ACHM
AUSTRALIAN CULTURAL HERITAGE MANAGEMENT

Cultural Heritage Management Plan

Water for a Growing West Project - Stage 2

By: Vicki Vaskos, Erica Walther and Laura Donati

Date: 11 October 2013

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The professional advice and opinions contained in this report are those of the consultants, Australian Cultural Heritage Management (Victoria) Pty Ltd, and do not represent the opinions and policies of any third party.

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Spatial Data

Spatial data captured by Australian Cultural Heritage Management (Victoria) Pty Ltd in this report for any newly recorded sites has been obtained by using hand held or differential GPS units using the GDA94 co-ordinate system.

Abbreviations

Term	Meaning
AAV	Aboriginal Affairs Victoria, Department of Planning and Community Development
ACHM	Australian Cultural Heritage Management (Victoria) Pty Ltd
ACHRIS	Aboriginal Cultural Heritage Register and Information System
AHA 2006	Victorian *Aboriginal Heritage Act 2006*
AHR 2007	Victorian *Aboriginal Heritage Regulations 2007*
ASTT	Australian Small Tool Tradition
BP	Before Present
Boon Wurrung	The Boon Wurrung Foundation
Bunurong	Bunurong Land Council Aboriginal Corporation
CHA	Cultural Heritage Advisor
CHM	Cultural Heritage Management
CHMP	Cultural Heritage Management Plan
HV	Heritage Victoria, Department of Planning and Community Development
In Situ	In archaeology, in situ refers to an artefact or item of material culture that has not been moved from its original place of use, construction or deposition
LDAD	Low Density Artefact Distribution
LGA	Local Government Area
MYA	Million Years Ago
MWC	Melbourne Water Corporation
NOI	Notice of Intent
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Party
VAHR	Victorian Aboriginal Heritage Register
Wurundjeri	The Wurundjeri Tribe Land and Compensation Cultural Heritage Council Inc

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Alex Kerr (Wurundjeri)
Colin Hunter Jr Jr (Wurundjeri)
Delta Freedman (Wurundjeri)
Gary Galway (Wurungjeri)
Gary Watkins (Boon Wurrung)
James Hughes (Boon Wurrung)
Jason Tweedie (Wurundjeri)
John Winch (Bunurong)
Michael Xiberras (Wurundjeri)
Naomi Zukanovic (Wurundjeri)
Robert Anthony (Boon Wurrung)
Sean Kelly (Bunurong)
Sonia Murray (Bunurong)
Stephen Compton (Bunurong)
Yongbin (Boon Wurrung)

Executive Summary

This Cultural Heritage Management Plan (CHMP) has been prepared for Melbourne Water Corporation (MWC) (ABN 81 945 386 953) who intend to construct a water pipeline from St Albans to the Cowies Hill Reservoir in Tarneit.

The Complex Assessment (subsurface testing) component of this CHMP is yet to be completed. The Complex Assessment component will be completed once the final pipeline alignment has been decided, in order to determine the nature, extent, and significance of Aboriginal cultural heritage potentially impacted by the activity.

The activity area investigated as part of this assessment was provided to Australian Cultural Heritage Management (Vic) Pty Ltd (ACHM) in July 2013.

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PART ONE
THE ASSESSMENT

1 Introduction

Cultural heritage sites or places represent a tangible or intangible record of human interactions within the landscape. The daily activities of humans throughout the millennia survive as the archaeological record across the continent. In Victoria, these sites or places provide evidence of approximately 30,000 years of Aboriginal occupation prior to the arrival of Europeans, and also evidence of the more recent past since European settlement.

Throughout most jurisdictions in Australia, cultural heritage sites or places are protected by either state or commonwealth heritage legislation, or a combination of both. The Aboriginal Heritage Act (2006) provides legal protection for all materials, sites or places relating to the Aboriginal occupation of Victoria. The Heritage Act (1995) provides for the protection and conservation of places and objects of cultural heritage significance and the registration of those places and objects.

1.1 Project Background

This CHMP was commissioned by Melbourne Water (MWC) who intend to construct a water pipeline from St Albans to the Cowies Hill Reservoir in Tarneit. The proposed pipeline is approximately 17 kilometres in length. The pipeline will increase the transfer capacity between St Albans Reservoir and Cowies Hill Reservoir by augmenting an existing water supply pipeline with a second supply line to the Cowies Hill Reservoir. This project is the second stage of the Wyndham transfer capacity augmentation as outlined in the Wyndham Growth Area Water Transfer Strategy, September 2006.

The CHMP is being prepared because the proposed activity triggers a CHMP:

- The activity area intersects with areas of cultural heritage sensitivity as shown on the AAV website (see http://www.dpcd.vic.gov.au/__data/assets/pdf_file/0003/56874/Sensitivity_MELBOURNE.pdf). In particular the activity area is intersected Dry Creek, Skeleton Creek and Kororoit Creek (23(1) *AHR* 2007);
- The construction of the proposed water pipeline is a high impact activity (43 (1) (b) (xxiii) (B).

The proposed activity is described in Section 2, and the activity area details are included in Section 3.

1.2 Sponsor

The sponsor of this CHMP is:

Melbourne Water Corporation

PO Box 4342 Melbourne Vic 3001

1.3 Cultural Heritage Advisor and Authorship

This CHMP was undertaken by Australian Cultural Heritage Management (Victoria) Pty Ltd. The consultants undertaking the works documented in this report are qualified cultural heritage advisors in accordance with the requirements stated in Section 189(1) of the *Aboriginal Heritage Act* 2006.

The following is a brief description of the qualifications and experience of the cultural heritage advisor as stated in Schedule 2(3) of the AHR 2007.

The project supervisor of this CHMP is:

- Dr Shaun Canning. Dr Shaun Canning is senior archaeologist and anthropologist and a General Manager of the consulting firm Australian Cultural Heritage Management (Vic) Pty Ltd. (ACHM), which specializes in cultural heritage assessment, expert advice, management of complex and large-scale cultural heritage management projects (both primarily in relation to Australian Indigenous culture and heritage), native title research, Indigenous community development issues, geographic information systems, cartography and analysis. Dr Canning holds a Bachelor of Arts degree majoring in Cultural Heritage Studies and Anthropology, a Bachelor of Applied Science (Hons) degree in Parks, Recreation and Heritage, and a PhD in Australian Indigenous Archaeology (La Trobe), specialising in predictive modelling and cultural heritage management in the Melbourne metropolitan area. Shaun has extensive experience in Indigenous cultural heritage management in the resources and public land management sectors, alongside considerable experience in community consultation and Aboriginal education. Shaun has particular expertise in the use of GIS and predictive modelling in archaeological, cultural and natural heritage management contexts. Shaun is active in many professional associations, and is currently National Webmaster of the Australian Association of Consulting Archaeologists Inc. Shaun is a Fellow of the Australian Anthropological Society (FAAS) and a Full Member of the Australian Association of Consulting Archaeologists Inc (MAACAI).

The primary authors of this CHMP are:

- Vicki Vaskos. Vicki is an Archaeologist at Australian Cultural Heritage Management (Vic.) Pty Ltd. (ACHM). Vicki completed a Bachelor of Arts degree with Honours, majoring in Classical Studies and Archaeology, at The University of Melbourne (2005). Vicki has also completed a Bachelor of Laws with Honours at Monash University (2010), and was admitted to legal practice in March 2011. Since early 2011 she has managed on archaeological surveys and excavations throughout Victoria and Western Australia. Vicki has experience in in project management, community liaison and the resolution of cultural heritage issues in varying situations. Vicki is a qualified cultural heritage advisor and archaeologist in accordance with the requirements of Section 189 (1) of the Aboriginal Heritage Act 2006.
- Erica Walther. Erica is a Cultural Heritage Advisor and Project Manager with experience supervising and conducting Standard and Complex Cultural Heritage Management Plans. Erica specialises in project management, community liaison and the resolution of cultural heritage issues in varying situations. Erica provides specialist cultural heritage legislative advice and completes technical reports to meet the requirements of heritage legislation. Erica also has experience supervising and conducting archaeological salvages and monitoring compliance with CHMP recommendations. Erica completed a Bachelor of Archaeology (Honours) degree at Latrobe University in 2007. Since 2007 Erica has worked on archaeological surveys and excavations in Victoria, New South Wales and Tasmania.

1.4 Location of the Activity Area

The activity area is located within the Brimbank City Council, Melton City Council and Wyndham City Council areas (Map 3-1 and Map 3-2). The final route of the pipeline within the activity area will be determined by MWC following the functional design phase. The table in Section 3 details the properties that are to be impacted by the proposed pipeline (Table 3-1).

2 Activity Description

This project is currently in the pre-construction phase.

During the construction phase, the proposed activities to be undertaken during the pipeline construction are:

- Trenching which will be approximately 2.5 metres deep and 4 metres wide; and
- Boring under roads.

The pipe size is currently estimated to be 1150 mm diameter Mild Steel Concrete Lined or Glass Reinforced Plastic.

Materials excavated from the trench will be used as back fill over the pipe, with proposed excess material taken off site.

The types of equipment likely to be used in the construction of the works are:

- Excavators;
- Boring machines;
- Flat-bed delivery trucks; and
- 4 x 4 vehicles.

Access to the trench will likely require a 15 metre wide strip adjacent to the trench in locations where amenable (i.e. open pastures) with a reduced area in built up areas.

(The activity description will need to be finalised to include *all* proposed works within the activity area)

Figure 2-1: General conditions within the transmission easement portion of the activity area, south of Middle Road

3 Extent of Activity Area

The proposed pipeline is approximately 17 kilometres in length and varies in width (Map 3-1). The current investigation area covers an area of approximately 193 ha.

The current investigation area was provided by Melbourne Water to ACHM in July 2013.

The activity area intersects with individual properties from St Albans to Tarneit. The final route of the pipeline will be determined by MWC following the functional design phase. The following table details the properties that are to be impacted by the proposed pipeline (Table 3-1).

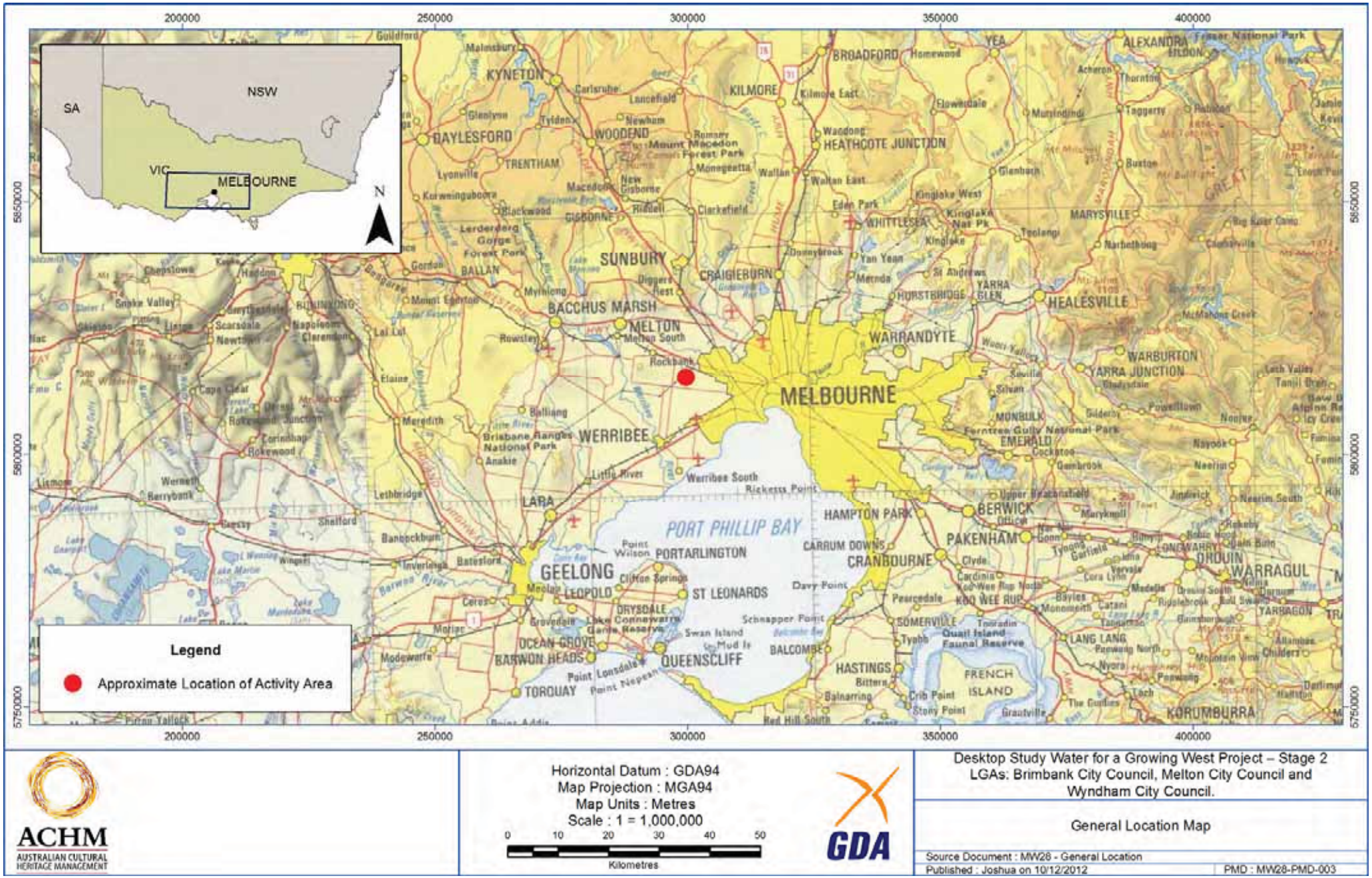
Table 3-1: Property and Landowner Details

Property Address	Property Identifier	Landowner Details

The pipeline begins from the western side of Station Road opposite Gladstone Road and approximately follows the transmission easement in a south westerly direction until Ballarat Road. It then follows Robinsons Road with options of travelling north or south around the Metropolitain Remand Centre (north of Middle Road). The preferred route then follows Middle Road to the west, following the transmission easement to the corner of Dohertys Road and Tarneit Road. The route then travels generally south along Tarneit Road and ends the storage reservoir (Map 3-1).

An additional set-down area, which is located directly north of the intersection of Marquands Road and Leakes Road, has also been included in the desktop and standard assessment.

Map 3-1: Map showing the activity area.



Map 3-2: General location map.

4 Documentation of Consultation

4.1 Consultation in relation to the assessment

Sections 54(1) and (2) of the *AHA* 2006 state that before the preparation of a CHMP commences, the Sponsor must submit a Notice of Intent to Prepare a CHMP form to the relevant RAP, the Secretary of AAV and the owner/occupier of the land covered by the CHMP if different from the Sponsor.

A Notice of Intent to Prepare a CHMP (NOI) was completed by ACHM and lodged with AAV on 24 May 2013. A copy of this NOI is included in Appendix 12.1. AAV allocated CHMP number 12652 on 23 May 2013.

The landowners (where relevant) were notified of the CHMP on (Date) by (method).

Due to changes to the activity area, an update to the activity area was sent through to AAV on 13 June 2013, and is included in Appendix 12.2.

As a RAP has not been appointed for the activity area, representatives from the Wurundjeri (RAP applicants) were invited to participate throughout the preparation of the CHMP. An invitation to participate was also sent to the Boon Wurrung and Bunurong, as former RAP Applicants and Traditional Owners as acknowledged by the Heritage Council. The following table outlines the documentation of consultation.

4.2 Participation on the conduct of the assessment

Table 4-1: Correspondence Table

From: Name and/or Organisation	To: Name and/or Organisation	Date	Type of Correspondence	Discussion
Vicki Vaskos (ACHM)	OAAV	24/05/2013	Email	Submission of NOI to AAV
Vicki Vaskos (ACHM)	Delta Freedman (Wurundjeri), Sonia Murray (Bunurong), Yongbin (Boon Wurrung)	29/05/2013	Email	Booking Request
Vicki Vaskos (ACHM)	OAAV	13/6/2013	Email	Update of activity area
Vicki Vaskos (ACHM)	Sean Kelly (Bunurong), Michael Xiberras (Wurundjeri), Robert Anthony (Boon Wurrung)	12/06/2013	In Person	Standard Assessment Fieldwork
Vicki Vaskos (ACHM)	Sean Kelly (Bunurong), Gary Galway (Wurundjeri), Robert Anthony (Boon Wurrung) John Winch (Bunurong)	13/06/2013		
Matthew Wilson (ACHM)	Sean Kelly (Bunurong), Robert Anthony (Boon Wurrung)	14/06/2013		
Matthew Wilson (ACHM)	Sean Kelly (Bunurong), Robert Anthony (Boon Wurrung)	17/06/2013		

Vanessa Flynn, Erica Weston (ACHM)	Stephen Compton (Bunurong), Colin Hunter Jnr Jnr (Wurundjeri), James Hughes (Boon Wurrung)	25/06/2013	In Person	Complex Assessment Fieldwork
Vanessa Flynn, Erica Weston (ACHM)	Naomi Zukanovic (Wurundjeri), James Hughes (Boon Wurrung)	26/06/2013		
Vanessa Flynn, Matthew Wilson (ACHM)	Stephen Compton (Bunurong), Alex Kerr (Wurundjeri), Gary Watkins (Boon Wurrung)	27/06/2013		
Vanessa Flynn, Erica Weston (ACHM)	Stephen Compton (Bunurong), Gary Galway (Wurundjeri), Gary Watkins (Boon Wurrung)	28/06/2013		
Matthew Wilson (ACHM)	Delta Freedman (Wurundjeri), Sonia Murray (Bunurong), Yongbin (Boon Wurrung)	28/06/2013	Email	Booking Request
Erica Walther (ACHM)	Gary Watkins (Boon Wurrung), Stephen Compton (Bunurong), Jason Tweedie (Wurundjeri)	4/07/2013	In Person	Complex Assessment Fieldwork
Vicki Vaskos (ACHM)	Delta Freedman (Wurundjeri), Sonia Murray (Bunurong), Yongbin (Boon Wurrung)	28/06/2013	Email	Booking Request
Erica Walther, Vanessa Flynn (ACHM)	Robert Anthony (Boon Wurrung), Colin Hunter Jr Jr (Wurundjeri)	11/07/2013	In Person	Complex Assessment Fieldwork

4.3 Consultation in relation to the recommendations

The consultation process comprised ongoing interaction with the Wurundjeri, Bunurong and Boon Wurrung whose recommendations and assessment have been incorporated into this report.

The standard and complex assessment components of this CHMP were undertaken by ACHM in partnership with the representatives of the Wurundjeri, Bunurong and Boon Wurrung (see Table 4-1).

As a result of the survey, it was determined, in conjunction with the RAP applicant and Traditional Owner representatives that a program of sub-surface testing would be required (i.e. a complex CHMP).

4.4 Summary of outcomes of consultation

Extensive and meaningful consultation was undertaken throughout this CHMP between the Traditional Owners, RAP Applicants, the Sponsor and the heritage advisor. The outcomes and management recommendations of the CHMP could not have been satisfactorily concluded without this exhaustive but productive consultation process.

5 Aboriginal Cultural Heritage Assessment

5.1 Desktop Assessment

The desktop assessment was undertaken by Vicki Vaskos in May 2013 and consisted of a review of the Aboriginal and historic cultural heritage issues within the activity area. Erica Walther and Kristine Reiersen provided additional details from June to July 2013.

5.2 Desktop Assessment Methodology

The aim of the desktop study was to determine the existence of the Aboriginal archaeology within the activity area and to produce an archaeological site prediction model. The desktop assessment involved a review of:

1. The Victorian Aboriginal Heritage Register (VAHR) to identify any previously registered Aboriginal archaeological sites either within or surrounding the activity area as well as the results of previous archaeological assessments;
2. The land-use history of the activity area, particularly evidence for the nature and extent of past land disturbances;
3. Ethnographic sources regarding the traditional owners in the area; and
4. Environmental conditions within the activity area as well as resources available to Aboriginal people within the activity area.

5.2.1 Search of the Victorian Aboriginal Heritage Register (VAHR)

The VAHR is a record of all previously recorded Aboriginal places in Victoria, and is a mechanism where a proponent can identify Aboriginal heritage places on a parcel of land prior to conducting ground disturbing activities on that land.

The VAHR was searched on 25 May 2013 for previous Aboriginal cultural heritage investigations and records of Aboriginal heritage places within the activity area. An additional search was completed on the 7 of June 2013 once the activity area had been finalised.

The following table details the sites located within the activity area and within 50 metres of the activity area:

Table 5-1: Aboriginal archaeological sites within, and within 50 metres, of the activity area.

VAHR/ Component	Site Name	Site Type
7822-0466	MOOROOKYLE 10	Artefact Scatter
7822-0467	MOOROOKYLE 11	Artefact Scatter
7822-0468	MOOROOKYLE 12	Artefact Scatter
7822-0469	MOOROOKYLE 13	Artefact Scatter
7822-0543	MOOROOKYLE 32	Artefact Scatter
7822-0564	MOOROOKYLE 53	Artefact Scatter
7822-0706	RAVENHALL	Artefact Scatter
7822-0912	POWERLINE SITE 1	Artefact Scatter
7822-0913	POWERLINE SITE 2	Artefact Scatter
7822-0914	POWERLINE SITE 3	Artefact Scatter
7822-0915	POWERLINE SITE 4	Artefact Scatter
7822-1409	LADY GEE 3	Artefact Scatter
7822-2173	DEER PARK BYPASS 2	Artefact Scatter
7822-1412	LADY GEE 1	Artefact Scatter
7822-1994	ROBINSONS RD 1	Artefact Scatter
7822-1915	TARNEIT RISE 2	Artefact Scatter
7822-3488-3	Kororoit Creek IA5	Low Density Artefact Distribution
7822-2673	Transmission Easement 2	Artefact Scatter
7822-2672	Transmission Easement 1	Artefact Scatter

The additional set-down area north of the intersection of Marquands and Leakes Road has the following sites within 50m (Table 5-2).

Table 5-2: Aboriginal archaeological sites within, and within 50 metres, of the additional set-down area.

VAHR/ Component	Site Name	Site Type
7822-2845	Lot 2 Leakes Rd IA 1	Artefact Scatter
7822-2851	Truganina IA 26	Artefact Scatter
7822-2476	Leakes Rd AS	Artefact Scatter

5.2.2 Information on the sites located within the activity area

Powerline Site 1 (7822-0912)

Powerline Site 1 (7822-0912) is an isolated artefact (flake) and was originally recorded by Brown and Lane (1997). It was considered that the general area where these sites were located (Kororoit Creek, St Albans) has been subject to some past land disturbance, however some areas appeared relatively undisturbed and displayed potential for archaeological subsurface deposits on creek terraces (Brown and Lane 1997:50).

Powerline Site 3 (7822-0914)

Powerline Site 3 (7822-0914) is an artefact scatter and was originally recorded by Brown and Lane (1997). It was considered that the general area where these sites were located (Kororoit Creek, St Albans) has been subject to some past land disturbance, however some areas appeared relatively undisturbed and displayed potential for archaeological subsurface deposits on creek terraces (Brown and Lane 1997:50).

Powerline Site 4 (7822-0915)

Powerline Site 4 (7822-0915) is an isolated artefact and was originally recorded by Brown and Lane (1997). It was considered that the general area where these sites were located (Kororoit Creek, St Albans) has been subject to some past land disturbance, however some areas appeared relatively undisturbed and displayed potential for archaeological subsurface deposits on creek terraces (Brown and Lane 1997:50).

Transmission Easement 1 (7822-2672)

Transmission Easement 1 (7822-2672) consists of a highly disturbed artefact scatter, which is located on a relatively flat plain. The Aboriginal Place is located within a disturbed context related to the previous and current landuse, including ground disturbance due to the construction and maintenance of overhead transmission lines and the associated access track, and the removal and relocation of basalt floaters. Rose (Rose and Kaskadanis 2011) considered the scientific significance of Transmission Easement 1 (VAHR 7822-2672) to be low due to the highly disturbed nature of the site; that is, it was recorded within a transmission easement which has suffered extensive ground disturbance due to activities such as the construction and installation of the transmission line and the existing access track.

Transmission Easement 2 (7822-2673)

Transmission Easement 2 (7822- 2673) consists of artefact bearing subsurface deposits located on the generally flat plain in the transmission easement, directly underneath the transmission lines. Transmission Easement 2 (7822-2673) is a medium-density artefact scatter which Rose (Rose and Kaskadanis 2011) considered of moderate preservation value and research potential.

Moorookyle 10 (7822-0466)

Moorookyle 10 (7822-0466) consists of an isolated surface artefact located in a paddock near a swamp on Leakes Road. Moorookyle 10 (7822-0466) is a low density artefact scatter consisting of 1 quartzite biploar core and 1 chert flake. Weaver (1991) considered this site to have low significance.

Moorookyle 12 (7822-0468)

The site is located 10 metre to the east of the telegraph pole on top of a pile of soil and is not believed to be in situ. The artefact located on this site is an isolated quartz piece that has been worked at one end.

Moorookyle 13 (7822-0469)

Moorookyle 13 (7822-0469) consists of in isolated surface artefact located in a firebreak of a grassed paddock within 320 metres east of the corner of Leakes Road and Tarneit Road. Moorookyle 13 (7822-0469) consists of a quartz core with use wear. Weaver (1991) considered this site to have low significance.

Ravenhall (7822-0706)

Ravenhall (7822-0706) consists of a medium density surface artefact scatter. Ravenhall (7822-0706) contained a total of 28 artefacts, 7 of which were scrapers. It was considered that the contents of this site were of great interest when compared with sites in the surrounding area (du Cros and Murphy 1994). The large number of scrapers sets the site apart from the most of the Kororoit Creek sites which are small scatters or large workshops with few examples of formal tools found (du Cros and Murphy 1994). The lack of cores, wide range of raw materials and the presence of broken scrapers indicated that the site may have been associated predominantly with the use and maintenance (rather than manufacture) of implements(du Cros and Murphy 1994).

Lady Gee 1 (7822-1412)

An isolated artefact was located on the flat plain north west of Lady Gee Ranch. The artefact was made of slicrete and had no sign of retouch.

Lady Gee 3 (7822-1409)

This site comprises of one isolated artefact east of Lady Gee Ranch, just north of Middle Road. The artefact is a worked flake/tool made of silcrete. The site is located on flat agricultural land at the edge of a ploughed paddock.

The following two sites are located within the additional set-down area.

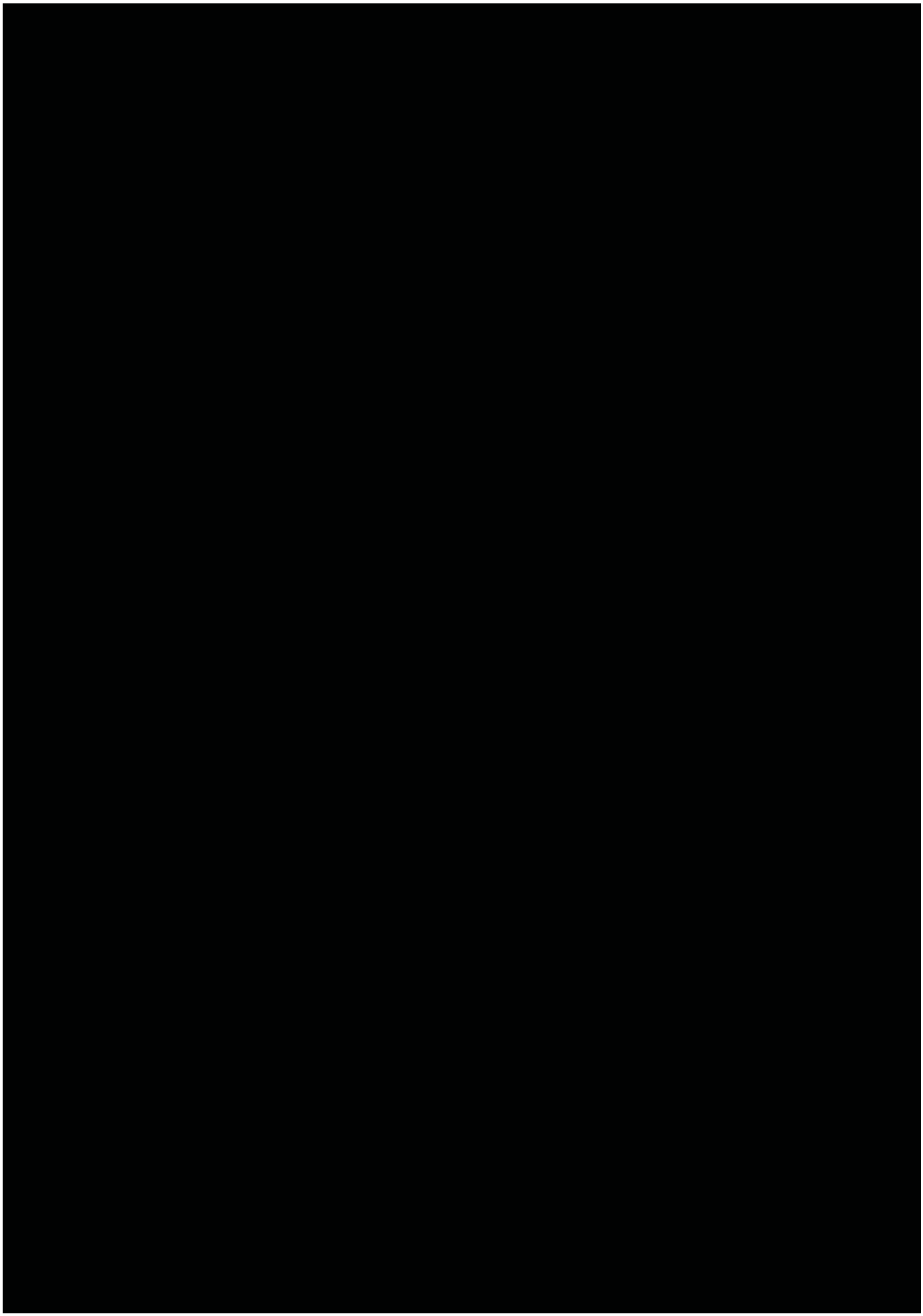
Lot 2 Leakes Road IA 1 (7822-2845)

The site consists of a silcrete angular fragment located subsurface. No additional deposits were located with additional testing.

