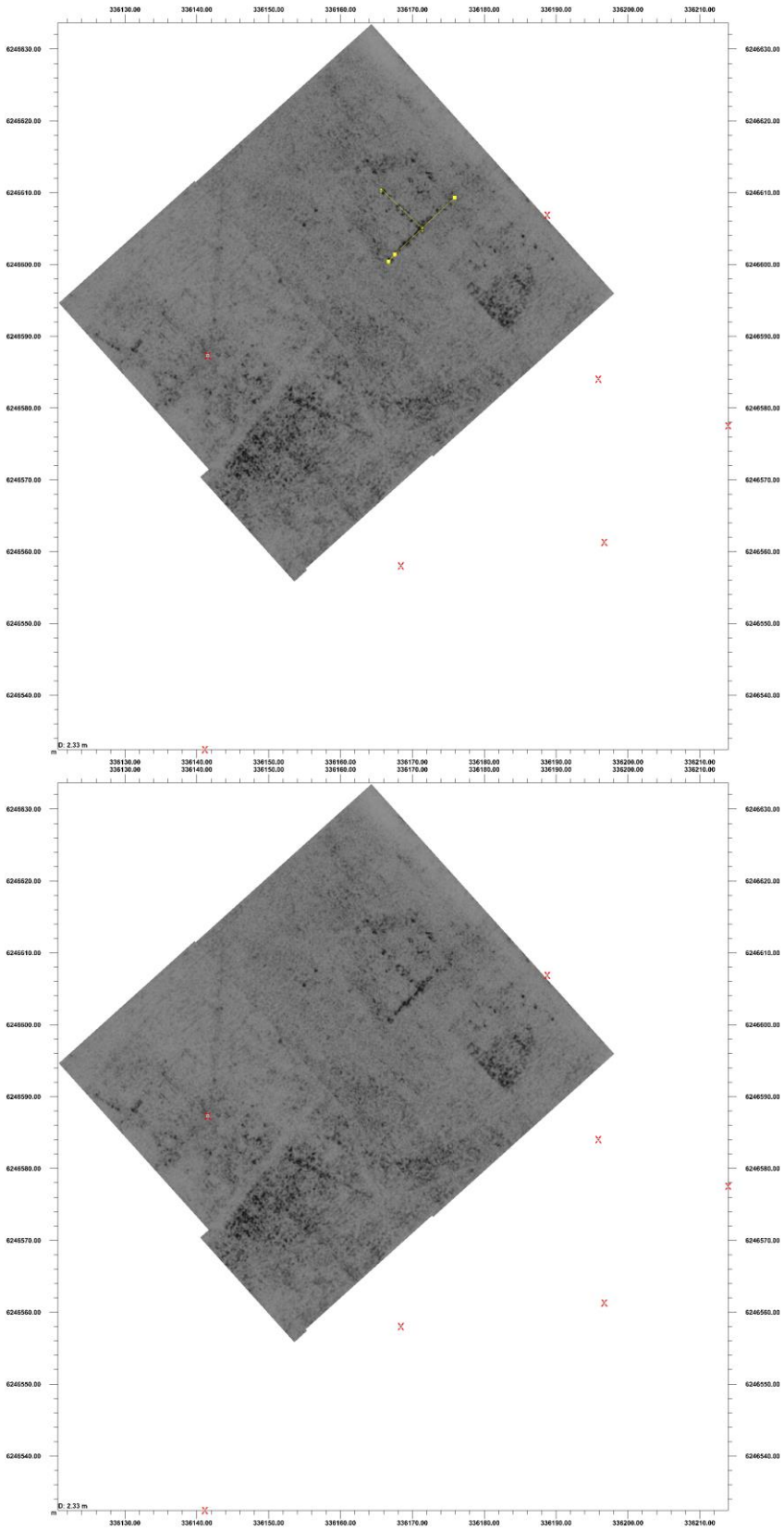

Figure 9: Zone 3 anomaly; Both images displaying a depth slice of migrated data at ~2.33m depth.

