WYNDHAM VALE PRECINCT STRUCTURE PLANS (PSP) 40 EAST

ABORIGINAL CULTURAL HERITAGE ASSESSMENT

DESKTOP & STANDARD ASSESSMENTS

SPONSOR: GROWTH AREAS AUTHORITY.

CULTURAL HERITAGE ADVISOR: JIM WHEELER

AUTHORS: SHANNON SUTTON & JIM WHEELER

7TH DECEMBER 2012

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LARGE SIZED ACTIVITY

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Prepared by Archaeological & Heritage Management Solutions (AHMS) Pty Ltd on behalf of Growth Areas Authority.

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PLEASE NOTE - THIS REPORT CONTAINS PICTURES OF AND INFORMATION ABOUT PEOPLE WHO MAY HAVE PASSED AWAY.

EXECUTIVE SUMMARY

The Growth Areas Authority engaged Archaeological and Heritage Management solutions (AHMS) to prepare an Aboriginal Cultural Heritage Assessment for Precinct Structure Plan 40 East Wyndham Vale, Victoria. The Activity Area consists of 26 properties (including land bordering the Werribee River owned and managed by Wyndham City Council) (Table 1 & Figure 1). This report comprises a desktop and standard assessment.

We undertook a process of consultation with the Wathaurung Aboriginal Corporation (Waddawurrung). The Waddawurrung were closely consulted at various stages during the CHMP process and participated in the standard assessment.

The overriding purpose of the Aboriginal Cultural Heritage Assessment was to document and assess the Aboriginal heritage values of the subject land, the impact of the proposed residential subdivisions on those values and to provide management procedures to minimise and mitigate impact before, during and after development.

A search for known Aboriginal places on the Victorian Aboriginal Heritage Register (VAHR) was undertaken to identify previously recorded sites within the geographic region (Werribee River Basin) relevant to the study area. At the time of the search, only three Aboriginal places were recorded within the activity area

Drawing on the desktop research and previous archaeological survey work, we make the following predictions:

- Stone artefact deposits are likely to be found at varying densities across most landforms within the PSPs;
- Higher density artefact scatters and sub-surface deposits may be found on crest landforms and in association with eruption points;
- Higher density artefact scatters and sub-surface deposits are likely to be found adjacent to creeks or wetlands. Artefact density and frequency is

likely to increase with higher stream order (for creeks) and permanence (for wetlands);

- The density and complexity of artefact scatters and sub-surface deposits is likely to decrease with distance from water sources and wetlands;
- Higher density of artefact scatters and sub-surface deposits in close proximity to stone sources (either outcrops or river pebble sources);
- A particularly high density and complexity of archaeological deposits at major confluences and resource intersection zones (i.e. the meeting of two or more bodies of water);
- Stable aeolian and alluvial terrace landforms are likely to have deeper profiles and better preservation conditions. These landforms may contain greater archaeological integrity;
- Scarred trees may be present within areas containing mature remnant native trees of sufficient age and as isolated mature trees in agricultural settings;
- Rockshelters may be present in areas of outcropping rock escarpment, particularly along creek corridors. Areas of rock overhang sufficient in size to accommodate and shelter a person may have potential to contain occupation deposits;
- Isolated finds may be found anywhere across the landscape;
- Ceremonial places may be present in the landscape, but may not be archaeologically visible; and
- Stone arrangements may be found across the landscape.

Due to the large area covered by PSP 40 East, we used MapInfo GIS (Geographical Information System) to develop and map the predictions made regarding archaeological potential. The purpose of the predictive model was to:

- Provide the Growth Areas Authority, individual landowners within the PSP and the Aboriginal community with information about areas of Aboriginal archaeological sensitivity to feed into constraints and opportunities analysis,
- Help inform early PSP planning and design work,

- Provide part of the desktop assessment component of CHMPs, and
- To assist in developing a methodology for standard and complex assessments.

In developing the model, we drew on a number of environmental and disturbance variables that were used to identify areas of varying 'archaeological sensitivity'. For the purposes of the model, the term 'archaeological sensitivity' is defined as a combination of likely density, integrity and research value of archaeological deposits within any given area.

The modeling and mapping is based on a probabilistic approach, where a combination of traits was used to determine the combined level of potential. The traits used to formulate the sensitivity model are listed in section 5.11.3 of this report. The sensitivity model is shown on Figure 21.

An archaeological survey was undertaken by Shannon Sutton with assistance from Adrian Burrow from the 26th to the 29th of July 2010 Representatives of Waddawurrung were present during the survey (participants are listed in Table 3). The principal aim of the survey was to identify exposed cultural material (i.e. surface sites) and gauge the extent of prior disturbance. The survey results and observations were used to identify any potential archaeological deposits (i.e. areas that are 'likely' to contain Aboriginal sites or objects). They were also used to assess the extent to which past land-uses may have affected natural soil profiles.

One Aboriginal scarred tree, one isolated artefact and two Aboriginal artefact scatters were identified during the survey (refer to 6.2.5 for full details of Aboriginal cultural heritage identified during the survey).

From the results of the desktop and standard assessments, we make the following recommendations for the PSP 40 East activity area.

Cultural Values Recording: In addition to archaeological values, each complex assessment must include consultation with the Registered Aboriginal Party, Wadawurrung, to identify any cultural values which may be present within the

Activity Area. The Wadawurrung must be invited to participate in any further survey or test excavation fieldwork

Higher Priority for Conservation (outlined yellow on Figure 20) and areas of Cultural Significance to the RAP (outlined in white on Figure 21): We recommend these areas, and any additional area identified during the course of Complex Assessments undertaken for PSP 40 East, have a higher priority for conservation. Where decisions about conservation or open space allocation are made by GAA or individual landowners / development proponents in consultation with the RAP, the higher priority areas should be considered as 'first priority' options for conservation. It may not be possible to include all of the higher priority land in conservation, however, where it is feasible it should be actively considered.

Low Density Artefact Distributions - VAHR 7822-3551 - Artefact reburial:- Following completion of individual complex assessments and the return of artefacts from VAHR 7822-3351 by KAS, the artefacts from VAHR 7822-3551 must be reburied. The location of reburial must be determined in consultation with Waddawurrung and the Sponsor

Site WVAS1 - VAHR 7822-3448 - (Property ID#90): The artefact scatter should be included in conservation or open space and measures should be adopted to protect the site prior to development and during development works. Management measures should be established to ensure ongoing protection after development has been completed in the precinct.

Site WVAS2 - VAHR 7822-3418 - (Wyndham City Council Land): WVAS2 should be included in conservation or open space and measures should be adopted to protect the site prior to development and during development works. Management measures should be established to ensure ongoing protection after development has been completed in the precinct.

Site WVIA1 - VAHR 7822-3417 - (Property 12): WVIS1 should be salvaged by means of a surface collection by a suitably qualified archaeologist prior to development. Waddawurrung Representatives must be invited to participate in

the salvage. VAHR forms must be updated to reflect that the site has been salvaged.

Site WVST-1 - VAHR 7822-3419 - (Wyndham City Council Land): The scarred tree should be included in conservation or open space and measures should be adopted to protect the tree prior to development and during development works. Management measures should be established to ensure ongoing protection after development has been completed in the precinct.

Proposed Bridge Crossing (Property ID#5): No Aboriginal archaeological evidence or sensitive landforms were identified in the area of the proposed Werribee River Bridge crossing on property ID #5. However, due to the constraints imposed by limited visibility throughout the activity area, test excavation should be undertaken to confirm disturbance levels and archaeological sensitivity in this area. Although the predicted sensitivity model produced from the desktop & standard assessment CHMP for the Tarneit PSP#91 (AAV# 11795) indicates that the area has high archaeological potential, the proposed bridge location east of the Werribee River is outside of the priority conservation and impact avoidance zones. Test excavation should be undertaken to determine levels of disturbance and archaeological sensitivity in the location of the proposed bridge crossing.

Very High Sensitivity: Retain as much as possible in open space, riparian, bio-link, set-backs and asset protection zones. The aim of PSP design should be to minimize future development impact on these areas (particularly the Very High sensitivity zone). This approach will protect areas with high potential for significant archaeological deposits and cultural values. The approach will also save time and money in reducing the scope of mitigation and salvage of sensitivity areas.

Moderate and High Sensitivity: Where there is an opportunity, development impact should be minimized where practicable. For instance, where there are opportunities to establish open space, these could be placed on areas of moderate sensitivity to protect Aboriginal heritage and reduce the scope of expensive and time consuming archaeological mitigation measures and salvage.

Low Sensitivity: No design and planning recommendations. These areas are essentially archaeologically 'neutral'.

Very Low and Disturbed Sensitivity: These areas could be the focus of development, particularly high impact features of a subdivision like a town centre, medium or high density residential, industrial or commercial.

Contents

List of Figures (Including Maps)

Abbreviations

AAV	Aboriginal Affairs Victoria
AHC	Australian Heritage Council
BP	Before Present
CHMP	Cultural Heritage Management Plan
EVC	Ecological Vegetation Communities
GAA	Growth Areas Authority
GSV	Ground surface visibility
LGA	Local Government Area
PSP	Precinct Structure Plan
RAP	Registered Aboriginal Party
SGD	Significant Ground Disturbance
VAHR	Victorian Aboriginal Heritage Register
VRO	Victorian Resources Online
Wadawurrung	The Wathaurung Aboriginal Corporation
PSP	Precinct Structure Plan
WCC	Wyndham City Council

Definitions

ACTIVITY AREA	The area or areas to be used or developed for the activity. For the purposes of this CHMP, this was the area subject to a standard level CHMP assessment.
GEOGRAPHIC AREA	Otway Plains Bioregion

PART 1 – ASSESSMENT.

1 INTRODUCTION

1.1 Preamble

The Growth Areas Authority (The Sponsor - ABN 77 803 352 468) engaged Jim Wheeler of Archaeological and Heritage Management Solutions (AHMS) Pty Ltd (Cultural Heritage Advisor) to prepare a desktop and standard assessment Cultural Heritage Management Plan (CHMP) for precinct structure plan (PSP) 40 East. The PSP 40 East activity area is located south of the Werribee River, down to Ballan road (Figure 1). The total area covered by the activity area is approximately 396.79 ha. The activity area is located within the Wyndham City Council municipality.

A notice of intent to prepare the CHMP was lodged with Aboriginal Affairs Victoria (AAV) on the 19/08/2011 (a copy of the notice is included in Appendix 1). AAV issued a project number 11896. A copy of the notice of intent was also submitted to the Registered Aboriginal Party, the Wathaurung Aboriginal Corporation (Wadawurrung) on the 19/08/2011. Wadawurrung indicated that, as the RAP for the activity area, they will evaluate the CHMP.