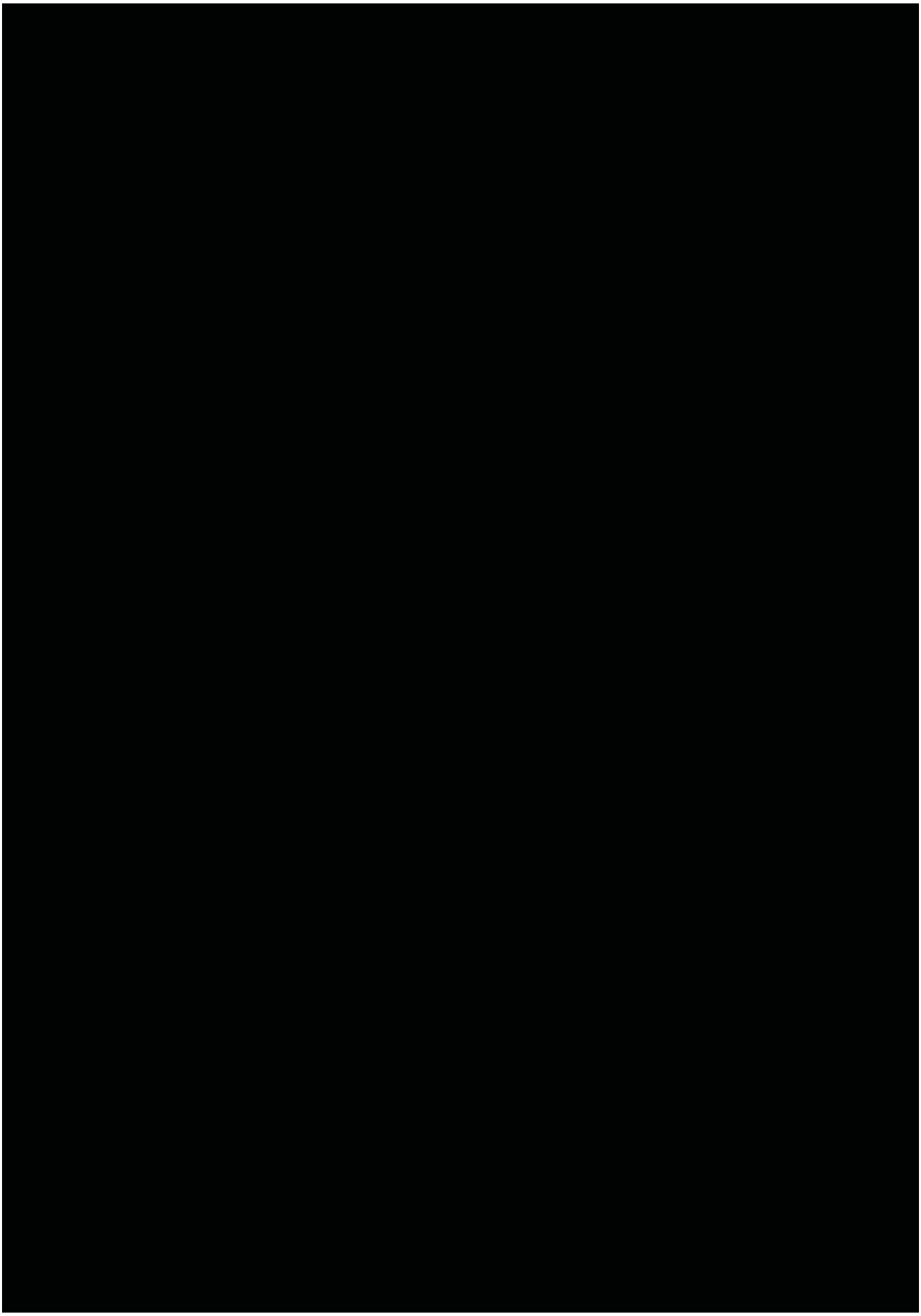
Leakes Rd AS (7822-2476)

The site is located on the floodplain east of Doherty's creek north of Leakes Road and opposite of Marquands Road. It comprises of four artefacts; one quartzite core and three quartz flakes. The artefact was located on surface spread east-west direction along a ploughed area immediately south of the fence line and a row of trees.

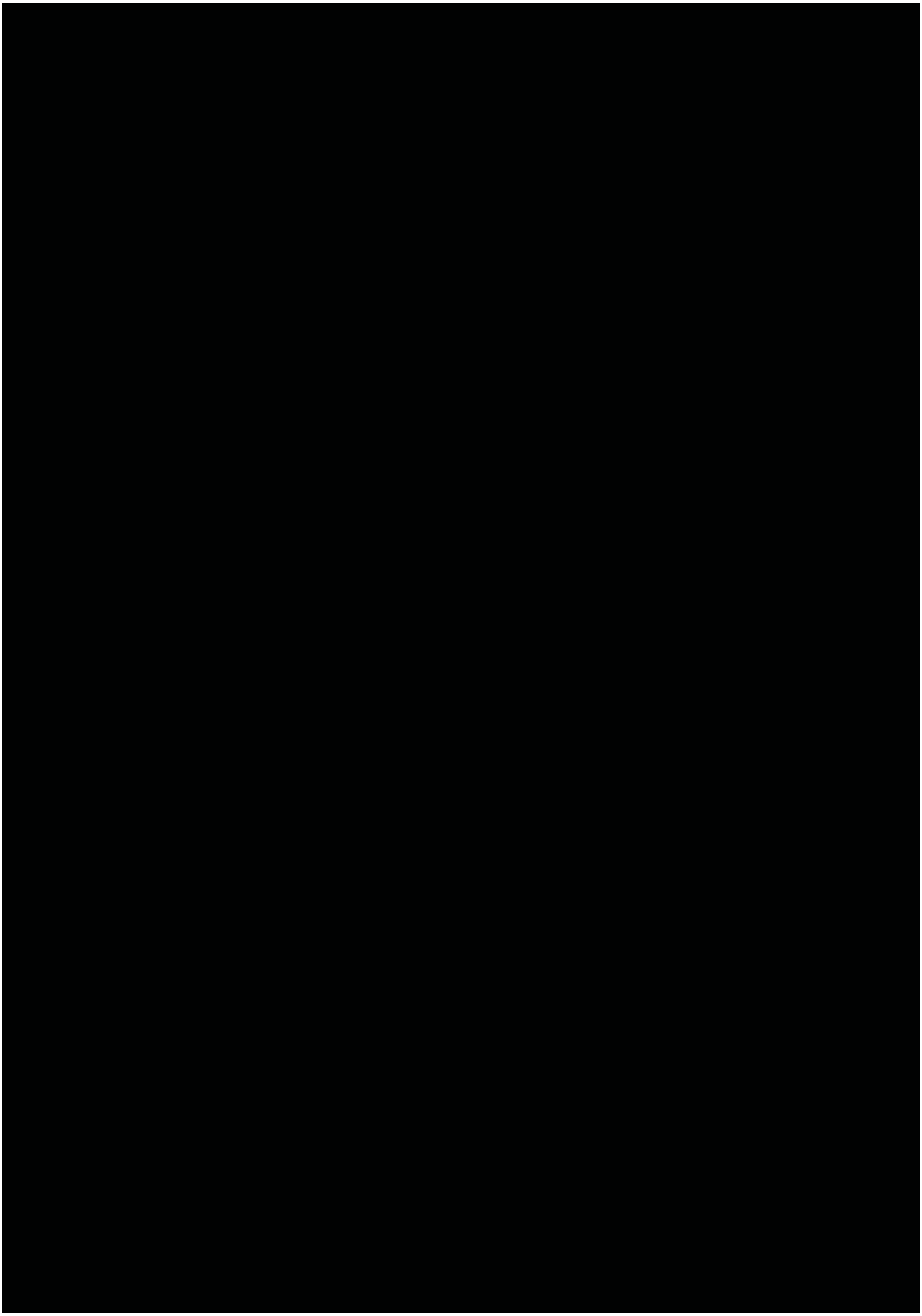
The following map series (Map 5-1, Map 5-2, Map 5-3 Map 5-4 and Map 5-5) detail the sites that are located within, and within 50 metres of the activity area.



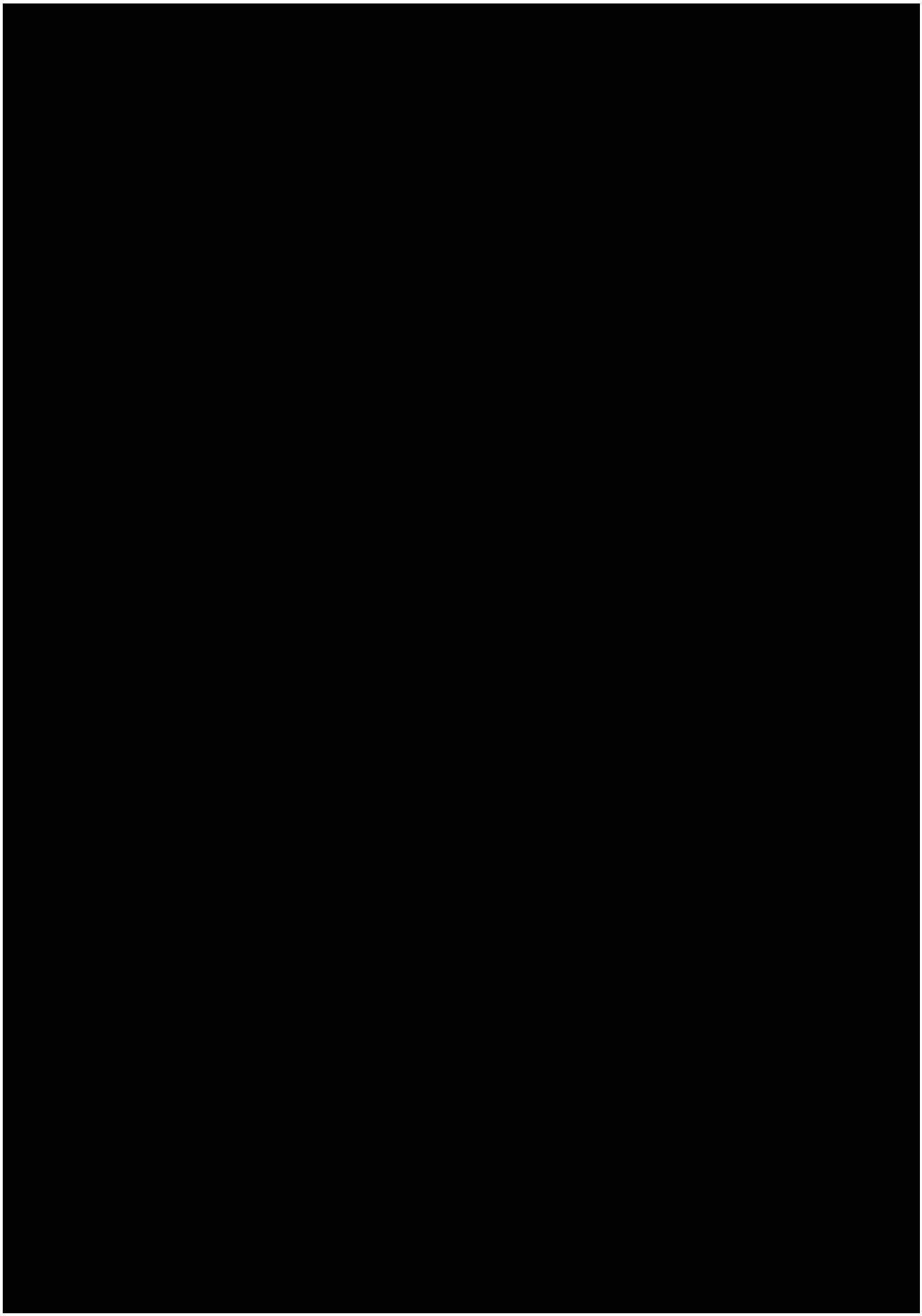
Map 5-1: Aboriginal archaeological sites located within and within 50 metres of the activity area.



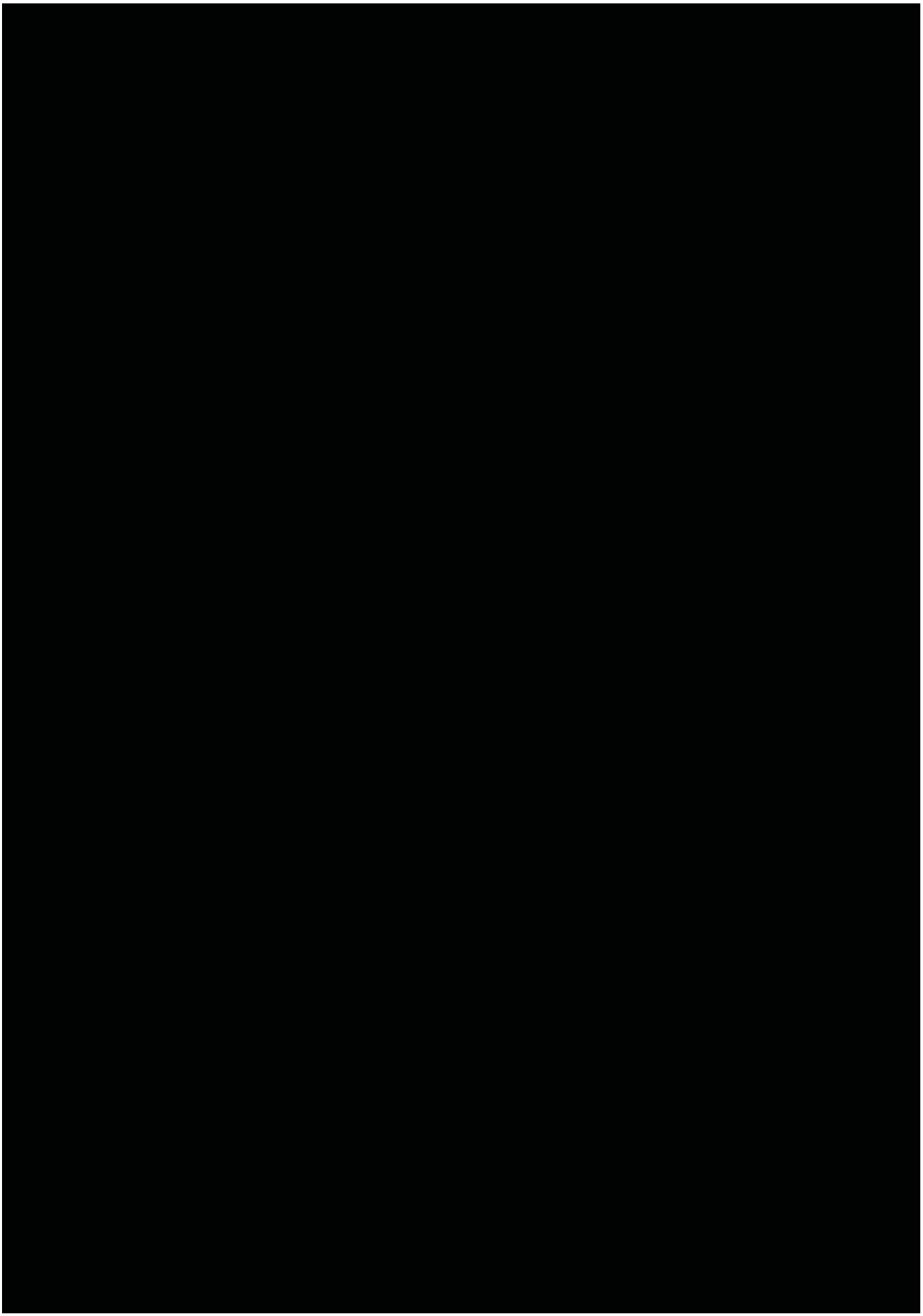
Map 5-2: Aboriginal archaeological sites within and within 50 metres of the activity area.



Map 5-3: Aboriginal archaeological sites within and within 50 metres of the activity area.



Map 5-4: Aboriginal archaeological sites within and within 50 metres of the activity area.



Map 5-5: Aboriginal archaeological sites within and within 50 m of the activity area.

5.2.3 The Geographic Region

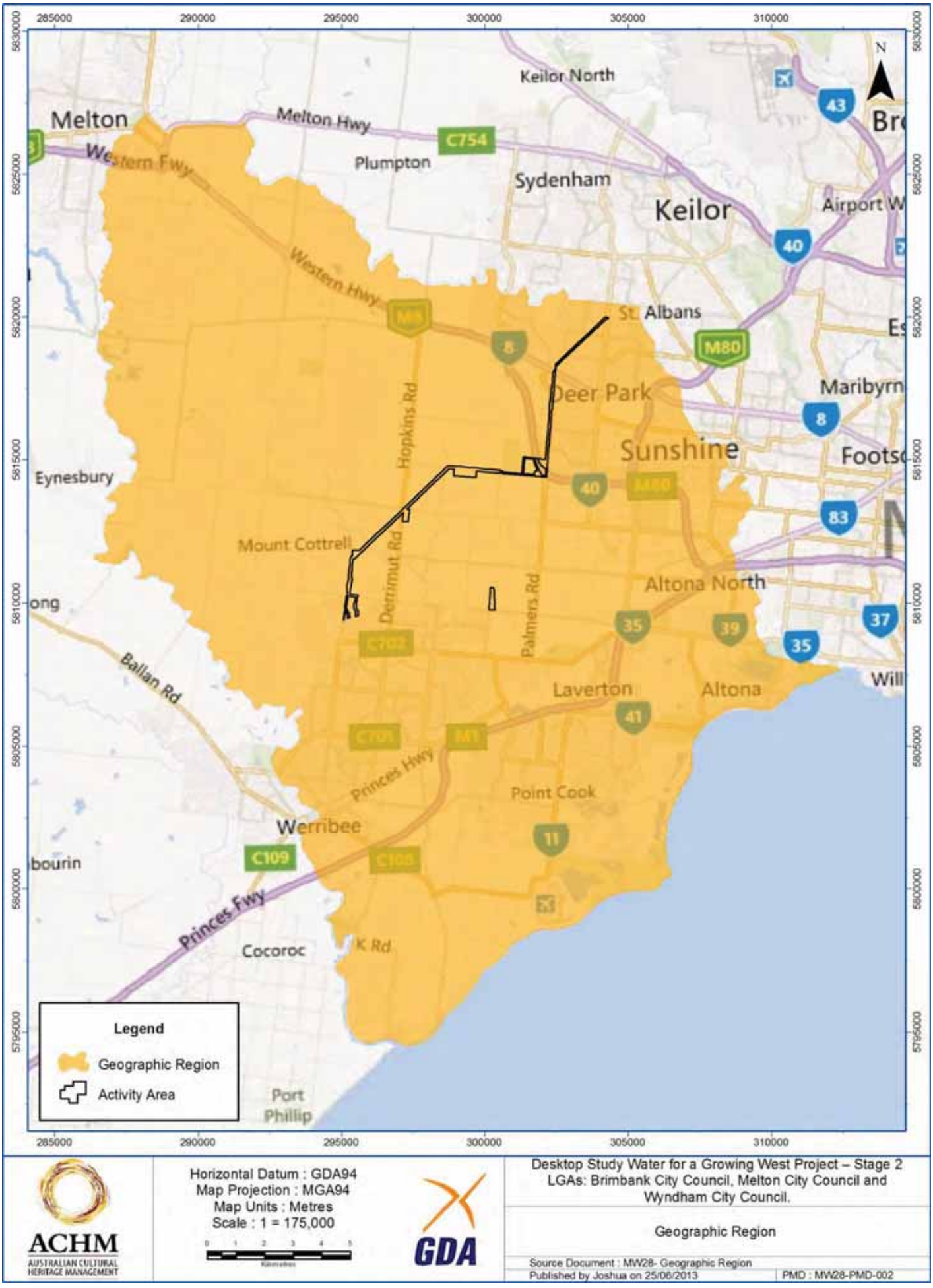
The geographic region is defined on the basis of topography and drainage, and encompasses Werribee River as well as the surrounding landscape north east/ east to Kororoit Creek, Toolern Creek to the northwest and Port Phillip Bay to the south (Map 5-6).

This geographic region thereby includes the main hydrological resources in the vicinity of the activity area: Port Phillip Bay, Kororoit Creek, Dry Creek, Skeleton Creek, Werribee River, Toolern Creek, Jones Creek, Laverton Creek, Dohertys Creek and Stony Creek.

The creeks which dissect the landscape would have afforded a source of fresh water and a means of navigation throughout the landscape. In the south, the geographic boundary is represented by Port Phillip Bay.

This entire region would have provided abundant food and resources and can therefore be considered as a relatively self-contained though porous geographic unit.

The geographic region of the activity area is shown in Map 5-6.



Map 5-6: Map detailing the geographic region.

5.2.4 Aboriginal Places within the geographic region

Following on from Section 5.2.1, the VAHR was searched on 24 May 2013 for previous cultural heritage investigations and records of Aboriginal heritage places within the geographic region.

A total of 1231 previously recorded Aboriginal archaeological places have been recorded within the geographic region.

Aboriginal Archaeological Place Type (Components)	Number
Aboriginal Cultural Place	1
Aboriginal Historic Place	1
Aboriginal Human Remains (Burial)	
Artefact Scatter	1149
Earth Feature	18
Low Density Artefact Distribution	309
Quarry	1
Rock Art	1
Scarred Tree	34
Shell Midden	5
Stone Feature	1

Table 5-3: A total of 1231 previously recorded Aboriginal archaeological places are located within the geographic region. Please note that Registered Places may include more than one component. As a result the total components may be greater than the total Registered Places.

Given the large number of sites within the geographic region, a search of the sites within 1 km of the activity area was undertaken. The following table details the sites that are located within 1 km of the activity area.

There are 100 sites within 1 km of the activity area, **thirteen** of which are located within the activity area.

5.2.5 Previous work in the geographic region

The reports discussed below are important as they provide an understanding about the activity area and area directly surrounding the activity area of this CHMP. They can give an indication of what to expect in the activity area regarding site types and the types of artefacts that could be found there.

A significant number of regional studies, localised studies and cultural heritage management plans have been completed within the geographic region. As a result studies completed within the activity area have been summarised below. These will provide the best indication of potential archaeology within the activity area.

Regional Studies

In response to rapid urban and industrial development potentially threatening Aboriginal cultural heritage places, du Cros (1989) conducted a survey of the western region of the Melbourne Metropolitan area, which includes the current activity area. Du Cros then espoused a site prediction model for the western region (du Cros 1989). Of particular relevance are the following points (1989:69-70):

- Burials, artefacts scatters, isolated artefacts and scarred trees will be found on river or creek flats, terraces or slopes within 100 metres of a major water course.
- Artefact scatters are also likely on points of vantage on the volcanic plains, such as eruption points (or extinct volcanoes or rises).

- Artefact scatters, isolated artefacts and scarred trees are likely to be found close to large or permanent swamps and lakes on the volcanic plains.
- The ridge tops of the mountain ranges and saddles in particular where people could travel over the ranges are the most likely places for sites. Any water sources such as local springs, soaks, major rivers and creeks are the most probable places for site occurrences.
- Sites with extensive subsurface archaeological deposits containing burials, hearths, faunal material and artefacts are most likely in areas with the best preservation.
- Contact sites are most likely to be located close to old homesteads or provisioning points.

du Cros (1991) also conducted a study and survey of the Werribee growth corridor, which includes the southern section of the current activity area. Based on her findings, du Cros was able to formulate a prediction model for the region. Those points relevant to the present activity area are (1991:33):

- Burials, cultural material in river banks, scarred trees and most artefact scatters will be found within 100 metres of major rivers and creeks.
- Shell middens are likely along terraces of major rivers.
- Stone arrangements may be found in areas of little or no disturbance.
- Sub-surface deposits are likely in the river terraces of major rivers where little disturbance has occurred.
- Contact sites are most likely in places close to old homesteads and provisioning points.

du Cros (1991:32) identified that Skeleton Creek has a lower site density than the rivers in the study area. This may be due to rural activities and urban expansion.

Webb (1991).conducted a predictive archaeological assessment of the Melbourne to Adelaide Telecom optical fibre cable route, which includes a portion of the northern section of the current activity area. Because of time constraints during Webb's survey the area between Deer Park and Ballarat was not sampled. Despite this, recommendations were made on that area (Webb, 1991: 16-17). Webb summited that most of the land between Deer Park and Ballarat was farmland with little visibility, which should be sampled. The rivers in the area exhibited little disturbance, and Webb considered these river corridors as places likely to contain archaeological remains. Webb recommended that the easement be intensively surveyed.

Schell et al (2006) completed an Aboriginal archaeological desktop report for the Wyndham Growth Area. The report detailed a number of key finding, of which the following are most relevant (Schell et al, 2006: 2-3):

1. River and major creek valleys, in particular Werribee River, Little River, Skeleton Creek and Lollipop Creek, have formed the core focus for Aboriginal activities throughout the past, with the majority of archaeological sites and site types located within a 200 m corridor around their margins. The longevity of Aboriginal activities in this zone is demonstrated by the presence of buried deposits containing artefacts within alluvial terraces of some antiquity.
2. Artefact scatters, many of them small or diffuse, and selected other site types occur widely across the intervening basalt plains, with their locations influenced by the position of localised topographic features, including minor creeks, swamps, eruption points and other elevated landforms. This is illustrated by a widespread scatter of artefacts around the lower slopes of Cowies Hill, Tarneit, which was surveyed as ploughed land offering 100% surface exposure.

Local Studies

Murphy and du Cros (1994) completed a desktop assessment of Kororoit Creek between Deans Drive Rockbank and Princess Highway Laverton. A total of 77 Aboriginal archaeological sites had been previously recorded within the study area, mainly comprising of artefact scatters and isolated artefacts. Murphy and du Cros surmised that Aboriginal archaeological sites were predominantly located from the creek bank to above the break of slope, and are dated to the last 3000 years (Murphy and du Cross, 1994: 11). Most of these sites were composed of flake pieces with few formal tools recorded. The report emphasises that Kororoit Creek was a focus of activity and possibly movement by Aboriginal people of the nearby area and therefore an archaeologically rich area (Murphy and du Cros, 1994: 11).

Lane (Lane and du Cros and Associates 1997) conducted a survey and subsurface testing of the proposed Western Ring Road, Western Freeway connection route in Deer park. This study intersects the current activity area in the north. As a result of the fieldwork four artefact scatters (7822/870, 874, 875 and 868) and five isolated artefacts. (7822/872, 869, 871, 873 and 867). None of the recorded site contained more than 8 artefacts. Artefacts were generally recorded on disturbed surfaces.

Debney (1998) undertook an archaeological survey of the proposed Western Freeway Western Ring Road connection (Railway option alignment) in Deer Park. This report intersects with the current activity area where the current activity

area intersects with the Western Freeway at the Western Ring Road connection. Four new isolated artefacts were located as a result of the survey. Debney (1998:ii) suggests that the location of these four sites suggests that although major creeks and more ephemeral creeks and swamps were the focus of some activities, the flat volcanic plains have evidence of movement as groups of Aboriginal people sought access to a variety of resources.

Light (2004) undertook a survey of 132.6 hectares of pasture land bounded by Tarneit Road to the west, Leakes Road to the north and Sayers Road to the south. The southern portion of the current activity area (south of Leakes Road) is incorporated into this assessment. During the survey ground surface visibility was extremely low (<1%). 27 Aboriginal archaeological sites were previously recorded within the activity area, and a further artefact scatter was recorded during Light's investigations. The assessment determined that there was a high potential for further Aboriginal sites to occur in the study area, with diffuse artefact scatters the most likely site type. (Light, 2004:10) Light noted that in the past, Cowies Hill may have formed a strategically located base for Aboriginal people exploiting the riverine resources of the Werribee River and Skeleton Creek and smaller swamps and tributaries (Light, 2004:10). Light's activity area was considered likely to have been a focus for Aboriginal occupation as it provides good aspects over the surrounding plain (Light, 2004:10). Despite this, development of the land for pastoral and farming land will have impacted on the preservation of Aboriginal archaeology within the area (Light, 2004:10).

Bell and Rhodes (2004) conducted an archaeological desktop investigation for the Palmers Road Corridor Strategy. As the study corridor was approximately 25 kilometres in length, the study area was broken into several sections. Area 6 (between the Western Highway and Taylors Road) incorporates part of the current activity area. Bell and Rhodes (2004: 22) considered that there is a high potential for further Aboriginal cultural material to be located in subsurface context within 250 metres of Kororoit Creek.

3. Edmonds and Long (2004) completed an Aboriginal archaeological desktop report for the Melton- Caroline Springs Growth Area. The report detailed a number of key finding, of which the following are most relevant (Edmonds and Long, 2004: 2-3):

1. Wetlands and drainage corridors, in particular Kororoit Creek, have formed the core focus for Aboriginal activities throughout the past. The majority of archaeological sites are located within 200 m of the major creeks, that is Kororoit, Toolern and Djerriwarrh and within 100 m of other smaller creeks and tributaries. Artefact scatters in particular occur in higher numbers and densities within 50 m of Kororoit Creek and there is high potential for sub-surface cultural deposits along the major and minor creek corridors.

2. The plains landscape contains a diffuse scatter of surface and sub-surface artefact scatters and/or deposits with higher concentrations of artefacts occurring on elevated areas adjacent to swamps and on eruption points, localised hills and other elevated landforms. This zone has low-moderate potential for both surface scatters of archaeological material as well as sub-surface deposits.

3. It is important to note that several modern housing developments may have incorporated and protected archaeological sites in their design process, which will require consideration in future planning decisions.

Murphy and Maitri (2005) conducted a cultural heritage assessment of a parcel of land between the Western Highway and Ballarat Road, which intersects with the current activity area in the north. No Aboriginal archaeological sites were previously located within the study area. Murphy and Maitri did not locate any new Aboriginal archaeological sites and determined that the potential for significant archaeological sites being located within the study area was low.

Matthew, Feldman and Chandler(2006) conducted a cultural heritage impact assessment of the GasNet Brooklyn – Lara Gas Pipeline Project. This pipeline intersects with a small portion of the activity area in the north. The assessment identified sites in areas of ground surface visibility and areas of archaeological sensitivity within the activity area. Four new Aboriginal archaeological sites (7822-2044, 7822-2045, 7822-2046, 7721-800 were identified and two previously recorded sites (7721-116, 7721-2-3) were re-identified during the survey. One site was an isolated stone artefact and the remaining sites comprised diffuse stone artefact scatters. The area defined as having moderate to high archaeological sensitivity comprised of the areas within 200 metres of wetlands and drainage corridors. Included in this area was Kororoit Creek, Skeleton Creek. It was noted that all landforms have the potential to contain Aboriginal archaeological sites, but that the densities at which these occur in the remainder of the study area are likely to be substantially lower than in those areas associated with wetlands and drainage corridors. A subsurface testing program was then carried out over the GasNet Brooklyn - Lara Pipeline Project (Matthews, Feldman et al. 2007). This testing program resulted in the recording of an additional four Aboriginal sites (AAV 7822-2161, 7822-2162, 7822-2160 & 7822-2163) and the revision of six existing site boundaries (AAV 7822-203, 7882-874, 7822-1074, 7822-2044, 7822-2046 & 7721-116).

Ford, Matic et al (2007) completed a regional audit of cultural heritage assets on roadsides in the Metropolitan Northwest Region, which includes the current activity area. They recommended (2007:109), amongst other things, that archaeological survey should be undertaken prior to any road works that occur in areas of road reservation or adjoining property not previously disturbed by earlier road construction, along any of the declared main roads within the study to identify if further Aboriginal archaeological sites are located within the road reserves.

Matic (2007) undertook an archaeological survey of a proposed pipeline along Taylors Road, Kings Road and Station Road St Albans. The southern portion of that study area intersects within the current activity area. No new Aboriginal archaeological sites or areas of potential were identified during the survey.

Schlitz and Freedman (2010) completed a cultural heritage assessment (Report Number 4316) for the Department of Justice Crown Land P373281, Ravenhall, which intersects with the current activity area where the current activity area intersects with the Western Freeway at the Western Ring Road connection. No Aboriginal Places were recorded during the field survey.

Cultural Heritage Management Plans

Webb and Kaskadanis (2008) undertook a complex cultural heritage management plan (CHMP10342) for the proposed Cowies Hill Potable Water Supply Main which connects Cowies Hill Reservoir to Derrimut Road in Tarneit. This CHMP activity area intersects with the most southern section of the current activity area on Tarneit Road Tarneit. The extents of two previously existing sites (7822-0564 and 7822-0530) were altered.

A CHMP was completed for Abercairn Court Punping Station, which is located for the most part within the current activity area, south of Kororoit Creek (Kaskadanis 2008). One site, Powerline Site 3 (VAHR 7822-0914), was known to be located within the activity area. During the cultural heritage assessment no further sites were located. The nature of the site was examined by two stratigraphic test pits, while the extent was established by STPs with 2 m spacing. The site contained 38 surface artefacts and six subsurface artefacts unearthed in two test pits and three STPs (TP 11, TP 12 and STP; 11B, 12A & 12B). No artefacts were found in situ. Powerline Site 3 (VAHR 7822-0914) is assessed to be of low scientific significance due to its highly disturbed context and low density of artefacts. The recommendations for this site stated that no need for further work was required, as harm to the site was avoided by the activity.

