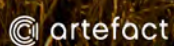


9.6 Appendix G: Test Excavation Methodology

Albion Park Rail Bypass PACHI Stage 3

Archaeological Test Excavation
Methodology

Report to Hyder Cardno Joint Venture
(HCJV) on behalf of Roads and Maritime
Services



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1.0 INTRODUCTION AND BACKGROUND

Roads and Maritime Services proposes to construct a road bypass of Albion Park Rail (previously referred to as the Yallah to Oak Flats Road upgrade). The Hyder Cardno Joint Venture (HCJV) has been engaged by Roads and Maritime to manage the preparation of all investigations and documentation required for an Environmental Impact Statement (EIS).

Artefact Heritage was engaged by Roads and Maritime in 2013 to prepare an archaeological survey report (ASR) as part of Stage 2 of the Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation 2011 (PACHCI) for the project. Following finalisation of that document in June 2013, Roads and Maritime engaged Artefact Heritage to prepare a first addendum to that investigation in March 2014. The first addendum concerned properties within the study area that were not accessible for the original investigation, as well as an addition to the study area that incorporates the Croome Regional Sporting Complex.

As part of final options development for the Albion Park Rail Bypass, HCJV, on behalf of Roads and Maritime, identified a number of additional areas which require Aboriginal heritage investigation outside the previous boundaries of the project area. This includes the possible location of road interchanges and widening of the originally proposed corridor to accommodate alignment alterations. As such, HCJV engaged Artefact Heritage to prepare a second addendum PACHCI Stage 2 ASR for those additional areas.

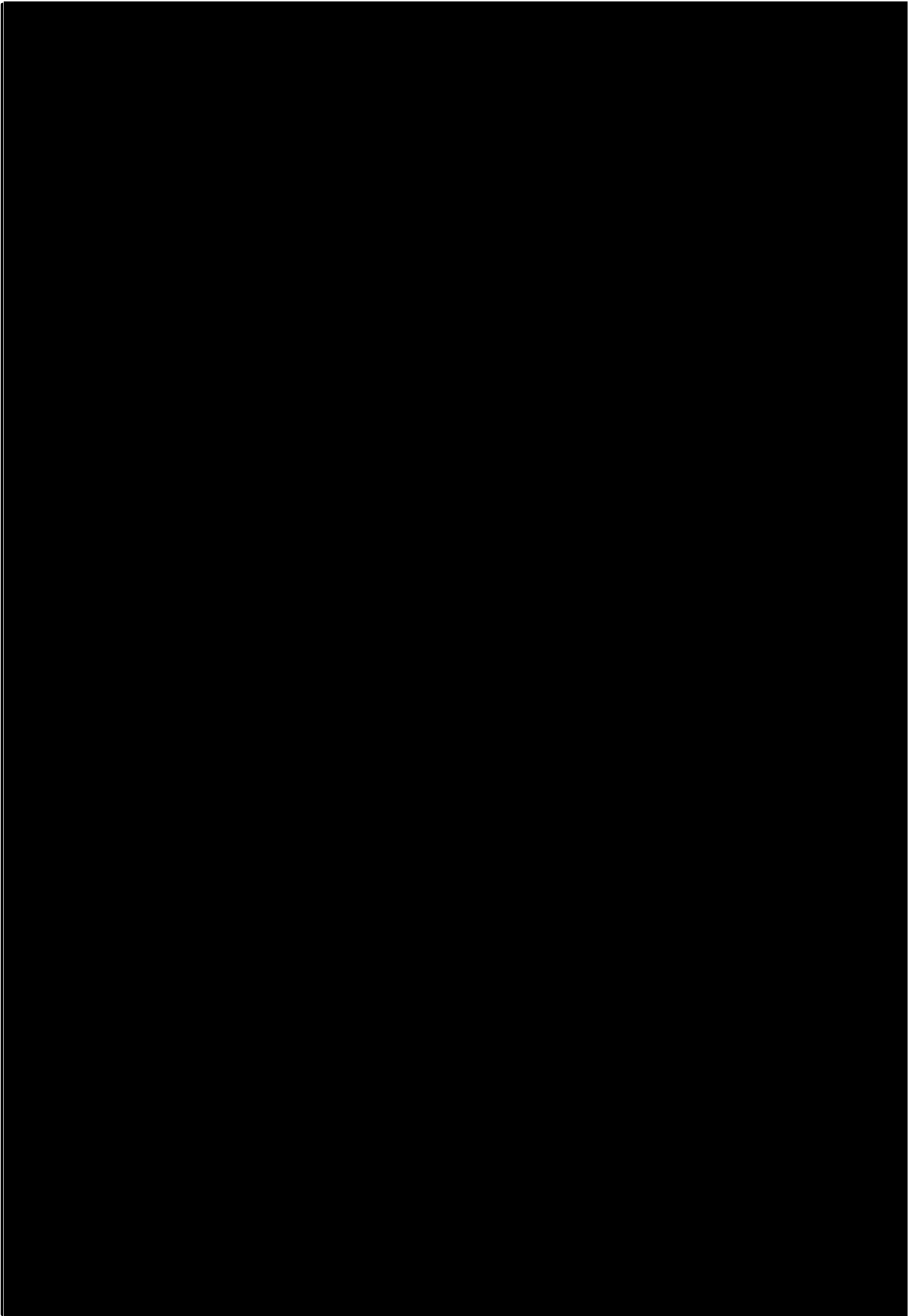
The identified areas of Potential Archaeological Deposit (PAD) and Aboriginal sites are shown in Figure 1. The ASR recommended that further archaeological investigation, including test excavation, should take place where there will be impacts to identified PADs and/ or Office of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) site number 52-5-0484/ 52-5-0512 (duplicate recording).

Since completion of PACHCI Stage 2 investigations, Roads and Maritime has continued with concept design for the Albion Park Rail Bypass. In addition to the concept design, Roads and Maritime has advised HCJV that in addition to the proposed motorway, there will be a number of ancillary facilities during road construction, including compound sites and stockpile locations. In preparation of this archaeological test excavation methodology, HCJV has indicated to Artefact Heritage that the following PADs and Aboriginal site will be impacted by the proposed motorway, ancillary facilities, realignment of Yallah Road, and relocation of some parts of the Croome Road Sporting Complex:

- YTOF PAD 1, YTOF PAD 2, YTOF PAD 3, YTOF PAD 4, YTOF PAD 5, YTOF PAD 6 and YTOF PAD 7.
- Aboriginal site 52-5-0484/52-5-0512.

The aim of this document is to outline the proposed methodology for archaeological test excavation of those areas in accordance with Stage 3 of the PACHCI.

Figure 1: Overview of areas proposed for archaeological test excavation



2.0 LEGISLATIVE CONTEXT

The *National Parks and Wildlife Act 1974* (NPW Act), administered by OEH, provides statutory protection to all Aboriginal 'objects' (consisting of any material evidence of the Aboriginal occupation of NSW) under section 90. The NPW Act was amended in 2010, and as a result the legislative structure for seeking permission to impact on heritage items has changed. A section 90 permit is now the only Aboriginal Heritage Impact Permit (AHIP) available and may only be granted by OEH if the conditions of the 'due diligence guidelines', and / or an 'archaeological investigation' have been met.

The PACHCI Stage 2 investigations of the project area by Artefact Heritage have recommended that further archaeological investigation is required across areas of PAD identified as having high archaeological potential and AHIMS site 52-5-0484/52-5-0512 only where impacts will occur from the proposal. The aim of archaeological test excavation as part of Stage 3 PACHCI investigations is to assess the significance of each impacted area in order to inform the preparation of an Aboriginal Cultural Heritage Assessment Report (CHAR) and guide finalisation of the concept design and placement of ancillary facilities.

2.1.1 Archaeological test excavation guidelines

It is the intention of Roads and Maritime to lodge an application to Department of Planning and Environment for project approval as State Significant Infrastructure (SSI) under Part 5.1 of the EP&A Act 1979. It is proposed that SSI application would be submitted in late 2014 during PACHCI Stage 3 investigations.

Prior to issue of the Secretaries Environmental Assessment Requirements (SEARs) of the Albion Park Rail Bypass project, archaeological test excavation will be conducted in accordance with the OEH 'Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales' (2010) [referred to as the 'OEH code of practice']. The OEH code of practice prescribes guidelines for archaeological test excavation without an Aboriginal Heritage Impact Permit (AHIP), and outlines the amount of excavation allowed in a particular area, the size of the test pits, and the way that they are excavated.