The CHMP was prepared in accordance with the requirements of the *Aboriginal Heritage Act 2006* and associated regulations and guidelines issued by AAV regarding preparation of CHMPs. The overriding purpose of the CHMP was to document and assess the Aboriginal heritage (archaeological and cultural) values of the study area to assist in PSP design and planning work. The CHMP is also designed to provide management recommendations for future subdivision and development and to provide a desktop and standard CHMP assessment that can be utilised by landowners and developers to develop complex CHMPs for specific development projects within the Wyndham Vale PSP 40 East area.

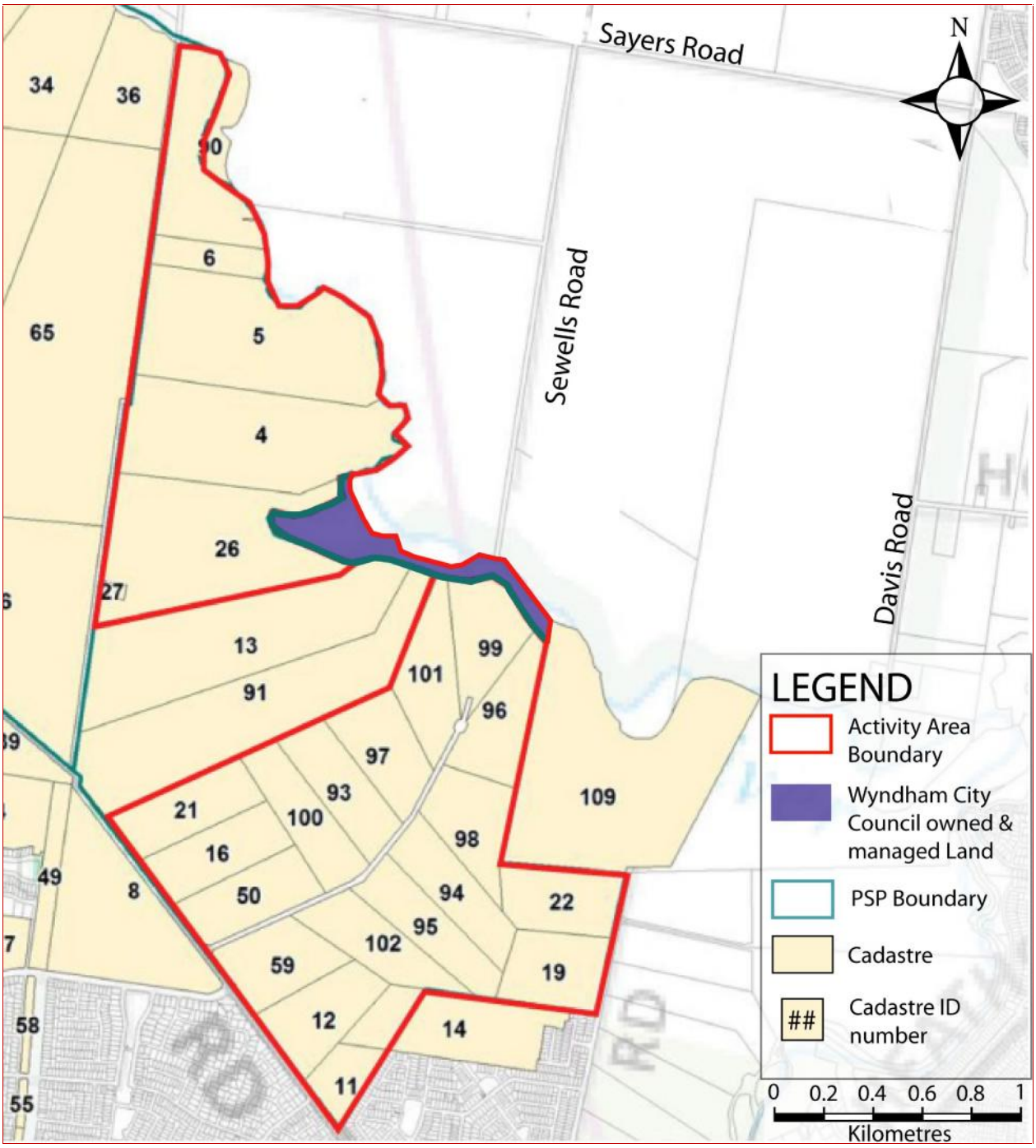


Figure 1. Location of PSP 40 East Activity Area

1.2 Reason for the current study

The objective of the CHMP was to identify and assess the nature, extent and significance of Aboriginal sites, objects and cultural heritage values within the subject land to inform PSP design and planning work. The CHMP also provides recommendations to manage and assess Aboriginal heritage during complex assessment CHMPs for future development projects within the Wyndham Vale PSP 40 activity area.

A CHMP is required as the activity is a high impact activity, and is within an area of sensitivity (*Aboriginal Heritage Regulations 2007*):

- The activity area is within 200m of a waterway (the Werribee River) (*Aboriginal Heritage Regulations 23)*.
- The activity is within 50m of a registered cultural heritage place (*Aboriginal Heritage Regulations 22)*.
- The activity is a high impact activity because a precinct structure plan is a form of residential subdivision (*Aboriginal Heritage Regulations 46*).

This CHMP has been prepared in accordance with the Aboriginal Heritage Act 2006.

In accordance with Section 61 of the Aboriginal Heritage Act 2006, the following mandatory matters are considered by this CHMP:

- Whether the activity will be conducted in a way that avoids harm to Aboriginal cultural heritage;
- If it does not appear to be possible to conduct the activity in a way that avoids harm to Aboriginal cultural heritage, whether the activity will be conducted in a way that minimises harm to Aboriginal cultural heritage;
- Any specific measures required for the management of Aboriginal cultural heritage likely to be affected by the activity, both during and after the activity;

- Any contingency plans required in relation to disputes, delays and other obstacles that may affect the conduct of the activity; and
- Requirements relating to the custody and management of Aboriginal cultural heritage during the course of the activity.

In addition the Management Plan also includes matters set out in Schedule 2 of the Regulations.

Specific aims of the CHMP were as follows:

- Identify any known Aboriginal sites, relics and any places of cultural significance to the Aboriginal community within the subject land;
- Assess the potential for Aboriginal sites and/or relics buried below ground surfaces;
- Assess the Aboriginal heritage significance of Aboriginal sites, relics, places and areas of archaeological potential in partnership with the local Aboriginal community;
- Assess the potential impact of the activity on Aboriginal sites, relics, places and significance values;
- Make recommendations to help inform PSP design and planning;
- Make appropriate recommendations for protection of cultural heritage and/or mitigation of development impact, including contingency procedures, in consultation with the local Aboriginal community.

1.3 Authorship

The Cultural heritage advisor for this CHMP is Jim Wheeler (B.A. Hons Archaeology (ANU), *MAACAI*). Jim has been a practicing archaeological consultant since 1997 and is a full member of the Australian Association of Consulting Archaeologists Inc. Jim Wheeler (B.A. Hons *MAACAI*) reviewed and made revisions to the report.

Shannon Sutton (B.A. Hons) is the principal author for this CHMP. Shannon has over three years experience as a consultant archaeologist within Victoria, experience in supervising surveys and excavations, and has authored Aboriginal and historical management plans.

1.4 Acknowledgements

The authors acknowledge the assistance and valuable input provided the Growth Areas Authority, in particular Fiona McDougall, Dane Logan, Cathy Brady, Gillian Christie, Tim Peggie & Paul Cassidy. We especially acknowledge the assistance, important input and support provided by the representatives and staff of Wadawurrung, in particular Bonnie Fagan, Tammy Gilson, Blair Gilson, Kacie Mitchell, Mick Castriosis, Peter Castrisios, Tim Kennedy, Bryon Powell and Simone Werts.

2 ACTIVITY DESCRIPTION

The majority of the activity area (Figure 1) is currently zoned Urban Growth Zone, with some properties zoned (wholly or in part) Rural Conservation Zone (RCZ). UGZ attempts to streamline planning controls within the Precinct Structure Plan (PSP) area -effectively removing the rezoning process. Properties zoned RCZ include the eastern sections of properties 4, 5, 6, 90, and the entire Wyndham City Council owned and managed parcel (Figure 1).

The Sponsor (the Growth Areas Authority (GAA)) does not intend to develop each individual allotment, nor would they undertake subdivision works. The role of the GAA is to undertake master planning and design work to assist in facilitating streamlined and high quality development within the Wyndham Vale growth area. Subdivision works and implementation of development projects within the Wyndham Vale PSP 40 East activity area would be undertaken by individual landowners and/or developers.

This CHMP comprises desktop and standard level assessments designed to assist the GAA in PSP design and planning and to provide a desktop and standard CHMP assessment that can be utilised by landowners and developers to develop complex CHMPs for specific development projects within the Wyndham Vale PSP 40 East area.

Sections of the activity area already zoned UGZ will remain 'UGZ – Urban Growth Zone' under the Wyndham City Planning Scheme. The schedule to this zone is included in Appendix 2. Development within this area in keeping with the precinct structure plan, PSP 40 East will not require rezoning.

A draft Future Urban Structure Plan produced by the GAA shows a proposed bridge crossing over the Werribee River through property ID# 5. The Predictive model indicates that the proposed location of the bridge crossing is in an area which has been disturbed by residential development and pastoral landuse and is therefore considered to have low potential for intact archaeological deposits. The proposed location of the bridge crossing is considered in further detail in sections 6.2.6 & in the management recommendations 7.3 below.

3 EXTENT OF ACTIVITY AREA

The Activity Area consists of 26 properties (including land bordering the Werribee River owned and managed by Wyndham City Council) (Table 1 & Figure 1). Twenty-two (22) of the 26 properties were surveyed during standard assessments conducted by Kayandel Archaeological Services (KAS).

The activity area comprises 396.79ha of land situated within the Wyndham City Council (WCC) municipality. Table 1 includes a description of properties within the PSP. The northern section of PSP 40 East is bounded by Hobbs road to the west, the Werribee River to the east and rural allotments to the north and south. The southern section of PSP 40 East is bounded by Bacchus Marsh-Ballan Road to the south and west, rural allotments and the Werribee River to the North and by residential allotments and subdivided land to the east and south.

The allotments are currently used for a variety of uses including residential and agricultural purposes (i.e. crop and livestock rearing).

Table 1. Parcels within the activity area.