Mitchell, Richmond et al (2008) completed a complex cultural heritage management plan (CHMP10471) for 165-279 Robinsons Road Ravenhall, immediately adjacent (east) of the current activity area at the Deer Park Bypass. A previous archaeological survey had been conducted by Tardis Enterprises Pty Ltd during which time one new Aboriginal archaeological site was registered (Robinsons Road 1 7822-1994). One registered site was inspected and a sample of 20 artefacts recorded (DA1 7822-0840), the remaining two sites (7822-1040 and 7822-0867) were unable to be re-located. The spatial analysis survey, undertaken as part of the CHMP, revealed that the two sites 7822-0840 and 7822-1994 were actually one large site. Mitchell (2009:52) considered site DA 1 (7822-0840) of moderate scientific and Aboriginal cultural significance. A surface salvage was recommended for this site. Mitchell (2009:52) considered Pine Forest 1 as low cultural heritage significance and recommended that no further work was required for this site.

Feldman, Matthews et all (2010) conducted a complex cultural heritage management plan as part of the next stage 'Our Water Our Future' plan announced by the Victorian State Government in 2007 (CHMP10888). A potable water pipeline was to be constructed connecting Geelong to Melbourne’s water supplies. This project intersects with the current activity area immediately south of the intersection of Dohertys Road and Tarneit Road (in the south of the activity area). 33 new Aboriginal cultural heritage places were identified during the assessment. In addition, two previously registered places were re-identified and found to extend further within the activity area than envisaged in the original registration.

Golder Associates (Day 2010) completed a complex cultural heritage management plan (CHMP11028) for a proposed shared trail along a 3.6km section of Kororoit Creek, located at Deer Park, Victoria. This CHMP intersects with the current activity area on the corner of Robinsons Road and Winslow Crescent, Deer Park. As a result of the assessment eight new sites were documented – five of which appeared to be located in areas of disturbance or fill. Based on the land use history and degree of disturbance within the activity area and an analysis of the recovered artefacts, Golder Associates determined that the scientific and cultural significance of the Aboriginal cultural heritage within the activity area was considered to be low. Golder Associated recommended salvage of the Aboriginal archaeology within the activity area.

Rose and Kaskadanis (2011) completed a complex assessment (CHMP11407)for the following proposed activities:

- The construction of the Derrimut Interceptor Sewer-Rising Main;
- The installation of a below ground power supply;
- The construction of a vehicle access track beneath the existing transmission lines; and,
- The creation of a stockpiling area.

This CHMP is encompassed by the current activity area and sits north of Winslow Crescent and Robinsons Road, Deer Park. The assessment redefined the extent of Powerline Site 3 (VAHR 7822-0914) Two new Aboriginal archaeological places were located during the assessment. The results of the confirmed the findings of the desktop assessment in that the activity area has suffered substantial disturbances to the land surfaces, to a lesser extent directly beneath the transmission lines, relating to the following activities:

- Existing network of buried water and sewerage infrastructure developed during the 1970s;

- Pastoral and agricultural uses of the activity area including grazing;
- The introduction of fill across the transmission easement;
- The construction maintenance of the overhead transmission lines and the associated vehicle access track; and,
- The removal and re-location of basalt floaters from across the activity area to an area outside the current activity area.

Burch and Macmanus (2011) completed a complex cultural heritage management plan (CHMP11173) for Section of the proposed Regional Rail Link (RRL) extending from North Melbourne to Deer Park. This CHMP intersects with the current activity area at the junction of the Western Highway and Melbourne - Ballarat railway line Ravenhall. In addition, this CHMP runs adjacent with the current activity area along the Melbourne Ballarat Railway between Caroline Springs and Deer Park. The desktop assessment indicated that large sections of the activity area have been subject to previous significant ground disturbance. This disturbance has resulted from the construction of railway tracks and railway stations, car parking facilities, and the installation of sub surface electrical and optical fibre cables and gas pipelines. It was determined that there was no likelihood of any Aboriginal cultural heritage occurring within these disturbed areas. No Aboriginal archaeological places were located during the assessment.

O'Connor (2012) undertook a complex cultural heritage management plan (CHMP 12104), which incorporates the southern portion of the activity area on Tarneit Road, Tarneit. No Aboriginal cultural heritage places were located as part of the assessment. These results are likely due to the disturbed nature of the soil deposits across the activity area. The results of the evaluation also determined that no dense deposits of stone artefacts or other materials of cultural origin representing Aboriginal cultural heritage places of high significance are likely to occur in the activity area.

Matthews, de Lange et al (2012) completed a complex cultural heritage management plan (CHMP11272 for the proposed construction of the Regional Rail Link project; a transport development project providing a rail link between West Werribee Junction and Southern Cross Station. This CHMP intersects twice with the current activity area, both in the north (section continuing north from the intersection of Christies Road and Middle Road) and in the south (at the intersection of Leakes Road and Tarneit Road). A total of 1387 artefacts were identified within a subsurface context during the complex assessment. Flakes (n=1074 or 77.4% of the assemblage) and angular fragments (n=158 or 11.4%, comprised the majority of the assemblage, while tools (n=115, or 8.3%), cores (n=34, or 2.5%), manuports (n=5, or 0.4%) and a core fragment (0.1%) were also represented. Tools were exclusively found at Aboriginal cultural heritage places 7822-2975 and 7822-2977 (Regional Rail Link 13a and 13c), with microliths, backed blades, retouched flakes, scrapers, backed flakes, grinding stone fragments, retouched bladelets, notched flakes, notched blade, notched scraper, piercer/drills, adzes, bondi points, core tools, end scrapers, round-edge scrapers and thumbnail scrapers all represented. Silcrete dominates the subsurface assemblage (n=1091 or 78.7% of the assemblage), with quartzite (n=62 or 10.8%), quartz (n=127 or 9.2%) and other raw materials (n=17 or 1.2%) also represented. All other raw materials were recovered from Aboriginal cultural heritage place 7822-2975 (Regional Rail Link 13a). A total of 10 Aboriginal cultural heritage places were registered as part of this assessment.

Noble and Kiddle (2012) undertook a standard cultural heritage management plan over an area that intersects in the south of the current activity area (at the junction Leakes Road and Tarneit Road). No Aboriginal cultural heritage places or areas of sensitivity for Aboriginal cultural heritage were identified during the assessment. A complex assessment was not recommended.

One CHMP has been completed which covers the additional area located north of Leakes Road. This CHMP was completed for the construction of an industrial estate. Before No known Aboriginal Sites were located in the activity area prior to the assessment. During the Standard Assessment one artefact scatter (Leakes Road AS VAHR 7822-2845), and one subsurface artefact (Lot 2, Leakes Rd Ia1 VAHR 7822-2845) were located. The Complex Assessment comprises three 500x500 mm stratigraphic test pits (1m x 1m) on each landform within the activity area, 253 test holes excavated along 34 transects, and 28 radial test holes. It was recommended that site Lot 2, Leakes Rd Ia1 VAHR 7822-2845, that comprise of one angular silcrete fragment, that no further work is required as the single artefact has been collected. Leakes Road AS VAHR 7822-2845 contains four surface artefacts; a quartzite core and three quartz flakes. Harm to the site cannot be avoided due to the nature of the proposed activity. The site has been assessed as being of low scientific significance, and no salvage management measures are recommended.

One CHMP (11011) was completed immediately to the south of the additional section of the activity area (Context 2012). The investigation area for this CHMP contained 18 previously recorded sites before the CHMP was conducted. During the Standard Assessment five new sites each comprising of an isolated artefact; Truganina IA 22 (VAHR 7822-2837), Truganina IA 23 (VAHR 7822-2849), Truganina IA 24 (VAHR 7822-2848), Truganina IA 25 (VAHR 7822-2847), and Truganina IA 26 (VAHR 7822-2851). The Complex Assessment investigated 23 Aboriginal Places and did not identify any further Aboriginal Cultural Heritage. The majority of the sites (20) comprises only one isolated artefact; Truganina IA 7 (VAHR 7822-1332), Truganina IA 8 (VAHR 7822-2436), Truganina IA 9 (VAHR 7822-2437), Truganina IA 10 (VAHR 7822-2438), Truganina IA 11 (VAHR 7822-2439), Truganina IA 12 (VAHR 7822-2440), Truganina IA 13 (VAHR 7822-2441), Truganina IA 14 (VAHR 7822-2443), Truganina IA 15 (VAHR 7822-2443), Truganina IA 16 (VAHR 7822-2444),

Truganina IA 17 (VAHR 7822-2445), Truganina IA 18 (VAHR 7822-2446), Truganina IA 19 (VAHR 7822-2447), Truganina IA 20 (VAHR 7822-2448), Truganina IA 21 (VAHR 7822-2449), Truganina IA 22 (VAHR 7822-2837), Truganina IA 23 (VAHR 7822-2849), Truganina IA 24 (VAHR 7822-2848), Truganina IA 25 (VAHR 7822-2847), and Truganina IA 26 (VAHR 7822-2851). In total three artefact scatters was located within the activity area; Truganina AS3 (VAHR 7822-2826), Truganina AS2 (VAHR 7822-1330), and Truganina AS 1 (VAHR 7822-2449). The recommendation for the sites is mainly collection of surface artefacts (Truganina AS3 (VAHR 7822-2826), Truganina IA 7 (VAHR 7822-1332), Truganina IA 8 (VAHR 7822-2436), Truganina IA 9 (VAHR 7822-2437), Truganina IA 10 (VAHR 7822-2438), Truganina IA 11 (VAHR 7822-2439), Truganina IA 12 (VAHR 7822-2440), Truganina IA 13 (VAHR 7822-2441), Truganina IA 14 (VAHR 7822-2443), Truganina IA 15 (VAHR 7822-2443), Truganina IA 16 (VAHR 7822-2444), Truganina IA 17 (VAHR 7822-2445), Truganina IA 18 (VAHR 7822-2446), Truganina IA 19 (VAHR 7822-2447), Truganina IA 20 (VAHR 7822-2448), Truganina IA 21 (VAHR 7822-2449), and Truganina IA 26 (VAHR 7822-2851)). Harm could be avoided for some of the sites (Truganina IA 22 (VAHR 7822-2837), Truganina IA 23 (VAHR 7822-2849)), while other sites had to be protected by permanent fencing around the grasslands (Truganina IA 24 (VAHR 7822-2848), Truganina IA 25 (VAHR 7822-2847) and Truganina AS2 (VAHR 7822-1330)). It was possible to protect part of one site with the recommendation of surface salvage of the part of the site that could not been protected from the proposed activity (Truganina AS 1 (VAHR 7822-2449)).

One CHMP (11783) has been completed immediately to the north of the current activity area (Matthews, 2011a). The Complex Assessment for this CHMP comprised subsurface testing by excavation of 89 shovel test pits, seven 0.5x0.5 m test pits and one 1x1 m test pit. A total of seven stone artefacts, forming seven Aboriginal Cultural Heritage Places were identified during the fieldwork for this CHMP (Dohertys Road Truganina 1 VHAR 7822-2839, Dohertys Road Truganina 2 VHAR 7822-2838, Dohertys Road Truganina 3 VHAR 7822-2844, Dohertys Road Truganina 4 VHAR 7822-2843, Dohertys Road Truganina 5 VHAR 7822-2842, Dohertys Road Truganina 6 VHAR 7822-2841, Dohertys Road Truganina 7 VHAR 7822-2840). The Aboriginal Places are within land subject to subdivisions rather than ground disturbing works covered by this CHMP. A number of Aboriginal Places was avoided and did not need any specific management response. Surface salvage was proposed for two of the sites (Dohertys Creek 1 VHAR 7822-2971, Dohertys Creek 2 VHAR 7822-2972), while specific management requirements was outlined for seven sites (Dohertys Road Truganina 1 VHAR 7822-2839, Dohertys Road Truganina 2 VHAR 7822-2838, Dohertys Road Truganina 3 VHAR 7822-2844, Dohertys Road Truganina 4 VHAR 7822-2843, Dohertys Road Truganina 5 VHAR 7822-2842, Dohertys Road Truganina 6 VHAR 7822-2841, Dohertys Road Truganina 7 VHAR 7822-2840) prior to the activity taking place. One other CHMP (11646) was completed within this activity area for a separate activity, with the same results (Matthews, 2011b).

5.2.6 Historical and ethno-historical accounts of Indigenous culture in the region

The assessment also included a review of relevant documentation on Aboriginal archaeology and history of the region. This is used together with information on previously recorded archaeological site locations, and areas of the cultural heritage sensitivity in the surrounding region to formulate a predictive model on where Aboriginal cultural heritage sites are most likely to occur within the activity area and which site types can be expected.

Ethnohistory

Ethnographic information collected during the first years of contact between Aboriginal people and European settlers provides us with a vital interpretative link to the ways in which Aboriginal people organised their everyday lives in the past. Archaeologists utilise the ethnographic record as a means of informing aspects of the archaeological record. This ethnographic data provides a series of vignettes of Aboriginal behaviour in the years immediately after initial contact (Coutts, Witter et al. 1977; McBryde 1984). By piecing together this information, it is possible to construct very general ideas of how Aboriginal people utilised landscapes or resources and to develop models of Aboriginal behaviour to help explain the archaeological record (Frankel 1991).

While the available ethnographic data is a valuable historical resource, it must be treated with caution if used as the basis for reconstructions of Aboriginal society or land use practices in prehistory (Wobst 1978; Murray and Walker 1988). What ethnographic data does provide though is a view of Aboriginal society at, or just after, the point of contact between two very different cultures. Eurocentric notions of cultural superiority somewhat cloud many of the early ethnographic accounts of Aboriginal society (Coutts, Witter et al. 1977; McBryde 1984). As well as biases introduced by a Eurocentric worldview, the collection of ethnographic data during the first years of settlement in Victoria was by no means consistent. In some parts of the state, a relatively large body of ethnographic literature exists, while in other areas there may be no ethnographic data at all. Therefore, the level of ethnographic detail known for each area differs enormously, and the inferences that can be drawn for each area similarly differ. It must also be remembered that ethnographic accounts were often recorded after Aboriginal populations had suffered almost irreparable damage, and the data recorded were one or two generations removed from pre-contact times (Coutts, Witter and Parsons, 1977; McBryde, 1984a: 132-134). Despite the inherent limitations of this data, ethnographic accounts of Aboriginal society during the years immediately after contact can be used as a means of informing archaeological investigations.

The ethnographic information for the region has been synthesised into a brief general account of various aspects of Aboriginal life at the time of contact. This form of synthesis is required as much of the ethnographic data is simply not

available. From the available data, it is possible to build a very basic picture of Aboriginal life at the time of first contact with Europeans.

Social Organization

The principal unit of Aboriginal social organization in the southern parts of Victoria was the clan. The clan unit in southern Victorian Aboriginal society was a patrilineal descent group, sharing historical, spiritual, economic, territorial and genealogical identity (Barwick 1984; Clark 1990). At the time of first contact between Aboriginal people and Europeans, much of southern and central Victoria was the traditional estate of the five tribal groups shown in Table 5-1. The activity area falls within the lands of the Woi Wurrung. Each of the five tribes consisted of numerous smaller clans. The activity area falls within the clan estate of the Karung jang balug. The common spiritual, economic, genealogical and political identities shared by many of the clan groups, resulted in the larger tribal groups also being intimately interconnected. Table 4-7 (below) describes the known tribal groups of south central Victoria and their traditional territories.

Name	Territory
Bun Wurrung	Mornington Peninsula and Westernport Bay, north into the Dandenongs
Woi Wurrung	Yarra and Maribyrnong rivers and surrounding tributaries. To Mt Macedon, Mt William, Kilmore. East of the Werribee river
Wada Wurrung	Bellarine Peninsula, Otway Ranges, west of the Werribee river to Streatham
Djadja Wurrung	Loddon and Avoca river catchments, Bendigo
Daung Wurrung	Kilmore to Euroa, east to Mt Buller, west to Kyneton.

Table 5-4: The known tribal groups of south central Victoria and their traditional territories. These tribal groups consisted of numerous smaller clans. There are numerous variations in the spelling of each clan or tribe name; however for consistency we follow Clark (1990)

The clan was further subdivided into individual family groupings, known as a 'band' (Presland 1994). These smaller family units were the principal economic unit of the clan on a day-to-day basis. Social, ceremonial, or ritual gatherings between band, clan and tribe were common. At these gatherings ceremonial duties were discharged, alliances formed, marriages arranged, goods traded, and kinship obligations met. Gatherings of up to 800 people at a time were known to have occurred in the region (McBryde 1978; McBryde 1984; McBryde 1984).

Economy

The traditional territories of the Woi Wurung encompassed a vast range of available economic resources. Their traditional territories stretched from the foothills of the Great Dividing Range in the north, south to sheltered bays, and the open ocean. While there is no doubt that members of the various clan groups within the Woi Wurung tribal areas would have utilised both coastal and hinterland resources, the activity area in question here is somewhat removed from the coast.

In the wider Melbourne area, there have been several compilations of extant plant and animal species. While these are modern accounts of biological diversity, for the most part these compilations assume that these species would have been indigenous to the same regions in the recent past. Indeed, the compilations for Woodlands Historic Park (See Table 5-5 below) were collected to reflect what the landscape and fauna might have been like in 1840. Table 5-5 presents a summary of the flora and fauna data available for selected sites within the wider region. While it is unlikely that Aboriginal people made use of all species of flora and fauna, the number of available species illustrates the biological diversity present. As Table 5-5, below, shows the various locations examined were home to in excess of 300 vascular plant species, 150 species of birds, 15 species of mammals, nine species of amphibians, numerous reptiles, and several species of fish (Carr, Peake et al. 1996; Parks Victoria 1997; Parks Victoria 1998; Parks Victoria 1998).

Area	Flora	Fauna
Brisbane Ranges National Park	619 Vascular Species	170 birds, 25 mammals, 24 reptiles, 15 amphibians
Woodlands Historic Park	343 Vascular Species	150 birds, 15 mammals, 9 amphibians, 6 reptiles, 3 fish
Woodlands Historic Park	347 Vascular Species	148 birds, 15 mammals, 9 amphibians, 16 reptiles, 3 fish
Organ Pipes National Park	Not Known	15 mammals, 88 birds, 6 amphibians, 13 reptiles

Table 5-5: Summary of various plant and animal species present in various areas in contemporary times. While not all would have been utilised, the numbers of species present demonstrates the enormous biological diversity available.

From early ethnographic accounts and contemporary research, it is known that the Aboriginal people of the Melbourne region hunted, fished, or trapped a wide variety of fauna. This dependence on local flora and fauna demanded extensive knowledge of variations in seasonal availability and ecology (Coutts 1981; Coutts 1981; Kirk 1981). The animals hunted throughout the Melbourne region included kangaroo, emus, possum, bandicoot, koala, echidna, wombat, and a variety of reptiles and smaller marsupials (Winter 1837; Thomas 1854; Bunce 1859). Bunce (1859) believed that possum was the most common target in upland areas as they were common than kangaroos or wallabies. He commented that their diet was 'varied occasionally by wombat, native bear and porcupine' (Bunce 1859). Birds were caught in nets, traps or by hand. Fishing by trap or spear and eel harvesting were also widely used modes of food procurement throughout south-eastern Australia (Bunce, 1859; Coutts, 1981b).

Aboriginal people also placed great reliance upon the procurement of plant foods from their clan estates. While hunting activities often receive priority in contemporary accounts of prehistoric ways of life, the procurement and processing of various plant taxa was of vital economic importance (Gott 1982: 59-67). The ethno-botanist Beth Gott estimated that vegetable foods gathered from the areas surrounding Melbourne approximated half of the diet of the Aboriginal population of the region.

Certain plant foods are regarded as having been staples in Aboriginal diets prior too European settlement. The 'Yam Daisy' (Frankel 1982: 43-45) or 'Murnong' (Gott, 1982: 59-67; 1983: 2-18) -Microseris scapigera - is particularly noted as having been a staple food throughout the region, and indeed many parts of Victoria. Other plants contributed to nutritional requirements, as well as having medicinal uses or a more utilitarian function in the manufacture of utensils, string, baskets or clothing. Mueller (1866) noted that local Aboriginals within the Upper Yarra Valley and Dandenong Ranges region used the bark from the Manna Gum in the manufacture of flat shields and canoes and wood from the Messmate Stringybark to manufacture spears. The importance of subterranean tubers such as the 'yam daisy', however, was its ease of procurement and consistency of availability. Not only was this food source extensive and required limited processing, it was available year round (Gott, 1982: 59-67), and 'was always a fallback food' (Gott, 1999: 41-45). The Yam Daisy or 'murnong' was common on the landforms adjoining the Yarra River and its associated drainages such as the Wandin Yallock Creek (Ellender 1991: 9).

Trade and Exchange

The work of Isabel McBryde at the Mt William greenstone quarry (McBryde and Watchman 1976; McBryde 1978; McBryde 1979; McBryde and Harrison 1981; McBryde 1984; McBryde 1984) established the existence of a complex trade and exchange network operating in the region at the time of European contact. McBryde successfully identified the source of hundreds of greenstone hatchet heads found across south-eastern Australia since European settlement. While there were several sources identified, McBryde was able to show that the greenstone sourced from the Mount William quarry was more widely distributed across southern Australia than that from any other quarry – in other words, more of the Mount William greenstone had travelled further than stone from any other source. The significance of this is not simply that the material was widely distributed; the significance of the dispersal lies in the fact that exported Mount William greenstone was found in areas where the extant population had access to local greenstone of equal quality and utility.

McBryde (1984b: 268) found that greenstone quarried from other sources tended to be found within about 100 kilometres of the source, while the majority of the Mount William greenstone in her sample (n=224) was located at distances greater than 300 kilometres from the source, and was generally distributed to the west of Mt William. This patterned distribution in the archaeological record cannot simply be explained as a coincidence, or an artefact of site survival. Clearly, some type of behavioural influence was determining the widespread dispersal of this material. The survival of complete uncurated hatchet heads at great distances from the source, and the existence of heavily worked

hatchet heads from other quarries in the same assemblages as the curated material indicate that the greenstone from Mount William held far more than just utility value. Frankel (1991: 128) however, noted a problem with McBryde's analysis. The way in which McBryde calculated the distribution and density of axe heads from the Mt William quarry created a distortion in the data. McBryde calculated the number of hatchet heads in 50 kilometre wide bands radiating away from Mt William. McBryde did not account for the increase in area of each of these bands, as each band got further away from Mt William. Frankel (1991) recalculated McBryde's data for the area west of the Mt William quarry. While the results were broadly similar, the ratio of hatchet heads found per 10,000m2 was higher closest to the quarry, and very few hatchets were found between 50-150km from their source, and the distribution at greater distances is more even than McBryde's analysis suggests (Frankel, 1991: 128).

The patterned distribution observed by McBryde (McBryde, 1978; McBryde, 1984a; McBryde, 1984b; McBryde and Harrison, 1981; McBryde and Watchman, 1976) can be interpreted as part of a complex ethno-historical system of trade and exchange between the traditional owners' of the Mt William greenstone quarry, and the recipients of its product (i.e. hatchet heads). The widely distributed nature of the Mt. William greenstone indicates that this particular stone held much more than simple utility value. The goods being traded (i.e. the greenstone) were more meaning-laden than a piece of stone would otherwise suggest. The items being exchanged formed part of a larger reciprocity system, where information, meaning, and socio-political identity were encoded in the act of exchange; and indeed, were the currency.

The patterning of the distribution of Mt William greenstone was also found to reflect the alliance and kin networks of the Kulin and their closest allies. McBryde (1984b: 284) identified that greenstone from Mt William occurred most abundantly in areas linguistically related to the Kulin, such as central and north-western Victoria, south-western Victoria, and south-eastern South Australia. The distribution of Mt William greenstone also illustrates the ethnographically recorded socio-cultural isolation that existed between the Kurnai of eastern Victoria, and the Kulin of central Victoria. The enmity that existed between the two language groups resulted in a distinct social, political and economic boundary between the Kulin and the Kurnai, and open hostility between the two groups was relatively common (McBryde, 1984b). McBryde's (1984b: 278) analysis showed that although 70% of the Mt William greenstone in her sample was found distributed outside of the Kulin territories, none found its way east of Wilson's Promontory into the lands of the Kurnai people.

European Impressions

A passage written by Aboriginal Protector William Thomas to colonial Superintendent Charles La Trobe describes the daily activities of members of the Kulin tribes near Melbourne.

> *'In the Kulin tribes they seldom travel more than six miles a day. In their migratory movements, all are employed. Children getting gum, knocking down birds; women are digging up roots, killing bandicoots, getting grubs, the men hunting and scaling trees for opossums. They are mostly at the encampment an hour before sundown… (Thomas 1854: 397-434).*

Many early European settlers were often struck by the ease with which the Aboriginal inhabitants of the area could procure sufficient resources for themselves. This is almost to be expected in one sense, as some of the early European settlements of the Melbourne region initially struggled in the new and strange conditions (Shaw 1996: 1-16).

Exploring north-west of Geelong in early 1837, Thomas Learmonth and his party surprised a large Aboriginal camp:

> *At the mouth of the Pirron Yalloak…..we came upon them so suddenly that they had time only to set fire to their mia-mias as a signal of danger to the other tribes' (Learmonth 1853:96.).*

By this action, it must have been apparent to Learmonth and party that there were other camps of indeterminate number located nearby. Learmonth continued,

> *'near our encampment we found a fishing weir of the natives, in which were small conical nets of good workmanship. Nearly a bushel of delicious little fish like whitebait was in the nets, part of which we took, and faithfully remunerated the owners by giving provisions to a couple of men whom we induced to approach' (Learmonth, 1853:96).*

This seemingly casual encounter throws some light upon the efficiency of Aboriginal fishing technology, the abundance of fish available, and the importance of aquatic environments. A 'bushel' weighed approximately 30 kilograms (67 pounds), equating to a considerable number of fish trapped, thus allowing a significant number of people to be fed. This is the yield presumably from one weir and one set of nets, for a part of one day. The fish caught may have been one of the numerous indigenous fish species from Victorian waterways, which normally do not exceed 8-10cm in length. Species such as Smelt, Hardyhead, Gudgeon, Pigmy Perch, Gobies, and Galaxids were all relatively abundant (Barnham 1998).

Another early settler, Evelyn Pittfield Sturt appeared impressed at the skill shown by Aboriginal people in the procurement of ducks:

> *It is curious to observe the skill shown by the natives in their pursuit of game. They catch vast numbers of ducks in an ingenious manner. The lagoons run for some length, narrowing at the end, where the trees close in; two or three blacks plant themselves near this narrow pass, having extended a large net from tree to tree, the others then proceed to the top of the lagoon driving the ducks before them. As they fly by the ambuscade, they throw their boomerangs whizzing over the heads of the birds, which dreading that their enemy, the hawk, is sweeping at them, make a dash for the trees, strike the net, and fall as if shot, when the natives dash in after them. I imagine it is a panic, which seizes the poor birds, for I have seen a hundred caught by such means' (Sturt 1853).*

Joseph Tice Gellibrand remarked:

> *'In the winter season they live principally upon fish and game. Upon the plains, there are immense quantities of Rats which resemble the English Rat and of which the natives are very fond. The women and children are employed in catching these rats at the same time they gather the roots' (Gellibrand 1836: 6-35).*

5.2.7 Pleistocene Archaeology

This section is not intended as an exhaustive review of the Pleistocene archaeology of south eastern Victoria as archaeological data from the Pleistocene period for Victoria is relatively limited, despite many years of investigation and an ever-increasing number of known Pleistocene sites. Pleistocene archaeological evidence of human occupation of Victoria is essentially restricted to a handful of excavated sites - Kow Swamp, Clogg's Cave, Billimina, Drual, New Guinea II, Lake Bolac, Lancefield Swamp, and Box Gully.

Keilor and Green Gully

Through the work of a great many individuals (Mahony 1943; Wunderly 1943; Keble and Macpherson 1946; Gill 1953; Gill 1954; Gill 1955; Gill 1966; Bowler 1969; Bowler 1970) spanning several decades, much has been determined from the single cranium discovered at Keilor. The initial investigations revealed that, based on size and anatomical attributes, the cranium most probably belonged to a middle-aged male (Wunderly, 1943). This has subsequently been the subject of some debate, with Alan Thorne placing the male crania into the modern female range of size variability (Thorne 1977: 189; Thorne 1980). This conclusion, however, was rejected by Brown who determined that the cranium was that of a 'large and robust male' (Brown 1987: 45).

Initial estimates of the age of the Keilor cranium relied solely upon erroneous geological and geomorphological associations. The development of 14C dating techniques during the 1950's provided a means to date the Keilor cranium, independent of the problematic geomorphic correlations postulated by Mahony (1943). Edmund Gill (1953) produced the first 14C dates for the Keilor crania site. Gill dated various cultural features from the location where the Keilor cranium was originally recovered. This series of dates provided an absolute age of between 9,000 and 10,000 years for the terraces in which the cranium was located. Gill (1966) subsequently revised these ages upwards and finally settled upon an age of 19,000 years BP for the Keilor cranium. This age was based upon his belief that the cranium was a true fossil, and as such was older than the terraces in which it was discovered, and the numerous similar dates coming to light from all over Australia during the 1960's. Mulvaney (1964) attempted to answer many of the lingering questions surrounding the Keilor site by conducting a new series of excavations. This was, however, unsuccessful as a flash flood washed all of Mulvaney's excavation into the Maribyrnong River (Mulvaney, 1964).

While there is data indicating human presence throughout south-eastern Australia as early as 30,000 years ago, many of the older 14C determinations existing for the study area date non-cultural events (i.e. sediments associated with artefacts), and as such should be regarded with some caution (Gallus 1969; Godfrey, Bird et al. 1996).

Kow Swamp

Between 1968 and 1972 Alan Thorne excavated the skeletal remains of approximately 22 individuals from Kow Swamp, near Leitchville, Victoria. The skeletal material dates from between 13,000 ± 250 (ANU-403b) and approximately 6,500 years BP. The Kow Swamp burials are best known for their place within the wider debate of human origins in Australia and Aboriginal skeletal morphology than any other issue. Detailed reports on the Kow Swamp burials have never been published, and the remains have subsequently been reburied (Thorne and Macumber 1972; Lourandos 1997; Munro 2000; Brown 2002).

Clogg's Cave

Josephine Flood excavated this limestone cave, located at Buchan in East Gippsland, during 1971-72. Human occupation of Clogg's Cave dates to 17,720±840 BP (ANU-1044). As well as an extensive suite of extant faunal remains, limited extinct faunal remains, and some bone points from the Pleistocene levels of the excavated deposits, a small amount of lithic material was recovered (Flood 1974). Seventy artefacts were recovered from the excavated deposits. These artefacts consisted of a microlithic industry dating to about the last 1,000 years, with an underlying macrolithic

industry. The microlithic artefacts were generally 'bipolar scaled artefacts, small low-angled scrapers and backed blades' (Flood, 1974:176-177). Flood (1974) also noted that geometric microliths dominated the backed blades found, as was the case in other Victorian sites. The raw materials found at Clogg's Cave include quartz, chert, jasper, and quartzite. Silcrete is noticeably absent from the Clogg's Cave assemblage.

Flood (1974) concluded from the evidence at Clogg's Cave, and various other Australian Pleistocene assemblages, that there was generally little change in the form of the lithic assemblage at Clogg's Cave until after about 8,000 years ago. It was not until the introduction of hafting technology, and the 'small tool phase' that any great variation is seen in the assemblage (Flood, 1974:184-185). The small amount of lithic material recovered from Clogg's Cave renders it difficult to compare the assemblage to other contemporaneous assemblages in any detail.