Figure 9 above displays an anomaly detected at ~2.33m depth. The anomaly is of low contrast (most likely due to the depth encountered). Two relatively large linear lines are seen to create a feature that has potential to be a subsurface footing. The orientation of the anomalies lines up with existing dwellings. This anomaly has medium confidence from the interpreter towards being a foundation and it is recommended it is investigated further for confirmation.

GREEN Interpretation Marker – Interpreted Utility/Redundant Service

Many anomalies were detected throughout the dataset that were interpreted as potential active/redundant services. A number of these had pattern while others had no pattern. Mostly all the anomalies were able to be delineated through the dataset which allows further inference towards them occurring as subsurface utilities and/or redundant services. Additionally, a number of these anomalies ran towards manhole pits (as marked within the dataset, further supporting their interpretation as utilities.

Figure 10 below displays all interpretations made towards potential live/redundant services. Note; these interpretations were made so due to the nature of the anomalies, being depth, contrast and orientation. It is possible that these anomalies could in fact represent subsurface footings however have been interpreted differently.

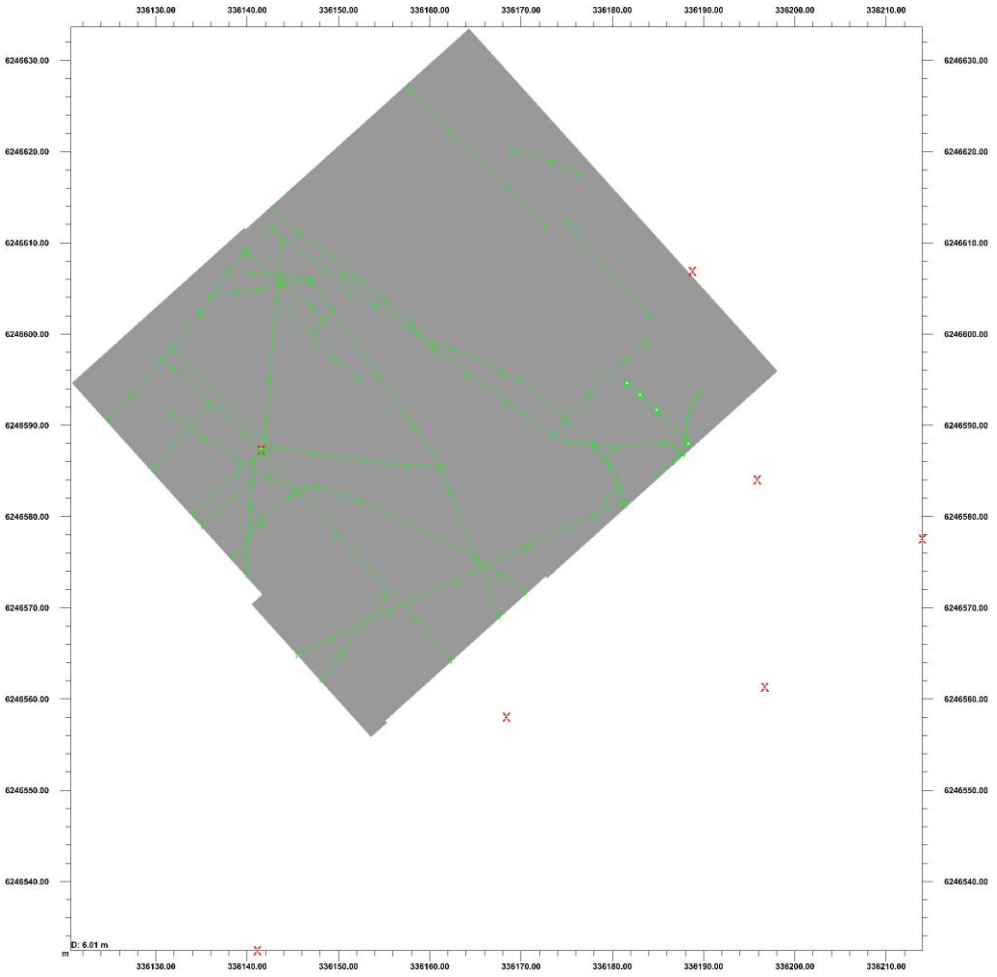

Figure 10: Green polylines indicated areas where subsurface anomalies were detected that were interpreted as potential subsurface live/redundant services. Note the anomalies occur at different depths and this plan view is an overall visual only.