ID	Parcel Number	Address
90	1\Tp609103	Hobbs Road Wyndham Vale 3024
6	1\Tp680909 & 2\Tp680909	180 Hobbs Road Wyndham Vale 3024
5	1\Lp128235	162 Hobbs Road Wyndham Vale 3024
4	2\Lp128235	160 Hobbs Road Wyndham Vale 3024
26	2\Ps612751	70 Hobbs Road Wyndham Vale 3024
27	1\Ps612751	70 Hobbs Road Wyndham Vale 3024
21	4\Lp125673	504-530 Ballan Road Wyndham Vale 3024
16	5\Lp125673	468-502 Ballan Road Wyndham Vale 3024
50	11\Lp131455	Ballan Road Wyndham Vale 3024
59	1\Ps506355	418 - 438 Ballan Road Wyndham Vale 3024
12	7\Lp125673	378-416 Ballan Road Wyndham Vale 3024
11	1\Lp143937	340-376 Ballan Road Wyndham Vale 3024
100	12\Lp131455	Wollahra Rise Wyndham Vale 3024
101	15\Lp131455	Wollahra Rise Wyndham Vale 3024
14	A\Ps633134	445-479 Mcgrath Road Wyndham Vale 3024
97	14\Lp131455	Wollahra Rise Wyndham Vale 3024
93	13\Lp131455	Wollahra Rise Wyndham Vale 3024
94	19\Lp131455	Wollahra Rise Wyndham Vale 3024
95	20\Lp131455	Wollahra Rise Wyndham Vale 3024
19	9\Lp126153	481-523 Mcgrath Road Wyndham Vale 3024
22	10\Lp126153	525-559 Mcgrath Road Wyndham Vale 3024
98	18\Lp131455	Wollahra Rise Wyndham Vale 3024
96	17\Lp131455	Wollahra Rise Wyndham Vale 3024
99	16\Lp131455	Wollahra Rise Wyndham Vale 3024
102	21\Lp131455	Wollahra Rise Wyndham Vale 3024
N/A	Res 1\Lp131455	Wollahra Rise Wyndham Vale 3024
WCC		Wyndham City Council Land

4 DOCUMENTATION OF CONSULTATION

4.1 Development of Consultation

The Wathaurung Aboriginal Corporation (Wadawurrung) was the sole Registered Aboriginal Party (RAP) for the activity area at the time the notice of intent was submitted to AAV. Wadawurrung was consulted during the cultural heritage assessment and during preparation of the management recommendations.

Our approach to the Aboriginal community consultation was to undertake all components of the study in partnership with Wadawurrung. In practice, we conducted two meetings with Wadawurrung, including an initial meeting to discuss the project, the results of the desktop assessment and a second meeting to discuss the results and management recommendations. Wadawurrung were also invited to participate in the survey conducted as part of the standard assessment component of the CHMP.

4.2 Outcomes of Consultation

Wadawurrung was closely consulted throughout the development of the CHMP and during the archaeological survey fieldwork. In practice, the Wadawurrung were consulted during an initial inception meeting to discuss the project and following the completion of the standard assessment to discuss the results of the survey and to agree upon a methodology for complex assessment.

Key issues raised during consultation with Waddawurrung outlined the need for further consultation between individual Sponsors and the RAP concerning cultural heritage values of the landscape and archaeological deposits. The summary of the outcomes of consultation between AHMS, the Sponsor and the RAP are provided overleaf in table 2.

Table 2. Aboriginal Community Correspondence Log.

Date	Action	Method
19/8/2011	NOI submitted to AAV & Wadawurrung	Email
02/9/2011	Inception meeting with Shannon Sutton & Jim Wheeler (AHMS), Fiona McDougall & Dane Logan (GAA) & Bonnie Fagan (Wadawurrung Cultural Heritage Coordinator). Bonnie Indicated she was satisfied with Kayandel Archaeological Services level of survey during the standard assessment.	Meeting
28/9/11, 29/9/11, 7/10/11	Standard assessment with Shannon Sutton & Adrian Burrow (AHMS) & representatives of Wadawurrung (details of Wadawurrung representatives present during survey overleaf (**Table 3. Wadawurrung representative survey participants**.).	Standard assessment/ survey
22/2/2012	Post-standard assessment meeting with Shannon Sutton, Jim Wheeler (AHMS), Tim Peggie & Dane Logan (GAA) & John Young (Wadawurrung Cultural Heritage Coordinator). Bryon Powell invited but unable to attend. It was considered that another meeting would be required with Bryon present to discuss the management recommendations.	Meeting
15/6/2012	Meeting with Shannon Sutton, Jim Wheeler (AHMS), Tim Peggie, Karan Mahoney, Paul Cassidy (GAA) & John Young (Wadawurrung Cultural Heritage Coordinator). to discuss comments received on draft report from the Wathaurung Aboriginal Corporation. Bryon Powell invited to discuss management recommendations and provide commend on cultural significance of the activity area, but unable to attend.	Meeting

Date	Action	Method
28/8/2012	Meeting held at GAA offices in Melbourne with Shannon Sutton, Jim Wheeler (AHMS), Paul Cassidy, Gillian Christie, Kara Mahoney (GAA), John Young & Bryon Powell (Wadawurrung). Discussed cultural values of the activity area, this is reflected in the recommendations section and predictive model of this report. Bryon Powell stated that he is happy to provide a letter of endorsement for the desktop/standard assessment to the effect that any future desktop/standard assessment will not be required prior to commencing a complex CHMP.	Meeting

The representatives that participated with the survey are outlined as follows:

Table 3. Wadawurrung representative survey participants.

Date	Wadawurrung Representative
28/09/11	Tammy Gilson, Blair Gilson
29/09/11	Kacie Mitchell, Mick Castriosis
07/10/11	Peter Castrisios, Tim Kennedy

RESULTS OF ABORIGINAL CULTURAL HERITAGE ASSESSMENT

5 DESKTOP ASSESSMENT

5.1 Preamble

This section comprises the 'desktop assessment' required by the *Aboriginal Heritage Regulations (2007)*. In accordance with the regulations this section of the report comprises the following:

- A search of the Victorian Aboriginal Heritage Register for information relating to the activity area, including the date(s) the Victorian Aboriginal Heritage Register was accessed;
- An identification and determination of the geographic region of which the activity area forms a part that is relevant to the Aboriginal cultural heritage that may be present in the activity area;
- A concise map or maps showing the geographic region referred to in point 2 and the location of the activity area in that geographic region;
- A review of the registered Aboriginal places in the geographic region referred to in point 2;
- A review of reports and published works about Aboriginal cultural heritage in the geographic region referred to in point 2, relevant to the activity area;
- A review of historical and ethno-historical accounts of Aboriginal occupation of the geographic region referred to in point 2, relevant to the activity area;
- A review of the landforms or geomorphology of the activity area;
- A review of the history of the use of the activity area, including discussion of prior disturbance to ground surfaces and soil deposits if available; and

- A conclusion surmising from the desktop assessment where it is possible Aboriginal cultural heritage may be located in the activity area.

The information obtained during desktop assessment assists in determining the archaeological potential of the activity area in a number of ways. For example, cconsidering the types of natural resources that may have been available within the study area, or in the region, provides an indication of why people may have been present in the area, and of the potential physical traces of such a presence (e.g. the types of stone used for artefact making, whether trees having bark suitable for the manufacture of certain items existed/exist in the area, or whether there exists a known resource - plant animal or otherwise - that may have drawn people to the area).

Information about previously recorded archaeological sites in the region can provide an indication of the types and distribution of archaeological deposits and material that may be present, or may once have been present, in the study area. It also provides comparative information that is essential for the assessment of the archaeological significance of any previously unrecorded archaeological material or deposits.

Environmental and historical information (particularly regarding past and present land use) may indicate the potential for post-depositional processes to have altered or disturbed any archaeological deposits or materials that may have once, or may still, exist within the current study area.

In short, knowledge of the environmental, cultural and historical contexts of the study area is crucial for understanding the archaeological potential and significance of that area.

5.2 Geographic Region

The geographic region for the purpose of this CHMP is the Werribee River Basin (Figure 2). The Werribee River Basin is situated within the greater geological feature of the Western District Plains or Volcanic Plains. The Volcanic Plains are comprised of basaltic lava flows, tuffs and scoriae ranging in age from the Middle Pliocene to geologically recent and are known as the Newer Volcanic Group[1].

The Werribee River Basin covers an area of approximately 2,700km^2 and includes all rivers and creeks west of the Maribyrnong River up until Little River. The landscape of the Basin varies from steep sided hills and gorges to basalt plains. Agricultural land accounts for approximately 67% of the catchment, while natural vegetation covers 25% and approximately 5% is urbanized[2].

Although the geographic region comprises the Werribee River Basin, the desktop assessment will focus on land within a 5km radius of the activity area. This provides a suitable region for study because it shares common and distinct topographic, drainage, geological and soil landscape characteristics.