New Guinea II

The discovery of the New Guinea II cave site is attributed to Rudy Frank of La Trobe University. Situated on the western margin of the Snowy River, 50 kilometres from the coast, New Guinea II was excavated between 1980 and 1985 by staff and students of La Trobe University. The area inside the cave proper was not excavated to protect fragile rock art; however some 45 square metres near the cave entrance was investigated (Ossa, Marshall et al. 1995). The results from New Guinea II were broadly similar to those of Clogg's Cave. Significant quantities of faunal remains were discovered, along with five bone points. A small amount of lithic material was recovered, which was predominantly chert (n=164), quartz (n=30), and other fine-grained siliceous materials (n=52). Other raw materials present included a quantity of limestone flakes (n=10). Ossa et al. (1995) classified artefacts with a mass greater than 5 grams as being 'large', while those less than 5 grams were considered 'small'. Of the 285 artefacts recovered in the shelter area, 88.1% were recorded as being 'small'. There were few formal tools recovered during the excavations. Core/Pebble tools were the most common, but Ossa et al. (1995) noted that this classification is not without its problems. One small blade core was located deep in the sequence, while the remainder of the small blade cores were located in the upper levels of the deposit. Only two geometric microliths were recovered, and these were in the upper two layers of the deposit. Ossa et al. (1995) concluded that the material recovered demonstrated a low-density occupation sequence commencing approximately 21,000 BP and continuing until the late Holocene.

Drual and Billimina

These two important rock shelter sites are located in the Grampians - Gariwerd ranges of south-western Victoria. Originally excavated by Peter Coutts and the VAS in 1975 (Coutts and Lorblanchet 1982; Bird, Frankel et al. 1988), both of these sites have later proved to possess far greater antiquity and diversity than was at first thought. Prior to recent reassessments of the material from Drual and Billimina it was argued that these sites were only occupied in the late Holocene, as recently as 3,500 BP (Mulvaney and Kamminga 1999), and that no clear change or variation was discernable in the stone tool assemblages (Bird and Frankel 1998). A program of re-dating sediment and re-analysing lithic materials from these sites led to a radical reassessment of both the antiquity of the sites, and the variation in the stone tool assemblages.

New radiocarbon determinations from Drual revealed basal occupation dates of approximately 22,000 BP. Similarly, newly dated evidence from Billimina provided a non-basal date of approximately 9,000 years BP, allowing Bird and Frankel (1998) to argue that cultural material began to accumulate at Billimina before 10,000 BP. These age estimates are significantly different to the original dates obtained by Coutts, and resulted in a reappraisal of the sequence of human occupation of this part of south-western Victoria. Both assemblages are defined as being of low density. Although the raw material types present at Drual are diverse, Billimina does not display the same diversity.

The Billimina assemblage is generally more reduced than the Drual assemblage, indicating differential access or utilisation/scheduling of raw materials. The greater proportion of waste material and cores at Drual may also be indicative of wider ranging tool production activities (Bird and Frankel, 1998).

Lancefield Swamp

In 1975-76 excavations at the Lancefield Swamp, approximately 75 kilometres northwest of Melbourne, revealed a buried bone bed dated to 26,000 BP. This bone bed contained the remains of some 10,000 extinct animals, as well as 2 quartzite artefacts in association with the bone bed. A further 191 artefacts were found in sediments overlying the bone bed. This site provides tantalising evidence for the co-existence of humans and megafauna during the Pleistocene. Although there is a paucity of dated material from the lower levels of the excavations, the implications are that Aboriginal people and the megafauna coexisted in southern Victoria for a period of at least 7,000 years (Horton 1976; Orchiston, Miller et al. 1977; Gillespie, Horton et al. 1978; Horton and Wright 1981). Recent excavations at Lancefield undertaken by the University of Sydney (Dortch 2004) may provide further information on the Lancefield swamp site.

Box Gully

In 2001 excavations at Box Gully in northern Victoria revealed evidence of ephemeral occupation within the remains of an ancient lunette. Radiocarbon determinations place some of the occupation episodes at between 32,000 cal BP and 26,600 cal BP. The stone tool assemblage recovered from the excavations contained only 7 items, and as such is too small to draw any revealing inferences. However silcrete, quartz and chert are present within the assemblage. The presence of silcrete and chert is uncommon in Murray Valley sites (Richards, Pavlides et al. 2007).

Summary of Pleistocene Archaeological Evidence in Victoria

Several other sites in Victoria are dated to the terminal Pleistocene. These sites include a coastal cave, (Bridgewater Cave-Discovery Bay) dated to between 10,760±10 BP (Beta-8465) and 11,390±310 BP (Beta-3923), freshwater shell middens on the Murray River dated to between 11,250± 240(GAK-1062) and 19,980±220 (Beta-58969), and a hearth site at Lake Bolac containing kangaroo bone and quartz artefacts dated to 12,480±560 BP (SUA-1335). Although numerous sites date from 22,000 BP to the beginning of the Holocene, there is few well-documented lithic assemblages on which to construct regional sequences (Bird and Frankel, 1998). Bird and Frankel (1998) have discussed four regional Pleistocene sequences. They are

1. East Gippsland (Clogg's Cave and New Guinea II)
2. Murray River Valley (Kow Swamp, Lake Victoria, Karadoc Swamp)
3. Maribyrnong River Valley (Keilor and Green Gully)
4. Far West Coast (Discovery Bay-Bridgewater Cave)

One unifying theme in all of the Pleistocene assemblages is the relatively small size of the recovered samples. As Bird and Frankel (1998:59) also note, quantitative comparison between artefact assemblages is challenging, as many results have not been published. The lack of a common artefact classificatory system is also problematic. The Pleistocene assemblages show a remarkable degree of variation across Victoria. The main variations are summarised in Table 5-6, below, adapted from Bird and Frankel (1998).

Area	Sites	Raw Material Availability	Technology	Tool Types
East Gippsland	New Guinea II	Diverse	Freehand	Pebble Tools
	Clogg's Cave	Intersite Variability		Large Scrapers
Maribyrnong	Three Open Sites	Silcrete and Quartz	Bipolar	Large Scrapers
		Intersite Variability	Freehand	Small Scrapers
Murray Valley	Numerous Floodplain Sites	Sparse	Bipolar	Small Scrapers
		Quartz		
Discovery Bay	Numerous Open Sites	Flint	Freehand	Large Scrapers
	Bridgewater Cave			
Gariwerd	Drual	Quartz and Quartzite's	Bipolar	Large Scrapers
	Billimina	Intersite Variability	Freehand	Small Scrapers

Table 5-6: Regional Pleistocene assemblage trends identified by Bird and Frankel (1998).

Unfortunately, it is not possible to be more precise with much of the Victorian data. The data sets do not have the chronological resolution to allow finer grained analysis, thus blurring the relationships between older and younger materials at each site, and the inter-site relationships between sites of similar content and context.

5.2.8 Wider Victorian Holocene Archaeology

The Holocene period, in general, has been characterised by several archaeological phenomena apparently unique to this period, which have become the subject of intense archaeological debate (Lourandos 1976; Lourandos 1977; Lourandos 1980; Ross 1981; Lourandos 1983; Williams 1984; Ross 1985; Williams 1987; Bird and Frankel 1991; Bird and Frankel 1991; Frankel 1995; Holdaway 1995; Bird and Frankel 1998). In contrast to the late-Pleistocene and early Holocene, the mid-Holocene (circa 5,000 BP onwards) has been regarded as a period of rapid social, economic, technological and demographic change throughout Australia, and is commonly referred to as 'intensification' (Lourandos, 1983).

The transition from the Pleistocene to the Holocene in Australia is both a 'reality of climate history' (Frankel, 1995:649) and a contemporary intellectual construct. Single site or pan-continental analyses of stone tool technology in particular, have led to a '…consensus view that the Pleistocene-Holocene transition did not involve any significant change in stone tool manufacture' (Holdaway 1995: 795). This apparent lack of change in stone tool assemblages through time (until the mid-Holocene) has however been described as a product of archaeological method (Holdaway 1995) rather than a product of the material under analysis, inadvertently highlighting the apparent changes in stone tool technology in the mid-Holocene. A closer analysis of stone tool assemblages at regional scales dated to either side of the Pleistocene-Holocene transition is seen as one method of redressing the balance and archaeologically challenging the standard view of apparent cultural and technological homeostasis until at least the mid-Holocene (Frankel 1995; Holdaway 1995).

Numerous perceived variations in the archaeological record upon which the intensification argument has been constructed were summarised by Bird and Frankel (Bird and Frankel 1991) as:

1. Increase in the number of sites,
2. Increased sedentism,
3. Use of marginal environments,
4. Development of facilities (i.e. fish trap complexes),
5. Alliance and exchange systems, and
6. Increased ceremonial activities.

Coincident with the postulated 'intensification' occurring in prehistoric Aboriginal society, many archaeologists have identified a pan-Australian stone tool industry emerging at about 4,500 BP. This industry emerging in the mid-Holocene is known as the 'Australian Small Tool Tradition' (ASTT) and is characterised by the presence of backed blades and geometric microliths in assemblages, and is commonly associated with the manufacture of timber hafted tools. This ASTT has come to serve as a chronological marker in Australian archaeological sequences, indicating the relative chronology of assemblages by the presence or absence of these supposedly diagnostic artefacts (i.e. backed blades). This 'chronology by association' is often utilised with surface artefact scatters, which are difficult (if not impossible) to date by any other means. The timing of the introduction of the ASTT is commonly held to be the mid-Holocene, at approximately 4,500 BP (Mulvaney and Kamminga, 1999) but may be as early as 9,000BP. Alongside the introduction of new stone tool technologies, the raft of perceived changes in the mid-to-late Holocene archaeological record of south eastern Australia are seen by some as a 'package of related events' (Bird and Frankel 1991: 1) occurring more or less simultaneously. A review of the available evidence however, draws into question many of the premises and relationships upon which the intensification arguments are based.

Many site chronologies have been built upon the dichotomous relationship between small tool type presence (< 4,500 BP) and small tool type absence (>4,500 BP) in artefact assemblages. This dichotomy is assumed to have specific chronological significance (Bird and Frankel, 1991a) and marks the pan-continental introduction of this technology (Hiscock and Attenbrow 1998). Bird and Frankel (1991a) however, argue that this dichotomy is an artificial relationship, and is not suitable for the construction of chronological sequences based simply on the presence or absence of identifiable 'marker'[s] (Bird and Frankel, 1991a: 2-3). The validity of basing regional chronologies upon this dichotomous ASTT presence or absence has also been demonstrated as erroneous by Hiscock and Attenbrow (1998). Evidence from the Upper Mangrove Creek for example, has revealed the presence of backed artefacts in deposits radiocarbon dated to between 5,500 BP and 8,500 BP at Mussel Shelter (Hiscock and Attenbrow, 1998:55) and '…older than 8,000 years BP' (Hiscock and Attenbrow, 1998:57) at Loggers Shelter.

A significant effect of the use of the ASTT as a chronological marker may have been the artificial inflation of the number of sites thought to date to more recent periods, largely based on the presence of backed blades or geometric microliths. The sites where a typological chronology has been employed are typically surface artefact scatters where there is only a remote possibility of recovering radiometric dates (Bird and Frankel, 1991b). As these sites cannot be accurately dated, and the use of typological markers as the basis for chronologies is flawed, it is 'effectively impossible to fit these sites into a regional chronological framework' (Bird and Frankel, 1991b: 188).

An apparent increase in the number of coastal shell middens from the mid-Holocene onwards is also seen as a component of the intensification of regional prehistoric Aboriginal behavioural. However, this apparent increase in the number of shell middens is also a flawed premise upon which to construct models of regional change. Bird and Frankel (1991a: 3) argue that taphonomy, site survival, and research agendas have all played a part in creating a biased view of the archaeological database. For example, shell middens make up approximately 50% of the 14C determinations of Bird and Frankel's (1991a) study area. Taphonomic and post-depositional processes along coastal margins are considered to artificially bias the archaeological database, inflating the number of younger sites. It is highly unlikely that many (if any) coastal shell middens more than about 6,000 years old have survived the advance and stabilisation of sea levels at or near their contemporary mark. Early Holocene or Pleistocene shell middens that may

have existed on early coastlines could not have survived the rising of the seas (Rowland 1989). Similarly, research bias may have also favoured the selection of sites displaying better preservation (i.e. generally younger). The combination of these factors may have resulted in the chronological range of 14C determinations being artificially truncated, while the overall number of younger 14C determinations has been artificially inflated, suggesting a dramatic increase in the number and use of coastal sites.

Arguments in favour of increased sedentism in the Holocene, particularly after about 2,500 BP, are often based upon the emergence of a different type of archaeological evidence - earth mounds. A date of approximately 4,000 BP has been recorded at an earth mound site near the Wakool River in the Murray Valley (Berryman and Frankel 1984) however the majority of other investigated mounds in Victoria are dated to about the last 2,000 years (Frankel, 1991a). In her study of earth mounds on the volcanic plains of Western Victoria, Elizabeth Williams concluded that the earth mounds were constructed as 'hut foundations, general camping places, and ovens' (Williams 1987: 317). Bird and Frankel (1991a: 7) however, argue that the archaeological evidence for deliberate construction of these earth mounds as hut foundations is tenuous, and residential use is most likely a secondary use of the mound features.

The notion that an aggregation of large numbers of earth mounds indicates increased sedentism also appears flawed. As Bird and Frankel conclude 'mounds often appear as clusters but where adjacent mounds have been dated they may be separated in time by as much as 1,000 years' (1991a:8). The construction of mounds is seen more as evidence of localised responses to the wetter conditions of the last 2,500 years, than any increase in sedentism (Bird and Frankel, 1991a:8).

The emergence of 'stone houses' in parts of south-eastern Australia, such as those at Lake Condah (Coutts, Frank and Hughes, 1978) has also been interpreted as evidence for increased sedentism in prehistoric Aboriginal populations, and associated with increases in local productivity (through fish traps), and population growth. It is implied in the literature (Coutts, Frank et al. 1978: 42; Flood 1989: 205-207) that these supposed village sites (complete with stone houses) were more or less permanently occupied, and in close association with the fish trap complexes, such as Lake Condah (Clarke 1994: 11). There is however, no archaeological evidence to support this, nor is there any archaeological evidence demonstrating contemporaneity of occupation (Bird and Frankel, 1991a: 8; Clarke, 1994:11). It has subsequently been argued that the stone houses may represent 'post contact refuge areas' and were not part of a wider prehistoric settlement system (Bird and Frankel, 1991a:8). Although this view of European influenced post-contact housing construction (i.e. mimicry) is also somewhat problematic.

Two types of food procuring facilities have been identified in south-eastern Australia that have played a significant role as archaeological evidence supporting the prehistoric Aboriginal 'intensification' (Lourandos, 1983) argument. These facilities are commonly referred to as 'fish traps', and extensive examples have been recorded at Lake Condah, Toolondo and Mount William in central Western Victoria. The Lake Condah example developed as a result of the hydrology along the edges of the basalt plains with human intervention (Bird and Frankel, 1991a; Coutts, Frank and Hughes, 1978), while the second type of facility recorded at Toolondo and Mount William consists of extensive systems of 'earth cut channels and ditches' (Bird and Frankel, 1991a:8). While it has been argued that these food-procuring systems are evidence for increases in productivity, populations and sedentism, the antiquity, utilisation history and construction sequencing of the features is not entirely clear. The Lake Condah system however, is geomorphologically constrained, and cannot be more than about 4,000 years old (Head, 1989). There is no archaeological evidence available to determine if this feature was gradually or rapidly constructed. Bird and Frankel (1991a:8) argue that these systems could have emerged over a long period rather than because of sudden demographic or environmental pressures or processes.

The development of trade in materials such as greenstone for hatchet heads (McBryde, 1978; 1979; 1984a; 1984b), and the remains of ceremonial sites such as stone arrangements and earth rings (Frankel 1982) have also been argued to be elements of a wider intensification and development of socio-economic alliance and reciprocity systems. While these phenomena are of undoubted archaeological significance, their place within debates of prehistoric Aboriginal intensification is unclear. None of these archaeological features (i.e. Sunbury earth rings or Mount William hatchet quarry) has been adequately dated. The best estimates available for the introduction of hatchet heads into the archaeological record in south-eastern Australia is sometime after 4,500 BP (Mulvaney and Kamminga, 1999) and possibly as recently as 2,000 years ago (Frankel, 1991a). Whether this apparently recent introduction of hatchet heads proves to be the case, or it has been an artefact of research biases is yet to be determined. Bird and Frankel (1991a: 9) argue that it is difficult to include any of these types of archaeological phenomena into discussions of prehistoric change as none have been directly dated.

What emerges from a review of the evidence for late-Holocene intensification appears to be an over-reliance upon modern ethnographic analogues, a distinct lack of archaeological evidence for many of the perceived changes in prehistoric Aboriginal behaviour, and an over-reliance upon 'social' explanations (Bird and Frankel, 1991a) for archaeological phenomena poorly understood and often over-represented in the research database. While the intensification of Aboriginal prehistoric society is indeed possible, the current archaeological evidence does not offer unequivocal support for this position. Of greater concern is the perceived need to argue that Aboriginal society was intensifying and advancing towards an agricultural state as Williams, for example, has argued (Williams, 1987:320).

The supposed cumulative long-term structural changes in prehistoric behaviour culminating in the intensification of Aboriginal society and the eventual emergence of agriculture is rooted within a social evolutionist paradigm (Bird and Frankel, 1991b) that is not demonstrated by the archaeological evidence in Australia, and is generally not supported by the archaeological evidence of hunter-gatherer societies anywhere in the world. The emergence of agriculture was by no means inevitable or necessary (Rowley-Conwy, 2001) - nor should it be viewed as such.

Context of Pleistocene and Holocene Sites in the Activity Area

There has been little pure archaeological research to date within the activity area and surrounds, although there have been cultural heritage management investigations (See Sections above). The Pleistocene site of Keilor/ Green Gully is within 10 kilometres of the current activity area. Whilst Pleistocene remains may occur in the activity area, it is generally thought that the majority of surface archaeological sites within close proximity to the activity area are of late Holocene antiquity. This assumption is based on (a) the artefact assemblages most often encountered, and (b) the geomorphic sequences where the cultural materials sites are found (i.e. late Holocene landforms). These sites consist mainly of stone artefact scatters and scarred trees. Throughout the wider region there are numerous artefact scatters, stone procurement locations, scarred trees, and earth features. However, well excavated and dated cultural sequences are rare, as are sub-surface deposits which offer the potential to expand the archaeological record.

5.2.9 Landforms and/ or geomorphology of the activity area

The CHMP included a review of the physical context and natural resources present within the activity area. These environmental factors affect how people used the landscape in the past. This information is used to gain an understanding of past human behaviours and provides an indication of where archaeological sites and heritage places may be located within the landscape. These environmental factors are summarised below.

Geology and Geomorphology

The activity area forms part of the Werribee Plains catchment region.

The vast majority of the geology is characterised by unnamed sheet flow basalt (Qno1) of Neogene (Miocene) age, and forms part of the Newer Volcanic Group A small section of the activity area in the south (in Tarneit), is unnamed alluvium (Qa1) and is of Quaternary (Holocene) age.

The activity area forms part of the Victorian Western Plains geomorphological region, which is made up of low-lying undulating plains formed on both volcanic and sedimentary lithologies.

The plains developed on the older Newer Volcanic lavas that formed in the Late pliocene and during the Pleistocene, from about two million year ago and up to one million years ago, are generally characterised by thin regolith development and poorly developed drainage (VRO Website, 2013).

Much of the plains were formed from lobes of lava which flowed from eruption points, overlapping to form a veneer of basalt lava flows. The flow varied in thickness according to both the underlying topography and the present-day surface (VRO Website, 2013). The flows are interleaved in places with pyroclastic deposits (scoria and tuff) and discontinuous buried palaeosoils of variable thickness (VRO website, 2013). The meandering channel of Kororoit Creek includes several deep pools developed below undercut basalt banks. Alluvial terraces have been deposited on the inner bank of the meander bends (VRO Website, 2013). The valley course of Skeleton Creek is determined by drainage developed around the margins of lava flows and the stream channel is only weakly incised. The stream gradient is low and the channel is in filled by swampy alluvium (VRO Website, 2013).

Of state significance within the geographic region is Mount Cottrell. Mt Cottrell has had a significant impact on the geomorphology of the geographic region as it is the most massive of the Werribee Plains volcanoes and one of the largest shield volcanoes in Victoria (VRO Website, 2013).

Stone suitable for the manufacture of tools was available from sources in neighbouring areas including Silurian sediments such as silcrete, which outcrops in the Maribyrnong River Valley (Brown and Lane 1997:5). Stone tools were often traded or exported from quarries over large distances. Such material could be present within the activity area. Silcrete is a common material used for the manufacture of stone materials and may possibly be obtained from the Werribee valley and Kororoit Creek. These outcrops are likely to occur where Newer Volcanics overlay Silurian formations. Proximity to several water courses would also have provided access to quartz.

Topography

A major influence on the topography in the activity area, and more generally, the geographic region has been the Rowsley fault. The most recent major movements of this fault took place in the Early Pleistocene about one to two million years ago (VRO Website, 2013). This uplift caused the streams to be rejuvenated and the Werribee River, Parwan Creek and the tributaries of the Little River cut deep valleys into the uplifted plateau and the scarp of the fault (VRO Website, 2013). Some of the eroded material was deposited in areas adjoining the scarp; however, much of this

material was transported directly down the Werribee River and the Little River and redeposited in the Werribee Delta (VRO Website, 2013).

Rejuvenation of stream valleys has also taken place during the several periods of sea level fall during the Pleistocene. As recently as 20 000 years ago the sea level was over 100 m lower than today and this caused the major streams (Werribee River, Little River and Skeleton Creek) to cut into the landscape (VRO Website, 2013).

The topography of the region comprises gently undulating to level lava plain with a drainage system influenced by the edges of old lava flows.

Hydrology

The activity area is intersected by Dry Creek, Skeleton Creek and Kororoit Creek and by a number of small drains (Dohertys Drain, Whiteside Drain, Clarkes Drain and Billingham Road Drain). These creeks were southerly flowing consequent streams crossing a coastal plain, until the extensive early sheet flows of the Newer Volcanics completely obliterated them (Bell, Bowen et al. 1967). The surface of these earlier lava flows still reflected the slope of the buried coastal plain and on this surface the early Werribee River, Skeleton Creek and Kororoit Creek developed as subsequent streams (Bell, Bowen et al. 1967). Then a later phase of vulcanism, in which smaller tongue like flows were outpoured, modified the courses of these streams and gave them their present positions (Bell, Bowen et al. 1967).

Most of the stony lava area north-east and around Werribee has been stone-picked to improve its agriculture versatility and some of the swampy areas have been drained. Only a few channels such as the Werribee River, Little River and Skeleton Creek have succeeded in deeply incising into the lava plain (VRO Website, 2013).

A search of the 1788 Wetland Categories on the DSE (Department of Sustainability and Environment) Biodiversity Interactive Map (accessed, January 2013) revealed the existence of a freshwater meadow wetland intersecting with the south of the activity area (immediately west of the intersection of Leakes Road and Tarneit Road).

Vegetation Regime

A review of the DSE website (Department of Sustainability and Environment, 2013) identified the activity area as principally part of the Victorian Volcanic Plain bioregion (VVP) and as principally part of the Plains Grassland prior to European land clearance (Ecological Vegetation Class [EVC] 132). This EVC is principally treeless vegetation mostly less than 1 m tall dominated by largely graminoid and herb life forms. It occupies fertile cracking basalt soils prone to seasonal waterlogging in areas receiving at least 500 mm annual rainfall (Department of Sustainability and Environment, 2013). A small section of the activity area, within approximately 100 metres of Kororoit Creek, was identified as part of the Riparian Woodland prior to European land clearance (Ecological Vegetation Class [EVC] 641) (Department of Sustainability and Environment, 2013). This EVC occurs beside permanent streams, typically on narrow alluvial deposits. Species are typically woodland to 15 m tall generally dominated by Eucalyptus camaldulensis over a tussock grass-dominated understorey (Department of Sustainability and Environment, 2013). Tall shrubs may be present and amphibious herbs may occur in occasional ponds and beside creeks. While flooding may be common, sites are rarely inundated for lengthy periods (Department of Sustainability and Environment, 2013). A search of the 2005 EVCs indicates that the area around Kororoit Creek within the activity area is no longer defined as Riparian Woodland.

Climate

The nearest weather station is Werribee.

Werribee has a temperate climate with warm summers and cool mild winters. The mean temperatures in Werribee vary between 25.6°C in January and 13.4°C in July (Bureau of Meteorology, 2013). Modern day records show that the average rainfall per year is 546.9 millimetres (Bureau of Meteorology, 2013).

5.2.10 Land use history of the activity area

The wider region surrounding this activity area contains several landforms which would have been utilised by Aboriginal people prior to European contact. The utilisation of these landforms is discussed below.

Hills

Very little archaeological or ethnographic evidence exists to assist in the construction of land use models for the hill environments. Where there are archaeological sites, they have been interpreted as evidence for ephemeral procurement activities during times seasonally suited for utilising the higher regions of the region. Pleistocene utilisation of higher altitudes would have been limited, given the extreme climatic conditions and restricted growth patterns of many vegetation communities, and the subsequent restrictions on the distribution of fauna. Without archaeological or ethnographic evidence however, it can only be assumed that Aboriginal people did utilise the higher zones of the region, particularly during the Holocene. To what degree this zone was utilised is not known.

River and Creek Valleys

Deeply incised river and creek valleys, such as those found in the region, have been the focus of many previous archaeological investigations, both academic and management orientated (Gill 1953; Gill 1954; Gill 1955; Mulvaney 1964; Gill 1966; Bowler, Mulvaney et al. 1967; Bowler 1969; Bowler 1970; Casey and Darragh 1970; Mulvaney 1970; Mulvaney 1970; Coutts and Cochrane 1977; Gallus 1983; Ellender 1988; Burke 1989; du Cros 1989; Burke 1990; Rhodes 1990; Munro 1997; Tunn 1997; Duncan 1998; Tunn 1998; Tunn 2006). These valleys would have provided the most advantageous settlement localities for Aboriginal people throughout the history of human settlement in the region.

The river valley environments provided Aboriginal people with a range of necessary resources, as well as providing shelter from the elements, timber for fires, tools, and housing; all manner of food sources, and stone for tool manufacture. The importance of the availability of perennial fresh water to the resident Aboriginal populations also cannot be overlooked. The valley landscapes may also have served as travel routes throughout much of the region (du Cros 1989). The intensity of occupation and use of the incised valleys is reflected in a relatively rich and dense archaeological record.

Intensive use of these environments has resulted in the formation of an almost continuous distribution of archaeological material within a corridor on either side of the waterways forming the valleys. The evidence for intensive Aboriginal occupation of these areas is manifested in a great many high density artefact scatters, scarred trees, stone quarries, fish traps, human burials, and earth mounds. The nature of the alluvial sediments in certain areas (i.e. Keilor) has revealed that this spatially continuous pattern is not of recent origin, but has a demonstrable Pleistocene antiquity (Gill 1966; Tunn 1997; Tunn 1998; Tunn 2006). Deeply stratified alluvial sequences found in the valley landscapes have the potential to reveal the archaeological signature of spatially varied but continuous activities over a period of perhaps the last 30,000 years.

Swamp and Lake Deposits

A search of the DSE Website revealed that the activity area is characterised by swamp and lake deposits. These areas would have provided the most advantageous settlement localities for Aboriginal people throughout the history of human settlement in the region. This environment would have provided Aboriginal people with a range of necessary resources, timber for fires, tools, and housing; all manner of food sources, and stone for tool manufacture.

The importance of the availability of perennial fresh water to the resident Aboriginal populations also cannot be overlooked.

5.2.11 Historic land use history

In the nineteenth and early twentieth centuries, water reservoirs and channels dotted the landscape. With fresh water imperative for drinking, crop production, transportation and some industries, they were fundamental for any self-sustaining community or town. This was especially pertinent when water cartage on poorly constructed roads was often difficult, expensive and time consuming or simply not practical as it was from St Albans to Tarneit. Water bodies and pathways were also a necessity in areas slow to be connected to Melbourne's water supply, like in St Albans which had to wait until 1940 to be on mains water (Lack 2005:630). Initially, waterways were open channels, sometimes sewers or drains. In 1857 the new colony of Victoria embarked on its first public works project, an ambitious and forward thinking scheme to pipe water from the Yan Yean dam to Melbourne (Dingle 2005:763). In 1891 the Melbourne and Metropolitan Board of Works took over responsibility for the city's water supply from local trustees.

By the early 1920s, pressure on Melbourne's water supply was reaching breaking point as drought, increased population and greater industry demand all required more and more fresh water. To meet such needs, the Maroondah dam (1927), O'Shannassy dam (1928) and Silvan dam (1932) were constructed. While these reservoirs went some way in resolving Melbourne's inadequate water supply problem, it was still not enough. The commencement of World War II halted further works and it was not until 1957 that the Upper Yarra dam was completed [Dingle, 2005, p.763-4].

Yet from the 1950s, water needs again escalated. The construction of houses with two or more bathrooms and large gardens, together with time saving water appliances, like washing machines and dishwashers, increased water requirements as did Melbourne's booming population and drought. The Greenvale (opened in 1973 with a capacity of 27,000ML) and Cardinia reservoirs were erected to improve the situation while another project, the lower Yarra dam at Yarra Brae was abandoned due to public backlash(Dingle 2005:764).

The section of pipeline in question commences at St Albans. In 1910, the suburb, initially known as Keilor Plains, was little more than a small town some sixteen kilometres from Melbourne, and comprised of a state school, church, post office and telephone exchange. A decade later, two shops were added to the slowly developing landscape. Located in the shire of Keilor, county of Bourke, its population was 120 in 1920 (Arnall & Jackson 1910; Ribarrow 2004). In the late 1920s, St Albans consisted largely of crop farmers, a small number of sheep and cattle graziers, rail employees and some factory workers and "there was still no electricity, no roads, no water supply, no sewerage ... there was nothing" (Ribarrow 2004:17). It was such a distant and unremarkable place that "nobody knew where St Albans was" (Ribarrow 2004:17).

By 1907 the St Albans reservoir had been constructed and was under the control of trustees. In that year, it was this administrative body that attempted to reconcile the ongoing debate of just who had access to the water supply. Residents within the St Albans Estate believed they had sole rights yet people in neighbouring Overnewton used the dam to water their cattle and sheep (Argus 1907:6). Following heavy rains a few months later, one reporter wrote "this timely [rain] settles, for one thing, the trouble over the St Albans Reservoir, as every farmer has his own dam full to overflowing now and isn't troubling any longer over the one big one" (Independent 1908:2).

By 1928, the proposal to ban bathing at the St Albans reservoir was quite a contentious issue. Some locals believed that bathers would detrimentally effect its water equality, which was especially important since it was for domestic consumption, yet others contended swimming would have little, if any, effect. At a council meeting, one councillor argued that, when under the control of the trustees, swimming was prohibited and so the current overseers should follow suit. The ensuing motion to ban swimming was unanimously carried (Sunshine Advocate, 1928: 3).

In a 1968 street directory of Melbourne, there was no reference to either the St Albans reservoir or its pipeline (Gregory's Guides and Maps Pty Ltd 1968). Yet in 1980, Melway Street Directory of Greater Melbourne inadvertently illustrated part of the route that is from approximately Gladstone Street to just beyond the Western Highway, St Albans, as it followed the course of Melbourne's electricity transmission line. Today, that particular stretch is marked simply as a green corridor in current street directories.