3.0 ABORIGINAL STAKEHOLDER CONSULTATION

Comprehensive Aboriginal stakeholder consultation in accordance with the Roads and Maritime PACHCI and the OEH 'Aboriginal cultural heritage consultation requirements for proponents' (2010) is being conducted by Roads and Maritime.

Artefact Heritage has been informed that the following Aboriginal stakeholders have registered for the Albion Park Rail Bypass project:

- South West Rocks Aboriginal Corporation
- Sheryl Davis
- National Koori Site Management
- Kullila Site Consultants
- Three Ducks Dreaming Surveying and Consulting
- Gunnamaa Dream'n
- Anthony Moore
- Illawarra Local Aboriginal Land Council
- Leanne Tungai
- Craig Tungai
- Illawarra Aboriginal Corporation
- James Davis

Roads and Maritime will forward this archaeological test excavation methodology to registered Aboriginal stakeholders for a 28 day review period. An Aboriginal Focus Group (AFG) meeting will be scheduled during the 28 day review period to provide all registered Aboriginal stakeholders the opportunity to discuss the project and test excavation methodology with representatives of Artefact Heritage, Roads and Maritime Services and HCJV.

4.0 BACKGROUND CONTEXT

A comprehensive summary of background information for the project is provided in the PACHCI Stage 2 ASR and two addendum reports prepared for the project. These documents are attached with this document. A summary of pertinent background information is included below.

4.1 Environmental context

Much of the study area crosses through the floodplain associated with Duck Creek and Macquarie Rivulet. The land at the very northern end of the study area rises up moderately into the hill slopes of Mount Brown. South of this, the terrain flattens out towards the floodplain. The area immediately to the north and west of where the study area crosses Macquarie Rivulet is gently undulating. The east-west stretch of the study area runs along the northern basal slopes of Wentworth Hills and Signal Hill, which are drained by Horsley Inlet and its tributaries. Overall, the landform units within the study area range from alluvial flats and creek terraces, to gentle and moderate hill slopes and gullies. The study area presents an opportunity to investigate a variety of landform units across a large area.

4.2 Aboriginal histories of the locality

Aboriginal people traditionally lived in small family or clan groups that were associated with particular territories or places. The study area is located within the Dharawal language group area (Attenbrow 2010: 34). The Dharawal language group was largely coastal and is thought to have extended from the Shoalhaven River in the south, to Botany Bay in the north and then inland to Camden (Attenbrow 2010: 34). The Dharawal language group was bordered to the north in the Botany Bay – southern Sydney region by the Darug and to the west in the Mittagong – Moss Vale region by the Gundungurra. The study area falls within the territory of the Dharawal-speaking Wodi Wodi people. Tindale (1974) described the territory of the Wodi Wodi as extending from north of the Shoalhaven River at Nowra to Wollongong and inland to Moss Vale.

The area covered by the Dharawal language included a variety of landscape and resource types, including coastal and estuarine environments, rolling hills and creeks bordering the coastal environment, and the large sandstone escarpment and plateau. Sullivan (cited in Rich 1988: 23) suggested that the boundary between the Gundungurra and the Dharawal was the divide between the coastal and inland river systems, which runs on an approximate south-west to north-east line east of Wingello, Bundanoon, Robertson and Mittagong. Movement across these different terrain types and resource areas may have been dictated by the season or purpose (DEC 2005: 8). Additionally, exchange with people from surrounding language groups included Gundungarra and Wiradjuri people travelling to the coast to exchange foods and raw materials, whilst the Dharawal and Awabakal (Central Coast region) shared ceremonies (DEC 2005: 8).

Long-term areas of interaction and 'travel corridors' for movement between different language groups may have existed where there were shared boundaries. Laila Haglund has suggested that the Campbelltown area in south-west Sydney may have represented the intersection between the boundaries of the Dharawal, Darug and Gundungurra, and that the Narellan Valley may have been part of a 'travel corridor' facilitating movement between the north-western Sydney and the Illawarra (JMcD CHM 2007: 21 after Haglund 1989).

Early interaction between the Dharawal and the British was intermittent and brief. The earliest sighting of British people by the Dharawal would most likely have been when they saw sailing ships along the coast. The records of Captain Cook and several of his crew document seeing numerous fires and occasional Aboriginal people on the coastline in the Illawarra region (Organ 1993: 46). Organ (1993: 49) documents an anonymous exploration journal attributed to surveyor George William Evans, which recorded an overland expedition north from Jervis Bay via Wollongong in 1812. The exploration party encountered several groups of Aboriginal people, and at one point exchanged some of their possessions with one of the groups for oysters (Organ 1993: 49).

Several of the early British settlers in the Illawarra documented large gatherings of Aboriginal people, including a reference by Navin (1994: 8) that Robert James, a local resident of the area, recorded a camp of around 100 Aboriginal people on the banks of American Creek at Mount Kembla. In 1836 a group of around 200 Aboriginal people were observed in the Illawarra area as they were preparing to travel to Cowpastures in south-west Sydney (Griffin 1986: 6 cited in AMBS 2010: 33).

A variety of flora and fauna resources were utilised in the Illawarra region for subsistence, personal ornament and tool requirements. The variety of subsistence resources in the Illawarra included marine, estuarine, freshwater and hinterland flora and fauna. Early British records documented torchlight spearing of bream and consumption of whale meat (Organ 1993: 262). The consumption of whale was documented as an important event linked to the spirits of their ancestors (Organ 1993: 262). Cabbage trees were used for various purposes, including utilisation of the fibre (Organ 1993: 155), used to make bridges over creeks and for food (AMBS 2010: 35). Other plant species utilised for food and tools included bats-wing tree, grass tree, Gynerium lily, various *Eucalypt* sp., mat-rush, sticky hop bush, *Melaleuca* and black wattle (AMBS 2010: 35).

4.3 Previous archaeological investigations

A number of archaeological investigations have been carried out within and around the project area. These have generally been associated with large land releases and the development of infrastructure to service these precincts. The following summary of previous investigations focuses on sub-surface archaeological investigations which have been conducted in the area.

Extensive archaeological assessment and preliminary sub-surface excavation have occurred within the West Dapto Release Area (WDRA), located across gently undulating farming land between the Princes Highway and the Illawarra Escarpment. The WDRA covers a planned residential release area, and extends over a large area stretching from Yallah in the south to Kembla Grange in the north. The WDRA has been subject to an archaeological assessment with sample field survey and test excavation (AMBS 2006), a preliminary Sydney Water Aboriginal heritage desktop assessment that covered both the WDRA and surrounding area, including the current study area (AMBS 2010), and sub-surface investigation in specific release areas (AHMS 2011).

A total of 136 test pits were excavated across the WDRA by AMBS (2006), sampling the main landform units within the study area – slope, alluvial flat, drainage channels and crest. The number of artefacts recovered totalled 425, and these were retrieved from just over half of the test pits (n=75). The highest number of artefacts retrieved (n=146) came from a single test pit in a slope landform context. Artefacts were recovered from all creek catchments (AMBS 2010: 38).

The majority of artefacts (n=353) were recovered from the upper 20 cm of deposit. The total assemblage comprised a range of raw materials, with chert being predominant (n=176). Quartz was the next most frequent material (n=100), followed by silicified wood (n=51), quartzite (n=41), silcrete (n=38), silicified tuff (n=13) and fine-grained siliceous (n=6). Broken flakes were the most frequent artefact type (n=209), followed by flakes (n=112), flaked pieces (n=82) and cores (n=22). Twenty-nine artefacts displayed modification or retouching. Usewear was identified on five artefacts, and evidence for both retouch and usewear was identified on one artefact (AMBS 2010: 39).

Biosis Research (2007) undertook an archaeological assessment along a proposed gas pipeline route near the Tallawarra Power Station, at Yallah NSW that includes a portion of the current project area near Duck Creek. Biosis identified two areas of PAD, and surface artefacts were identified to the west of the current study area. No sites or areas of PAD were identified along the pipeline route within, or to the east of, the current project area. The two areas of PAD - Tallawarra Pipeline 1 (AHIMS site 52-5-0471) and Tallawarra Pipeline 2 (AHIMS site 52-5-0472) - were subject to a program of test excavation. Thirty-six 1.0 x 0.5 metre test pits were excavated, totalling an area of 18 square metres. A total of 136 artefacts were recovered – nine from Tallawarra Pipeline 1 (seven percent of the excavated assemblage) and 127 from Tallawarra Pipeline 2 (93 percent of the excavated assemblage). The predominant raw material is silcrete (43 percent), with other

common raw materials including chert, quartz and volcanics. Manufacturing debris including flakes, cores and angular fragments comprised 96 percent of the assemblage (Biosis Research 2007: 21-24).