[1] *Hills 1964: 261-262*

[2] *Melbourne Water Website*

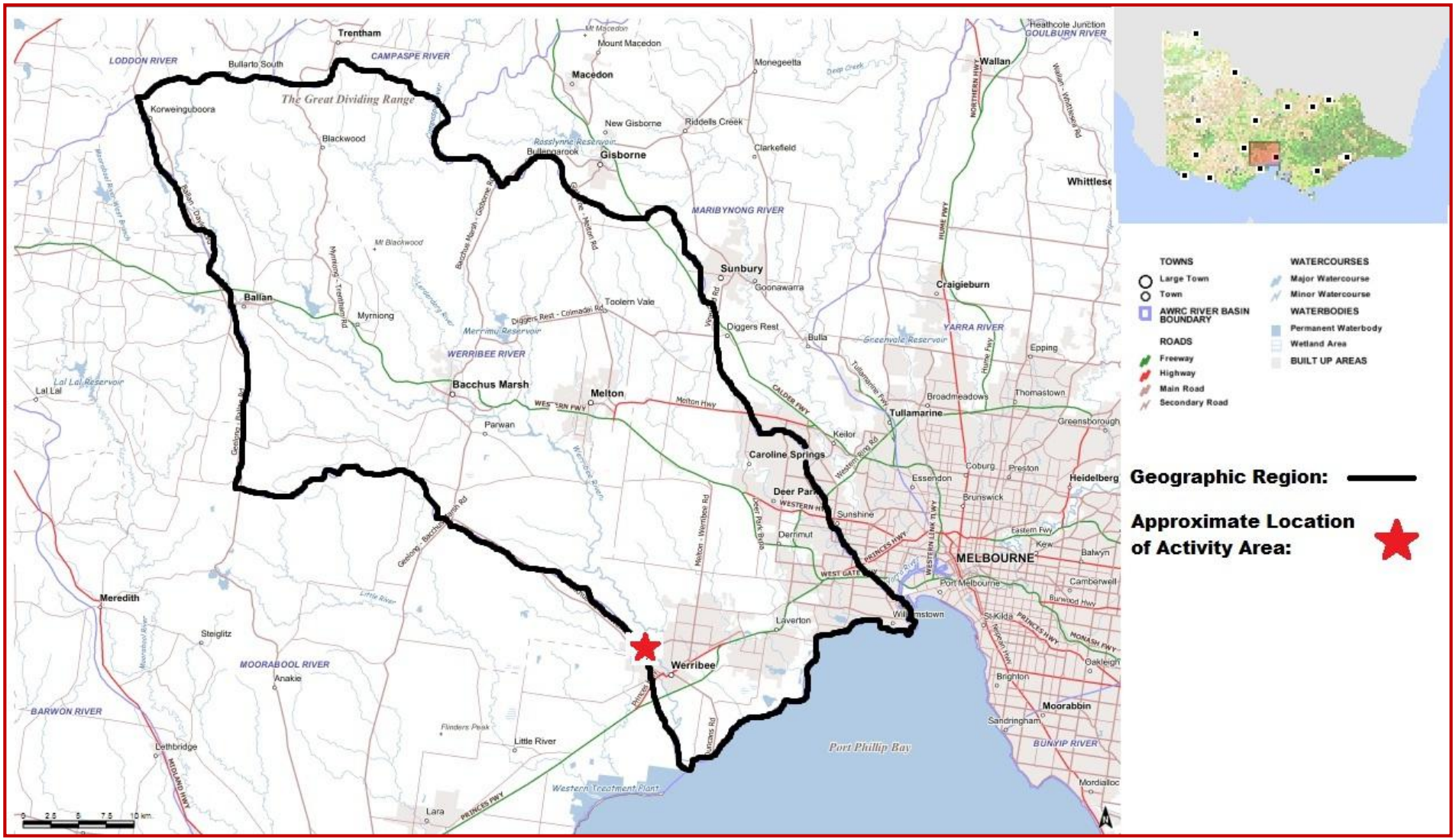


Figure 2. The geographic Region – the Werribee River Basin (outlined in black) showing the general location of the activity area (indicated by a red star)

5.3 Review of Aboriginal Places in the Region

A search of the Victorian Aboriginal Heritage Register (VAHR) was undertaken to identify previously recorded Aboriginal site types and distribution patterns within the Werribee River Basin & within the study area (within a 5km radius of the activity area) (Figure 3).

The search identified a total of 182 registered Aboriginal places have been registered within a 5km radius of the activity area (Figure 3, Table 4). The majority were stone artefact scatters, followed by scarred trees. The majority of these were situated in close proximity to the drainage corridors (particularly the Werribee River) and adjacent to swamp or wetland. The current site distribution pattern is clearly weighted towards areas of higher surface visibility within areas that have previously undergone archaeological assessment.

There are three registered Aboriginal places within the activity area (Table 5). The registered places consist of surface scatters and isolated surface artefacts of quartz and silcrete. The registered sites were located south of the current activity area, adjacent to West Road and Browns Road as part of a due diligence assessment undertaken by Vincent Clark & Associates. All of the sites have been subject to similar levels of disturbance from agricultural activities (i.e. land clearance and stock trampling), as well as vehicular and pedestrian activities.

The search of the VAHR revealed that, due to the presence of Aboriginal Cultural Heritage and Werribee River, that all parcels, with the exception of Parcel ID 93, within PSP 40 East require completion of mandatory CHMP prior to development.

The VAHR search also revealed that portions of the activity area fall within areas of sensitivity (see Figure 3). These included:

- Areas within 200m of the Werribee River and other named waterways (r.23 of the Aboriginal Heritage Act); and
- Areas within 50m of a registered cultural heritage place (r.22 of the Aboriginal Heritage Act). Although not shown on Figure 3, areas within a

50m radius of a known Aboriginal place are also considered to be areas of cultural heritage sensitivity.

Table 4. Frequency of sites within a 5 km radius of the activity area.

Site Type.	5km radius Frequency (No).	5km radius Frequency (%).
Artefact Scatter	272	79.1
Earth Feature	3	0.9
Historical Place	1	0.3
Object Collection	55	16.0
Scarred Tree	13	3.8
Total	344	100

Table 5. Registered Aboriginal places within the activity area.

VAHR #	Site name	Property ID# 40	Property ID#
7822-1556	WV IA 1	Artefact scatter (2 possible sandstone grinders)	14
7822-2918	Regional Rail Link 12a	Consists of 64 stone artefacts	90
7822-2872	Regional Rail Link 12c	Artefact scatter of 19 stone artefacts	90

5.3.1 Parcels within the PSP 40 East activity area which require completion of a mandatory CHMP

This section of the report confirms which properties require completion of a mandatory CHMP. As this information may be subject to change, a Cultural Heritage Advisor or Aboriginal Affairs Victoria should be contacted to ensure the information outlined in Table 6 below is still applicable prior to development. Currently, all parcels, with the exception of ID 93, require a mandatory CHMP.Table 6. Showing parcels within PSP 40 East which require completion of a mandatory CHMP

Table 7. Showing parcels within PSP 40 East which require completion of a mandatory CHMP

ID	Parcel Number	Address	Requires a mandatory CHMP?
90	1\Tp609103	Hobbs Road Wyndham Vale 3024	YES
6	1\Tp680909 & 2\Tp680909	180 Hobbs Road Wyndham Vale 3024	YES
5	1\Lp128235	162 Hobbs Road Wyndham Vale 3024	YES
4	2\Lp128235	160 Hobbs Road Wyndham Vale 3024	YES
26	2\Ps612751	70 Hobbs Road Wyndham Vale 3024	YES
27	1\Ps612751	70 Hobbs Road Wyndham Vale 3024	YES
21	4\Lp125673	504-530 Ballan Road Wyndham Vale 3024	YES
16	5\Lp125673	468-502 Ballan Road Wyndham Vale 3024	YES
50	11\Lp131455	Ballan Road Wyndham Vale 3024	YES
59	1\Ps506355	418 - 438 Ballan Road Wyndham Vale 3024	YES
12	7\Lp125673	378-416 Ballan Road Wyndham Vale 3024	YES
11	1\Lp143937	340-376 Ballan Road Wyndham Vale 3024	YES
100	12\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
101	15\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
14	A\Ps633134	445-479 Mcgrath Road Wyndham Vale 3024	YES
97	14\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
93	13\Lp131455	Wollahra Rise Wyndham Vale 3024	NO
94	19\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
95	20\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
19	9\Lp126153	481-523 Mcgrath Road Wyndham Vale 3024	YES
22	10\Lp126153	525-559 Mcgrath Road Wyndham Vale 3024	YES
98	18\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
96	17\Lp131455	Wollahra Rise Wyndham Vale 3024	YES

ID	Parcel Number	Address	Requires a mandatory CHMP?
99	16\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
102	21\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
N/A	Res 1\Lp131455	Wollahra Rise Wyndham Vale 3024	YES
WCC		Wyndham City Council Land	YES

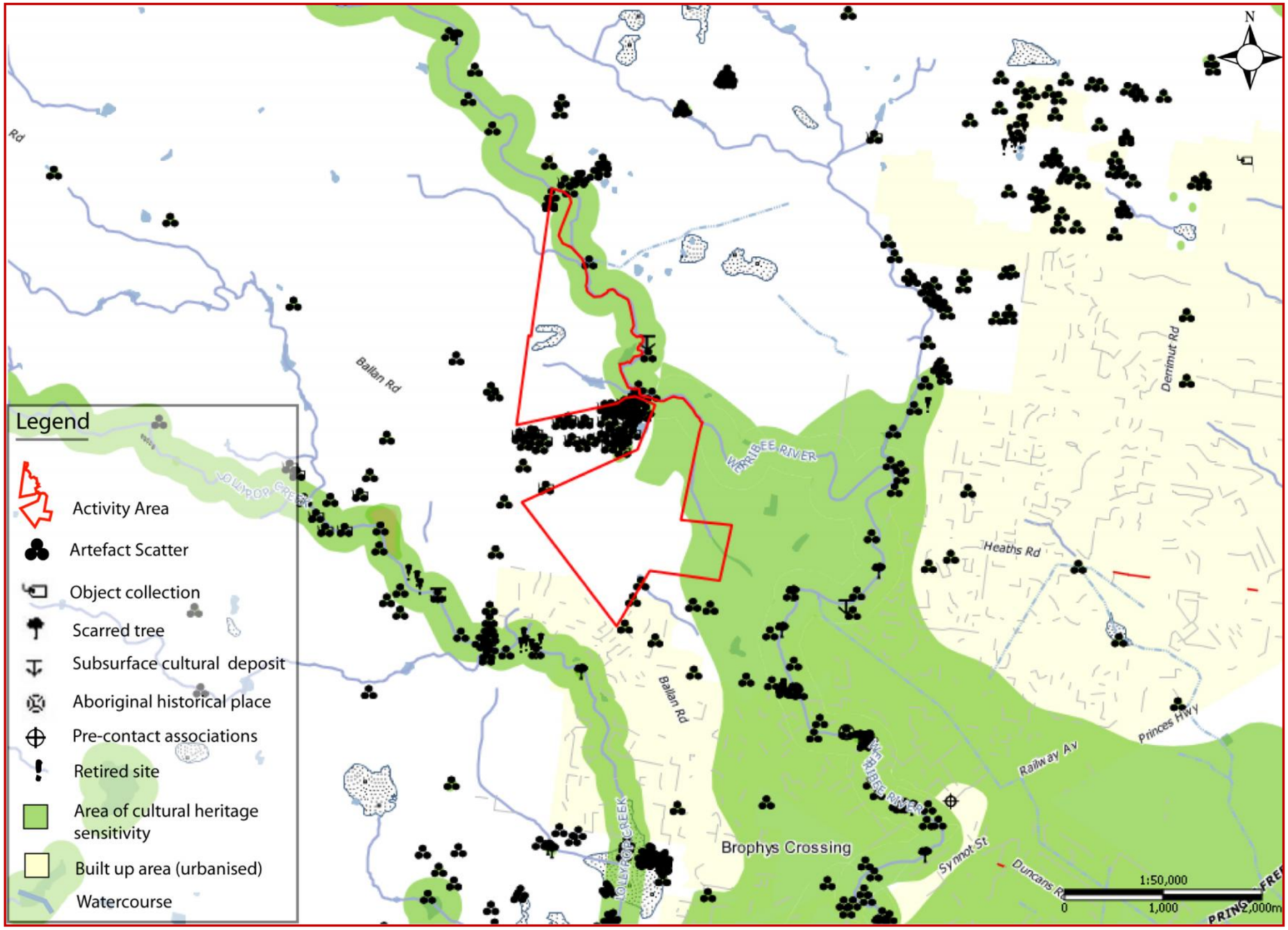


Figure 3. Registered Aboriginal places within approximately 5 km of the study area. Source: Aboriginal Cultural Heritage Register and Information System

5.4 Review of Regional Archaeological Context (including reports and published works)

For the purposes of determining settlement and site distribution patterns, archaeologists examine regional and local trends in the distribution of known sites in relation to environment and topography. This provides evidence about economic and social systems in the past and also assists archaeologists in predicting likely site types, site locations and the nature of the archaeological resource in any given area. Key regional studies are reviewed and discussed below.