Once it crossed the Kororoit Creek, the pipeline moved from the old Maribyrnong parish into the parish of Derrimut, County of Bourke, both of which are today incorporated into the City of Brimbank and the City of Wyndham. It is interesting to note that the parish maps of Maribyrnong, Derrimut, Truganina and Tarneit (incorporating today's suburbs of St Albans/Albanval, Deer Park/Ravenhall, Derrimut/Truganina and Tarneit respectively) make no mention of the St Albans reservoir or its pipeline (Victoria. Division of Survey & Mapping, 1977, 1976, 1982, 1959).

The section of pipeline in question concludes at Tarneit. Tarneit was originally an agricultural area and in the late 1800s many of its residents supplied hay to the markets of Melbourne. Although first surveyed in 1839-40, the suburb was slow to develop and it was not until the late twentieth century that development became more widespread (Barnard 2005). In the 1968 edition of Gregory's Melbourne Street Directory Tarneit is not even included in the maps (Gregory's Guides and Maps Pty Ltd 1968).

Being previously agricultural in nature and slow to build up, the area in question has experienced a number of extreme weather phenomena, from droughts to fires. Droughts affected the area many times, such as 1865 and 1993-2010. A fire swept through much of the area during the Black Thursday fires of 1851 and in Truganina in 1868 with the Lara bushfire (Deer Park Primary School 1974).

5.2.12 Archaeological Predictive Model

This section provides a predictive statement of the site types that possibly exist within the activity area and a predictive statement on the likelihood of finding such sites.

Due to the nature and type of subsurface deposits present within the activity area, it is considered that there is little likelihood of encountering Aboriginal places, sites or materials of Pleistocene antiquity. Deposits of Pleistocene antiquity are only likely to occur where there are well preserved and deeply stratified alluvial sediments in situ, such as those evident along the Maribyrnong River at Keilor or in the vicinity of the Snowy River in East Gippsland. Consequently, it is considered likely that any cultural materials encountered within the activity area are likely to be of late Holocene antiquity (i.e. < 5,000 years BP).

All of the Aboriginal archaeological heritage places recorded within a one kilometre radius of the activity area are artefact scatters. Artefact scatters are concentrations of stone tools made by Aboriginal people in the past, or the debris from making stone tools. These usually occur where people were camping or were preparing their tools or weapons, and are most frequently found on or below the ground surface located within 200 metres of major waterways and in particular, on level elevated ground areas such as ridge lines and spurs.

In the geographic region, the following Aboriginal archaeological places were recorded: artefacts scatters/low density artefact distributions (1054) (seven of which occur within the activity area), scarred trees (19), earth features (10), shell middens (6). One of each of the following was recorded in the geographic region: Aboriginal burial, quarry, rock art and stone feature.

Scarred trees are trees that have been culturally modified in some way, usually by having bark cut from the trunk for use as canoes, shields, shelter, containers, or foot holds that have been cut in to the trunk to allow access to the upper branches for hunting purposes. Culturally modified trees are most often eucalypt trees that pre-date European settlement (i.e. over 174 years old in the Melbourne region). Scarred trees usually occur close to rivers or creeks or in areas where riparian forests have survived. No scarred trees have been recorded within a two kilometre radius of the activity area, and the potential for their presence is low given the severe effect that logging and European settlement has had over them.

Quarries are sites where Aboriginal people collected and worked stone from rocky outcrops. These are generally found on slopes where erosion has exposed the stone beneath. This often occurs on slopes above creeks and rivers, on the sides of old volcanoes and on ridges. One quarry has been located within two kilometres of the activity and slopes and ridges are common in the area; therefore the likelihood of finding a quarry is moderate within the proposed activity area.

Other sites that may occur (although rarer) include freshwater shell deposits and burials.

It is known from the locations of previous archaeological sites and the results of previous archaeological assessments in Victoria that these types of sites are usually located within 200 metres of major waterways and in particular, on elevated ground areas such as ridge lines and spurs.

As the activity area is intersected by Skeleton Creek, Dry Creek and Kororoit Creek and a number of smaller ephemeral drains, there is a high likelihood that Aboriginal sites or materials will be present within the activity area.

Although sections of the activity area have been subjected to some ground disturbance since European settlement (Section 5.2.11). Recent fieldwork undertaken nearby has yielded evidence of Aboriginal activity in and around the activity area (Section 5.2.5). Therefore, it is considered highly likely that some previously unlocated Aboriginal archaeological sites are present within the pipeline alignment.

In addition, eleven previously Aboriginal archaeological sites are located within the activity area.

Based on the desktop assessment and brief site visit, it has been concluded that creek lines and their tributaries in the activity area are considered more sensitive and therefore more likely to contain Aboriginal cultural heritage material than the remainder of the activity area.

Based on our current knowledge of the activity area, and the known distribution of archaeological sites within the region, the following predictive statements can be made:

- Artefact scatters may be found within 200mm of the creek lines (Skeleton Creek, Kororoit Creek and Dry Creek), decreasing in likelihood of occurrence as the distance to the creek lines increases;
- Stony rises have a higher potential to contain surface artefact artefact scatters;
- Scarred trees may occur anywhere within the activity area where remnant native trees of an appropriate age survive;
- Alluvial terraces have higher potential to contain denser surface artefact scatters and subsurface archaeological deposits; and
- Occasional isolated artefacts may be encountered more than 200m from a waterway or hill slope, most likely on the tops of prominent hills.

5.3 Standard Assessment

This section of the report documents the results of the Aboriginal cultural heritage survey undertaken by ACHM.

5.3.1 Standard Assessment Methodology

A Standard Assessment was conducted for this CHMP and involved a surface archaeological survey. A survey may be able to locate Aboriginal archaeological sites on the surface; however it is generally unlikely that it will locate subsurface archaeological deposits unless a suitable cutting and/or exposures are available.

The specific aims of the Aboriginal archaeological survey were as follows:

1. To relocate and assess previously recorded Aboriginal archaeological sites within the activity area;
2. To determine if any additional Aboriginal archaeological sites are located within the activity area;
3. To identify areas of Aboriginal archaeological sensitivity (potential archaeological deposits or PADs); and
4. To determine whether a program of subsurface testing would be required, and hence whether a complex CHMP would be needed for the activity area.

The methodology for the survey was informed by the results of the Desktop Assessment (Section 5.2), as well as the archaeological predictive model (Section 5.2.12).

A systematic surface survey was employed across the activity area using a pedestrian transect methodology. Four field workers were to walk transects of the activity area at 2 m spacing, an approximate width of 8 m would be covered per transect.

The percentage of ground surface visibility was recorded throughout the survey. Evidence of prior ground disturbance as well as any areas of potential archaeological sensitivity were closely inspected and recorded during the survey. A photo log was kept in order to record the conditions encountered of the activity area (i.e. areas of prior disturbance and/or areas of potential archaeological sensitivity).

Thirteen sites have been previously recorded within the activity area. In addition, nine sites are also located within 50m of the activity area. Therefore, the survey would attempt to relocate known, and locate unknown Aboriginal archaeological sites, and identify areas of potential archaeological sensitivity.

Table 5-7: Sites located within the activity area, and within 50 m of the activity area, and subject to investigation during the standard assessment.

VAHR/ Component	Site Name	
7822-0466	MOOROOKYLE 10	Artefact Scatter
7822-0467	MOOROOKYLE 11	Artefact Scatter
7822-0468	MOOROOKYLE 12	Artefact Scatter
7822-0469	MOOROOKYLE 13	Artefact Scatter
7822-0543	MOOROOKYLE 32	Artefact Scatter
7822-0564	MOOROOKYLE 53	Artefact Scatter
7822-0706	RAVENHALL	Artefact Scatter
7822-0912	POWERLINE SITE 1	Artefact Scatter
7822-0913	POWERLINE SITE 2	Artefact Scatter
7822-0914	POWERLINE SITE 3	Artefact Scatter
7822-0915	POWERLINE SITE 4	Artefact Scatter
7822-1409	LADY GEE 3	Artefact Scatter
7822-2173	DEER PARK BYPASS 2	Artefact Scatter
7822-1412	LADY GEE 1	Artefact Scatter
7822-1994	ROBINSONS RD 1	Artefact Scatter
7822-1915	TARNEIT RISE 2	Artefact Scatter
7822-3488-3	Kororoit Creek IA5	Low Density Artefact Distribution
7822-2673	Transmission Easement 2	Artefact Scatter
7822-2672	Transmission Easement 1	Artefact Scatter
7822-2845	Leakes Rd IA 1	Artefact Scatter
7822-2851	Truganina IA 26	Artefact Scatter
7822-2476	Leakes Rd AS	Artefact Scatter

5.3.2 Results of the Ground Survey

The field survey was carried out by a team of four people over four days: the 12th of June 2013 to the 17th of June 2013 (see Table 5-8, below).

Table 5-8: Table of Attendance for the Standard Assessment

Date	ACHM Archaeologist	Bunurong Representative	Boon Wurrung Representative	Wurundjeri Representative
12/06/2013	Vicki Vaskos	Sean Kelly	Robert Anthony	Michael Xiberras
13/06/2013	Vicki Vaskos	Sean Kelly	Robert Anthony	Gary Galway
14/06/2013	Matthew Wilson	Sean Kelly	Robert Anthony	-
17/06/2013	Matthew Wilson	Sean Kelly	Robert Anthony	-

The ground surface of the activity area was inspected by the field team walking in regularly spaced transects. One property could not be accessed during the survey (Map 5-7). Notes and photographs were taken throughout the survey.

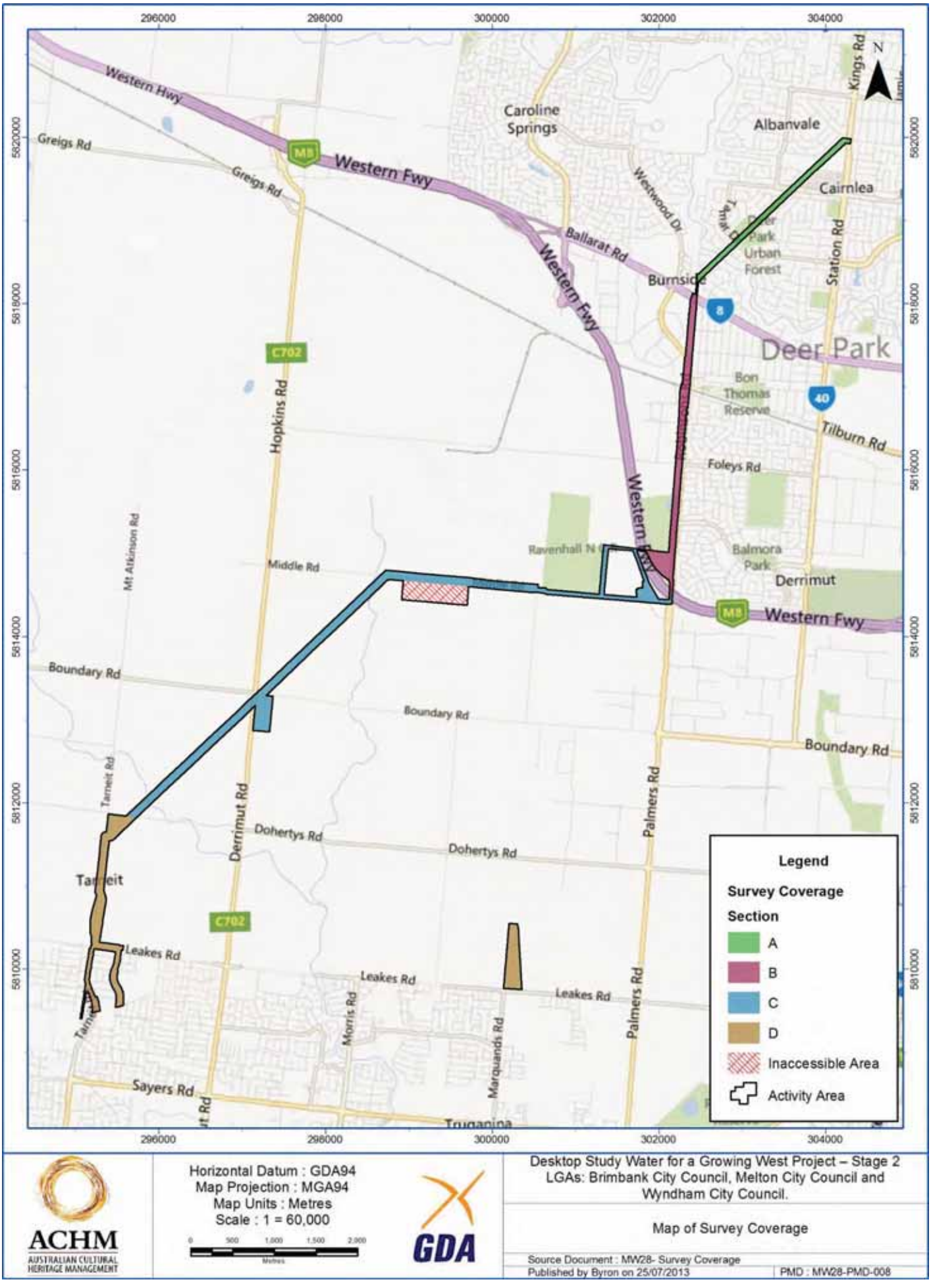
Weather conditions were generally cold with light rain. Ground surface visibility was generally poor (0-20%) but variable, with areas of good ground surface visibility (40-95%), where paddocks had been ploughed. Due to substantial groundcover and the presence of road infrastructure (namely bitumen and gravel), visibility was often obscured. Approximately 95% of the activity area was surveyed. Effective survey was approximately 30%.

A large portion of the activity area is located within road reserves (such as Middle Road, Tarneit Road and Robinsons Road). These areas are generally heavily disturbed by the road itself, but also by associated construction, such as grading and swale drains in the road verges. In addition, a number of services run parallel to these roads, such as the high pressure gas pipeline to the south of Middle Road and (add more examples of services, MWC to provide detail).

A small portion of the activity area borders the Metropolitan Remand Centre (located on Middle Road). Constructed in 2006 the prison grounds and immediate surrounds have been subject to high levels of disturbance, including the construction of a large swale drain. This area borders the Western Freeway (Deer Park Bypass), which was opened in 2009. The current activity area passes under the Western Freeway near the corner of Middle Road and Robinsons Road. The construction of this freeway has caused high levels of disturbance in the general vicinity.

Two large sections of the activity area are located within transmission easements, north of Ballarat Road, and south of Middle Road. These easements have been subject to high degrees of disturbance where the pylons have been located. In general there are restrictions for the use of the land directly under the power lines (i.e. limiting development) which may in turn reduce the level of disturbance between the pylons when compared to outside the easement. However, the easement to the north of Ballarat Road appears to be heavily disturbed as it is located between well-established residential and commercial development. To the south of Middle Road, the easement is relatively undisturbed as it is located in ploughed paddocks.

The survey of the activity area included the inspection of four named waterways: Kororoit Creek, Skeleton Creek, Dry Creek and Dohertys Drain. In addition an unnamed waterway (*currently incorrectly listed as an area of Cultural Heritage Sensitivity on ACHRIS)* is located crossing Robinsons Road, south of Windsor Boulevard.



Map 5-7: Survey Coverage within the activity area - showing inaccessible property and survey sections.

The activity area is approximately 193ha in area, and approximately 17km in length.

The majority of the activity area is confined to road reserves (Robinsons Road, Middle Road, and Tarneit Road), but also follows the transmission easement between Station Road and Ballarat Road, and between Middle Road and Dohertys Road.

The survey will be discussed in the following sections based on road reserve/transmission easement (as shown on Map 5-6).

Section A – Station Road to Ballarat Road

This section of the activity area is located within the power line easement, with residential and commercial development to either side (Figure 5-1).

In general this section is heavily vegetated with low visibility. The majority of the easement is heavily grassed with exotic species. Some native replanted vegetation is present, as are a number of formal and informal pedestrian and access paths. The dominant natural feature within this section of the activity area is the crossing of Koroit Creek (Figure 5-2).

Figure 5-1: General conditions within the powerline easement. View from Neale Road facing north. Residential subdivision is located to the left. A large shopping centre is located to the right.

Figure 5-2: Kororoit Creek Crossing, showing exposed basalt and poor ground surface visibility.

The creek crossing and the protected native grassland ("Deer Park Urban Forest" and other areas of fenced native vegetation) are considered to be sensitive for archaeological material. However, in the vicinity of the Kororoit Creek Crossing, high levels of disturbance were encountered (Figure 5-3). This area has been subject to CHMP investigation in the past (Kaskadanis 2008; Day 2010; Rose and Kaskadanis 2011) . It is considered likely that previously recorded sites within these areas of disturbance have been destroyed.

Figure 5-3: View of works currently being undertaken within the current activity area for other works.

Seven previously recorded sites are located either in or within 50m of the activity area within this section (see Table 5-9). None of these sites were relocated.

Table 5-9: Previously Recorded sites located within Section A of the Activity Area

Place Number (VAHR)	Place Name	Place Type	Relocated?
7822-0922	Powerline Site 1	Artefact Scatter	No - fencing and native vegetation
7822-0914	Powerline Site 3	Artefact Scatter	No - fencing and excavation work (likely destroyed)
7822-0915	Powerline Site 4	Artefact Scatter	No - poor visibility
7822-2673	Transmission Easement 2	Artefact Scatter	No - fencing and native vegetation
7822-2672	Transmission Easement 1	Artefact Scatter	No - disturbance from grading (likely destroyed)
7822-0913	Powerline Site 2	Artefact Scatter	No - poor visibility
7822-3488-3	Kororoit Creek IA5	LDAD	No - poor visibility

No stone artefacts or other site types were located within Section A.

Areas of cultural heritage sensitivity recorded include:

a. the immediate vicinity of Kororoit Creek (i.e. within 50 m of the creek), including its banks, and

b. the areas of fenced native vegetation, as these areas may indicate areas which may not have been impacted by the general disturbance within the easement.

Section B –Ballarat Road to Western Freeway

This section of the activity area follows Robinsons Road. The northern section appeared to be heavily disturbed by the residential and industrial development bordering the activity area (Figure 5-4 and Figure 5-5). The area between the railway and Foleys Road has been subject to a CHMP in the past (Mitchell, Richmond et al. 2008). The area consisted of formal and informal access tracks, as well as landscaped areas and established swale drainage (Figure 5-6). The ground surface visibility in this area was generally poor.

Figure 5-4: Disturbed area between Ballarat Road and Westwood Drive, facing North.

Figure 5-5: View across the activity area facing west, across a heavily modified industrial landscape

Figure 5-6: Formal swale and drainage within the road verge of Robinsons Road.

In the south of this area (generally between Riding Boundary Road/Foleys Road and the Western Freeway) a swamp was noted (Figure 5-7). The natural land surfaces adjacent to this swamp are sensitive for archaeological deposits. It was indicated by the Traditional Owner representatives on site that archaeological subsurface testing (complex assessment) in this area would be required as the swamp would have provided valuable resources in the past. Some isolated disturbance has occurred within this area, due to the former use of the land (including a former railway siding), however the majority of the easement to the west of Robinsons Road appears intact.

Figure 5-7: View of the natural swamp, facing south (in the general location of the previously recorded site (Ravenhall [7822-0706]).

Two previously recorded sites are located within this section of the activity area (seeTable 5-10). None of these sites were relocated.

Table 5-10: Previously Recorded Sites Located Within Section B of the Activity Area

Place Number (VAHR)	Place Name	Place Type	Relocated?
7822-1994	Robinsons Road 1	Artefact Scatter	No - poor visibility
7822-0706	Ravenhall	Artefact Scatter	No - poor visibility

No stone artefacts or other site types were located within Section B

Areas of cultural heritage sensitivity recorded include:

a. the area adjacent to the swamp/dam between Riding Boundary Road/Foleys Road and the Western Freeway, and

b. the vicinity of the previously recorded site, Ravenhall (7523-0706)

Section C – Western Freeway to Dohertys Road

This section of the activity area contains relatively less disturbed landforms (when compared with the balance of the activity area) as it crosses grazed and ploughed paddocks. This section of the activity area is located within the transmission easement. Due to the two creek crossings (Dry and Skeleton Creeks) the area is considered likely to contain Aboriginal archaeological deposits. During the standard assessment, one small and two large stony rises were located within the activity area, which are also considered sensitive for Aboriginal archaeological sites (Figure 5-8 and Figure 5-9).

Ground surface visibility within this section of the activity area ranged from 5% to 95%. Good ground surface visibility was afforded in some areas due to recent ploughing (Figure 5-10).

Figure 5-8: View across the small stony rise near Middle Road

Figure 5-9: View across the stony rise located near Derrimut Road

Figure 5-10: View across the activity area where good to excellent ground surface visibility was encountered due to ploughing.

Three newly recorded isolated artefacts were located within this section of the activity area.

One quartz flake (VAHR ID - 1) was located near Middle Road (Figure 5-11).

Figure 5-11: Quartz distal flake located near Middle Road (VAHR ID - 1)

A proximal silcrete flake (VAHR ID - 2) was found immediately north of a high voltage line tower, west of Derrimut Road (Figure 5-12).

Figure 5-12: Silcrete proximal flake located west of Derrimut Road (VAHR ID - 2)

A crystal quartz distal flake (VAHR ID - 3) was located north east of the intersection of Boundary/Derrimut Roads (Figure 5-13).

Figure 5-13: Crystal Quartz Flake located East of Derrimut Road (VAHR ID - 3)

Three previously recorded Aboriginal sites are located within this section of the activity area; however, they were not relocated due to low ground surface visibility (Table 5-11).

Table 5-11: Previously Recorded Sites Located Within Section C of the Activity Area

Place Number (VAHR)	Place Name	Place Type	Relocated?
7822-1412	Lady Gee 1	Artefact Scatter	No - poor visibility
7822-1409	Lady Gee 3	Artefact Scatter	No - poor visibility
7822-2173	Deer Park Bypass 2	Artefact Scatter	No - likely destroyed by Deer Park Bypass

Areas of cultural heritage sensitivity recorded include:

a. The stony rises,

b. Dry Creek crossing

c. Skeleton Creek crossing

d. The area between the Western Freeway and Middle Road may be sensitive (due to the proximity to the swamp deposit, see previous section), however ground surface visibility was low.

Section D – Dohertys Road to Leakes Road, Additional area on Leakes Road

This section of the activity area extends through paddocks from Dohertys Road (Figure 5-14) south into the residential area of Tarneit (Figure 5-15). A large portion of this section has been heavily disturbed by the works associated with the Regional Rail Link and residential subdivision works at Tarneit.

Figure 5-14: Ploughed field between Dohertys Road and Leakes Road

Figure 5-15: Area of subdivision, south of Leakes Road

The additional survey area is located north of Leakes Road. The small area follows Dohertys Drain (Figure 5-16).

Figure 5-16: Additional Survey Area, north of Leakes and Marquands Roads

Three artefacts were located on the surface in this section of the activity area.

Two artefacts were located in proximity to Tarneit Road: a quartz core (VAHR ID-4), and a quartz distal flake (VAHR ID-5) (Figure 5-17 and Figure 5-18).

Figure 5-17: Quartz Core located near Tarneit Road (VAHR ID-4)

Figure 5-18: Quartz Flake located near Tarneit Road (VAHR ID-5)

A quartzite Single Platform Core (VAHR ID-6) was located north of Leakes Road (Figure 5-19).

Figure 5-19: Quartzite Single Platform Core (VAHR ID-6)

There are seven previously recorded Aboriginal sites either in or within 50m of this section of the activity area. All were not relocated (Table 5-12). This is likely due to the development removing the physical component of the places. The areas were heavily landscaped with extensive disturbance (as shown on Figure 5-15).

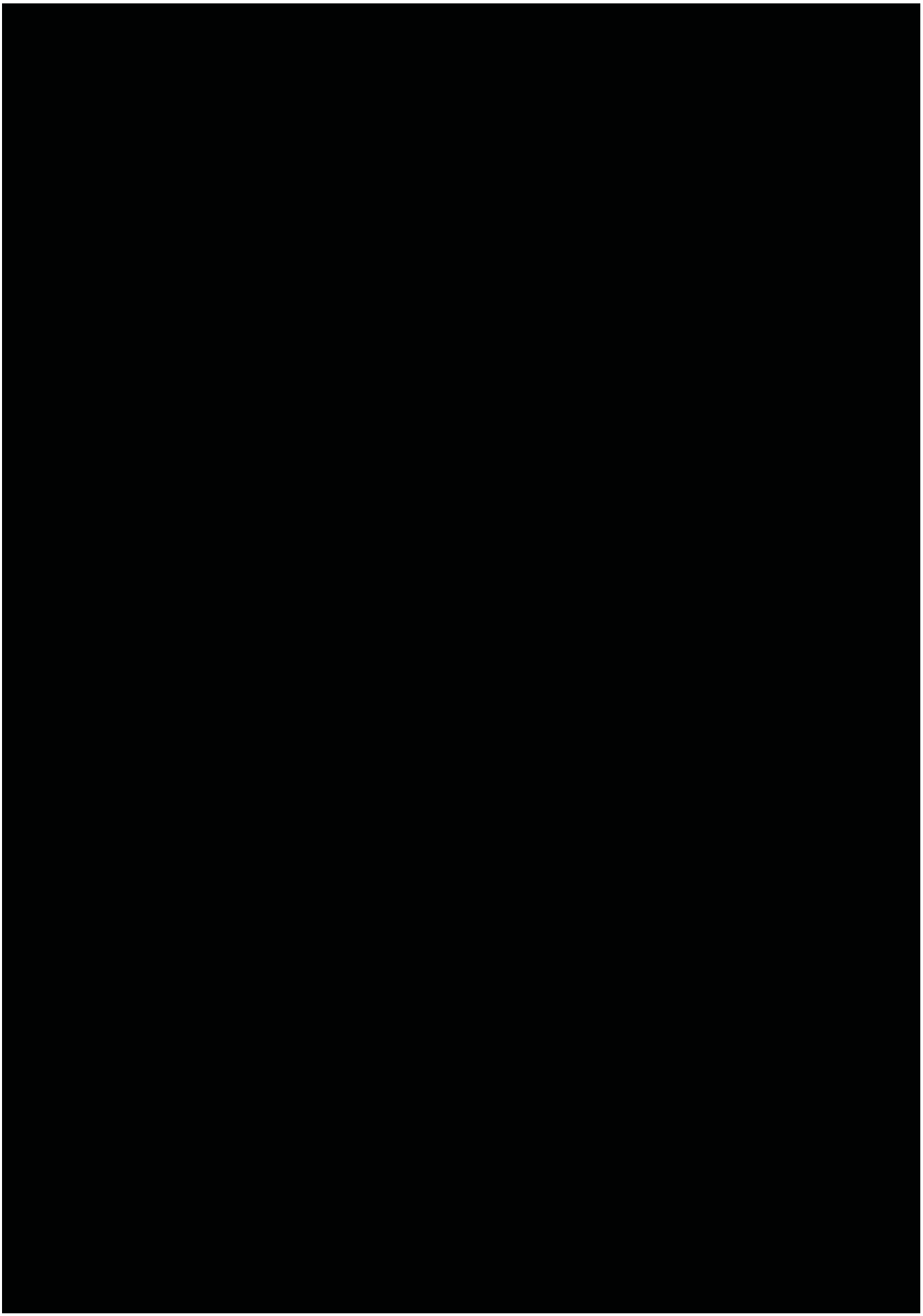
Table 5-12: Previously Recorded Sites Located Within Section D of the Activity Area

Place Number (VAHR)	Place Name	Place Type	Relocated?
7822-0468	Moorookyle 12	Artefact Scatter	No - destroyed by subdivision
7822-0469	Moorookyle 13	Artefact Scatter	No - destroyed by subdivision
7822-1915	Tarneit Rise 2	Artefact Scatter	No - destroyed by subdivision
7822-0467	Moorookyle 11	Artefact Scatter	No - destroyed by subdivision
7822-0466	Moorookyle 10	Artefact Scatter	No - destroyed by subdivision
7822-0564	Moorookyle 53	Artefact Scatter	No - destroyed by subdivision
7822-0543	Moorookyle 32	Artefact Scatter	No - destroyed by subdivision
7822-2845	Lot 2 Leakes Rd IA 1	Artefact Scatter	No - poor ground surface visibility
7822-2851	Truganina IA 26	Artefact Scatter	No - poor ground surface visibility
7822-2476	Leakes Rd AS	Artefact Scatter	No - poor ground surface visibility

Areas of cultural heritage sensitivity recorded include:

a. The additional area within the vicinity of Dohertys Drain,

b. Stony Rises



Map 5-8: Results of the Standard Assessment showing newly recorded isolated artefacts, previously

5.3.3 Discussion and Conclusion to the Standard Assessment

A Standard Assessment (pedestrian survey) of the current activity area was completed by ACHM Archaeologists in partnership with the Bunurong, Boon Wurrung, and Wurundjeri. This survey was completed over four days from the 12th of June to the 17th of June 2013.

The activity area includes a narrow corridor between Deer Park and Tarneit, consisting of road reserves (Robinsons Road, Middle Road, and Tarneit Road), and also follows the transmission easement between Station Road and Ballarat Road, and between Middle Road and Dohertys Road.

Twenty two sites have investigated during the desktop and standard assessments, as they have been previously recorded within or within 50m of the activity area. None of these sites were relocated during the Standard Assessment.

Six isolated artefacts were located as a result of the standard assessment (VAHR DETAILS - TBC). Each artefact was located within areas of high visibility, where paddocks had been recently ploughed on the plain landform.

Due to the presence of the following sensitive landforms, it is considered likely that further archaeological deposits are located within the activity area:

- Waterways (Kororoit Creek, Skeleton Creek, Dry Creek and Doherty's Drain)
- Swamp deposits (near Robinsons Road)
- Areas of protected grassland (near Robinsons Road and north of Kororoit Creek), and
- The presence of stony rises

Ground surface visibility within the activity area was variable, ranging from poor (0-10%) in vegetated areas, to excellent (80-95%) within recently ploughed paddocks.

Due to the presence of sensitive landforms, and the lack of ground surface visibility in these sensitive areas, it is considered necessary to complete a targeted testing program within the activity area

The following map shows the activity area broken down into varying levels of archaeological potential (Map 5-9). These can be described in the following categories.

Unlikely to contain Aboriginal Cultural Heritage

The least likely areas to contain Aboriginal cultural heritage are the locations which have been heavily disturbed by previous ground disturbing activities. These areas include road reserves, roads, and areas previously disturbed by construction and long-term active use in residential and commercial contexts. These areas are shaded red on the following map (Map 5-9). On a finer scale, all locations of powerline towers within the transmission easement, and the locations of existing services (such as high pressure gas) are unlikely to contain aboriginal cultural heritage.

It is recommended that no further investigation take place in these areas.

Low to Moderate likelihood to contain Aboriginal Cultural Heritage

Some areas within the activity area may contain Aboriginal cultural heritage. These areas are shaded green on the following map (Map 5-9). These areas had poor ground surface visibility during the surface survey and warrant further investigation.

The inaccessible area has been included within this category, as it could not be accurately determined that the area was unlikely to contain Aboriginal Cultural Heritage (as no assessment could be made and the time of the survey).

It is recommended that sub surface testing take place in these areas.