Very few (if any) artefacts were recovered from within many of the test pits, and it is concluded that this distribution represents background scatter. Relatively higher densities were recovered from two areas within Tallawarra Pipeline 2, both associated with locally elevated positions close to the aggraded channel of Duck Creek. It was suggested that these areas were more frequently occupied and utilised than is indicated by the background scatter elsewhere. It was determined that a main function of the area appears to have been stone tool production. The overall low numbers of artefacts possibly indicates that sites were occupied at a low level of intensity, and the area may have been used intermittently to access local wetland sources (Biosis Research 2007: 29-30). It was concluded that the findings are comparable with site predictive models for the Illawarra region, where artefact scatters are the common site types and are usually located on level, well-drained ground, close to water sources and wetlands such as Duck Creek (Biosis Research 2007: 30).

Godden Mackay Logan (GML) conducted archaeological test excavation of PAD SUFA 3 at Lot 12 Ashburton Drive, Albion Park (GML 2012). The PAD area is located on a spur between two second order creeks, approximately 1.5 kilometres to the southwest of the current project area. Thirty-five test pits were excavated, each of 0.50 x 0.50 metres. The total excavation area comprised 8.75 square metres (0.044 percent of the PAD). A total of 54 artefacts were recovered across the 35 test pits. Eleven test pits contained no artefacts. The highest number of artefacts recovered from one test pit was nine, while the remaining test pits contained between one and three artefacts (GML 2012: 25-27). The assemblage included three retouched tools; two artefacts with possible usewear; a broken core; a bipolar flake; 11 complete flakes; seven proximal broken flakes; eight cone-split broken flakes; 11 medial and five distal flake fragments; and five flaked pieces (GML 2012: 30). The most common raw material was fine-grained siliceous, followed by chalcedony, petrified wood, chert and silcrete, most of which can be found within the local area. The uneven soil depths and presence of certain stratigraphic layers across the site reflected the erosional hill slope landform the study area is located on (GML 2012: 34-35). It was concluded that the artefacts of the PAD appear to be part of background scatter as opposed to a concentrated camp site. The PAD has low potential for additional scientific information, and low significance based on scientific value (GML 2012: 54-55).

5.0 AREAS FOR ARCHAEOLOGICAL TEST EXCAVATION

The PACHCI Stage 2 investigations prepared by Artefact Heritage recommended further archaeological investigation should take place at Aboriginal site 52-5-0484/52-5-0512 and at identified areas of PAD where those items will be impacted by the concept design and placement of ancillary facilities. For a full list and discussion of all Aboriginal sites and PADs identified with the project area, refer to the PACHCI Stage 2 reports attached with this document.

The following PADs and Aboriginal site recommended for archaeological test excavation by PACHCI Stage 2 investigations will be impacted by the proposed motorway as prepared by Roads and Maritime and shown in Figure 1:

- YTOF PAD2
- Aboriginal site 52-5-0484/52-5-0512

Roads and Maritime has indicated that the following PADs recommended for archaeological test excavation by PACHCI Stage 2 investigations will be impacted by ancillary facilities, such as compound and stockpile locations:

- YTOF PAD 3
- YTOF PAD 4
- YTOF PAD 5
- YTOF PAD 7

Roads and Maritime has indicated that YTOF PAD 1 will be impacted by relocation of portions of the Croome Road Sporting Complex.

Roads and Maritime has indicated that YTOF PAD 6 will be impacted by realignment of Yallah Road.

Refer to the attached PACHCI Stage 2 reports for a full overview of the recorded attributes and photographs of YTOF PAD 1, YTOF PAD 2, YTOF PAD 3, YTOF PAD 4, YTOF PAD5, YTOF PAD6, YTOF PAD7, and Aboriginal site 52-5-0484/52-5-0512.

6.0 AIMS OF TEST EXCAVATION

The archaeological field surveys conducted during preparation of the PACHI Stage 2 investigation noted that surface visibility was generally very low across the project area due largely to dense grass cover. Due to the lack of surface visibility in most areas, landform observations and information from previous archaeological investigations were used to inform the selection of areas of PAD. The representative landform for each of the impacted PADs and site subject to this test excavation methodology is listed in Table 1.

Table 1: Impacted PADs and Aboriginal site and associated landforms

Table heading	Table heading
YTOF PAD 1	Slope overlooking Frazers Creek floodplain
YTOF PAD 2	Terrace landform adjacent to Frazers Creek
YTOF PAD 3	Slope overlooking Frazers Creek floodplain
YTOF PAD 4	Terrace on Frazers Creek floodplain
YTOF PAD 5	Terrace and lower slope landform at the confluence of two unnamed watercourses
YTOF PAD 6	Terrace and slope landform adjacent to an unnamed tributary of Duck Creek
YTOF PAD 7	Flat and associated low-lying rise overlooking Duck Creek
AHIMS site 52-5-0484/52-5-0512	Crest landform overlooking Macquarie Rivulet

The selection of areas of PAD within the project area provides a representative sample of different landforms over a long, relatively linear area, and presents the opportunity to further investigate these areas and add to the corpus of archaeological information for the region. Areas of PAD that will be investigated in accordance with this test excavation methodology includes key landforms within the project area, including crest landform (AHIMS site 52-5-0484/52-5-0512), raised areas associated with watercourses (YTOF PAD 1, YTOF PAD 3, YTOF PAD 6 and YTOF PAD 7), terrace landform (YTOF PAD 2 and YTOF PAD 4), and a raised area at the confluence of two watercourses (YTOF PAD 5).

Previous surface and sub-surface archaeological investigations in the area have identified some particularly high concentrations of artefacts (AHIMS site 52-5-0484/52-5-0512) on a crest landform overlooking Macquarie Rivulet, as well as lower density background scatters interspersed with higher artefact concentrations across slope and crest landforms in the local area. Archaeological test excavation as outlined in this methodology will further investigate the distribution of Aboriginal objects in sub-surface contexts across the project area and provide more information on Aboriginal land use patterns.

In accordance with the OEH code of practice, the aims of archaeological test excavation are:

- To adequately identify the extent of YTOF PAD 1, YTOF PAD 2, YTOF PAD 3, YTOF PAD 4, YTOF PAD 5, YTOF PAD 6, YTOF PAD 7 and AHIMS site 52-5-0484/52-5-0512.
- To assess the scientific significance of each of YTOF PAD 1, YTOF PAD 2, YTOF PAD 3, YTOF PAD 4, YTOF PAD 5, YTOF PAD 6, YTOF PAD 7 and AHIMS site 52-5-0484/52-5-0512 following an assessment of test excavation results.

- To provide an opportunity for registered Aboriginal stakeholders to comment on the Aboriginal cultural heritage values of the site.
- To provide the proponent with recommendations on opportunities to avoid impact and future requirements for further archaeological investigation where required.

7.0 EXCAVATION METHODOLOGY

Archaeological test excavation would be conducted at each location with the aim of testing the extent and nature of potential sub-surface Aboriginal objects.

The basis of the test excavation would be hand excavated 50 centimetre x 50 centimetre excavation units. These would be spaced out on transects oriented to adequately test the extent of potential sub-surface Aboriginal objects at each location. A brief description of the proposed number and orientation of test pits at each location is outlined below and shown in Figures 2 – 9.

7.1 YTOF PAD 1

Roads and Maritime has advised that YTOF PAD 1 will be impacted by relocation of parts of the Croome Sporting Complex from the motorway alignment. Test excavation of YTOF PAD 1 will involve the excavation of approximately 26 excavation units distributed on a 15 metre grid.

7.2 YTOF PAD 2

The motorway will impact approximately 35 metres of the southwestern corner of YTOF PAD 2. An additional 30 metre area bordering the concept design is also likely to be impacted, including 10 metres for ancillary construction works and a 20 metre buffer area. The remaining eastern portion of YTOF PAD2 will not be impacted under the current concept design.

Test excavation at YTOF PAD 2 will involve the excavation of approximately 14 excavation units distributed on a 15 metre grid.

7.3 YTOF PAD 3

Roads and Maritime has advised that YTOF PAD 3 will be impacted by ancillary facilities, including the possible location of site compound and/ or stockpiles. Test excavation of YTOF PAD 3 will involve the excavation of approximately 44 excavation units distributed on a 15 metre grid.

7.4 YTOF PAD 4

Roads and Maritime has advised that YTOF PAD 4 will be impacted by ancillary facilities, including the possible location of site compound and/ or stockpiles. Test excavation of YTOF PAD 3 will involve the excavation of approximately 19 excavation units distributed on a 15 metre grid.