5.4.1 Gaughwin 1983

In 1983, Denise Gaughwin undertook a regional study of Aboriginal coastal economies within the Western Port Catchment as part of a Master's thesis submitted to Latrobe University[3]. Gaughwin's study involved the identification of three broad landform units (coastal margins, coastal plains and uplands), and an investigation of their past use by Aboriginal people. Through an analysis of ethno-historical sources, an assessment of the availability of resources within each landform unit, and sample archaeological survey, Gaughwin developed a descriptive model which highlighted the variations in use between the different coastal environments[4].

The 'coastal plains' landform unit described by Gaughwin is the most similar to the current study area. The coastal plains landform unit was defined as *'all that area between the uplands and the coastal margins'*[5]. Site types recorded on this landform unit (n=15) consisted of artefact scatters and isolated finds[6]. Sites within the coastal plains landform were considered to display *'a preference for camps with immediate availability to wetlands and swamps'*[7]. Gaughwin considered that the coastal plains landform likely contained evidence of a significantly larger number of

[3] *Gaughwin 1983.*

[4] *Gaughwin 1983: 33-34; 140-155.*

[5] *Gaughwin 1983: 37.*

[6] *Gaughwin 1983: 110*

[7] *Gaughwin 1983: 113.*

archaeological sites - but that low effective survey coverage of the area meant that such evidence was not recovered during the course of her investigation[8].

5.4.2 Presland 1983

In 1983 Gary Presland undertook an archaeological survey of the Melbourne Metropolitan region focusing on the Yarra and Maribyrnong catchments. Presland's study was aimed at identifying areas of potential archaeological sensitivity through a combination of background research and field survey.[9]

Presland's study area was divided into five broad landscape units for the purposes of survey and comparative analysis. The landscape Unit 1 is the most similar to the current study area. Landscape unit 1 is described as 'a flat plain which includes the alluvial fans, terraces and valleys of the Yarra and Maribyrnong Rivers'[10]. A total of 10 new archaeological sites were recorded in Unit 1 as a result of Presland's field assessment. Of the sites recorded in this unit, six were scarred trees, and the remainder either artefact scatters or isolated artefacts. The results of this assessment indicated that significant levels of landscape modification were noted to have occurred across the region (particularly in Landscape Unit 1) as a result of a combination of residential and industrial development and associated infrastructure, diminishing the areas archaeological potential.

5.4.3 Rhoads 1986

A regional archaeological assessment of the Bellarine Peninsula, part of the Otway Plains Bioregion, was undertaken in two stages in the 1980s by Stockton (1983) and Rhoads (1986)[11]. The archaeological surveys of the Bellarine Peninsula were undertaken in two stages. The most common site types identified during the surveys were shell middens and artefact scatters.

[8] *Gaughwin 1983: 155.*

[9] *Presland 1983: 2.*

[10] *Presland 1983: 5.*

[11] *Rhoads 1986; Stockton 1983.*

Rhoads argued that the dominant activities represented at most sites were those that focused on food and resource gathering[12]. Rhoads also argued that *'Aboriginal campsites anywhere on the Peninsula would have likely been situated within a short distance of most plants and animals comprising the inhabitants' subsistence base'*[13]. Rhoads argued that settlement was probably focused away from the coast in winter and that there was little evidence to illustrate any precise locality as specifically significant[14].

5.4.4 du Cros 1989

du Cros conducted a study of the western region, which included the current study area. The survey sampled random and non-random areas. Dominant landforms identified by du Cros include the 'Volcanic Plains' and 'Major Rivers/Creeks'. Both of these landforms are also dominant types in the Wyndham Vale study area.

A total of twenty sites (scarred trees & artefact scatters) were recorded on the Volcanic Plains, with a site density of 1/30 ha. Sites were found to occur on extinct eruption points, as these are the highest points on the landscape and are associated with swamps and small springs. None of the sites identified were considered to be *in-situ*.

A total of forty-one sites were located within the Major River/Creeks landform, with a site density of 1/9 ha recorded during the survey. Sites predominantly comprised stone artefact scatters but also included grinding grooves, freshwater shell middens and scarred trees. du Cros determined that sites would typically occur within 50-200m of a waterway.

Drawing on the results of the survey, du Cros made the following predictions regarding site types and locations:

- Burials, artefact scatters, isolated artefacts and scarred trees will occur within 100m of major watercourses;

[12] *Rhoads 1986:1, 68*

[13] *Rhoads 1986:28*

[14] *Rhoads 1986:45*

- Artefact scatters will occur on the highest points of the volcanic plains, such as eruption points;
- Artefact scatters, isolated artefacts and scarred trees will occur close to permanent swamps, springs and lakes on the volcanic plain;
- Shell middens and other sub-surface deposits will occur in terraces and alluvial deposits along major rivers;
- Post-contact sites will occur in association with old homesteads in the region.

du Cros identified the following areas also represented in the Wyndham Vale study area as high in archaeological potential:

- Werribee River and river flats in areas not under housing; and
- Land between the Werribee River and Lollypop Creek.

5.4.5 du Cros 1990

du Cros conducted a survey for a proposed urban growth area between Kororoit Creek and the Maribyrnong River near Sydenham located east of the current study area. du Cros aimed to sample the major landscape units, the 'Volcanic Plains' and 'Major Rivers/Creeks' identified in previous investigations[15].

Of the nineteen sites located during the survey, only three sites were identified on the Volcanic Plains landform (an artefact scatter 7822-404 and two isolated artefacts 7822-0492, 7822-0403). No hills or eruption points were located on the Volcanic Plains landform within the study area, which was used by du Cros to argue that her initial prediction that '*Artefact scatters will occur on the highest points of the volcanic plains, such as eruption points*'[16] was correct. The remaining 16 sites were recorded on the Major Rivers/Creek landscape unit, where the most common site type identified was stone artefact scatters.

[15] *du Cros 1989*

[16] *du Cros 1989*

The results of the survey are in accordance with the predictive model developed in previous studies by du Cros for the Western Region[17]. The absence of scarred trees in proximity to waterways was considered to reflect post-contact vegetation clearance practices.

Among the findings of the study du Cros made the following additional predictions:

- Sources or outcrops of silcrete and metamorphic stone are likely to have been quarried by Aboriginal people if exposed more than 150 years ago.
- Sites with extensive sub-surface archaeological deposits containing burials, hearths faunal material and artefacts will most likely be found in areas with the best preservation.

5.4.6 du Cros 1991

du Cros examined a corridor of land along the Werribee River. The investigation entailed a sample survey to further refine and test her predictive model of the Western Region. Areas where little or no previous archaeological investigations had been undertaken were specifically targeted for the survey. The Werribee and Little Rivers were determined to be the principal areas of archaeological sensitivity within the study region. du Cros concluded that artefact scatters located on the Volcanic Plain may be the result of east-west traffic linking the Werribee to the Little River[18].

5.4.7 Weaver and Ellender 1994

In the late 1980's the Victorian Archaeology Survey (VAS) commissioned Ellender and Weaver to undertake an archaeological survey of a section of the Port Phillip Bay foreshore between Canadian Bay and Geelong[19]. The purpose of the survey was to fill gaps in earlier investigations of the Bay undertaken by Sullivan (1981), Presland (1983), Rhoads (1986) and du Cros (1989).

[17] *du Cros 1989*

[18] *du Cros 1991:31.*

[19] *Weaver & Ellender 1994.*

Shell middens were the most common site type found on the eastern foreshore and artefact scatters were found in the western hinterland zone in close proximity to water sources. Scarred trees were found in association with water bodies, estuaries and creeks[20]. Weaver and Ellender argued that the results of their survey indicated that seasonal exploitation of shellfish appeared to be the primary foraging strategy (and archaeological signature) identified on the eastern foreshores, with base camps located further inland near multiple resource zones such as hinterland swamp systems.

5.4.8 GHD / Andrew Long & Associates 2010

GHD and Andrew Long & Associates (ALA) were commissioned by Growth Areas Authority to conduct a large-scale regional desktop assessment of four study areas consisting of the North (Craigieburn-Beveridge), North-West (Sunbury), West (Melton-Werribee) and South-East (Pakenham-Cranbourne)[21]. The project aimed to identify high level areas of archaeological sensitivity to assist the GAA in future planning and to inform and guide the desktop assessment components of CHMPs prepared for individual precincts within the growth areas.

The current activity area, Wyndham Vale PSP 40 East, formed part of the West Study Area (Melton-Werribee).

A primary object of the GHD / ALA assessment was to define zones of Aboriginal cultural heritage sensitivity based on a regional predictive model. The predictive model was developed through a review of the following sources of information:

- a review of registered cultural heritage places on the Victorian Aboriginal Heritage Register,
- terrain patterning based predominantly on distance to water, geology and elevation,
- high level land use history and disturbance mapping,

[20] *Weaver & Ellender 1994: 66*

[21] *GHD / Andrew Long & Associates 2010*

- a review of ethnohistorical sources to identify Aboriginal sites and places, and to assist in understanding Aboriginal settlement patterns,
- a review of previous archaeological reports to assist in identifying prevailing archaeological patterning in the area, and
- some initial consultation with key traditional owner representatives to identify cultural values and places within growth areas.

A review of these sources of data identified terrain profile units (comprising a combination of landform and environmental traits) with varying levels of potential to contain Aboriginal cultural places.

These were defined as:

Zone 1 – High likelihood of Cultural Places.

Zone 1 comprised major waterways, such as the Werribee River and Skeleton Creek, major wetlands, eruption points and elevated areas (such as crests, ridges).

This zone contained the highest density of registered Aboriginal cultural sites, including sites of high scientific and cultural significance. Current site types within this zone include dense stone artefact scatters and scarred trees. There is some potential for sites types such as quarries, burials and ceremonial places to occur.

The following management recommendations were made for Zone 1:

- Complex assessment, including controlled excavation, should be undertaken for all activities within this zone.
- Use of controlled methods for subsurface testing with only limited use of "coarser" evaluation techniques i.e. shovels probes and mechanical excavation.
- Protection of cultural heritage places – by establishing management reserves in areas of known or predicted cultural heritage sensitivity.

- Minimisation of impacts from development by placing constraints, controls and limitations on works in this zone.
- Salvage of cultural heritage places, wherever development may occur within this zone that will impact on cultural heritage places.

Zone 2 – Moderate likelihood of Cultural Places.

Zone 2 landforms consisted of minor creeks, wetland margins, stony rises and minor elevations.

Zone 2 contained secondary densities of registered Aboriginal cultural places which were generally not characterised by places of high scientific significance. Registered cultural heritage places within Zone 2 are dominated by stone artefact scatters and scarred trees, although there is some potential for other site types (i.e. quarries burials and ceremonial places).