Moderate to High likelihood to contain Aboriginal Cultural Heritage

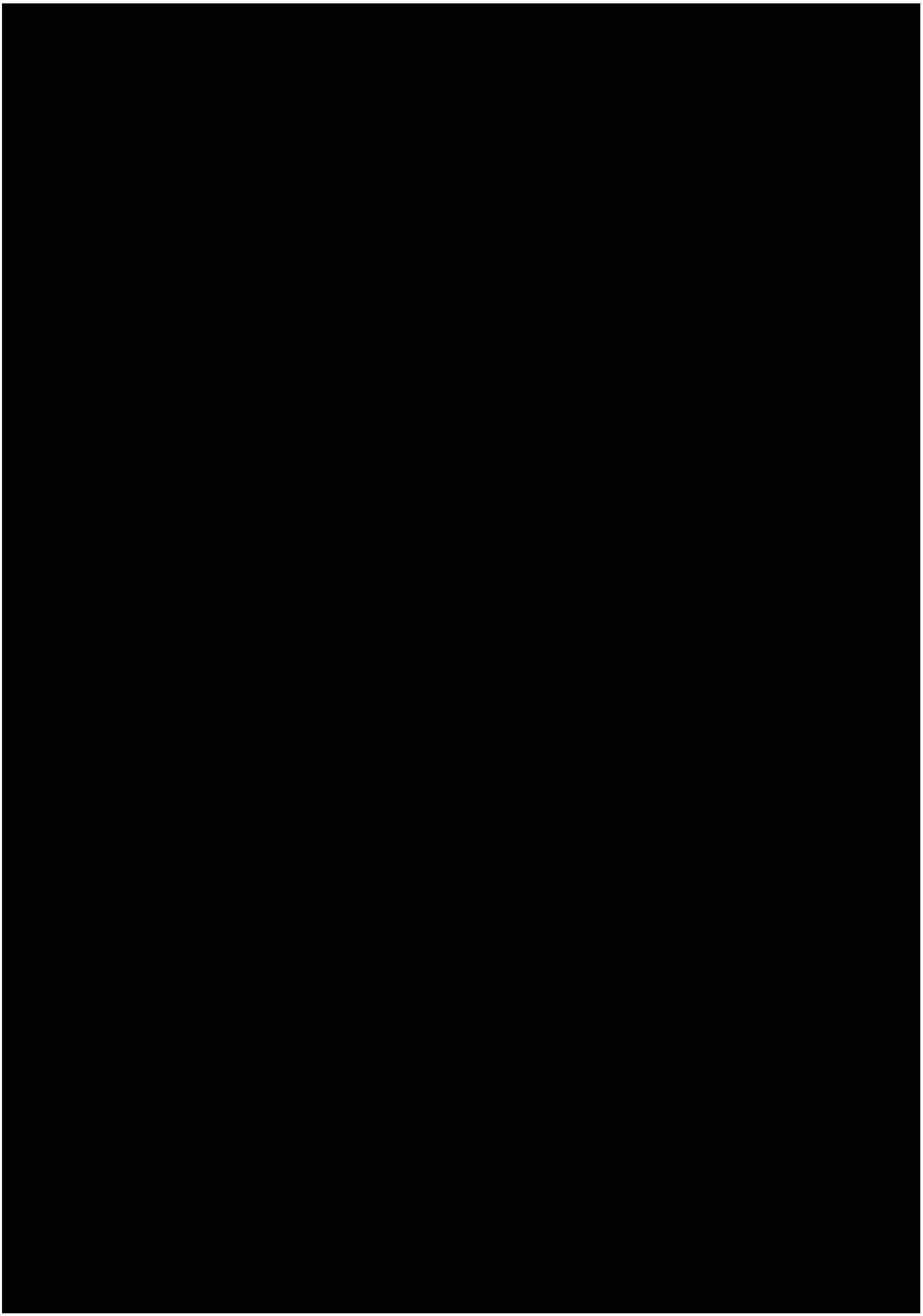
A number of locations within the activity area were assessed as having a moderate to high likelihood of containing sub surface cultural heritage (shaded blue on Map 5-9). These areas have been generally shown to be sensitive by archeological investigations in the past, and particularly by previous CHMP investigations in the surrounding region.

A program of subsurface testing is recommended for these areas.

Demonstrated to contain Aboriginal Cultural Heritage but sufficiently investigated

The ploughed fields (shown hashed on Map 5-9) were demonstrated to contain a low density "background scatter" of archaeological material during the standard assessment. Ground surface visibility in these areas was considered to be excellent (in the range of 80-95%). Effective survey coverage neared 80% across these areas. The soil profiles within this portion of the activity area (excluding stony rises and creek crossing) consists of a generally thin topsoil (<10 cm) overlying a heavy subsoil of (archaeologically) sterile clay. Repeated ploughing turns over the soil, exposing cultural heritage material (i.e. artefacts) where present. As such, ground surface survey is considered to be an appropriate methodology for accurately locating, and determining the nature, extent, and significance, of any archaeological sites (artefact scatters) located within these areas.

Whilst artefacts were located within these areas, it is considered unnecessary to conduct further testing in these areas as they have been sufficiently investigated.



Map 5-9: Areas of potential archaeological sensitivity within the activity area.

5.4 Complex Assessment

This section outlines the goals, methods and results of the subsurface testing undertaken as part of the complex assessment of the activity area.

The desktop and standard assessments indicated that sections of the activity area did not demonstrate signs of previous ground disturbance, and that there was a reasonable likelihood that as yet undetected subsurface archaeological deposits may remain.

Therefore, a complex CHMP assessment was considered necessary to determine if there were any subsurface archaeological deposits present within the activity area [AHR 2007 Regulation 60(1) (a) (b)].

The first phase of subsurface testing was undertaken between 25 June and 28 June; and on 4 July and 11 July 2013. The complex assessment was undertaken by (in alphabetical order) Vanessa Flynn (ACHM),Erica Walther (ACHM), Erica Weston (ACHM), Matthew Wilson (ACHM), and traditional owner representatives (in alphabetical ordrer) Robert Anthony (Boon Wurrung), Stephen Compton (Bunurong), Gary Galway (Wurundjeri)Colin Hunter Jnr Jnr (Wurundjeri), James Hughes (Boon Wurrung), Alex Kerr (Wurundjeri), Jason Tweedie (Wurundjeri), Gary Watkins (Boon Wurrung), Naomi Zukanovic (Wurundjeri).

The Complex Assessment (subsurface testing) component of this CHMP is yet to be completed. The Complex Assessment component will be completed once the final pipeline alignment has been decided.

5.4.1 Aims of the subsurface testing/ excavation

The purpose of the complex assessment was to discover any previously unrecorded Aboriginal archaeological sites by a means of a program of controlled excavation and shovel testing. If any subsurface archaeological deposits are present within the activity area, the complex assessment will determine the nature, extent and significance of those deposits.

The following subsurface testing methodology was developed prior to the commencement of the complex assessment.

5.4.2 Methodology of subsurface testing

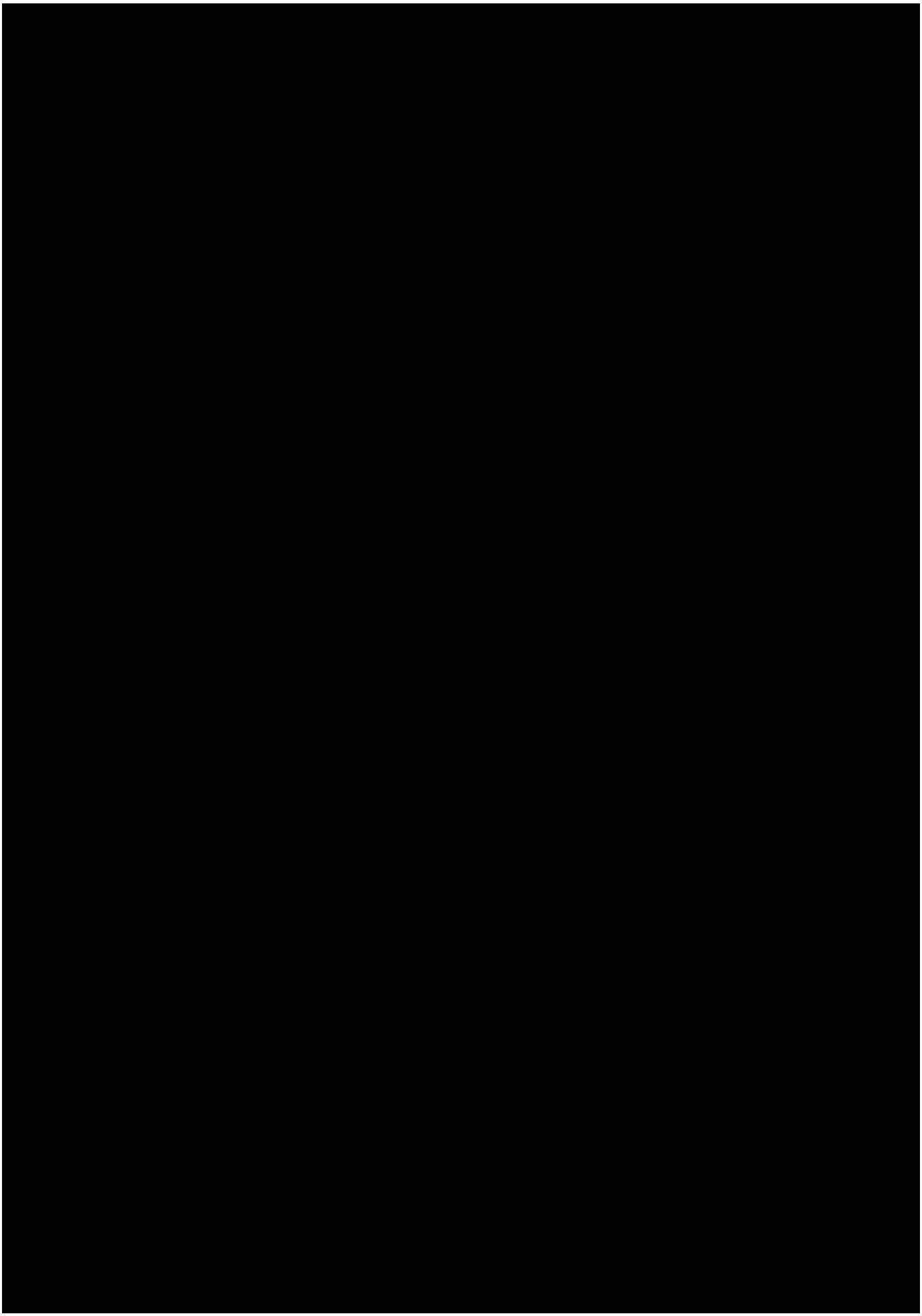
The aim of the initial test pit excavation program was to establish the stratigraphy of the various landforms within the activity area.

Following the controlled excavation of 1m x 1m test pits in each of the landforms within the activity area, the activity area is to be systematically investigated utilising a standard shovel testing methodology (shovel test probe or STP). The methodology of the hand excavation methodology is as follows:

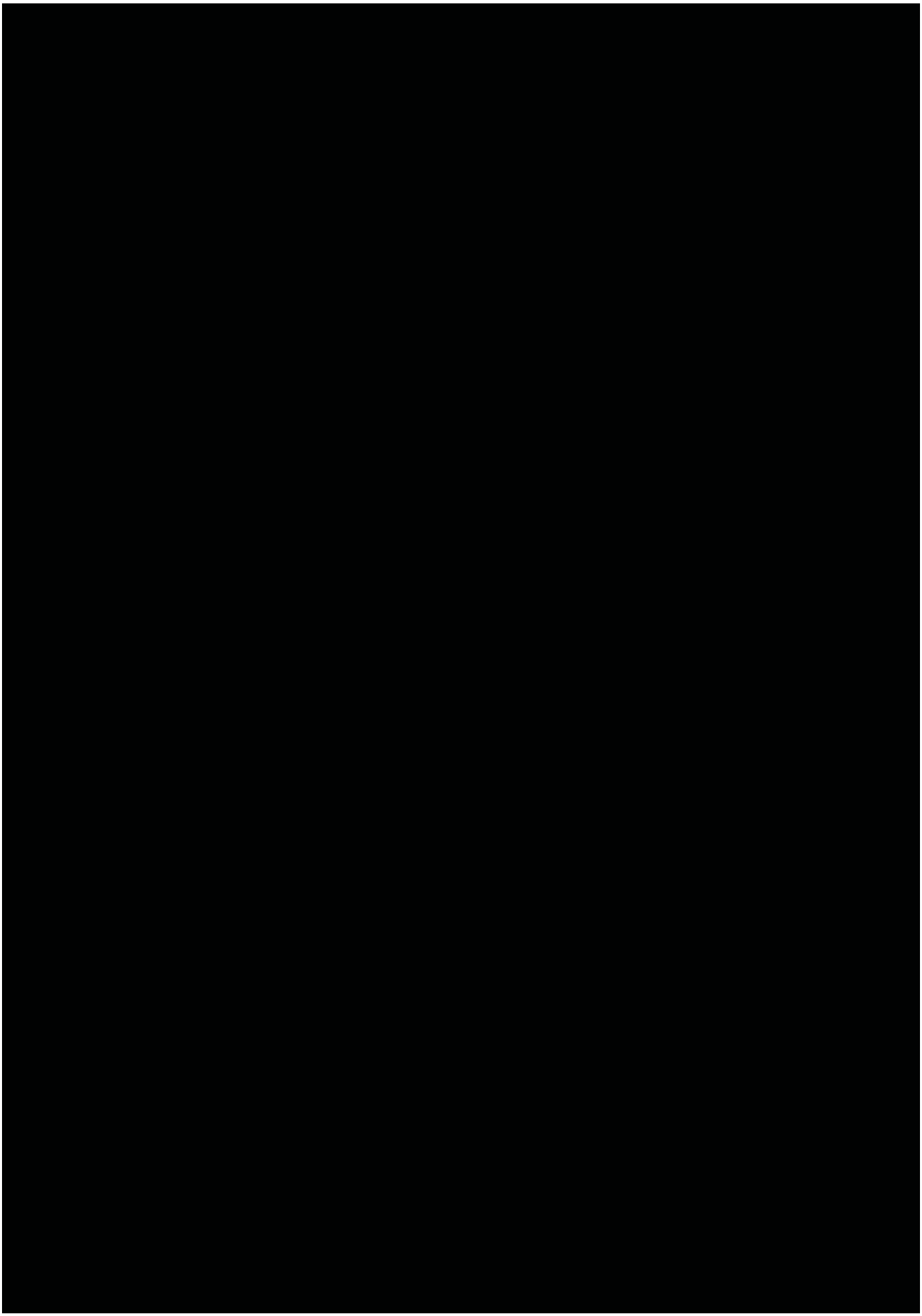
- A 1m x 1m test pit (TP) will be placed on each landform present within the activity area to establish stratigraphy and/or to determine the nature, extent, and significance of Aboriginal archaeological deposits. It is proposed that test pits be placed around each of the waterways and the swamp (off Robinsons Road in the north); on the Stony Rises and in each of the unsurveyed areas.
- A hand shovel test probe (STP) (ca. 40cm x 40cm) testing program is to be conducted set out on both a 25 m and 50 m GIS generated grid across the activity impact footprint, avoiding the areas already subject to ground disturbance or extensively tested by previous complex assessment CHMPs.
- The locations and contents of the TP and STPs are to be properly recorded to meet AAVs stringent site recording requirements.
- The TP and STPs are to be archaeologically excavated using hand tools (as required) in 100mm spits down to culturally sterile soil.
- The STPs are to be excavated by using a shovel (or other tools, as required) in as close to 100mm spits as possible, down to culturally sterile soil.
- Each spit is to be recorded using notes, drawings, and photography.
- The soil contents of each spit are to be sieved using 3mm and 5mm sieves.
- Any artefacts located within each spit are to be recorded horizontally as well as vertically so any spatial patterning can be identified.
- If highly significant archaeological deposits are uncovered then additional excavation will be required in order to properly define the extent, nature and significance of the Aboriginal cultural material present. The methodology of any additional testing will be determined in consultation with the Office of Aboriginal Affairs Victoria and the traditional owners.

- If in situ charcoal remains from any hearths are uncovered, then a sample should be properly removed and sent for radiocarbon dating. The methodology of any additional testing will be determined in consultation with the Office of Aboriginal Affairs Victoria and the traditional owners.
- All recovered artefacts are to be analysed in detail and the typology, material and any distinguishing features noted. All artefacts should be photographed.
- The results of the excavation and artefact analysis must be presented in the form prescribed in the Victorian Aboriginal Heritage Regulations 2007 (Part 3, Section 61) and these results must guide the management and contingency plans detailed in the complex CHMP.

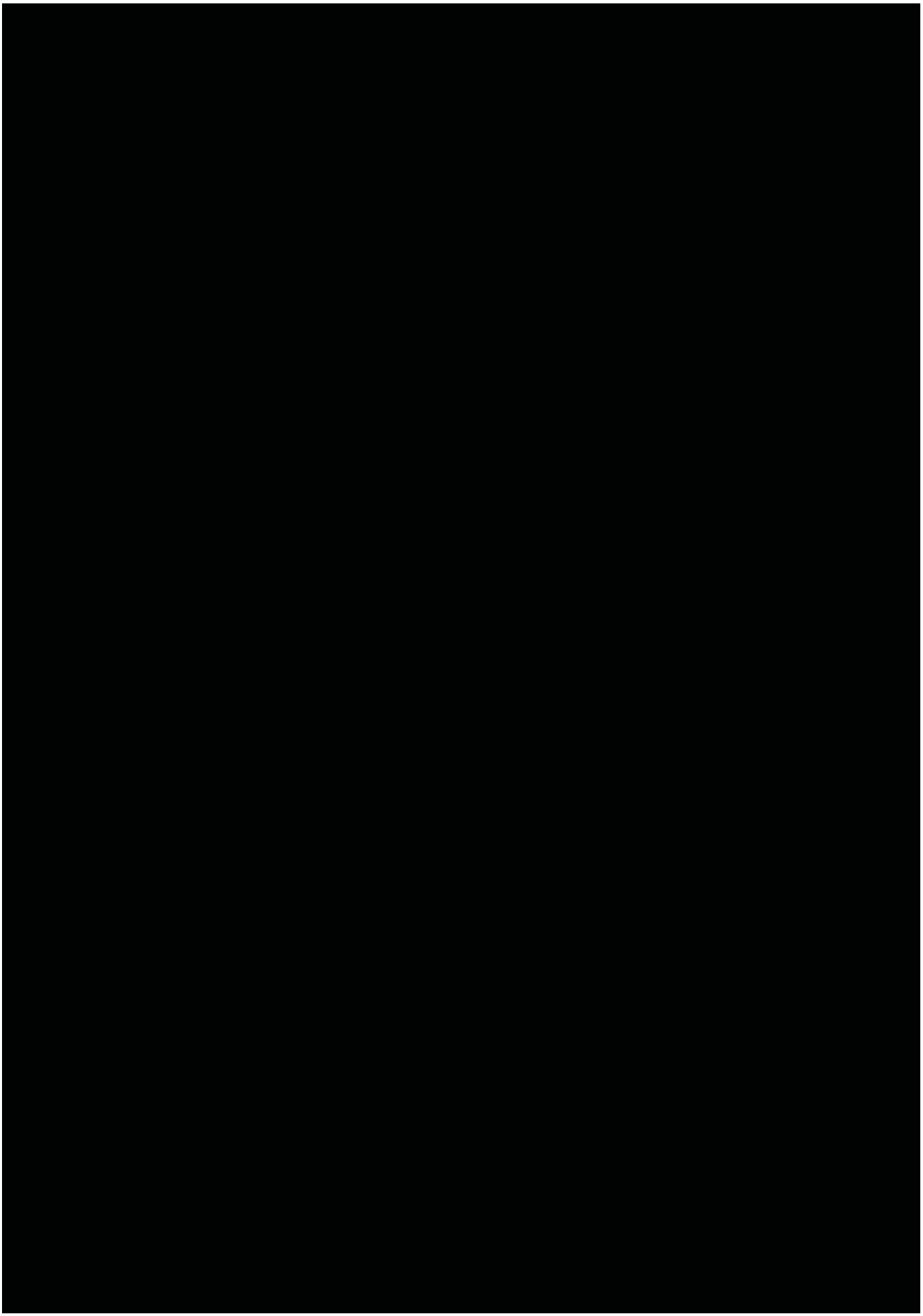
The following maps details the proposed subsurface testing methodology, as out outlined above. The following is only an indicative subsurface testing methodology. This will have to be further refined once the final pipeline alignment has been decided.



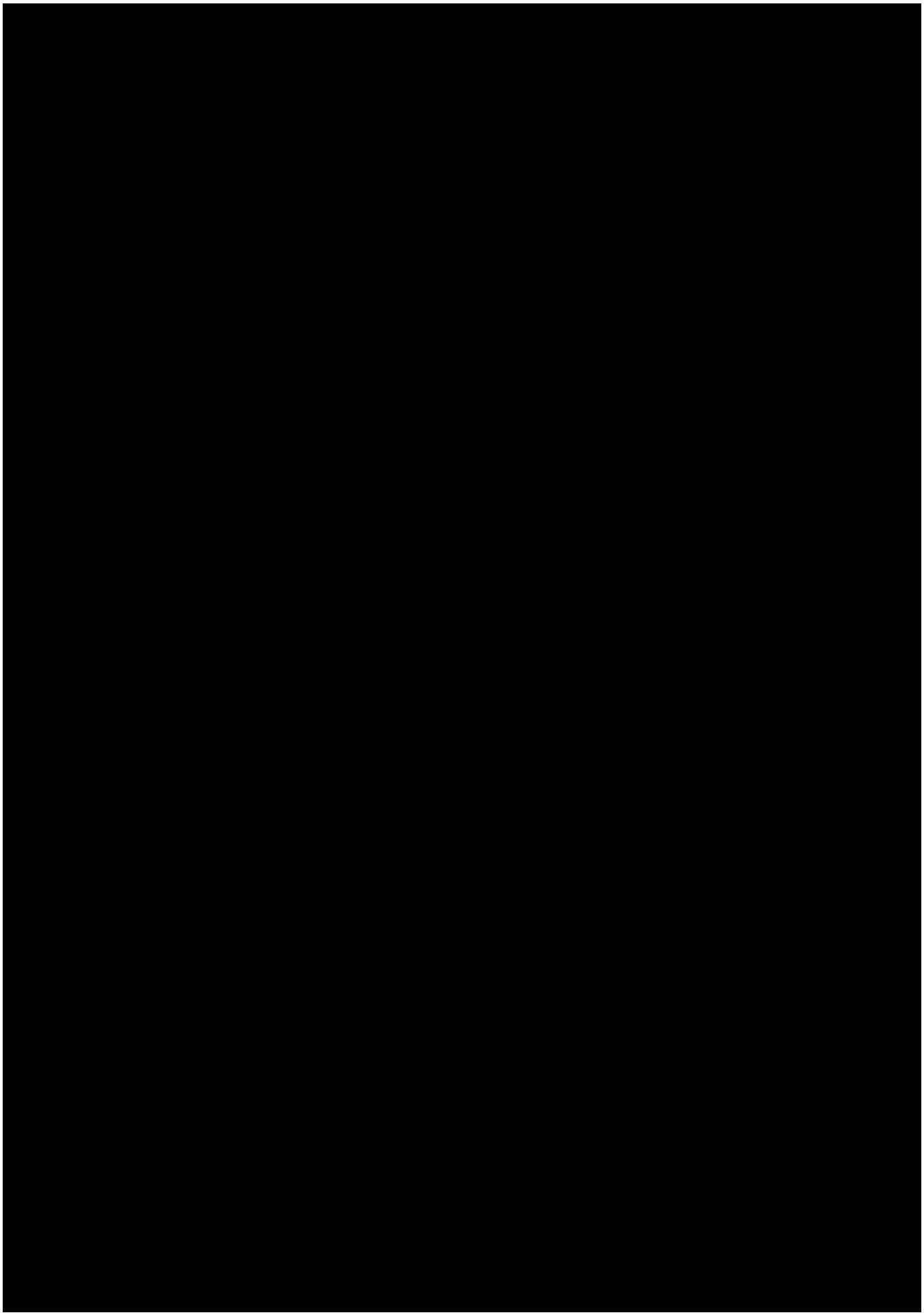
Map 5-10: Proposed Subsurface testing across the activity area.



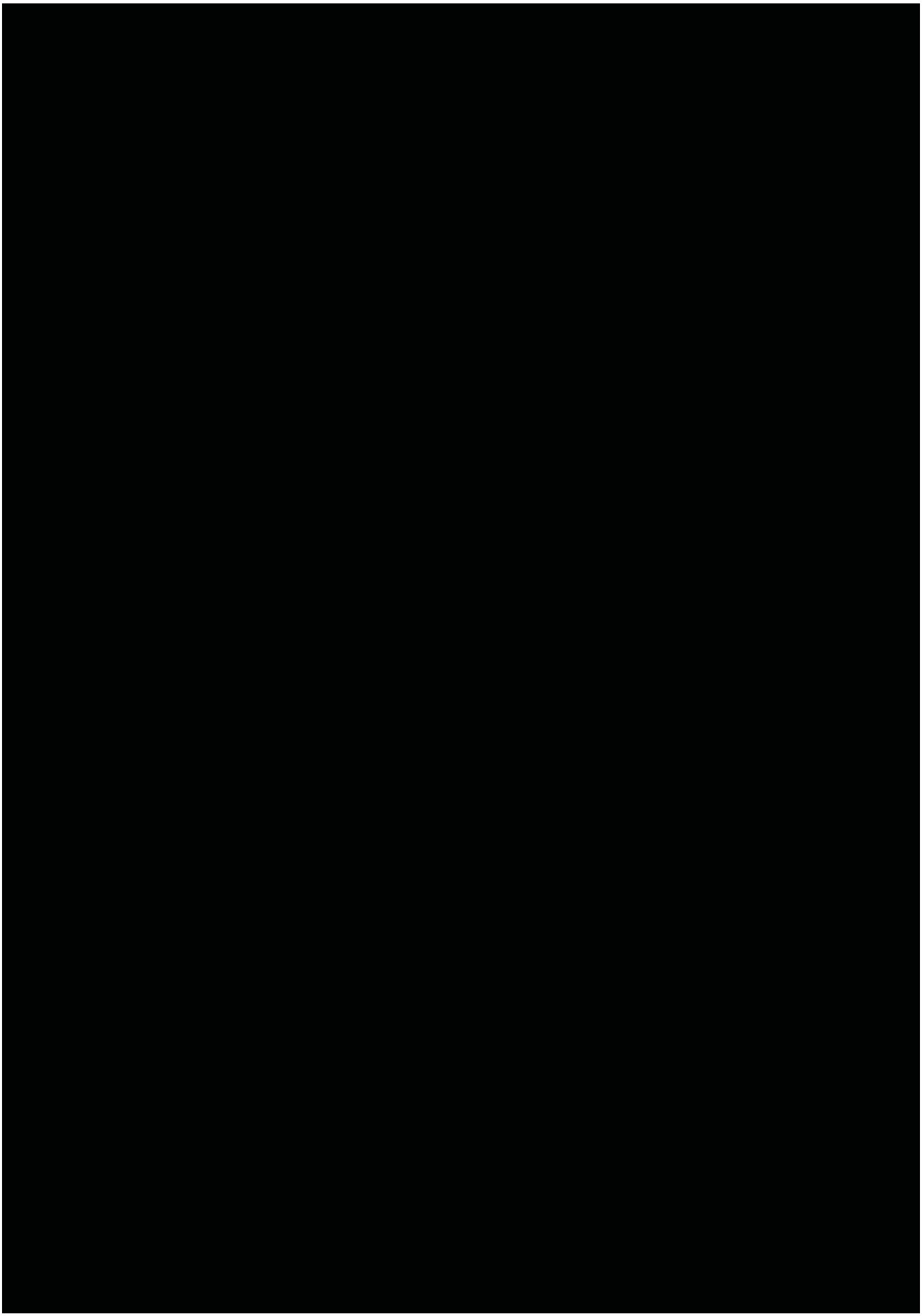
Map 5-11: Proposed Subsurface testing across the activity area.



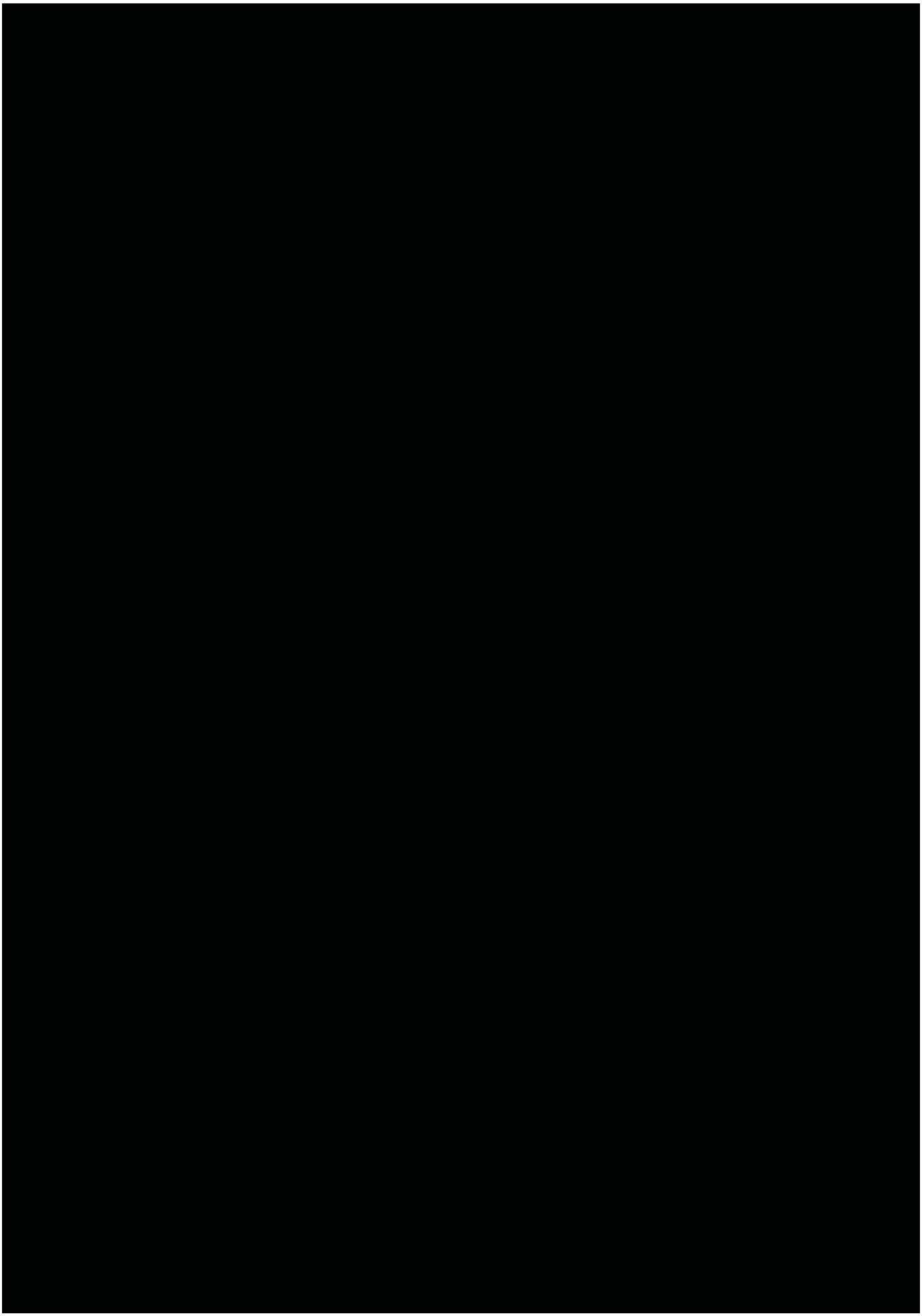
Map 5-12: Proposed Subsurface testing across the activity area.