7.5 YTOF PAD 5

Roads and Maritime has advised that YTOF PAD 5 will be impacted by ancillary facilities, including the possible location of site compound and/ or stockpiles. Test excavation at YTOF PAD 5 will involve the excavation of approximately 11 excavation units distributed on a 15 metre grid. Excavation will be divided between two areas separated by a large dam, with a proposed four excavation units to the north of the dam and seven to the south.

7.6 YTOF PAD 6

Roads and Maritime has advised that YTOF PAD 6 will be impacted by realignment of Yallah Road. Test excavation at YTOF PAD6 will involve the excavation of approximately 21 excavation units distributed 15 metres apart on three parallel transects spaced 20 metres apart.

7.7 YTOF PAD 7

Roads and Maritime has advised that YTOF PAD 7 will be impacted by ancillary facilities, including the possible location of site compound and/ or stockpiles. Test excavation at YTOF PAD 7 will involve the excavation of approximately 14 excavation units distributed 15 metres apart on two parallel transects spaced 20 metres apart.

7.8 AHIMS site 52-5-0484/52-5-0512

The concept design will impact a large portion of AHIMS site 52-5-0484/52-5-0512. The distribution of excavation units across AHIMS site 52-5-0484/52-5-0512 has taken into consideration an area of dumped rubbish on the ground surface towards the northern portion of the site. Approximately 18 excavation units will be distributed 15 metres apart on three parallel transects spaced 15 metres apart. A fourth, northern transect on the northern side of the dumped rubbish will involve the excavation of four excavation units spaced 15 metres apart along the approximate alignment of the original surface finds of artefacts at the site by AMBS (2006).