The following management recommendations were made for this zone:

- Complex assessment, including controlled excavation, should be undertaken for all activities within this zone.
- Use of coarse evaluation techniques and mechanical excavation may be undertaken except in localised places of higher sensitivity.
- There are unlikely to be requirements to protect specific cultural heritage places, though exceptions may exist (i.e. scarred trees).
- There will be minimal requirements to minimise development impacts, although minimization should be encouraged where possible.
- Salvage will be limited to localised areas with higher levels of significance.

Zone 3 – Low likelihood of Cultural Places.

Landforms within Zone 3 comprised uniform slopes at distance from major water sources.

Zone 3 areas generally did not contain any Aboriginal cultural places, with the exception of diffuse scatters and scarred trees. This zone is considered unlikely to contain sites of high scientific significance - however the report notes that this does not consider possible cultural significance values to the Aboriginal community, which would need to be considered in more detail at the CHMP stage.

The following recommendations were made for this zone:

- Completion of CHMPs for all activities within this zone. It is expected that completion of a CHMP to standard assessment stage will be adequate; however the outcomes of the standard assessment will determine if subsurface testing (Complex assessment) is required.
- No specific requirements for the protection of cultural heritage exist for this zone, however exceptions may exist, i.e. scarred trees and unregistered sites.
- There will be minimal requirements to mitigate and/or minimise development impacts.
- Salvage will be limited to localised areas of unusually high levels of significance.

Implications of the GHD / Andrew Long & Associates Predictive Model.

The predictive modeling was used to develop a preliminary sensitivity map based on terrain profile units, registered site distribution, distance from water bodies and points of elevation. GHD / Andrew Long & Associates state that there is scope for further refinement of their preliminary model. In particular, the character of the sensitivity zones could be better defined through ground truthing.

Our review of the GHD / Andrew Long & Associates report indicates that the following additional PSP 40 East activity area-specific research would be needed to support individual CHMP desktop assessments:

- Detailed disturbance history mapping, primarily through detailed review of historical and current aerial photographs;
- More detailed landform and soil landscape mapping to better define areas of specific archaeological sensitivity and develop a fine-grained predictive model and more detailed sensitivity map; and
- Detailed cultural values mapping with the local Aboriginal community to identify specific values and places of cultural significance within each PSP.

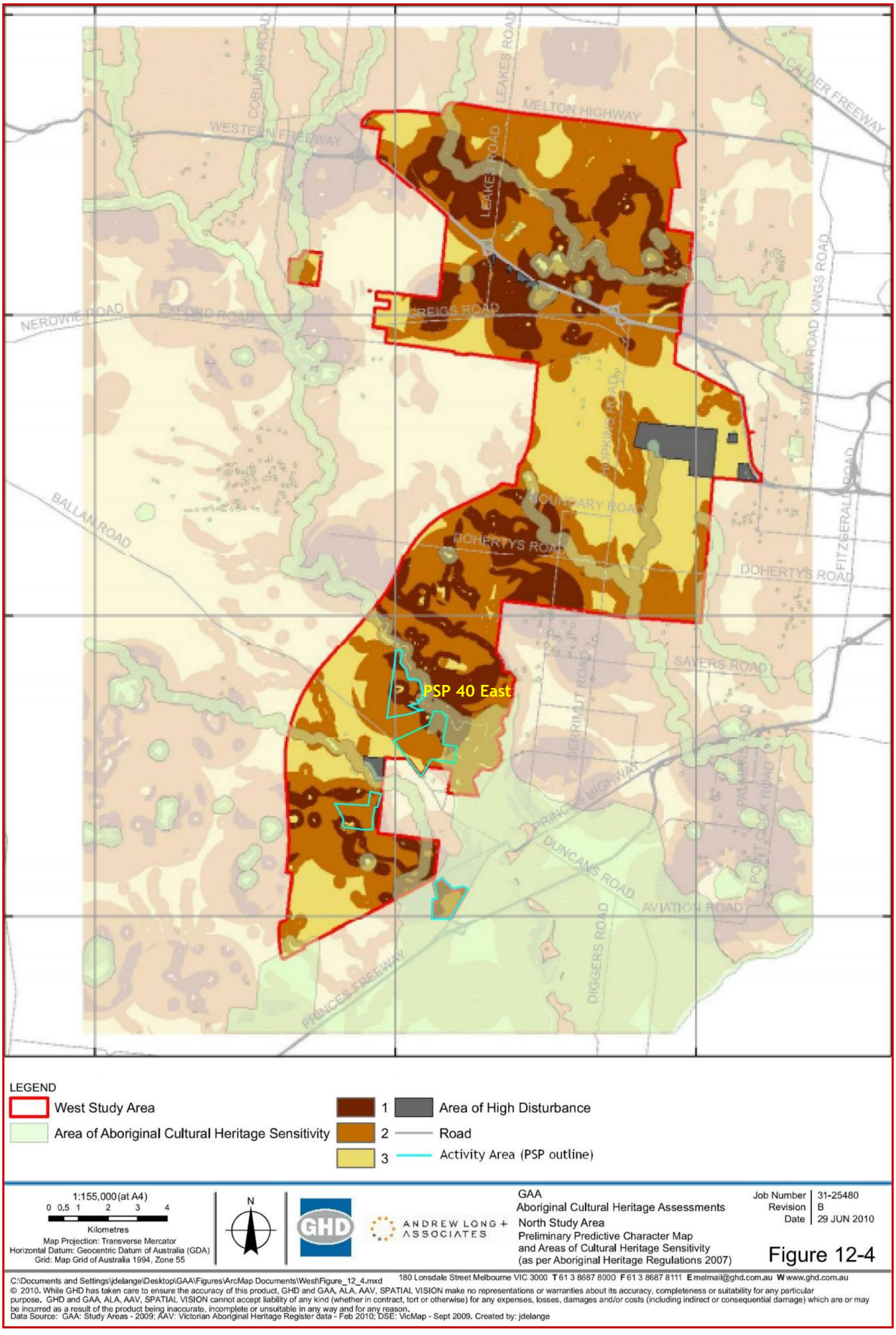


Figure 4. Current PSP areas overlain on Andrew Long & Associates sensitivity mapping (source GHD / Andrew Long & Associates 2010 Fig 12-4) including the current activity area, PSP 40 East

5.5 Review of Local Studies (Pre Aboriginal Heritage Act 2006)

Prior to the commencement of the *Aboriginal Heritage Act 2006*, archaeological studies were often carried out to satisfy Aboriginal cultural heritage assessment in advance of proposed development. The assessment work varied significantly in methodology and content in comparison to CHMPs, therefore a general indication of the types of studies which have been conducted is provided overleaf (Table 8).

The majority of studies conducted prior to the introduction of the Aboriginal Heritage Act (2006) consisted of desktop archaeological assessment or archaeological surveys, with a particular focus on the Werribee River and its surrounding landscape. Only limited archaeological subsurface investigations were carried out prior to the commencement of the Act in 2006[22].

[22] *E*.g. Debney's (1998) test excavation which aimed at identifying the subsurface extent of a known surface site (7822-090)

Table 8. Local Studies (within a 5km radius of the activity area (the study area).

Report	Assessment Type	Aboriginal Heritage Identified
du Cros (1990)	Desktop & Survey	No new Aboriginal places located
du Cros (1990)	Desktop & Survey	Four new Aboriginal places located (7822-457, 7822-458, 7822-455, 7822-456)
du Cros & Associates (1993)	Desktop & Survey	No new Aboriginal places located
Weaver (1993)	Desktop & Survey	Three new Aboriginal places located (7822-677, 7822-678, 7822-679)
Rymer& Sciusco (1996)	Desktop & Survey	None
Rymer (1997)	Desktop & Survey	None
Debney (1998)	Desktop, Survey and Test Excavation.	Subsurface investigation of a previously recorded surface site (7822-090)
Debney & Nicolson (1998)	Desktop & Survey	Two new Aboriginal places located (7822-1047, 7822-1048)

Report	Assessment Type	Aboriginal Heritage Identified
Newby & Muir (1999)	Desktop & Survey	Five new Aboriginal places located (7821-412, 7822-1037, 7833-1074, 7822-1075, 7822-1076
Clark (1999)	Desktop & Survey	Eight new Aboriginal places located (7822-1120, 7822-1121, 7822-1122, 7822-1123, 7822-1124, 7822-1125, 7822-1126, 7822-1127)
Webb (2000)	Desktop & Survey	No new Aboriginal places located
Bowen (2001)	Desktop & Survey	One new Aboriginal place located (7822-1272)
Cekalovic (2002)	Desktop & Survey	Five new Aboriginal places located (7822-1398, 7822-1399, 7822-1400, 7822-1401, 7822-1402).
Mcconnell, Buckley, Wickman, (2002)	Desktop	N/A
Mcconnell, Buckley& Wickman (2002)	Desktop	N/A
Murphy & Amorosi (2004)	Desktop	N/A
Murphy & Amorosi (2004)	Desktop	N/A

5.6 Review of Cultural Heritage Management Plans in the Local Area

5.6.1 Feldman, Matthews, de Lange (CHMP 10888)

Barwon Water Region Corporation commissioned Andrew Long and Associates to prepare a CHMP for the Melbourne Geelong Interconnection Project. Only part of this pipeline corridor passes through the current activity area. One new Aboriginal Place (7822-2537) was located within the activity area during this study[23].

5.6.2 Feldman (CHMP10520)

Villawood Land development No. 4 Ltd commissioned Andrew Long and Associates to undertake a CHMP for the construction of a proposed residential housing estate at 660 Tarneit Rd, Tarneit [24]. Two previously registered places were not re-identified during this investigation and no further archaeological deposits were located[25].

5.6.3 Berelov, Ricardi, Birkett-Rees, Thiele (CHMP 11583)

SMEC Urban re-commissioned ACHM 26to conduct a complex assessment for the aforementioned project because the area of works was altered and complex assessment was therefore required. One isolated artefact (7822-2734) was located during the complex assessment.