Discussions will not be held regarding interpreted potential services. All interpretation markers (both interpreted footings and services) are included within the accompanied .dxf file. These markers have a GPS position (x,y) and depth (z) value associated with them. The file can be imported into AutoCAD or similar for GIS manipulation and mapping.

CONCLUSION

Overall, data coverage was excellent over the Leger Lawn with complete GPR coverage of the area. GPS was excellent and allowed for high accuracy positioning of the dataset, aiding further informative interpretations. Areas between and behind the tree line were not surveyed. GPR data quality was above average with excellent depth penetration. Up to 2.5m depth penetration was achieved using the 400Mhz 3D array, a depth indicating favourable subsurface materials. The soil velocity used 10cm/µs was determined through hyperbola fitting and migration techniques and through analysis of 2D cross sectional profiles picked from the 3D dataset.

Many anomalies were evident in the data set which included mainly linear features that have in turn been interpreted as both potential subsurface utilities (both active and redundant) and potential footings/foundations. Interpretations on individual anomalies have been made as a result of the anomaly contrast and orientation. Interpretations have been made at the first sign of an anomaly within the depth slice (at the shallowest detected anomaly depth). These associated depths are based on the set soil velocity of 10cm/µs. The interpreted depths may vary and as a result, caution should be exercised during further invasive investigations.

Interpretations made towards those of subsurface footings are both of high and medium levels of confidence. Zone 1 for instance (figure 7) displays a very high contrast, large/wide, rectangular anomaly. This anomaly takes the pattern of a subsurface footing/foundation. It should be noted that this shape can also be seen imprinted onto the grass in satellite imagery (visible in Figure 1). Zone 2 displays lower contrast, less intense anomalies, however a pattern is still visible in the anomalies, displaying a 'group' of four rectangular features, relatively evenly spaced between each other. Zone 3 displays anomalies that could take the shape of a large subsurface footing however the limitation here is the depth it was detected, allowing for lost contrast and anomaly shape. Another 500mm of depth penetration would've aided this interpretation and associated confidence of interpretation.

There is high possibility that not all survey targets were detected. There are certain factors which may limit the GPR data resolution towards identifying utilities and other associated anomalies, including material of target, host material, and levels of saturation. The electrical contrast between the pipe/cable and the surroundings must be significant enough to accurately tell the difference between the two materials. For example, a steel pipe within a dry sand would create a strong contrast whereas an asbestos/clay pipe within a surrounding clay would create a lower density contrast. In this investigation, concrete (most presumably) footings within sandy soils should create a reasonable dielectric contrast however success is not always achievable to factors of signal attenuation, conductivity and associated dielectrics.

It is recommended that further invasive investigations are conducted. These will help to correlate with non-destructive GPR results and findings.

Please contact the author if relocation issues occur. Raw GPR data can be provided upon request. A .dxf file with all interpretations will accompany this report.

DISCLAIMER It should be noted that the attached results are the result of an interpretation of the collected data. Whilst state-of-the-art instrumentation and qualified personnel have been utilised for this survey there are circumstances under which the interpreted result can differ from the actual sub surface strata.

The author accepts no responsibility for actions or decisions made on the basis of the presented result. The results are presented for the clients' review only and should not form the sole basis of any decision or action made in relation to this project.

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Whilst to the best of our knowledge, information contained in this report is accurate at the date of issue; conditions on the site can change in a limited time. This should be borne in mind if the report is used after a protracted delay. As with any form of non-destructive resting, our opinions of results do not apply, we rely solely on date collection and criteria conformance.

If it is found that the actual locations differ from the interpreted result the author should be contacted immediately.

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