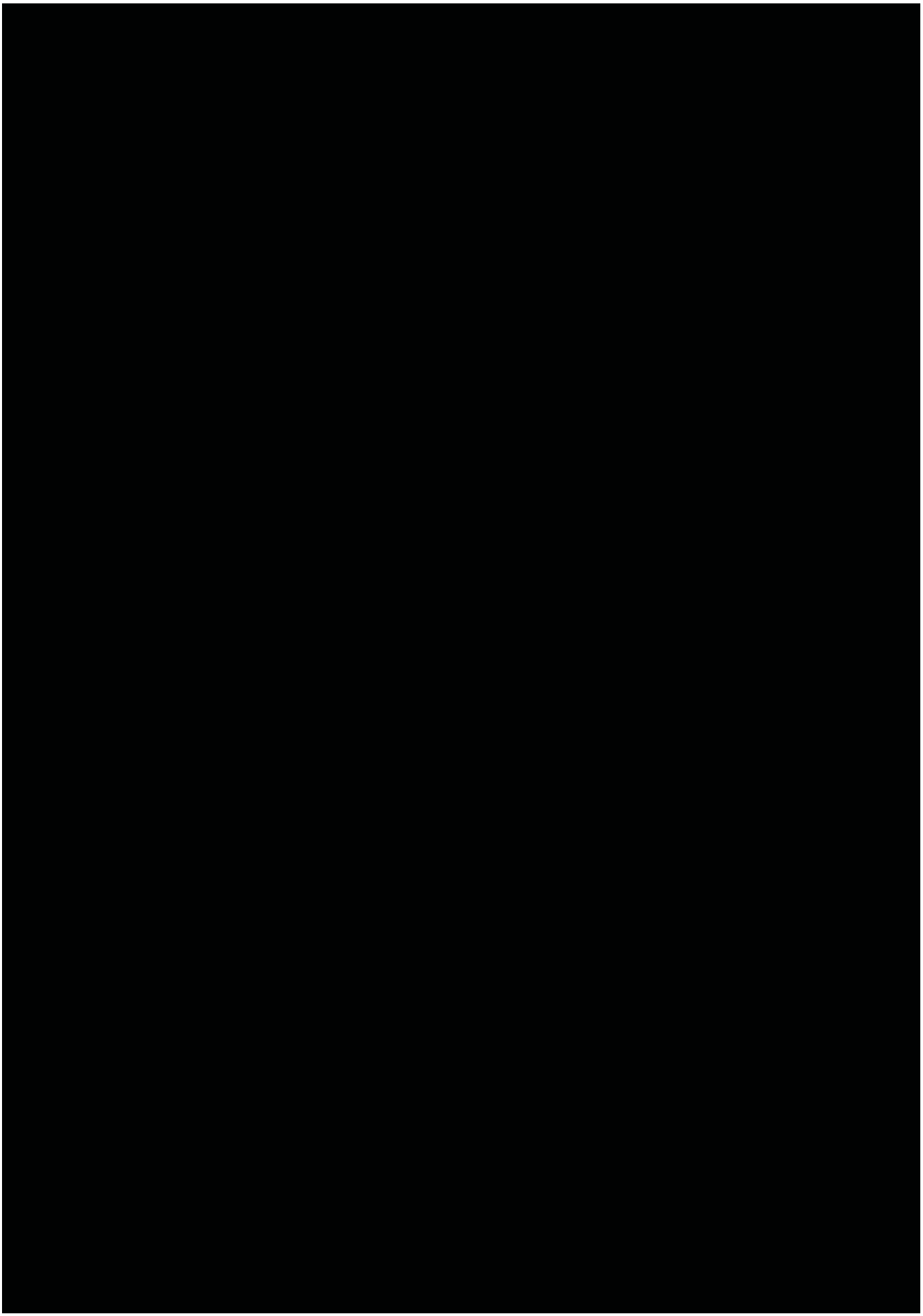
Map 5-13: Proposed Subsurface testing across the activity area.



Map 5-14: Proposed Subsurface testing across the activity area.



Map 5-15: Proposed Subsurface testing across the activity area.



Map 5-16: Proposed Subsurface testing across the activity area.

5.4.3 Results of the subsurface testing

The subsurface testing component of this CHMP is yet to be completed.

The first phase of subsurface testing was undertaken between 25 June and 28 June; and on 4 July and 11 July 2013. The complex assessment was undertaken by (in alphabetical order) Vanessa Flynn (ACHM),Erica Walther (ACHM), Erica Weston (ACHM), Matthew Wilson (ACHM), and traditional owner representatives (in alphabetical ordrer) Robert Anthony (Boon Wurrung), Stephen Compton (Bunurong), Gary Galway (Wurundjeri)Colin Hunter Jnr Jnr (Wurundjeri), James Hughes (Boon Wurrung), Alex Kerr (Wurundjeri), Jason Tweedie (Wurundjeri), Gary Watkins (Boon Wurrung), Naomi Zukanovic (Wurundjeri).

Summary of results of the first phase of subsurface testing

Table 5-13: Summary of results from the first phase of subsurface testing.

1x1 test pit location	Max Depth (mm)
North of Kororoit Creek	430
North of Kororoit Creek	300
South of Kororoit Creek	910
North of Dry Creek	300
North of Dry Creek	150
North of Dry Creek	200
South of Dry Creek	200
North of Skeleton Creek	300
South of Skeleton Creek	120
North of Neale Road	370
South of Middle Road	200

6 Details of Aboriginal Cultural Heritage in the Activity Area

This section summarises the details of the assessment of the Aboriginal cultural heritage undertaken to determine the nature and significance of each Aboriginal Place, including analysis of site formation processes and technological/ typological (attribute) analysis of the recorded stone artefacts.

6.1 Aboriginal Cultural Heritage in the Activity Area

Four Low Density Artefact Distributions (LDADs) were located during the standard assessment. These are shown in Table 6-1.

The Complex Assessment (subsurface testing) component of this CHMP is yet to be completed. The Complex Assessment component will be completed once the final pipeline alignment has been decided, in order to determine the nature, extent, and significance of Aboriginal cultural heritage potentially impacted by the activity.

Table 6-1: Summary of Aboriginal Places located within the activity area during the Standard Assessment.

VAHR Number	Place Name	Place Type
VAHR 7822- TBC	Middle Road Truganina LDAD 1	Low Density Artefact Distribution
VAHR 7822- TBC	Derrimut Road Truganina LDAD 1	Low Density Artefact Distribution
VAHR 7822- TBC	Tarneit Road Tarneit LDAD 1	Low Density Artefact Distribution
VAHR 7822- TBC	Tarneit Road Tarneit LDAD 2	Low Density Artefact Distribution

Site Formation Processes

The first phase of the Complex Assessment suggests that certain areas within the activity area, particularly those associated with both industrial and residential development, have been subject to ground disturbance and are unlikely to yield *in situ* Aboriginal archaeological remains.

This section will be further developed at the conclusion of the Complex Assessment.

Methodology for Artefact Analysis

The methodology for the technological and typological (attribute) analysis is structured on typical characteristics of Aboriginal flaked stone in south eastern Australia (Holdaway and Stern 2005) (Kaskadanis 2005).

The analysis is summarised below:

- Artefact type (i.e. complete flakes / tools, broken flakes / tools, cores and flaking debris);
- Tool type (i.e. the morphology type – microliths: backed points, backed blades, scrapers);
- Raw material type (i.e. chert, hornfels, silcrete, quartz, quartzite and basalt);
- Termination types (i.e. feather, step, overshot, hinge or crushed). This attribute refers to the amount of force that passes through the stone from striking the platform;
- Platform types (i.e. broad, flaked, crushed or missing). The platform is the point of 'percussion' when striking the core to detach flake blanks for tool production;
- Artefact dimensions (i.e. metrical attributes such as length, width, thickness and platform width / thickness of complete or broken flakes / tools and cores); and,
- Cortex type and amount (i.e. this is the type and amount of the stone's weathered outer surface which can provide information as to where the stone was sourced from; for example, cobble / pebbles, and the absence/ presence of cortex can be used to determine what stages of artefact manufacture the sample represents.

Artefact Analysis and Interpretation

This section will be developed at the conclusion of the Complex Assessment.

6.1.1 Traditional Owner Information about the Aboriginal Cultural Heritage

The landforms present within the activity area (including Kororoit Creek, Skeleton Creek, Dry Creek and Dohertys Drain) are considered to be community landmarks with strong symbolic qualities and spiritual and / or traditional connection between past and present. The presence of Aboriginal Places discovered as part of this CHMP, regardless of whether they are highly disturbed or not, have a deep meaning to the traditional owners.

Any further information provided by the traditional owners on the Aboriginal Cultural heritage present within the activity area will be included here, at the conclusion of the CHMP.

6.1.2 Results of the Assessment of Aboriginal Cultural Heritage

The Complex Assessment (subsurface testing) component of this CHMP is yet to be completed. The Complex Assessment component will be completed once the final pipeline alignment has been decided.

All of the Aboriginal Cultural material located during the standard assessment is considered to be a Low Density Artefact Distribution (LDAD).

6.1.3 Extent of LDADs within the activity area

Each LDAD recorded within the activity area is defined by the point of its location. No additional material was located in extent testing surrounding the artefact.

6.1.4 Nature of LDADs within the activity area

LDADs consist of less than 10 artefacts in a 10 m x 10 m area.

The nature of the LDADs located within the activity area will be included here at the conclusion of the Complex Assessment.

6.1.5 Significance of LDADs within the activity area

LDADs are low density scatters, with limited numbers of artefacts, usually thought to be indicative of casual discard or single-use events. In general, the locations of these artefacts are in disturbed conditions (i.e. within plough soil), however some are located below this in bleached horizons. The condition of the LDADs are considered to be low to fair. The scientific significance of these places is generally considered to be low. At the conclusion of the Complex Assessment a table detailing the significance ratings of each of the newly located LDADs will be included here.

7 Consideration of Section 61 Matters - Impact Assessment

The Complex Assessment (subsurface testing) component of this CHMP is yet to be completed. The Complex Assessment component will be completed once the final pipeline alignment has been decided, in order to determine the nature, extent, and significance of Aboriginal cultural heritage potentially impacted by the activity.

The following is a preliminary recommendation regarding each of the newly recorded sites, however discussions with both the Office of Aboriginal Affairs Victoria and the traditional owners will need to be undertaken both during and at the conclusion of the Complex Assessment prior to the finalisation of the Section 61 matters.

Despite this, the following preliminary recommendations could apply to each of the newly recorded LDADs within the activity area, during the Standard Assessment.

7.1 Section 61 Matters in Relation to the newly located LDADs

7.1.1 Can Harm to the newly located LDADs be avoided?

Harm to the place cannot be avoided.

7.1.2 Can Harm to VAHR #1 (Place Name) be Minimised?

Harm will be minimised by salvage of the place.

7.1.3 Are specific measures needed for the management of the Aboriginal Heritage Place?

The site is subject to specific management recommendations outlined in Section 9.3.

The material recovered for this place is subject to the general curation and reburial procedures outlined in Section 2.

Part Two - Cultural Heritage Management Recommendations

These Recommendations become Compliance requirements once the Cultural Heritage Management Plan is approved.

8 Specific Cultural Heritage Management Requirements

8.1 Complex Assessment

The Complex Assessment (subsurface testing) component of this CHMP is yet to be completed. The Complex Assessment component must be completed once the final pipeline alignment has been decided, in order to determine the nature, extent, and significance of Aboriginal cultural heritage potentially impacted by the activity.

The following is a preliminary recommendation regarding each of the newly recorded sites, however discussions with both the Office of Aboriginal Affairs Victoria and the traditional owners will need to be undertaken both during and at the conclusion of the Complex Assessment.

Despite this, the following preliminary recommendations could apply.

8.2 Cultural Heritage Induction

A cultural awareness start-up meeting and a compliance checklist induction should be held on site with contractors prior to the commencement of any of the works discussed in this CHMP. The induction should be held by a CHA appointed by the Sponsor and representatives of the relevant traditional owner communities should be invited.

The session must include a brief history of the Aboriginal occupation of the activity area and broader region; a summary of the archaeological investigations conducted within the activity area; specific details of all Aboriginal Places and Heritage located during the CHMP assessment (if relevant); a summary of the recommendations and contingencies contained within the CHMP; and the obligations of site workers/contractors and Sponsors under the Victorian Aboriginal Heritage Act 2006.

The main aim of the cultural heritage induction training session is to explain the procedures outlined in the CHMP; show the site contractors examples of the most likely Aboriginal cultural heritage material to be located within the activity area; and explain the procedure outlined in the Contingency Plan Section of the CHMP in the unlikely event that this material is uncovered by them during the course of construction works.

This training session must be organised and paid for by the site contractors and/or Sponsor.

8.3 Potential recommendations for the newly located LDADs

8.3.1 No Go Zones

The Sponsor must not undertake any ground-disturbing activities within a 50m buffer zone placed around the primary grid coordinates of the following newly located LDADs.

The perimeter of the sub-components must be barricaded with star picket and orange webbing at least seven days prior to the surface collection. This Aboriginal Place must remain a No Go Zone and be communicated to all of the Sponsor's Civil Contractors.

8.3.2 Surface Collection

A CHA in conjunction with representatives from the Wurundjeri, Bunurong and Boon Wurrung must salvage the Aboriginal archaeological material associated with the newly located LDADs. The salvage includes a site inspection and the collection and documentation of all surface Aboriginal cultural heritage material at least seven days prior to the commencement of any ground-disturbing activities. The surface collection must occur within a 50m radius of each of the sub-components of the newly located Low-Density Artefact Distributions (LDADs).

The Sponsor will be responsible for the costs and expenses associated with any actions undertaken by a Cultural Heritage Advisor and the Wurundjeri, Bunurong and Boon Wurrung.

8.3.3 Reburial and Documentation

After the completion of any high impact activities associated with the development, a CHA in conjunction with representatives from Wurundjeri, Bunurong and Boon Wurrung must rebury the collected cultural material as close as practical to its original position. All cultural material must be placed in a durable container together with information about the site's provenance. The decision of where to place the container must be made in consultation with representatives from Wurundjeri, Bunurong and Boon Wurrung and the location must be documented and an updated Object Collection form must be submitted to the Heritage Registrar at the Office of Aboriginal Affairs Victoria within 30 days.

9 Contingency Plans

The following contingency mechanisms are to be employed by the proponent during the activity:

Prior to construction work beginning within the activity area, the following tasks must be undertaken in order to ensure maximum protection to any potential Aboriginal archaeological sites that may exist within the activity area. This must include:

1. Should Aboriginal cultural material, or suspected cultural heritage material be located, the contingencies outlined in Sections 9.3 and 9.3.2 will need to be strictly adhered to; and
2. Where possible avoid further harm. In the event that further harm cannot be avoided, salvage of a portion of the site in accordance with Section 9.3.2 must be undertaken.

9.1 Section 61 matters

In accordance with Section 61.c of the Victorian Aboriginal Heritage Act 2006, the contingency plans outlined below must be adhered to at all times during and after the activity.

9.2 Dispute Resolution

Under the Aboriginal Heritage Act 2006, formal dispute resolution processes are available to resolve any dispute in a cultural heritage management matter. These processes are discussed in Part 8 of the Act (Sections 111-124). Given the cost of legalistic approaches to formal dispute resolution, these methods should be regarded as a last resort option.

9.2.1 Informal Dispute Resolution

Prior to undertaking formal dispute resolution through recourse to the Alternative Dispute Resolution process (Sections 111-115 of the Act) or VCAT (Sections 116-124), it is recommended that all parties undertake a process of informal dispute resolution to negotiate a solution.

In order to negotiate a solution, the following process is recommended:

1. That all matters in dispute be jointly investigated by the RAP(s) and the Sponsor
2. Where a breach of the CHMP or recommendations has occurred, the RAP and the Sponsor will agree to the best method / process to correct the breach,
3. Any correction of remedial activities required (i.e. repairing damage to a site) will be overseen by a RAP representative, and will be undertaken to the satisfaction of those representatives,
4. The Sponsor and/or its contractors must not undertake any works to salvage cultural material in accordance with Section 9.3.1 without the consent of the RAP or traditional owners,
5. The RAP or traditional owners will use their best endeavours to ensure there are no avoidable delays to work schedules,
6. Only issues directly related to cultural heritage management and the operations of this CHMP are to be discussed or resolved using these dispute resolution processes.
7. The informal dispute resolution process is straightforward. Within 48 hours of being notified that a disputed matter exists, the Authorised Project Delegates (APD) of the RAP or traditional owners and the Sponsor must meet to negotiate a solution as per 9.2.1. This matter will only be relevant to the cultural heritage management of the Activity area, and the operation of this CHMP. If the nominated parties cannot reach resolution, then it is recommended that alternative APR(s) attempt to resolve the matter.

If this is not successful within 7 days of the dispute notification, then the matter will need to be referred to professional dispute mediation.

9.2.2 Alternative Dispute Resolution (ADR)

Alternative dispute resolution (Sections 111 – 115 of the Aboriginal Heritage Act 2006) is only available as a recourse where the evaluation of a CHMP for which approval is sought is in dispute. It is not intended as a mechanism to resolve disputes involving the operation or workability of an approved CHMP. This can only be achieved using the methods outlined in Section 9.2.1 or more formal legal means (i.e. a breach of the CHMP may constitute a breach of contract).

9.2.3 Victorian Civil and Administrative Tribunal (VCAT)

A Sponsor may apply to VCAT for a review of a decision by AAV under Section 63 of the Aboriginal Heritage Act 2006 to refuse approval of a CHMP. The dispute must have undergone ADR (as per 9.2.2) prior to hearing by VCAT, or that the Chairperson of the Aboriginal Heritage Council is satisfied that ADR would not be successful. Once again, this is not intended as a mechanism to resolve disputes involving the operation or workability of an approved CHMP. This can only be achieved using the methods outlined in 9.2.1 or more formal legal means (i.e. a breach of the CHMP may constitute a breach of contract).

9.3 Discovery of Aboriginal cultural heritage during works

Should Aboriginal objects, artefacts or places be located during the works associated with the activity, the following management steps must be undertaken:

1. The APM must immediately suspend all relevant work(s) within 10m of the location of the discovery of the item in question,
2. The person identifying the find(s) must notify the Activity Project Manager (APM) within 24 hours,
3. The location of the find(s) are to be barricaded off using suitable materials (i.e. safety webbing, flagging tape) to a minimum distance of 10m.
4. All find(s) to remain in situ until assessed by the cultural heritage advisor,
5. Work(s) can continue outside of the barricaded area,
6. The APM must notify the cultural heritage advisor who will, in consultation with the RAP, fully assess the Aboriginal heritage culture and recorded the find(s).
7. The cultural heritage advisor must attend the activity area within 24 hours of notification to assess the new find(s) and advise on the appropriate management of the item(s), in consultation with the RAP.
8. Within 48 hours a decision or recommendation must be made in regard to the process to be followed in order to manage the newly located cultural heritage items in a culturally appropriate manner, in consultation with the RAP. Once the assessment is complete the cultural heritage advisor will notify the Secretary (AAV) of the discovery.

9.3.1 Human Remains

The discovery of human remains can be a deeply distressing and emotional time for all concerned. There are very strict legal guidelines as to how the discovery of human remains must be treated in Victoria. The remains may or may not be of Aboriginal origin. If the remains are not of Aboriginal origin and are more recent, they therefore may constitute a crime scene. It is imperative that human remains are not disturbed in any way prior to the assessment of the remains by the appropriate parties.

Actions to be taken in the event of the discovery of human remains

1. If it is suspected that human remains have been discovered, then all works must cease immediately within the vicinity of the discovery,
2. The remains must be left in situ and protected from all harm or damage,
3. Keep all unnecessary or unauthorised personnel away from the site to minimise the potential for damage to the site,
4. Do not contact the media.

Notifications

Once the site has been secured, the Victoria Police and the Coroner's Office must be notified immediately upon the discovery of any human remains:

If human remains are discovered:

1. Contact the Victoria Police,
2. Contact the Coroner's Office, and
3. If it is believed that the remains are of Aboriginal origin, the DSE Emergency Coordination Centre must be contacted immediately on 1300 888 544
4. Contact the RAP or traditional owners through the Cultural Heritage Advisor.

All details of the nature and location of the discovery of human remains must be made available to the authorities.

If it is confirmed that the human remains discovered are of Aboriginal origin, the Activity Project Manager must report the existence of the remains to the Secretary, Department of Planning and Community Development, in accordance with Section 17 of the *Aboriginal Heritage Act 2006*.

Mitigation or Salvage

Once it has been confirmed that the human remains discovered are of Aboriginal origin and the Secretary, Department of Planning and Community Development has been informed, then:

1. The Secretary will determine the appropriate course of action in accordance with S.18 (2) (b) of the Aboriginal Heritage Act 2006, and
2. An appropriate mitigation or salvage strategy as determined by the Secretary must be implemented. The strategy to be implemented will depend upon the circumstances of the discovery, the context, the location of the finds, the number of burials found, and the outcome of consultations with the relevant RAP applicants.

Curation and Storage

The on-going treatment, curation and/or storage of any Aboriginal human remains discovered will be at the direction of the Secretary, Department of Planning and Community Development. Appropriately managed to ensure the reburied material is not subsequently disturbed.

Reburial of Human Remains

Any reburial of salvaged human remains must be:

1. Fully documented and undertaken by a qualified archaeologist,
2. Clearly marked and all details provided to AAV,

- Appropriate management measures must be implemented to ensure that the remains are not disturbed in the future.

9.3.2 Contingency if Aboriginal Cultural Heritage is located during construction

If any previously unrecorded Aboriginal archaeological site is discovered during the works and cannot be retained within the development, then the Aboriginal cultural material or feature should be salvaged using the following methodology:

1. If the nature and extent of the newly recorded cultural material has not been defined, a series of shovel test probes will need to be excavated to delineate the vertical and horizontal boundaries of the material,
2. A 1 x 1m excavation unit will be hand excavated in spits of 0.1m increments to provide stratigraphical information on the newly recorded site,
3. All artefacts will be analysed, leading to an understanding of the artefact density and significance of the newly recorded site, and
4. All surface artefacts located within the site's boundaries to be impacted will be collected. A percentage of the newly recorded site will be excavated to mitigate the effects of the proposed impacts by recovering cultural materials. The quantum (a % of the total subsurface extent of the site) will be decided on the basis of the significance rating of the site and in consultation with the RAP.

9.3.3 Recommencing Works

Works may recommence within the 10m area(s) of exclusion established as a result of Section 9.3 once:

1. The steps outlined in 9.3 have been followed,
2. When the requirements for updating the relevant Aboriginal cultural heritage records have been collected or completed by the cultural heritage advisor, and
3. No dispute exists as to the course of action(s) to be undertaken.

9.3.4 Curation and Storage of Cultural Materials

Any Aboriginal cultural material recovered or salvaged from within the activity area remains the property of the traditional owners. Any salvage or recovery undertaken within the activity area is to be agreed to through discussion between the heritage advisor, the RAP(s) or the relevant Aboriginal communities. The cultural heritage advisor will be responsible for:

1. Cataloguing any items of Aboriginal cultural heritage,
2. Labelling and packaging any such items in a competent archival manner,
3. Arrange storage for the items of Aboriginal cultural heritage in an appropriate location, and
4. If required, facilitate the reburial of items of Aboriginal cultural heritage in consultation with the RAP(s) or the relevant Aboriginal communities. Should reburial be an option, the following steps will need to be followed:
    a. The relevant VAHR place record form will be updated and an Object Collection component form will be completed and submitted to Heritage Registrar, AAV.
    b. The reburial location will be recorded to sub-metre accuracy, be relocatable, and in an area which is protected from future development or disturbance.

Artefacts to be reburied will be placed in a durable container with a record of provenance and with the catalogue and assessment documentation on an archive-quality storage medium.

9.3.5 Activity Area Access

The Sponsor and the cultural heritage advisor will facilitate access to the activity area for traditional owners in the following situations:

1. During the initial cultural heritage survey of the activity area, and
2. If new Aboriginal cultural heritage material is located as per Section 9.3

9.4 CHMP Compliance

To ensure that this CHMP is complied with, and any unnecessary dispute(s), audit or stop work orders are prevent edit is essential that all of the requirements and steps outlined in the contingencies section are adhered to at all times. To ensure this, the following procedure is recommended:

1. All Parties should be familiar with the content and intent of this CHMP,
2. All personnel involved in the Activity / Activity Area should be inducted as to the requirements of this CHMP prior to works commencing,
3. Contact details of all parties to be available at all times. Changes to relevant contact details should be communicated immediately, and
4. All queries or questions should be addressed immediately by the Activity Project Manager in consultation with the RAP and the heritage advisor to avoid non-compliance with this CHMP.

9.5 Remedying CHMP non-compliance

The Activity Project Manager is responsible for remedying non-compliance with a CHMP. In the event that the contingencies set out in this CHMP are not adhered to, a record of the breach must be made and immediate action taken to remedy the breach. The record of the breach must include the reasons for non-compliance. The Activity Project Manager must take immediate action to remedy non-compliance in accordance with the relevant contingency recommendation. All acts of non-compliance that harms Aboriginal cultural heritage must be reported to AAV and will be investigated by an AAV inspector.

A record of CHMP compliance must also be maintained by the Activity Project Manager at all times and must be available for inspection by either an Inspector under the Act or other representative of the Secretary.

9.6 Authorised Project Delegates

For the purposes of continuous communication(s) and informal dispute resolution, the following persons shall initially act as Authorised Project Delegates:

Organisation	Individual	Contact
Melbourne Water Corporation	Nick Macdonald	0433 278 547
The Office of Aboriginal Affairs Victoria	Secretary	(03)9208 3333

Table 9-1: Authorised Project Delegates.

Any change in personnel or to the APD(s) should be notified to all parties as soon as is practicable.

9.7 Intellectual Property

It is recognised by all parties that culturally sensitive information will not be disclosed or discussed without the express consent of the relevant parties.

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11 Glossary

Absolute Dating: Is the process of determining a specific date for an archaeological or paleontological site or artefact. Some archaeologists prefer the terms chronometric or calendar dating, as use of the word "absolute" implies a certainty and precision that is rarely possible in archaeology. See also relative dating.

Adze: A stone tool made on flakes with steep flaking along the lateral margins and hafted for use as a wood working tool.

Alluvial Terrace: A terraced embankment of loose material adjacent to the sides of a river valley.

Amorphous: Showing no definite crystalline structure.

Angle Of Applied Force: The angle at which the force of flaking is applied to a core.

Angular fragment: A piece of stone that is blocky or angular.

Anisotropic: Having some physical properties which vary in different directions.

Anvil: A portable stone, used as a base for working stone tools. Anvils most frequently have a small circular depression in the centre which is the impact damage from where cores were held while being struck by a hammer stone. An anvil may be a multi-functional tool also used as a grindstone and hammer stone.

Archaeological Context: The situation or circumstances in which a particular item or group of items is found.

Archaeological site types: The archaeological site types encountered in Australia can be divided into three main groups:

Historical archaeological site: An archaeological site formed since the European settlement containing physical evidence of past human activity (for example a structure, landscape or artefact scatter).

Aboriginal contact site: A site with a historical context such as an Aboriginal mission station or provisioning point, or a site that shows evidence of Aboriginal use of non-traditional Aboriginal materials and technologies (e.g. metal or ceramic artefacts).

Aboriginal prehistoric archaeological site: A site that contains physical evidence of past Aboriginal activity, formed or used by Aboriginal people before European settlement.

These sites may be:

Artefact scatters	Scarred Trees
Isolated artefacts	Mounds
Rock shelters	Rock art
Burial Structures	Hearths
Shell middens	Quarries
Ethnographic Items	Grinding Patches

Archaeology: The study of the past through the systematic recovery and analysis of material culture. Archaeology relies heavily upon science and cognate disciplines to provide interpretations of the past life ways of the peoples under investigation.

Artefact: any movable object that has been utilised modified or manufactured by humans.

Artefact scatter: A surface scatter of cultural material. Aboriginal artefact scatters are often defined as being the occurrence of five or more items of cultural material within an area of about 10m x 10m.

Australian Height Datum: The datum used to determine elevations in Australia. The AHD is based on the mean coastal sea level being zero metres AHD.

Australian Small Tool Tradition: Stone tool assemblages found across Australia, with the exception of Tasmania, dating between 8000 BP to European contact. The tool types include hafted implements (e.g. Bondi points), bifacial and unifacial points, geometric microliths, and blades. The assemblage is named for its distinct lack of larger ‘core tools’ which characterised earlier assemblages.

Axe: A stone-headed axe or hatchet or the stone head alone, characteristically containing two ground surfaces which meet at a bevel.

Backed Artefact: Backed artefacts are flakes retouched until they have one or more steep and relatively thick surfaces that are covered with negative scars. Since the backing retouch was accomplished with a bipolar and/or anvil-rested knapping technique, these retouched surfaces typically show negative scars originating from two directions, a pattern that is sometimes described as "double backing". Backed pieces are a feature of the ‘Australian small tool tradition’, dating from about 8000 BP in southern Australia.

Bearing: An angle measured clockwise from a north line of 0° to a given surveyed line.

Bevelled Edge: An edge which has had its angle altered.

Biface: A flaked stone artefact which has flake scars on both ventral and dorsal surfaces.

Bipolar: Technique of knapping where a core is rested on an anvil and force applied to the core at an angle close to 90o in the direction of the core's contact with the anvil.

Blade: A flake at least twice as long as it is wide.

Blaze: A mark carved in a tree trunk at about breast height. This type of mark was traditionally used by explorers or surveyors to indicate a route of passage in a certain direction, or a particular camp location.

Bulb of Percussion: Is a convex protuberance located at the proximal end of the ventral surface of a flake, immediately below the ring crack.

Bulbar Scar: The negative scar on a core that results from the bulb of percussion on the extracted flake.

Burial site: Usually a sub-surface pit containing human remains and sometimes associated artefacts. Human burials can also occur above the ground surface within rock shelters or on tree platform burials.

Burin: A stone implement roughly rectangular in shape with a corner flaked to act as a point for piercing holes.

Cadastral: From the Latin, a cadastre is a comprehensive register of the real property of a country, and commonly includes details of the ownership, the tenure, the precise location (some can include GPS coordinates), the dimensions (and area), the cultivations if rural and the value of individual parcels of land.

Chert: Is a fine-grained silica-rich microcrystalline, cryptocrystalline or microfibrous sedimentary rock that may contain small fossils. It varies greatly in colour (from white to black), but most often manifests as gray, brown, greyish brown and light green to rusty red. Its colour is an expression of trace elements present in the rock, and both red and green are most often related to traces of iron (in its oxidized and reduced forms respectively).

Cleavage Plane: A plane of weakness or preferred fracture in a rock.

Composite: An artefact made up of two or more parts joined together.

Conchoidal Fracture: describes the way that brittle materials break when they do not follow any natural planes of separation. Materials that break in this way include flint and other fine-grained minerals, as well as most amorphous solids, such as obsidian and other types of glass. Conchoidal fractures often result in a curved breakage surface that resembles the rippling, gradual curves of a mussel shell; the word "conchoid" is derived from the word for this animal. A swelling appears at the point of impact called the bulb of percussion. Shock waves emanating outwards from this point leave their mark on the stone as ripples. Other conchoidal features include small fissures emanating from the bulb of percussion.

Conjoin: A physical link between artefacts broken in antiquity. A conjoin set refers to a number of artefacts which can be been refitted together.

Contours: Lines joining points of equal height on a topographic map. Contour lines that are relatively close together depict an area of steep terrain on the earth's surface; whereas lines depicted a distance apart represent flat areas on the earth's surface.