5.6.4 Webb & Kaskadanis (CHMP 10342)

City West Water commissioned Terraculture to prepare a CHMP for the Cowies Hill Potable Water Supply Main at Tarneit, located to the south of the activity area. A total of eight 1m x 1m test pits were excavated. Threes stone artefacts were found during the test excavations and were attributed to the already registered

[23] *Feldman, Matthews, de Lange, 2010*

[24] *Feldman, 2008*

[25] *Feldman, 2008: 31*

[26] *Berelov, Ricardi, Birkett-Rees, Thiele, 2010*

Aboriginal Places 7822-0530 and 7822 0564. Both of these places were assessed as having low scientific significance[27]

5.6.5 Berelov, Czastka, Ricardi, Thiele (CHMP 11522)

ACHM were commissioned by Wyndham City Council to prepare a CHMP for the reconstruction of Wootten Road Tarneit, located within 300m of the eastern boundary of PSP 91. ACHM undertook a concurrent program of field survey and geoarchaeological auguring across their activity area. No Aboriginal cultural material was identified during the investigations and it was concluded that it would be highly unlikely for in situ Aboriginal cultural material to be found on the property[28]

5.6.6 Veres (CHMP 10548)

Mohamed Fouz engaged Heritage Insight to prepare a cultural heritage management plan for a proposed residential subdivision at Lots 3 and 4 Tarneit Rd, Tarneit West. The investigation involved a desktop, standard and complex assessment. During the standard assessment six new Aboriginal places were located (7822- 2283 - 7822-2288) and one was located (7822-2293) during the complex assessment29. The artefacts associated with these places were collected during the assessment.

5.6.7 Berelov, Ricardi, Thiele (CHMP 11413)

SMEC Urban commissioned ACHM to complete a cultural heritage management plan for Heartland retarding basin outflow drainage, Davis Rd Tarneit. The study consisted of a desktop assessment and standard assessment. There were no new Aboriginal Places located during this investigation. A potentially sensitive drainage channel was identified, however, works were only impacting an already heavily

27 Webb & Kaskadanis, 2008: 18

28 *Berelov, Czastka, Ricardi, Thiele, 2010: 27*

29 Veres, 2009:iv

disturbed portion of this channel and as a result there was no complex assessment conducted[30].

5.6.8 Berelov, McMillan, Czastka, Ricardi & Thiele (CHMP 11249)

Wyndham City Council engaged Australian Cultural Heritage Management (ACHM) to prepare a CHMP for the construction of two senior sporting ovals, 12 teenis courts, a pavilion carparks and infrastructure. The activity area was located at the intersection of Wootten Road and Hogans Road, Tarneit. The CHMP was undertaken to Complex assessment level. Three previously unrecorded Aboriginal archaeological sites were located during the Standard assessment (VAHR 7822-2731, 7822-2732 & 7822-2728). These sites could not be relocated during the complex assessment, however subsurface investigation did identify an additional isolated surface artefact (VAHR 7822-2733) which was found to contain a low density subsurface component . All sites identified during the Standard and Complex assessment were determined to have low scientific significance as they are a poorly preserved regionally and locally common site type with limited research potential[31].

5.6.9 Burch, Parmington & Freedmon (CHMP 10906)

Manor Lakes Pty Ltd commissioned Environmental Resources Management Australia Pty Ltd (ERM) to undertake a CHMP for a residential subdivision. The CHMP was undertaken to subsurface excavation level, with a total of five 1m x 1m test trenches and 101 50cm x 50cm shovel test probes were excavated. No previously unrecorded Aboriginal archaeological sites were located during the Standard and Complex assessments, however the boundary of a previously recorded site (VAHR 7822-2070) was further extended as additional material was identified[32].

[30] *Berelov, Ricardi, Thiele, 2010*

[31] *Berelov et al 2011:V-VIi*

[32] *Burch et al 2009:I-III*

5.6.10 Burch & Parmington (CHMP 10905)

Manor Lakes Pty Ltd commissioned ERM to undertake a CHMP for a 10.12ha of land south of Ballan Road and north of Lollypop Creek in Wyndham Vale. The Desktop assessment identified one previously recorded Aboriginal archaeological site (VAHR 7822-2070) within the activity area. The Standard assessment located one new Aboriginal archaeological site, an isolated artefact in the northwest quadrant of the activity area (VAHR 7822-2385)[33]. The site was considered to be of low scientific significance[34].

5.6.11 Murphy & Amorosi (CHMP 10681)

Wyndham City Council commissioned Tardis Enterprises to undertake a CHMP for a bridge crossing on Armstrong Road across Lollypop Creek valley, Wyndham Vale. The CHMP comprised Desktop, Standard and Complex assessments35. One previously recorded site, a surface scatter of 74 artefacts (VAHR 7822/1125) was relocated during the standard assessment. A primary aim of the Complex assessment was to determine the subsurface extent (if any) of VAHR 7822/1125. Excavation of four test pits located two isolated artefact (n=2) indicating that the site had only a very limited subsurface component. On previously unrecorded surface artefact (VAHR 7822/1125) was identified on fill deposit adjacent to a track. Both sites were assessed as having a very low scientific significance due to their limited sample size and poor condition[36].

5.6.12 MacManus & Burch (CHMP 11330)

Manor Lakes (Werribee) commissioned ERM to undertake a CHMP for a residential subdivision in Wyndham Vale, Victoria. The CHMP comprised Desktop, Standard and Complex assessments. The Desktop assessment found that one Aboriginal archaeological site had been previously recorded within the activity area (VAHR 7822-2070). No additional Aboriginal archaeological evidence was located during

[33] *Burch & Parmington 2009:i-iii*

[34] *Burch & Parmington 2009:53*

[35] *Murphy & Amorosi 2010:I-IV*

[36] *Murphy & Amorosi 2010:52*

the Standard assessment. The Complex assessment revealed that VAHR 7822-2070 had a low density subsurface component. One previously unrecorded Aboriginal archaeological site, an isolated artefact (VAHR 7822- 2526) was located during the Complex assessment. VAHR 2070 was determined to have a moderate scientific significance as it comprised an extensive, low density artefact scatter. VAHR 7822-2526 was determined to have a low scientific significance.

5.6.13 Kaskadanis & Hill (CHMP 11224)

City West Water Ltd engaged Sinclair Knight Merz (SKM) to undertake a Desktop & Standard Assessment CHMP for the construction of a new booster pumping station and two recycled water supply mains near Warringa Crescent, Werribee. During the Standard assessment, two Aboriginal archaeological places (VAHR 7822-2501 & 7822-2502) were identified on exposed ground which had been subject to high levels of ground disturbance. It was considered that the sites had no archaeological integrity and that they were not associated with any sensitive landforms. It was concluded that a Complex assessment was not required to the high levels of ground disturbance observed during the survey37.

5.6.14 Hobbs & Burch (CHMP 11217)

Ecology Partners Pty Ltd was commissioned by Peet No 131 Pty Ltd to prepare a Desktop, Standard and Complex assessment CHMP for a large 87ha residential subdivision in Werribee[38]. No Aboriginal archaeological evidence was located during the standard assessment of the activity area, however areas of archaeological sensitivity (i.e. a gentle rise over an ephemeral drainage line and a steep escarpment) were identified. Subsurface investigation across the activity area proceeded to culturally sterile deposits. No Aboriginal archaeological evidence was located as a result of the Complex assessment, however one isolated artefact (VAHR 7822-2621) was identified on exposed ground overlooking a dry creek. The site did not have a subsurface component[39].

[37] *Kaskadanis & Hill 2010:i-ii*

[38] *Hobbs & Burch 2010:1-2*

[39] *Hobbs & Burch 2010:58.*

5.6.15 Murphy & Owen(CHMP 11108)

Tardis Enterprises Pty Ltd were commissioned by Manor Lakes (Werribee) Pty Ltd to develop a CHMP for a Wyndham Vale Structure Plan[40]. A CHMP was undertaken to Complex assessment level. One previously unrecorded Aboriginal archaeological site was identified during the Standard assessment. Six previously undrecorded Aboriginal archaeological sites (VAHR 7822-2583, 2584, 2585, 2586, 2791 & 2792) were identified during the complex assessment. All of the sites were determined to have a low scientific significance, due to poor preservation from mechanical grading, ploughing, basalt rock removal and stock trampling[41]. It was considered that all the sites identified during the course of the CHMP were salvaged[42].

5.6.16 Murphy & Owen (CHMP 11093)

Manor Lakes (Werribee) Pty Ltd commissioned Tardis Enterprises Pty Ltd to conduct a CHMP for a residential subdivision at Manor Lakes[43]. The Desktop assessment identified one previously recorded site (VAHR 7822-0456) was extant within the activity area, however attempts to relocate the site during the Standard assessment were unsuccessful. One previously unrecorded Aboriginal archaeological site (VAHR 7822-0457) was located during the Standard assessment of the activity area. Subsurface investigation aimed at identifying whether the site had a subsurface component. No additional archaeological evidence was located during excavation, indicating the site was limited to a low density surface scatter. An additional site, an isolated silcrete artefact (VAHR 7822-2500) was identified on the surface unsealed access track during the Complex assessment. The Complex assessment determined that none of the sites had a subsurface component, and that the surface sites were poorly preserved with nil archaeological integrity. On this basis the sites were ascribed an extremely low scientific significance[44].

[40] *Murphy & Owen 2011:VI*

[41] *Murphy & Owen 2011:61*

[42] *Murphy & Owen 2011:62*

[43] *Murphy & Owen 2010:V11*

[44] *Murphy & Owen 2010:137*

5.6.17 Howell-Muers & East (CHMP 11063)

Shaheen Holdings commissioned Andrew Long & Associates to undertake a CHMP for a 67 lot subdivision comprised of 65 small residential lots. The investigation was undertaken to Complex assessment level in order to define the archaeological sensitivity of the activity area and to determine the presence and absence of archaeological subsurface deposits. A total of 43 shovel test pits and one 1m x 1m test pits were excavated to a max depth of 450mm. A single isolated artefact (VAHR 7822-3-2-4) was located in a disturbed context. The isolated artefact was located in a disturbed context and was determined to have a low level scientific significance[45].

5.6.18 Howell-Muers & Feldman (CHMP 11000)

Andrew Long & Associates were commissioned by Dr Intaj Ali of Malek Fahd Islamic School to prepare a CHMP for the construction of an education facility on a 5.5ha lot at Wootten Road, Tarneit. Two Aboriginal archaeological sites, both isolated artefacts (VAHR 7822-2109 & 7822-1110) had been previously registered within the activity area[46]. Both sites were re-located during the standard assessment survey of the activity area. Complex assessment of the activity revealed that both of the previously recorded sites had a low density subsurface component, site cards were updated to reflect this. Both sites were determined to have a low level scientific significance due to their diffuse nature and lack of archaeological integrity[47].

5.6.19 Marshall (CHMP 10177)

Wyndham City Council commissioned TerraCulture to undertake a CHMP for a planted swale drain at the end of Mambourine Street, Werribee. A desktop, standard and complex assessment CHMP was undertaken. Two previously registered sites, artefact scatters (VAHR 7822/2230 & 7822/1769) was identified within the activity area from the desktop assessment. VAHR 7822-1769 could not be relocated. Further investigation of VAHR 7822/2230 during the standard and complex

[45] *Howell-Muers & East 2010:ii-iii*

[46] *Howell-Muers & Feldman 2010: 13*

[47] *Howell-Muers & Feldman 2010:65*

assessment re-assessed the site as having been re-deposited during flood mitigation works by machinery during the 1980's. It was considered that Aboriginal archaeological evidence in the form of subsurface stone artefact deposits may be present throughout the activity area (particularly in the eastern portion of the activity area), but that due to disturbance from flood mitigation works during the 1980's these sites will have nil-very low archaeological significance[48].