Figure 2: Proposed layout of excavation units at YTOF PAD 1

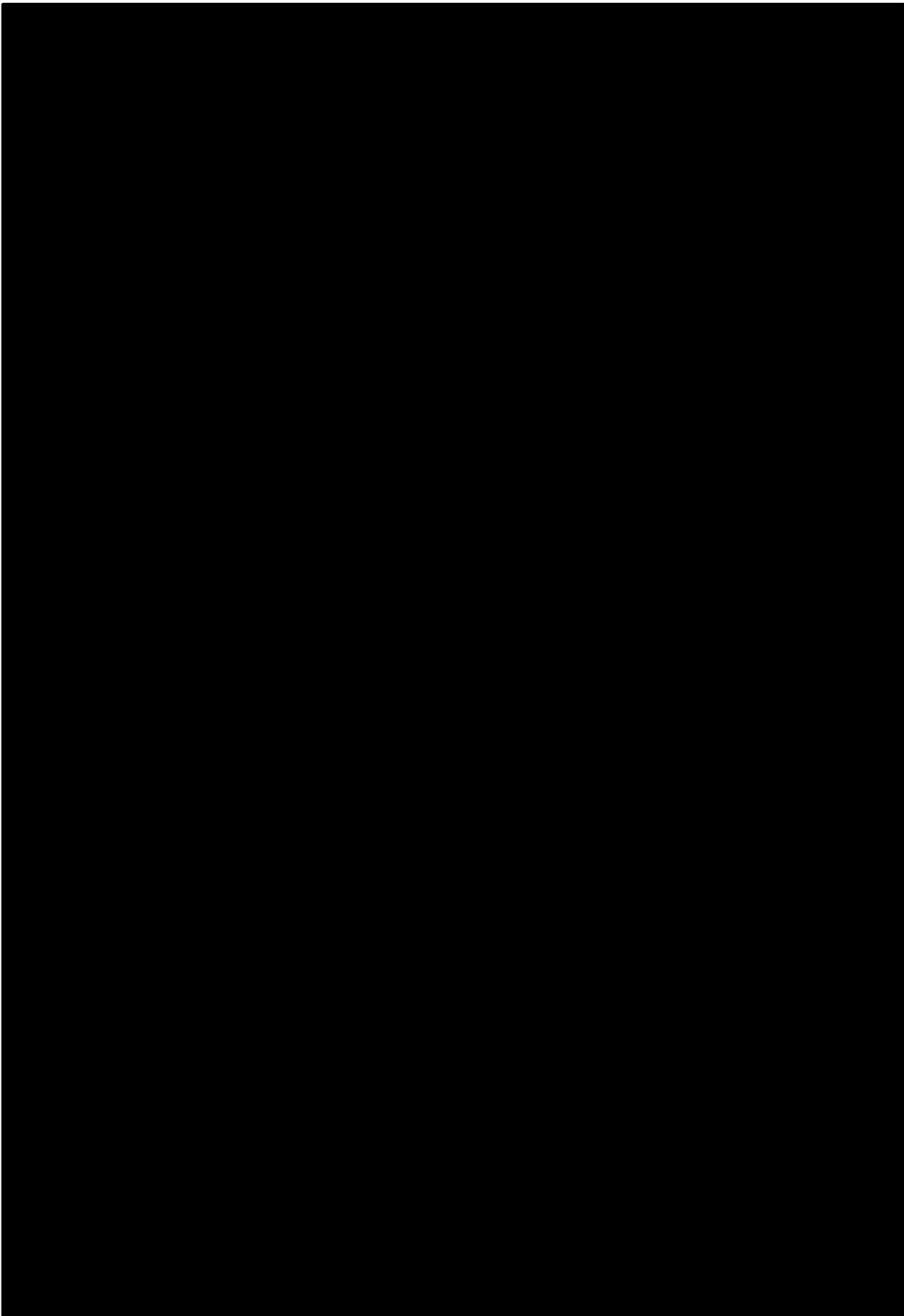


Figure 3: Proposed layout of excavation units at YTOF PAD2

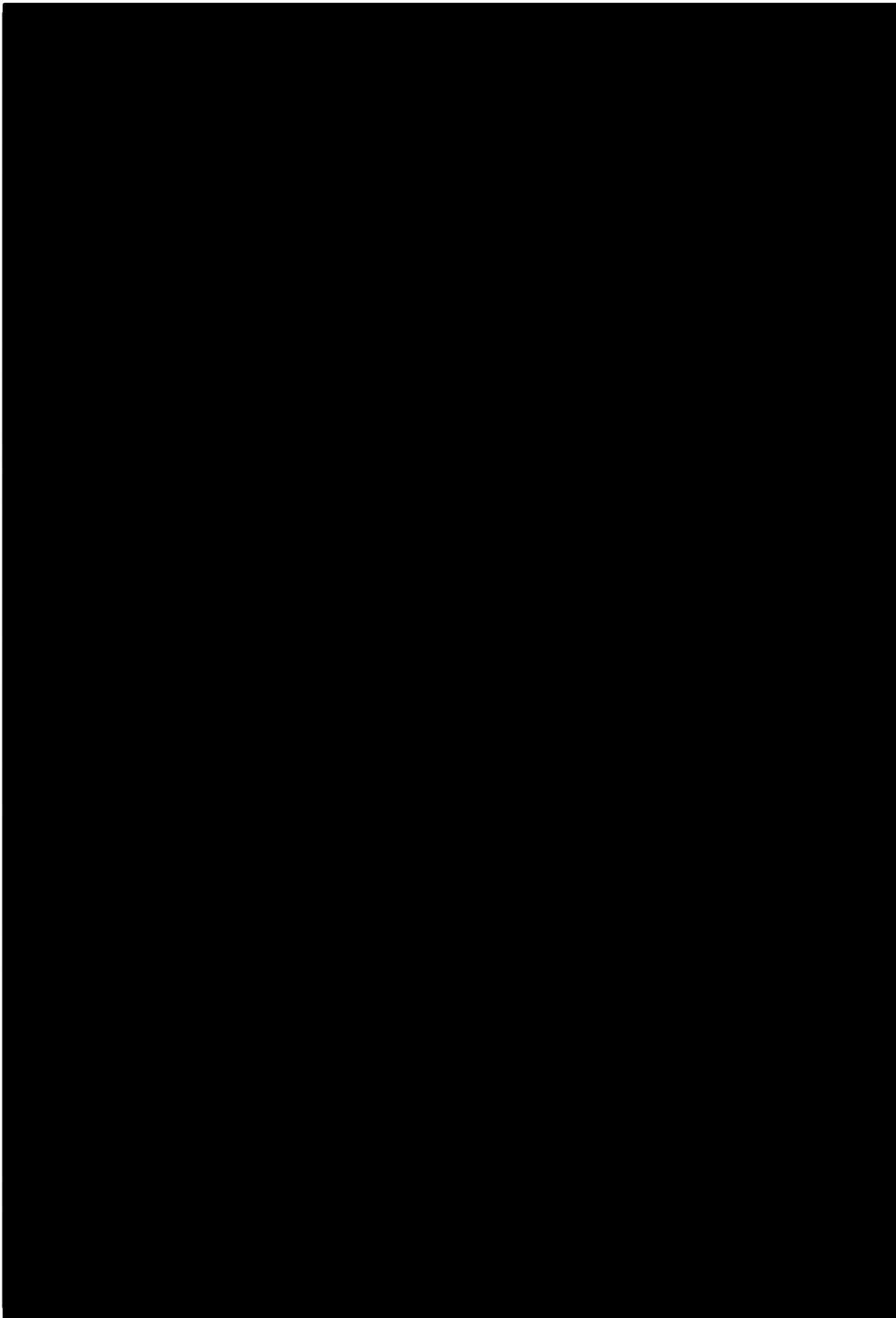


Figure 4: Proposed layout of excavation units at YTOF PAD 3

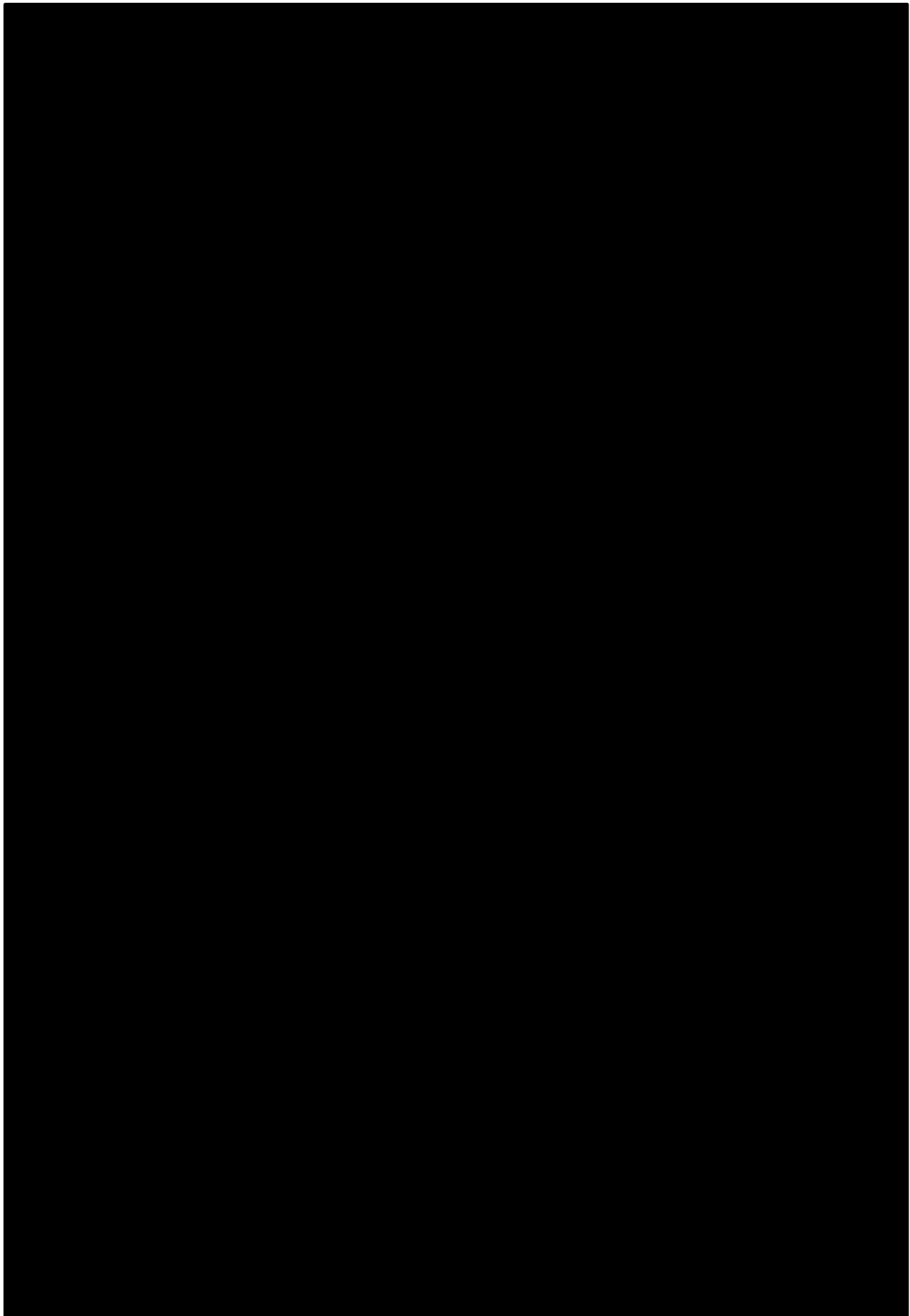


Figure 5: Proposed layout of excavation units at YTOF PAD 4

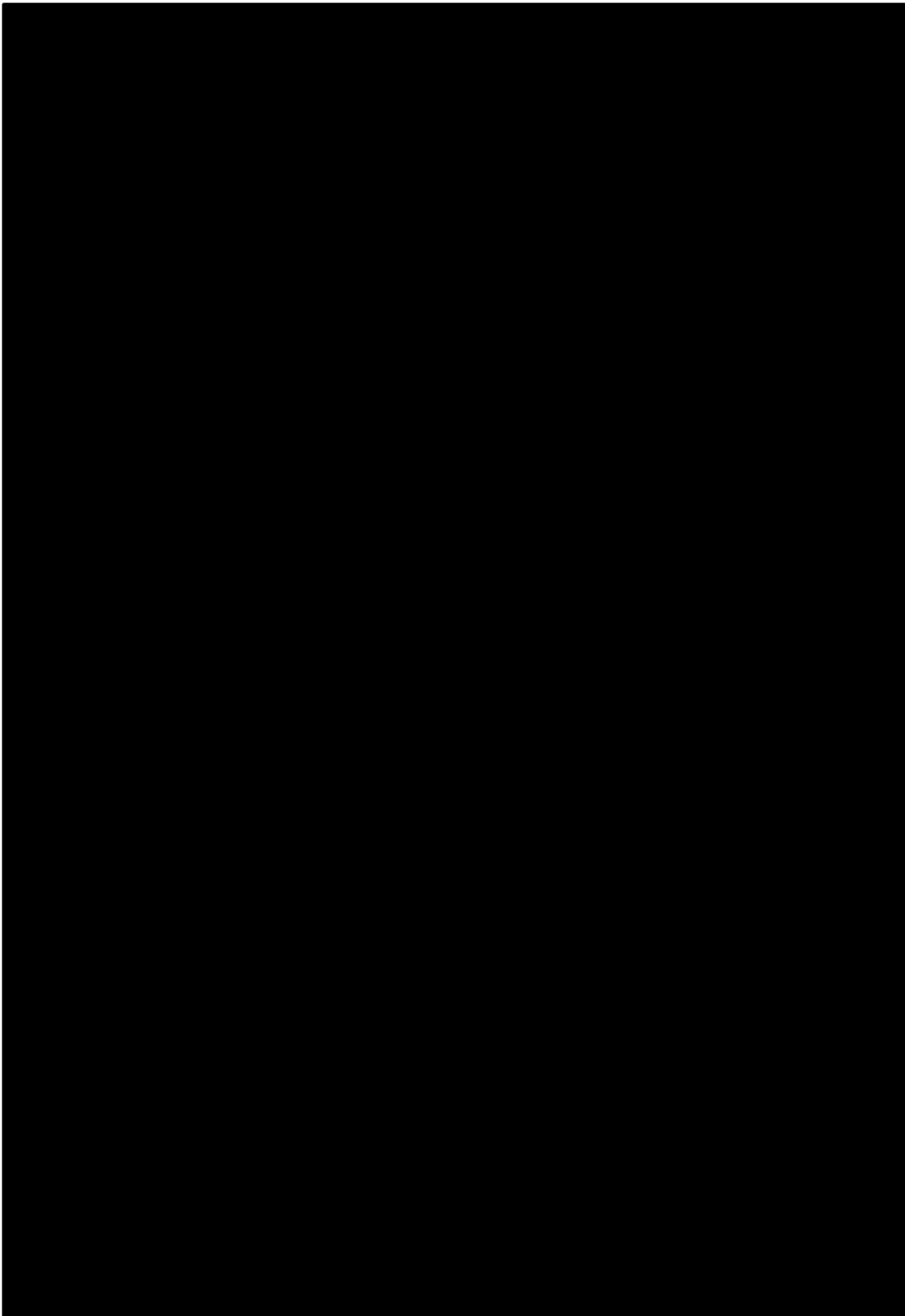


Figure 6: Proposed layout of excavation units at YTOF PAD 5

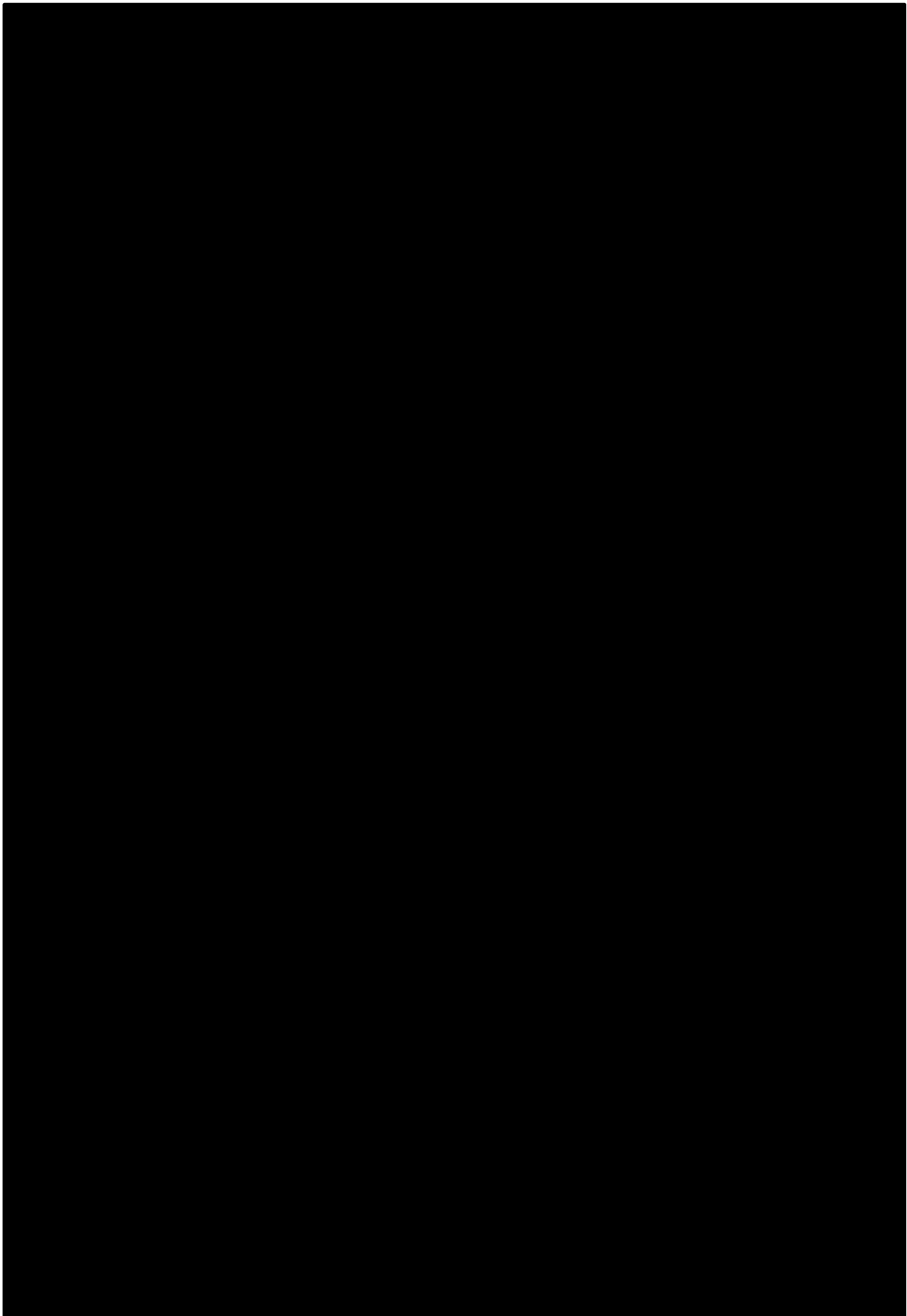


Figure 7: Proposed layout of excavation units at YTOF PAD 6

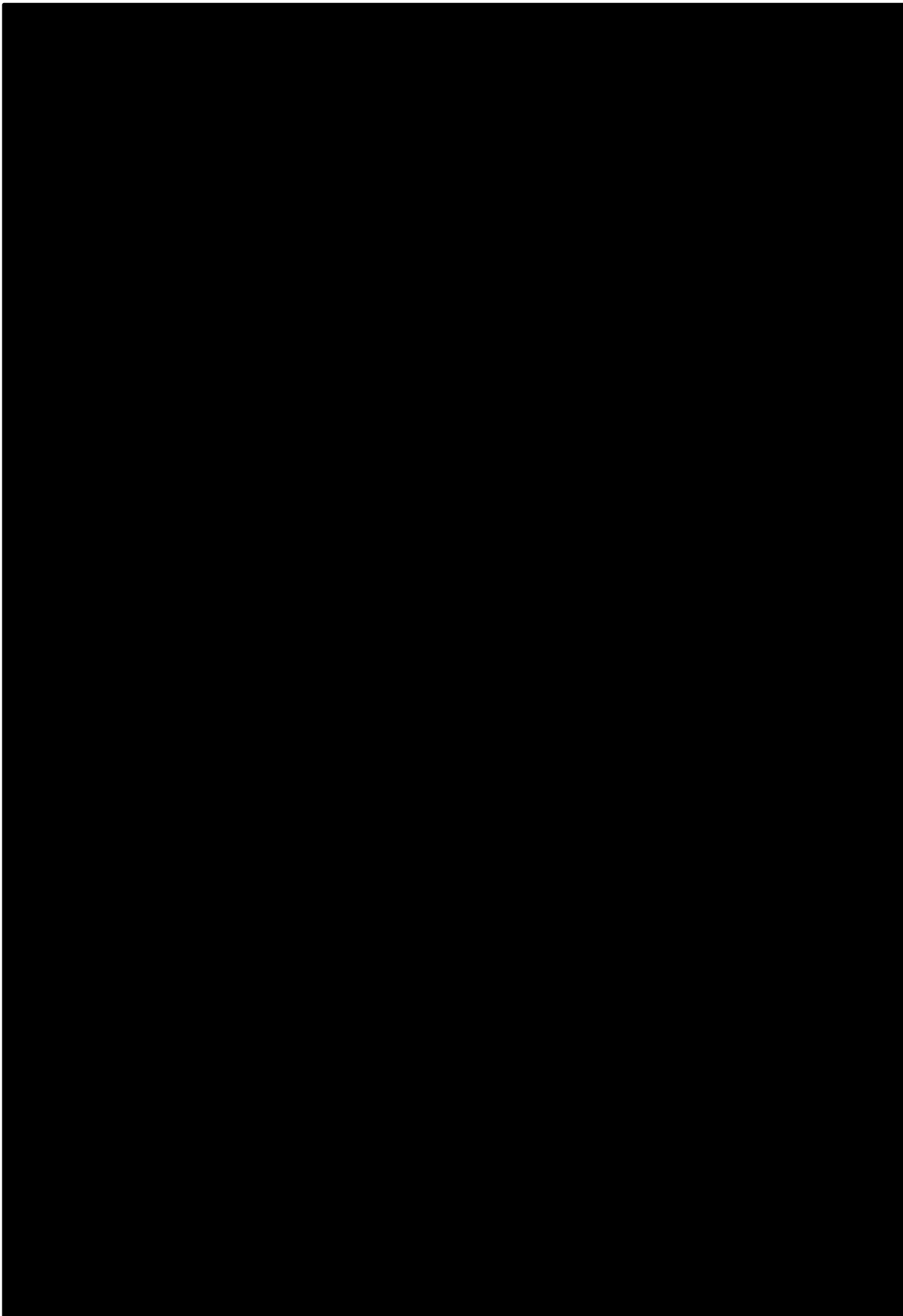


Figure 8: Proposed layout of excavation units at YTOF PAD 7

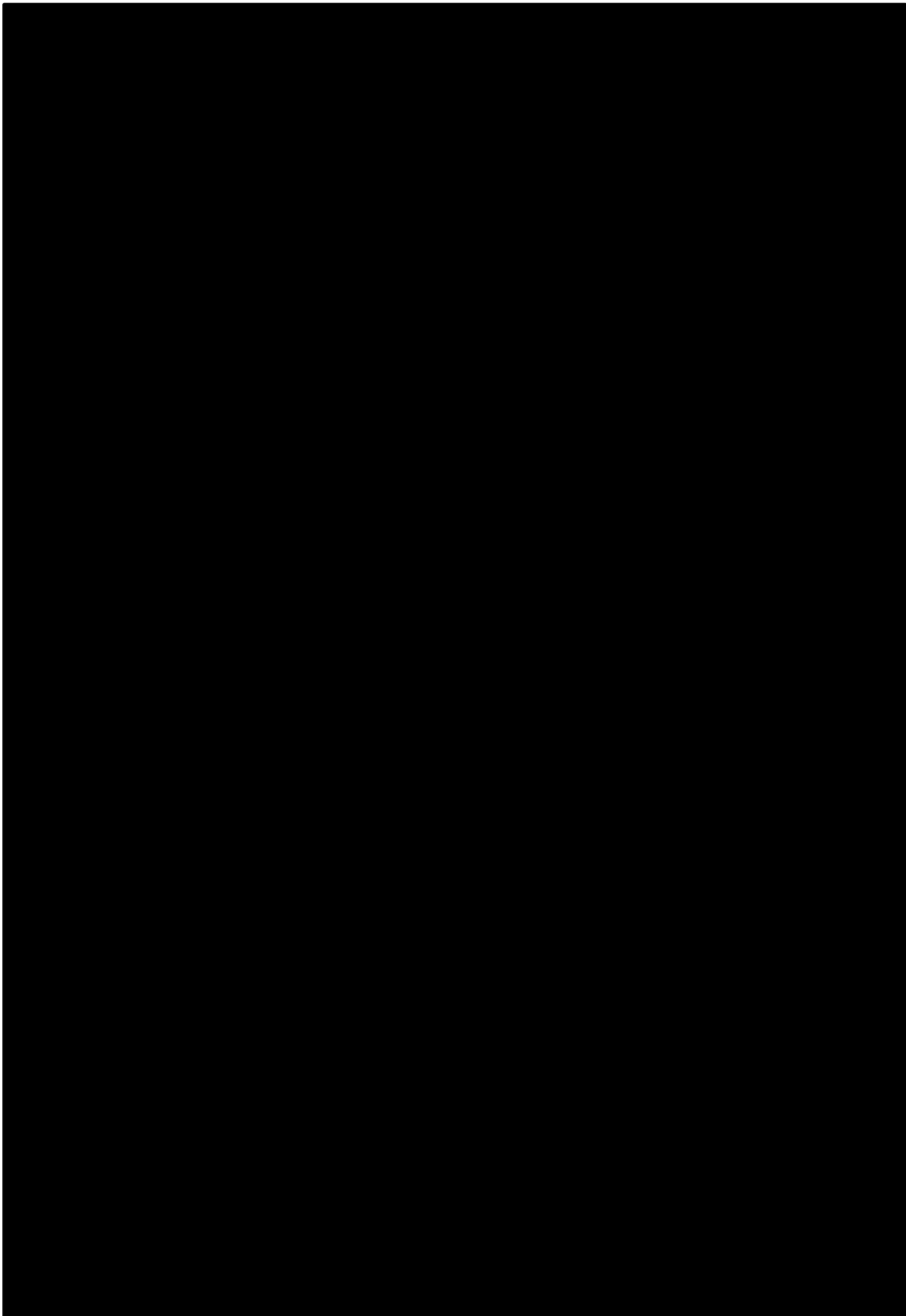
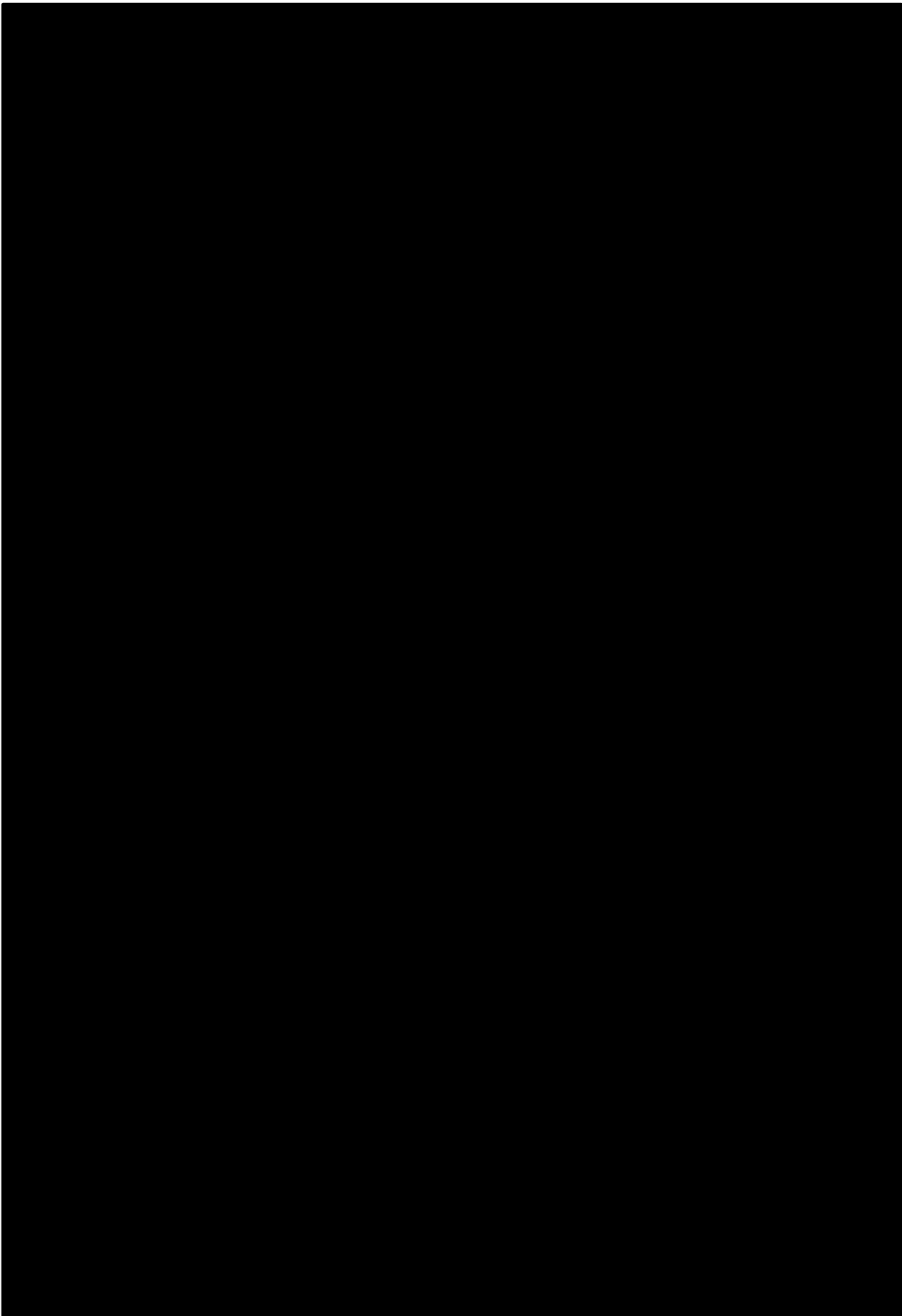


Figure 9: Proposed layout of excavation units at AHIMS site 52-5-0484/52-5-0512



7.9 Changes to number of pits excavated and timing

The proposed total number of excavation units across all locations is 171, with the total number excavation units at each location approximate only. The distribution and total number of pits shown in Figures 2 to 9 is a guide only. Examples of circumstances that may alter the timing and total number of pits at each location include the depth of deposit, hardness of deposit, any encountered areas of contamination, and access issues. It is anticipated that the test excavation would be completed in a period of 4-5 weeks.

Where there is some potential to encounter deeper deposits, such as at YTOF PAD 2, excavation would aim to determine the nature of fluvially deposited layers in those areas and whether further archaeological investigation following completion of PACHCI Stage 3. The test excavation methodology in areas of deep deposit would need to be altered to combine excavation units into a larger excavation point, such as combining four 50 centimetre x 50 centimetre excavation points to form a one metre x one metre excavation point, which would potentially reduce the areal distribution of test excavation. At no point would excavation proceed below 1.5 metres depth due to Occupation Health and Safety reasons. Any requirements for excavation below 1.5 metres would be determined following test excavation and carried out at a later stage.