Core: An artefact from which flakes have been detached using a hammer stone. Core types include single platform, multi-platform, and bipolar forms.

Cortex: Weathered outer surface of rock, usually chemically altered.

Crazing: Production of visible surface cracks by uncontrolled heating of rock.

Crown land: Technically belonging to the reigning sovereign, is a class of public land, provided for the enjoyment and benefit of the people.

Crushing: Abrasion, small fracturing and the formation of ring cracks, usually along an artefacts edge.

Cryptocrystalline: Rock in which the crystal structure is too fine for clear resolution with an optical microscope.

Cultural significance: Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations (Australia ICOMOS Burra Charter Article 1.2).

Cultural Materials: The products of human behaviour, such as stone artefacts or food debris.

Datum: In surveying and geodesy, a datum is a reference point or surface against which position measurements are made, and an associated model of the shape of the earth for computing positions. Horizontal datum's are used for describing a point on the earth's surface, in latitude and longitude or another coordinate system. Vertical datum's are used to measure elevations or underwater depths. The previous datum used in Australia was known as the Australian Geodetic Datum (AGD). However, this was restricted because it was defined to best fit the shape of the earth in the Australian region only. The change in datum's had a major consequence to all coordinates. Both latitudes/longitudes and eastings/northings were shifted by approximately 200 metres in a north-easterly direction.

Debitage: The term debitage refers to the totality of waste material produced during lithic reduction and the production of chipped stone tools. This assemblage includes, but is not limited to, different kinds of lithic flakes, shatter, and production errors and rejects.

Decortication: Removal of cortex from a stone artefact.

Dendrochronology: Is the method of scientific dating based on the analysis of tree-ring growth patterns.

Denticulated: Describes a stone tool which has one edge worked into a series of notches giving a toothed or serrated cutting edge.

Discard: The movement of an object from its systemic context to an archaeological context.

Distal: The end of a flake opposite the bulb; the area of a flake containing its termination.

Direct Freehand Knapping: A method of holding the material to be flaked in the unsupported hand and directing the hammer stone with the other hand.

Dorsal Surface: The face of a flake which was the core surface prior to flake removal and may therefore retain negative flake scars or cortex.

Edge ground implement: A tool, such as an axe or adze which has been flaked to a rough shape and then ground against another stone to produce a sharp edge.

Edge modification: Irregular small flake scarring along one or more margins of a flake, flaked piece or core, which is the result of utilisation/retouch or natural edge damage. Edge damage refers to the removal of small flakes from the edge of an artefact.

Elevation: The height above mean sea level.

Eraillure Flake: A flake formed between the bulb of force and the bulbar scar. Sometimes the eraillure flake adheres to the core in the bulbar scar. The eraillure flake leaves no scar on the core, but always leaves a scar on the ventral surface of the flake. The eraillure flake is convex / concave (like a meniscus lens), has no distinct features on the "dorsal face", but may contain compression rings on the bulbar face.

Ethno-archaeology: The study of human behaviour and of the material culture of living societies in order to learn how items enter the archaeological record, thus allowing the formation of hypotheses as to how items of material culture entered the archaeological record in pre-history.

Ethnographic Site: Often overlooked in cultural heritage management, an ethnographic site is one which has particular spiritual or ritual significance to a particular group of people. They are more commonly referred to as ‘dreaming sites’ in Australia, and most appropriately recorded by someone with anthropological qualifications.

Excavation: The systematic recovery of archaeological data through the exposure of buried sites and artefacts. Excavation is a destructive process, and hence it is accompanied by comprehensive recording of every aspect.

Excavation Report: Once an excavation has finished, a report outlining the reasons, aims, methods used and findings from the excavation as well as some conclusions drawn from interpreting the artefacts.

Faceted Platform: A platform which is created by the removal of a number of flake scars.

Feather Termination: A termination of the fracture plane that occurs gradually (i.e. there are no sharp bends in the plane), producing a thin, low angled distal margin.

Feature: In excavations, a feature is something that a human made in the past that has not been or cannot be moved. Examples of this would be a house floor or a hearth (fire pit). When archaeologists are excavating, they often come across features.

Flake: A piece of stone removed from a core during the process of knapping by the application of external force, which characteristically shows traces of the processes of removal: concentric fracture ripples and a bulb of percussion. Flakes with a length: breadth ratio of 2:1 or more are usually referred to as blades. In some cases flakes are the result of shaping a block of stone into a tool of some kind. When removed from a prepared core, however, they were usually used as blanks for making tools. Primary flakes (also called decortication flakes) are large, thick flakes struck off a core when removing the cortex and preparing it for working. Secondary flakes (also called reduction flakes) are large flakes struck off a piece to reduce its size or thickness. Tertiary flakes are small flakes struck off when shaping the detail of a piece to make a specific tool. Retouching flakes are tiny, extremely thin flakes pinched or pushed off a piece to finish it, to fine-shape part of the surface, sharpen it, or resharpen it. Notching flakes are produced when putting hafting notches in stone tools.

Force: The quantity of energy exerted by a moving body; power exerted; energy exerted to move another body from a state of inertia.

Formal tool: an artefact that has been shaped by flaking, including retouch, or grinding to a predetermined form for use as a tool. Formal tools include scrapers, backed pieces, adzes and axes.

Fracture: Irregular surface produced by breaking a mineral across rather than along cleavage planes.

GDA94: Geocentric Datum of Australia. A spatial reference system which is universally implemented across Australia. The Geocentric Datum of Australia (GDA) is a coordinate reference system that best fits the shape of the earth as a whole. It has an origin that coincides with the centre of mass of the earth, hence the term 'geocentric'

Geodesy: The science and mathematical calculations of the shape and size of the Earth.

Geographic coordinates: a geographic coordinate system enables every location on the earth to be specified, using mainly a spherical coordinate system. There are three coordinates: latitude, longitude and geodesic height.

Geographic Information Systems: Is any system for capturing, storing, analysing, managing and presenting data and associated attributes which are spatially referenced to Earth. GIS is a system or tool or computer based methodology to collect, store, manipulate, retrieve and analyse spatially (georeferenced) data.

Geometric microlith: A small tool that has been fashioned from breaking apart a microblade. The piece is then retouched or backed and a small tool formed.

Gilgai soils: Soils with an undulating surface, presenting as a pattern of mounds and depressions. Gilgai soils contain swelling clays, which shrink and swell with alternate drying and wetting cycles. They display strong cracks when dry. Elements of the soil circulate and move during the shrink-swell process.

Global Positioning System: GPS is a satellite based navigation system originally developed by the United State's Department of Defence. A GPS receiver calculates a position by measuring distances to four or more satellites of a possible 24. These orbit the Earth at all times.

Grain: A description of the size of particles or crystals in rocks or sand. Coarse grained rocks have particles or crystals which are large (1mm or more), and fine grained rocks have particles which are small (0.1mm or less).

Greywacke: Hard fine-grained rock of variable composition containing some quartz and feldspar but mostly very fine particles of rock fragments.

Graticule: A network of crossing lines on a map representing parallels of latitude and meridians of longitude as defined by the projection.

Grid: The division of an archaeological site into small squares that denote different areas of excavation, making it easier to measure and document the site.

Grid coordinates: A point on a map given as an easting and northing reading. The values are given in metres.

Grindstone: The abrasive stone used to abrade another artefact or to processes food. Upper and lower grind stones used to grind plants for food and medicine and/or ochre for painting. A hammer stone sometimes doubles as a hammer stone and/or anvil.

Hammer stone: a piece of stone, often a creek/river pebble/cobble, which has been used to detach flakes from a core by percussion. During flaking, the edges of the hammer stone become 'bruised' or crushed by impact with the core. Hammer stones may also be used in the manufacture of petroglyphs.

Hand-Held: Description of the method used to immobilize the rock during knapping, it which it is held in one hand and struck by a hammer stone held in the other hand.

Hardness: Resistance of material to permanent deformation.

Hearth: Usually a sub-surface feature found eroding from a river or creek bank or a sand dune – it indicates a place where Aboriginal people cooked food. The remains of hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved with a hearth.

Heat treatment: The thermal alteration of stone (including silcrete) by stone workers to improve its flaking qualities.

Heritage: The word 'heritage' is commonly used to refer to our cultural inheritance from the past that is the evidence of human activity from Aboriginal peoples through successive periods of later migration, up to the present day. Heritage can be used to cover natural environment as well, for example the Natural Heritage Charter. Cultural heritage can be defined as those things and places associated with human activity. The definition is very broad, and includes Indigenous and historic values, places and objects, and associated values, traditions, knowledge and cultures.

Heritage Place: A place that has aesthetic, historic, scientific or social values for past, present or future generations – 'this definition encompasses all cultural places with any potential present or future value as defined above'. Heritage place can be subdivided into Aboriginal place and historical place, for the purposes of this document.

Hinge Termination: A fracture plane that turns sharply toward the free surface of the core immediately prior to the termination of the fracture. The bend of the ventral surface is rounded and should not be confused with a step termination.

Historic place: A place that has some significance or noted association in history.

Homogeneous: Uniform structure and property throughout the material.

Hunter-gatherer: A member of a society who gains their subsistence in the wild on food obtained by hunting and foraging.

Hydrology: Is the study of the movement, distribution, and quality of water throughout the Earth.

ICOMOS (International Council on Monuments and Sites): ICOMOS is a nongovernment professional organisation closely linked to UNESCO, with national committees in some 100 countries with the headquarters in France. ICOMOS promotes expertise in the conservation of cultural heritage. It was formed in 1965, and has a responsibility to advise UNESCO in the assessment of sites proposed for the World Heritage List. Australia ICOMOS was formed in 1976. Its fifteen member executive committee is responsible for carrying out national programmes and participating in decisions of ICOMOS.

Incipient Crack: A crack or line of weakness in the rock.

Inclusion: An impurity or foreign body in the stone that reduces the homogeneity of the rock.

Indirect Percussion: Punch technique.

Interpretation: The process of explaining the meaning or use of an artefact.

Inward Force: Force applied to the platform, and directed into the body of the core.

Isolated artefact: The occurrence of less than five items of cultural material within an area of about 100 sq. metres. It/they can be evidence of a short-lived (or one-off) activity location, the result of an artefact being lost or discarded during travel, or evidence of an artefact scatter that is otherwise obscured by poor ground visibility.

Knapper: A person who creates stone artefacts by striking rocks and causing them to fracture.

Knapping Floor: The debris left on one spot and resulting from the reduction of one block of raw material. A knapping location is a site comprised of one or more knapping floors.

Koori: Koori is an Aboriginal term used to describe Indigenous people from Victoria and southern New South Wales.

Lateral Margins: The margins of a flake either side of the percussion axis.

Latitude: The angular distance along a meridian measured from the Equator, either north or south.

Layer: The layer is the level in which archaeologists dig. All excavation sites have different numbers of layers. Archaeologists try to work out when they are moving to a new layer by cultural or man-made clues like floors, but sometimes they will go by changes in soil colour or soil type.

Longitude: The angular distance measured from a reference meridian, Greenwich, either east or west.

Longitudinal Cross Section: The cross-section of a flake along its percussion axis.

Magnetic north: The direction from a point on the earth's surface to the north magnetic pole. The difference between magnetic north and true north is referred to as magnetic declination.

Maintenance: The process of keeping an artefact in a particular state or condition. An edge which is being used is maintained by flaking off blunted portions. A core is maintained by keeping its characteristics within the limits required for certain types of flaking.

Manufacture: The process of making an artefact.

Manuport: Foreign fragment, chunk or lump of stone that shows no clear sings of flaking but is out of geological context and must have been transported to the site by people.

Map scale: The relationship between a distance on a map and the corresponding distance on the earth's surface.

Margin: Edge between the ventral and dorsal surfaces of a flake.

Material culture: A term that refers to the physical objects created by a culture. This could include the buildings, tools and other artefacts created by the members of a society.

Mercator projection: A conformal cylindrical projection tangential to the Equator. Rhumb lines on this projection are represented as straight lines.

Meridian: A straight line connecting the North and South Poles and traversing points of equal longitude.

MGA94: The Universal Transverse Mercator coordinates of eastings, northings, and zones generated from GDA94 are called Map Grid of Australia 1994 coordinates.

Microblade: A very small narrow blade.

Microcrystalline: Rocks in which the crystals are very small but visible in an optical microscope.

Microwear: Microscopic use-wear.

Moiety: A moiety is a half. Tribes were composed of two moieties (halves) and each clan belonged to one of the moieties.

Mound: These sites, often appearing as raised areas of darker soil, are found most commonly in the volcanic plains of western Victoria or on higher ground near bodies of water. The majority were probably formed by a slow buildup of debris resulting from earth-oven cooking: although some may have been formed by the collapse of sod or turf structures. It has also been suggested some were deliberately constructed as hut foundations.

Morphology: The topographical characteristics of the exterior of an artefact.

Mosaic: A number of continuous aerial photographs overlapped and joined together by way of 'best fit' to form a single non-rectified image.

Negative Bulb of Force: The concave surface left after a flake has been removed. See Bulbar Scar.

Notched: Serration or series of alternating noses and concavities.

Obtrusiveness: How visible a site is within a particular landscape. Some site types are more conspicuous than others. A surface stone artefact scatter is generally not obtrusive, but a scarred tree will be.

Overhang: The lip on a core or retouched flake, caused by the platform being undercut by the bulb on the flake removed.

Overhang Removal: The act of brushing or tapping the platform edge in order to remove the overhang in a series of small flakes.

Overlays: The Victorian Planning Provisions establish a number of different Overlays to show the type of use and development allowed in a municipality. Heritage Overlays will list places of defensible cultural heritage significance.

Patina: An alteration of rock surfaces by molecular or chemical change (but not by attrition, hence not to be confused with sand blasting).

Pebble/cobble: Natural stone fragments of any shape. Pebbles are 2-60 mm in size and cobbles are 60-200 mm in size.

Percussion: The act of hitting a core with a hammer stone to strike off flakes.

Percussion Flaking: The process of detaching flakes by striking with a percussor.

Percussion Length: The distance along the ventral surface from the ring crack to the flake termination.

Place: Place means a site, area, land, landscape, building or other works, group of buildings or other works, and may include components, contents, spaces and views. (Australia ICOMOS Burra Charter Article 1.1)

Plane of Fracture: The fracture path which produces the ventral surface of a flake.

Planning scheme: The legal instrument that sets out the provisions for land use, development, and protection in Victoria. Every municipality in Victoria has a planning scheme.

Platform: Any surface to which a fabricator is applied when knapping.

Platform Angle: 1. The angle between the platform and core face on a core. 2. The angle between the platform and dorsal surface on a flake. 3. The angle between the platform and flaked surface on a retouched flake.

Platform Preparation: Alteration of the portion of the platform which receives the fabricator by grinding, polishing or flaking. Removal of small flake scars on the dorsal edge of a flake, opposite the bulb of percussion. These overhang removal scars are produced to prevent a platform from shattering.

Platform removal flake: A flake which contains a platform on the dorsal surface.

Point of force application: The area of the platform in contact with the indenter during knapping. Also known as point of contact.

Positive Bulb of Force: Bulb of force.

Post-depositional processes: The natural or cultural processes which may differentially impact upon archaeological sediments after they deposited.

Potlids: A concave-convex or plano-convex fragment of stone. Potlids never have a ringcrack or any other feature relating to the input of external force. They often have a central protuberance which indicates an internal initiation to the fracture. Potlids are the result of differential expansion of heated rock.

Pre-contact: Before contact with non-Aboriginal people.

Post-contact: After contact with non-Aboriginal people.

Pressure Flaking: The process of detaching flakes by a pressing force. Also Static Loading.

Primary decortication: The first removal of cortex from a core, creating a primary decortication flake. The flake will have a dorsal surface covered entirely by cortex.

Procurement: Obtaining raw materials.

Provenance: The location of an artefact or feature both vertically and horizontally in the site. Archaeologists record the provenance of artefacts and features in their field books and on the artefact bag. Provenance is important because it gives archaeologists the history and context of an object, i.e., exactly where it was found on the site.

Punch: An object which is placed on a core or retouched flake and receives the blow from the percussor.

Quarry: A place where humans obtained stone or ochre for artefact manufacture. A place where stone or ochre is exposed and has been extracted by Aboriginal people. The rock types most commonly quarried for artefact manufacture in Victoria include silcrete, quartz, quartzite, chert and fine-grained volcanics such as greenstone.

Quartz: A form of silica.

Quartzite: Sandstone in which the quartz sand grains are completely cemented together by secondary quartz deposited from solution.

Radiocarbon Dating: Also called carbon dating and C-14 dating. It is used to work out the approximate age of an artefact by measuring the amount of carbon 14 it contains. This dating technique is not perfect. It can only be used on organic remains (typically wood or charcoal). Also radiocarbon is only accurate to ±50 years, and cannot accurately date objects more than 50,000 years old.

Redirecting Flake: A flake which uses an old platform as a dorsal ridge to direct the fracture plane.

Redirection: Rotation of a core and initiation of flaking from a new platform situated at right angles to a previous platform. It produces a redirecting flake.

Reduction: Process of breaking down stone by either flaking or grinding.

Reduction Sequence: A description of the order in which reduction occurs within one block of stone.

Rejuvenate: The process of flaking in such a way that further reduction is possible or is easier. This usually involves removing unwanted features, such as step terminations, or making unsuitable characteristics more favourable, for example changing the platform angle. A Rejuvenation flake is a flake that has been knapped from a core solely for the purpose of preparing a new platform and making it easier to get flakes off a core, as it reduces that angle between platform and core surface.

Relative Dating: A general method of dating objects, which uses their relation to other objects. For example, artefacts found in lower layer are typically older than artefacts in higher layer.

Relic: Deposit, object or material evidence of human past.

Replica: A copy of a prehistoric artefact made by a modern investigator for research purposes.

Replicative Systems Analysis: A method of analysing prehistoric artefacts by creating exact replicas of all the manufacturing debris.

Reserves: The word 'reserve' derives from the land being reserved for a particular public use. Crown land retained in public ownership, but not reserved is termed unreserved Crown land.

Resharpening: The process of making a blunt edge sharper by grinding or flaking.

Retouched Flake: A flake that has subsequently been re-flaked. A flake, flaked piece or core with intentional secondary flaking along one or more edges.

Retouching: The act of knapping a flake into a retouched flake.

Ridge: The intersection of two surfaces, often at the junction of two negative scars.

Ring Crack: A circular pattern of micro-fissures penetrating into the artefact around the Point of Force Application and initiating the fracture. It appears on the ventral surface usually as a semi-circular protuberance on the edge of the platform.

Rock art: Paintings, engravings and shallow relief work on natural rock surfaces. Paintings were often produced by mineral pigments, such as ochre, combined with clay and usually mixed with water to form a paste or liquid that was applied to an unprepared rock surface.

Run: A large area of land in which squatters could pasture their stock without a lot of fencing necessary. Employed shepherds looked after various areas of the runs. Runs became consolidated pastoral holdings. Many of the runs were about 25 sq miles in area and later became parishes.

Sand: Quartz grains with only a small content of other materials. Grain size 2.00 mm to 0.05 mm.

Sandstone: A sedimentary rock composed of sand, and with only a small amount of other material, which has been consolidated by argillaceous or calcareous bonding of grains.

Sahul: This is the name given to the continent when Australia and New Guinea were a single landmass during the Pleistocene era. During this period, sea levels were approximately 150 metres lower than present levels.

Scar: The feature left on an artefact by the removal of a flake. Includes negative bulb, negative ring crack and negative termination.

Scarred tree: Scars on trees may be the result of removal of strips of bark by Aborigines e.g. for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide hand and toe holds for hunting possums and koalas. Some scars may be the result of non-Aboriginal activity, such as surveyors' marks.

Scraper: A flake, flaked piece or core with systematic retouch on one or more margins.

Screen: A screen is used by an archaeologist to sift excavated soil in search of small artefacts like nails, ceramic fragments, and organic material like seeds, shell, and bone. Can be either manual (hand held) or mechanical.

Secondary Decortication: The removal of cortex from a core after the primary decortication flake. A secondary decortication flake is one that has both cortex and flake scars on the dorsal surface.

Selection: Runs were subdivided into selections for farming, agriculture and grazing homesteads. After a period of yearly rental payments, the selector could often obtain freehold ownership.

Shell midden: A surface scatter and/or deposit comprised mainly of shell, sometimes containing stone artefacts, charcoal, bone and manuports. These site types are normally found in association with coastlines, rivers, creeks and swamps – wherever coastal, riverine or estuarine shellfish resources were accessed and exploited.

Sieve: See Screen.

Significance: Significance is a term used to describe an item's heritage value. Values might include natural, Indigenous, aesthetic, historic, scientific or social importance.

Silica: Silicon dioxide.

Silcrete: A silicified sediment.

Siliceous: Having high silica content.

Site: An area designated for archaeological exploration by excavation and/or survey usually due to the presence of a concentration of cultural material.

Step Termination: A fracture plane that turns sharply towards the free surface of the core immediately prior to the termination of the fracture. The bend of the ventral surface is sharp, often a right angle.

Stratification: Over time, debris and soil accumulate in layers (strata). Colour, texture, and contents may change with each layer. Archaeologists try to explain how each layer was added--if it occurred naturally, deliberately (garbage), or from the collapse of structures-and they record it in detailed drawings so others can follow. Stratigraphy refers to the interpretation of the layers in archaeological deposits. Usually, the artefacts found on top are the youngest (most recent), while those on the bottom are the oldest.

Structures (Aboriginal): Can refer to a number of different site types, grouped here only because of their relative rarity and their status as built structures. Most structures tend to be made of locally available rock, such as rock arrangements (ceremonial and domestic), fish traps, dams and cairns, or of earth, such as mounds or some fish traps.

Surface Site: A site where artefacts are found on the ground surface.

Taphonomy: The study of the depositional and preservation processes which produce archaeological or paleontological material.

Termination: The point at which the fracture plain reaches the surface of a core and detaches a flake.

Tertiary Flake: A flake without cortex.

Theodolite: Instrument used by a surveyor for measuring horizontal and vertical angles.

Thermal Treatment: Alteration of siliceous materials by controlled exposure to heat.

Thickness: Measurement of the distance between the dorsal and ventral surfaces of a flake.

Thumbnail scraper: A convex edged scraper that is small, generally the size of a thumbnail.

Tool: Any object that is used.

Topographic map: A detailed representation of cultural, hydrographic relief and vegetation features. These are depicted on a map on a designated projection and at a designated scale.

Transverse Cross Section: The cross section of a flake at 90^{o} to the length.

Transverse Mercator projection: A projection similar to the Mercator projection, but has the cylinder tangent at a particular meridian rather than at the equator.

True north: The direction to the Earth's geographic North Pole.

Tula: A flake with a prominent bulb, large platform and platform/ventral surface angle of about 130o, which is retouched at the distal end. Not to be confused with a Tula Adze.

Tula Adze: A composite tool observed ethnographically, consisting of a stone artefact (often a Tula), a wooden handle and resin.

Unidirectional Core: Core from which flakes were removed from one platform surface and in only one direction.

Unifacial: Artefact flaked on only one side.

Unit: Archaeologists lay out a grid over a site to divide it into units, which may vary in size, and then figure out which units will be dug. Archaeologists dig one unit at a time. Keeping track of specific measurements between artefacts and features gives archaeologists the ability to draw an overall map looking down on the site (called a floor plan), to get the bigger picture of the site.

Use-wear: Damage to the edges or working surfaces of tools sustained in use.

Ventral Surface: The surface of a flake created when it is removed and identified mainly by the presence of a ring crack.

Visibility: The degree to which the surface of the ground can be seen. This may be influenced by natural processes such as wind erosion or the character of the native vegetation, and by land-use practices, such as ploughing or grading. Visibility is generally expressed in terms of the percentage of the ground surface visible for a project area.

12 Appendices

12.1 Notice of Intent to Prepare a Cultural Heritage Management Plan

Notice of Intent to prepare a Cultural Heritage Management Plan for the purposes of the *Aboriginal Heritage Act 2006*

This form can be used by the Sponsor of a Cultural Heritage Management Plan to complete the notification provisions pursuant to s.54 of the *Aboriginal Heritage Act 2006* (the "Act").

For clarification on any of the following please contact Victorian Aboriginal Heritage Register (VAHR) enquiries on 1800-726-003.

SECTION 1 - Sponsor information

Sponsor:	Melbourne Water Corporation
ABN/ACN:	
Contact Name:	Nick McDonald
Postal Address	990 LaTrobe Street Docklands VIC 3008
Business Number:	ABN 81 945 386 953 Mobile:
Email Address:	Nick.Macdonald@melbournewater.com.au

Sponsor's agent (if relevant)

Company:	
Contact Name:	
Postal Address	
Business Number:	Mobile:
Email Address:	

SECTION 2 - Description of proposed activity and location

Project Name:	water pipeline
Municipal district:	Wyndham City Council

Clearly identify the proposed activity for which the cultural heritage managment plan is to be prepared (ie. Mining, road construction, housing subivision)

Pipeline

SECTION 3 - Cultural Heritage Advisor

Name	Company	Email address
Vasiliki Vaskos	Australian Cultural Heritage Management (Vic) Pty Ltd	vicki.vaskos@achm.com.au

SECTION 4 - Expected start and finish date for the cultural heritage management plan

Start Date: 23-May-2013 Finish Date: 30-May-2014

Submitted on 23 May 2013

Department of Planning and Community Development

SECTION 5 - Why are you preparing this cultural heritage management plan?

☑ A cultural heritage management Plan is required by the Aboriginal Heritage Regulations 2007

What is the high Impact Activity as it is listed in the regulations?

Pipeline

Is any part of the activity an area of cultural heritage sensitivity, as listed in the regulations? Yes

☐ Other Reasons (Voluntary)

☐ An Environmental Effects Statement is required

☐ A Cultural Heritage Management Plan is required by the Mister for Aboriginal Affairs.

SECTION 6 - List the relevant registered Aboriginal parties (if any)

This section is to be completed where there are registered Aboriginal parties in relation to the management plan.

SECTION 7 - Notification checklist

Ensure that any relevant registered Aboriginal party/s is also notitifed. A copy of this notice with a map attached may be used for this purpose.
(A registered Aboriginal party is allowed up to 14 days to provide a written response to a notification specifying whether or not it intends to evaluate the management plan.)

In addition to notifying the Deputy Director and any relevant registerd Aboriginal party/s, a Sponsor must also notify any owner and/or occupier of any land within the area to which the management plan relates. A copy of this notice with a map attached may be used for this purpose.

Submitted on:23 May 2013

12.2 Update to the Notice of Intent to Prepare a Cultural Heritage Management Plan

Vicki Vaskos

From:	Vicki Vaskos
Sent:	Tuesday, 11 June 2013 9:28 AM
To:	vahr@dpcd.vic.gov.au
Cc:	Matthew Wilson
Subject:	Water for a Growing West: CHMP 12652
Attachments:	MEG302_CHMP_Activity_130606.shp

Good morning,

Please find attached an updated shape file reflecting the updated activity area for the above CHMP. Please contact me with any queries. Thanks.

Kind regards,

Vicki Vaskos BA (Hons) LLB (Hons)
Archaeologist and Cultural Heritage Advisor
Australian Cultural Heritage Management (Victoria) P/L
| GPO Box 5112, MELBOURNE, VIC, 3001|
| t (1300) 724 913| f (03) 5781 0860 |m 0488 484 363|
| e Vicki.Vaskos@achm.com.au |
| www.achm.com.au |

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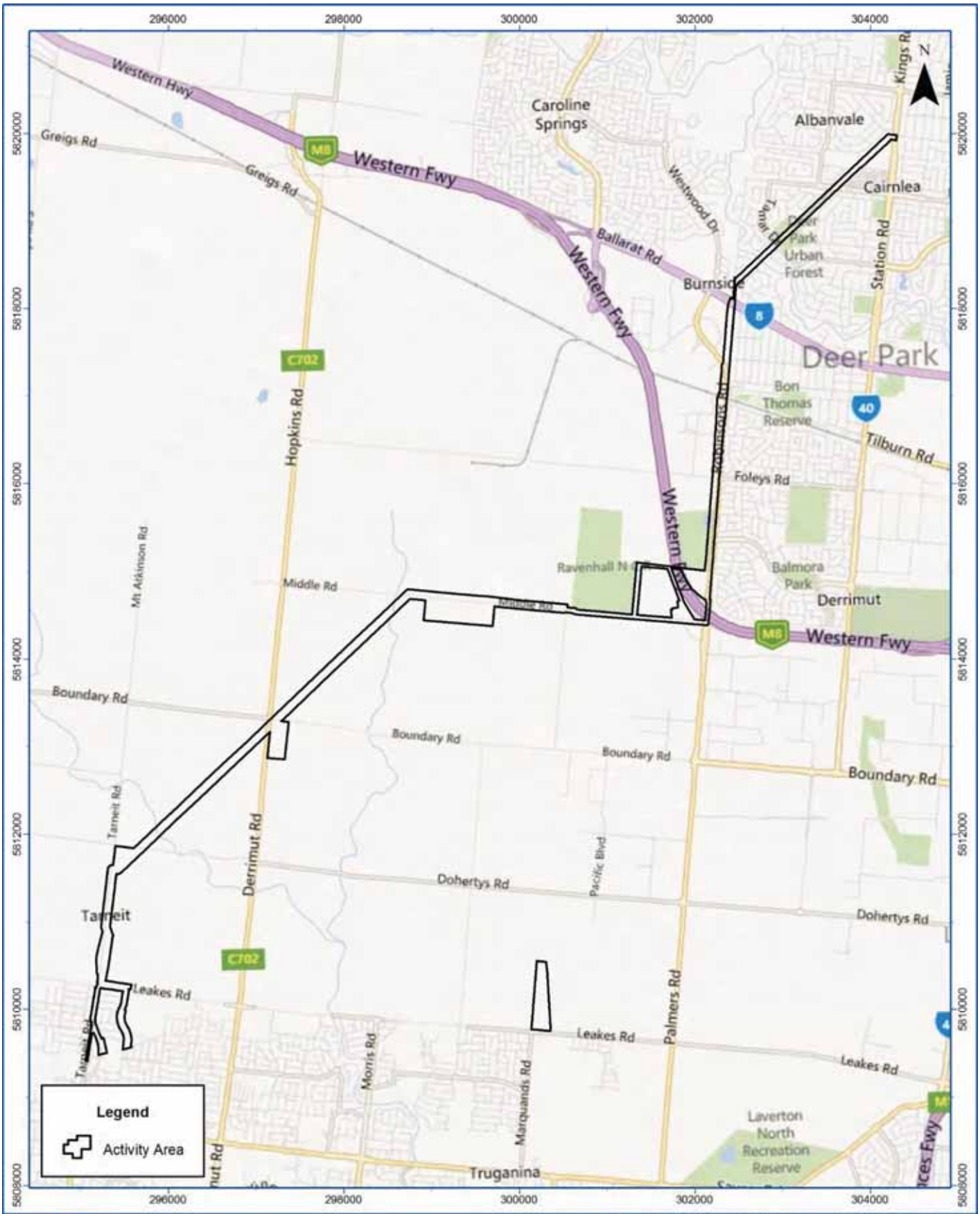

ACHM
AUSTRALIAN CULTURAL HERITAGE MANAGEMENT

Horizontal Datum : GDA94
Map Projection : MGA94
Map Units : Metres
Scale : 1 = 60,000

0 500 1,000 1,500 2,000
Metres

GDA

Desktop Study Water for a Growing West Project – Stage 2
LGAs: Brimbank City Council, Melton City Council and Wyndham City Council.

Map of Activity Area

Source Document : MW28- Activity Area_Rev4
Published by Joshua on 25/06/2013 | PMD : MW28-PMD-001