The OEH code of practice outlines requirements for when enough information has been retrieved and test excavation must cease. Test excavation at each location must cease when (DECCW [now OEH] 2010: 28):

- *'Suspected human remains are encountered.'*
- *'Enough information has been recovered to adequately characterise the objects present with regard to their nature and significance.'*

'Enough information' is defined by OEH (DECCW [now OEH] 2010: 28) as:

'the sample of excavated material clearly and self-evidently demonstrates the deposit's nature and significance, and may include things like:

- *Locally or regionally high object density.*
- *Presence of rare or representative objects.*
- *Presence of archaeological features or locally or regionally significant deposits, stratified or not.'*

The determination of whether there is enough information to stop excavation would be made in the field following discussions between the site supervisor and Aboriginal stakeholder representatives present in the field at that time.

Archaeological test excavation will also cease where potential shell midden material is encountered. Archaeological excavation of shell midden deposits requires an AHIP.

7.10 Excavated area

Under the OEH code of practice guidelines for test excavation, no more than 0.5% of each investigated location can be excavated without an AHIP. A summary of the areal total of each area and proposed total excavation area is outlined in Table 2 below.

Table 2: Excavation area

PAD/ site name	Total square metres	Proposed excavation area (metres ²)	Proposed excavated percentage of total area
YTOF PAD 1	14503	6.5	0.04%
YTOF PAD 2	9342	3.5	0.03%
YTOF PAD 3	20804	11	0.05%
YTOF PAD 4	8398	4.75	0.05%
YTOF PAD5	10355	2.75	0.02%
YTOF PAD6	9755	5.25	0.05%
YTOF PAD7	5067	3.5	0.06%
AHIMS site 52-5-0484/ 52-5-0512	10490	5.5	0.05%

The proposed test excavation at each area will not exceed the maximum excavation area of 0.5% as outlined in the OEH code of practice.

7.11 Excavation procedure

Transects and excavation squares would be laid out using long hand-tapes, flags and pegs. An initial baseline would be laid out at each location, and trigonometry used to lay out parallel transects and offset excavation squares. A flag and peg would be placed at each point to be tested, and hand tapes and pegs used to lay out the remaining pegs at each corner of the excavation units. A datum would be established at the first excavation unit on the baseline. The location of each excavation unit would be recorded using a hand-held non-differential GPS, and the magnetic bearing of the first transect recorded using a compass. An arbitrary site grid would be established at each datum, using a number sequence such as X2000 Y2000.

In accordance with the OEH code of practice, the initial excavation unit at each location would be excavated in 5 centimetre spits. Subsequent excavation units will be excavated in 10 centimetre spits to the base of the artefact bearing deposit (with the exception of deposits deeper than 1.5 metres – see Section 7.6). Where time allows and further investigation is required for particular areas, the code of practice allows for excavation units to be combined to open an area no larger than three square metres. The location of small open area excavations at each location would be at the discretion of the supervising archaeologist in consultation with Aboriginal stakeholder representatives in the field.

A context sheet for each excavation unit would be completed in the field. Details recorded will include date of excavation, name of excavators, depth, number of buckets and soil description. Additionally, one representative section wall from each excavation unit will be scale drawn, and photographs will be recorded of each section wall and base.

All retrieved deposit from each excavation unit would be placed in buckets and transported to a sieve area using wheelbarrows. All retrieved deposit would be sieved using nested 5 mm and 3 mm sieves.

All excavation units would be back-filled with clean fill and sieve spoil (see Section 7.9) following the completion of test excavation using a rubber tracked back-hoe or similar plant.

7.12 Wet sieving

It is anticipated that all of the excavated soils will be wet sieved as opposed to dry sieving. Wet sieving will involve establishing silt fencing where necessary to stop the flow of sediment loaded water into any neighbouring watercourse. Erection of silt fencing will involve the placement of wooden stakes in the ground at set intervals to support the silt fence.

Management of sieved spoil at each location will be arranged with HCJV and Roads and Maritime, and may involve collection of some of that material and back-fill into the excavated pits using a rubber tracked back-hoe or similar plant.

7.13 Fencing off open excavation units

Arrangements for the necessity of fencing off open excavation units overnight will be discussed with HCJV and Roads and Maritime for each location. Depending on the presence of livestock or public accessibility, marking out open excavation units may require high-visibility fencing around wooden stakes or metal star pickets. Where there is no livestock or public access, a flag at one corner of the pit may suffice.

7.14 Procedure for the discovery of human remains

Under the OEH code of practice and Roads and Maritime unexpected archaeological finds procedure, archaeological test excavation must cease when suspected human remains are encountered.

In the situation where human remains or suspected human remains are identified, all work will cease at that location and procedures enacted as outlined in Appendix F of the Roads and Maritime unexpected archaeological finds procedure. This includes seeking specialist advice where clarification of the nature of skeletal remains is required, or contacting the NSW Police directly where it is immediately obvious that the remains are human. Where the skeletal material is more than 100 years old and are likely to be Aboriginal remains, OEH must be notified on the Environment Line (131 555) and no further works can proceed in that area until authorisation in writing is provided by OEH.

Hard copies of the Roads and Maritime unexpected archaeological finds procedure and the OEH code of practice will be available in the field throughout the test excavation program.

7.15 Aboriginal objects

All Aboriginal objects retrieved during the course of test excavation would be washed and placed in re-sealable bags for further analysis and recording. Once test excavation has been completed, the artefact assemblage would be recorded and stored as stipulated in the OEH code of practice. This includes recording key attributes of material, artefact type, platform type, termination type and dimensions, as well as photographic and drawn records of representative artefacts. All recorded information would be entered into a Microsoft Excel table with detail linked to the provenance of each artefact. Once entered into the Excel table, the data can be readily supplied with the test excavation report to OEH and registered Aboriginal stakeholders in both electronic and hard-copy form.

All artefacts would be given a unique number and stored in double re-sealable snap lock bags. A permanent marker will be used to record the provenance and unique number of artefacts in each bag. All artefacts would be given a unique number and stored in double re-sealable snap lock bags. A permanent marker will be used

to record the provenance and unique number of artefacts in each bag in writing on the outside of the bag and on an archival grade tag such as Dupont TM Tyvek [®] paper.

All artefacts retrieved during the test excavation program must be reburied as soon as practicable in a manner prescribed by the OEH code of practice. The exact location of reburial would be decided following the completion of the test excavation report and assessment of site extent and scientific significance. The location of the reburied artefacts must be recorded with a hand-held GPS and the coordinates forwarded to OEH on an Aboriginal Heritage Information Management System (AHIMS) site recording form.

Options for long-term management of retrieved Aboriginal objects will be discussed with registered Aboriginal stakeholders during Stage 3 of the PACHCI. Options for long-term management options may include leaving the objects at their reburial location or deposition at the Australian Museum.

8.0 REPORTING ON ABORIGINAL OBJECTS

A report detailing the results of the archaeological test excavation program would be prepared once excavation and artefact recording activities are concluded. The excavation report would be completed to the requirements outlined in the OEH code of practice requirement 11 and Stage 3 of the PACHI.

The excavation report would provide details on the established extent and scientific significance of each of the investigated PADs and Aboriginal site, and would provide recommendations regarding the necessity of further archaeological investigations.

If an investigated location is assessed as demonstrating low archaeological significance, no further archaeological investigation would be required.

If an investigation location is assessed as demonstrating moderate-high archaeological significance, further archaeological work, such as salvage excavation may be required following completion of PACHI Stage 3 investigations.

Due to the fact that an application will be made for the Albion Park Rail Bypass project to be assessed as SSI under Part 5.1 of the EP&A Act, it is anticipated that any further archaeological investigation recommended following the completion of PACHI Stage 3 investigations would not require an AHIP from OEH, and would instead be subject to approvals under Part 5.1.

8.1 Changes to proposed impacts

Where proposed impacts are revised to encompass other areas of high archaeological potential identified during PACHI Stage 2 investigations, a separate test excavation methodology and timeframes for stakeholder review as specified in the OEH code of practice and Roads and Maritime PACHI will be required.

8.2 Site recording form and site impact recording form

A site recording form will be submitted to the OEH AHIMS site register where Aboriginal objects are retrieved from any of the investigated PADs.

A site impact recording form will be submitted to the OEH AHIMS site register to document test excavation results at AHIMS site 52-5-0484/52-5-0512 and where Aboriginal objects are retrieved from any of the investigated PADs. There is not a requirement to submit a site impact recording form for any of the investigated PADs where no Aboriginal objects are retrieved.

9.0 REFERENCES

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