5.6.20 Orr & Matic (CHMP 10718)

City West Water commissioned Biosis research to prepare a CHMP for the West Werribee Dual Water Supply Project in Werribee, Victoria. The activity comprised construction of a quadrilateral salt reduction plant and 12.5km of pipeline[49]. The CHMP was undertaken to Complex assessment level. One new site VAHR 7822-2361 was identified during subsurface investigation. The site comprised an isolated grey silcrete flaked piece and was determined to be typical of low density deposits throughout the region. The deposit had archaeological integrity due to disturbance from construction of the road and mechanical excavation of an adjacent drain. It was determined following the Complex assessment that the activity area had a low potential for cultural heritage and that any subsurface Aboriginal archaeological evidence extant would likely be disturbed[50].

[48] *Marshall 2008:25*

[49] *Orr & Matic 2011:i*

[50] *Orr & Matic 2011:82*

5.7 General Ethno-historical Background

This section presents a history of Aboriginal occupation and possible uses of the activity area based on documentary evidence and early ethnographic records. This information is important in providing a context to archaeological investigations as it can assist in interpreting the results of archaeological test excavations, and facilitate assessment of any cultural heritage values specific to the activity area.

5.7.1 The Wada wurrung Language Group

According to Clark, at the time of contact, the Wada wurrung language group occupied the study area. The Wada wurrung language group was made up of a number of smaller clans or kinship units, which occupied different parts of the wider Wada wurrung territory. Clark[51] identified 26 named clans of the Wada wurrung from historical sources, and has provided a general location for these clans. Based on this mapping the area west of the Werribee River between the Werribee River to the Barwon River was occupied by the *Wada wurrung balug*[52] who were associated with the Bunjil moiety[53].

The territorial boundaries of the Wada wurrung are inconsistently described in the historical literature. For example, in 1841, Addis described Wada wurrung boundaries as *'locating [sic] on the coast from Indented Head to the Werriby [sic] . . . the bounds of their tribe, distance from the town of Geelong from 20 to 30 miles'*[54]. *Mathews (1904) described a wider boundary, 'extending west from the Werribee River to Ballarat; thence southerly via Lake Korangamite to Cape Otway, and thence by coast back to Werribee River'*[55]. Clark has consolidated a number of historical references to Wada wurrung traditional lands, and maps the

[51] *Clark 1990: 311.*

[52] *Collins & Marshall 2004:14; Griffin & Ward 2006:7*

[53] *Clark 1990:330*

[54] *Addis 1841 after Clark 1990: 310.*

[55] *Mathews 1904 after Clark 1990: 310.*

Wada wurrung tribal boundary as extending from Aireys Inlet in the south to Werribee River in the north[56].

5.7.2 Lifestyle of the Traditional Owners

A review of ethnohistorical records relating to Aboriginal use and occupation of the region aims to identify ways in which Aboriginal people interacted with, and potentially left archaeological traces on, their environment. Although these early observations have the potential to provide useful information about Aboriginal society at contact, the information they do provide is of necessity incomplete, and subject to varying degrees of bias.

Ethnohistorical references of the Wada wurrung are very limited. The following ethnohistory is thus largely based on accounts of wider clan gatherings, or more generalised information about the Wada wurrung Language group.

5.7.3 Food Resources

Although traditional food gathering practices and access to resources were necessarily restricted by European occupation of the region at the time, ethnohistorical sources record Aboriginal exploitation of a range of plant and animal foods during the contact period. Food resources in the region would have been comparatively plentiful across the region in the pre-contact period. Plant foods comprised an important part of the diet of the local Wada wurrung peoples, having the advantage over animal resources in that they provided a resource that was 'more regular and reliable than that derived from hunting or fishing'.[57]

Of the wide variety of plant foods commonly exploited by local Wada wurrung peoples, the tuber of the Yam Daisy, or Murnong, was commented upon by European observers as providing a staple food resource. Thomas records the Murnong being eaten both raw (from younger plants), and after being cooked in the ashes of a fire when more mature and fibrous.[58] Tubers such as that of the Yam

[56] *Clark 1990: 311*

[57] *Presland 1983: 35*

[58] *After Goulding 1988: 21*

Daisy Yam provided a valuable source of carbohydrate for Indigenous populations of the region in spring and early summer, supported by other common plant foods such as the ferntree (bracken) pulp and 'some parts of a thistle'.[59]

The Wada wurrung also readily exploited the fresh and salt-water animal resources of the region. Fish were obtained through the use of nets and weirs. Local birdlife, reptiles and mammals also provided potential food resources, with kangaroo and possum a popular staple.[60]

5.7.4 Movements and Camps

The Wada wurrung would have moved around the region in a variety of ways and likely on a seasonal basis. Scant ethnohistorical information exists about such movements, however, with the exception of 'comings and goings from Melbourne'.[61] Most information about the movements of Wada wurrung comes from reports of gatherings between themselves and other clans such as the Bun wurrung and Woi wurrung. The following account provides a generalized picture of movements and camps.

Wada wurrung clans moved around the landscape and interacted with the larger language group and more broadly within the groups that are commonly referred to as the Kulin. Intermarriage was an important part of the social structure and the rules governing marriage led to a highly complex and overarching network of kin relationships between groups. The groups of the Kulin identified with one of two moieties, Waa (crow) or Bunjil (eagle hawk). Moiety affiliation was inherited, and marriage partners were obtained from the opposite moiety.

According to Thomas, part of the affiliation with other groups was through corroborees held at new and full moon, and intertribal meetings, which were held every few months.[62] Clans would have gathered during specific times of the year for resource gathering to enact social rituals, such as coming-of-age. These

[59] *Presland 1983: 35*

[60] *Presland 1983: 34*

[61] *Presland 1983: 31*

[62] *Thomas ML 21: 97*

meetings were important congregations that fulfilled a myriad of social functions, including arranging marriages, discussing politics and resolving disputes. These meetings also served as a forum for the exchanging of goods between the different groups.[63]

The following comments by Thomas illustrate facets of the traditional life of the Aboriginal people of the Kulin Nation, and provide insight into some of the purposes of the regular inter-tribal gatherings:

'…what I can learn, long ere the settlement was formed the spot where Melbourne now stands…was the regular rendezvous for the tribes known as the Waworongs, Boonurongs, Barrabools, Niluguons, Goulbourns twice a year of as often as circumstances and emergencies required to settle their grievances, revenge, deaths etc.'[64]

'…all are employed; the children in getting gum, knocking down birds etc; the women in digging roots, killing bandicoots, getting grubs etc; the men in hunting kangaroos, etc, scaling trees for opossums etc. They mostly are at the encampment about an hour before sundown - the women first, who get fire and water, etc. by the time their spouses arrive… in warm weather, while on tramp, they seldom make a miam - they use merely a few boughs to keep off the wind, in wet weather a few sheets of bark make a comfortable house. In one half hour I have seen a neat village begun and finished.'[65]

Camps were generally established for a few days at a time. Buckley described the type and durability of Wada wurrung huts as being dependent on the resources available, and the amount of time to be spent in a given area. While describing 'his' clan as being relatively sedentary at times, and the camps as 'turf cabins'[66], Buckley also mentions more makeshift camps:

[63] *Broome 2002: 4*

[64] *Thomas ML 8, 8 April 1840*

[65] *Thomas in Gaughwin & Sullivan 1984: 93-94*

[66] *ibid.: 16,18.*

> *….merely branches of trees thrown across each other, with slips of tea-tree and pieces of bark placed over as an additional shelter*[67].

When resources were limited, recalled Buckley, the clan used what was available, and 'made our huts with reeds and stones, there being no wood'[68].

5.7.5 Material Culture

The Wada wurrung manufactured and employed a wide range of material culture, sourced both from animal, plant and earth resources available locally; and resources and implements acquired through trade with neighbouring clans.

Plant resources were used in a wide variety of ways, with wood employed in the manufacture of tools such as boomerangs, spears and digging sticks, bark and reeds in the manufacture of string for bags and nets, and species of rushes in the manufacture of baskets[69]. The bark of larger trees such as the Red Gum was used to make canoes and shields. William Buckley described the spears of the Wada wurrung as:

> *very formidable weapons, about twelve feet long, sharp at one end; others are about half that length, being made of a kind of reed with pointed sticks joined to them; these are sharpened with cutting stones, or shells.*[70]

Stone resources, the most likely material culture to remain in the archaeological record, were employed in the manufacture of stone tools, which were put to a variety of different uses. Buckley notes that such tools were at times hafted to wooden implements by the Wada wurrung, and in discussing their weaponry described:

[67] *Morgan 1996(1852): 40-41.*

[68] *ibid.: 62.*

[69] *Presland 1983: 35-7.*

[70] *Morgan 1996(1852): 46.*

the Daar spear, used in hunting; it is made of two pieces of wood, fastened together with the sinews of the kangaroo. They are very sharp at the point, and have a white flint stone on each side, fastened in, and on, with gum.[71]

Not all of the material culture used by the Wada wurrung people had a utilitarian purpose, with jewellery and other items of personal adornment also produced and traded. Buckley recalled that the Wada wurrung:

> *are very fond of ornaments - the women especially - and in their manufacture, are very ingenious. Their head-bands are netted like silk purses… they make these bands as even as it could be done by the most experienced person with silk or thread, leaving a piece at each end to tie round the forehead, colouring them with ochre. Their neck ornaments are made like silk velvet guards. Upon these are strung a great number of pieces of shells, and of the teeth of the kangaroo, adding too, the feathers of the swan and emu… Many of the women have rings made out of the bones of birds suspended from the inside of their nostrils, and the men have a small straight bone with a sort of knob at one end. Those who have the most ornaments are considered the most fashionable and attractive'*72.

5.7.6 Early Settlement & Frontier Relations

In 1835, permanent European settlement began in the Port Philip & Western region of Victoria. Dispossession of traditional land occurred as the settlers and their livestock arrived and the pastoral expansion began in earnest. Severe depletion of food resources led to malnutrition within the local Aboriginal communities by the late 1830s.[73] European expansion caused structural changes within Aboriginal societies, affecting traditional lifestyles, living arrangements and social practices as Aboriginal people were forced from their traditional lands and deprived of access to resources.

[71] *Morgan 1996(1852): 46.*

[72] *Morgan 1996(1852): 94-5.*

[73] *Presland 1983: 13*

Throughout the nineteenth century and later, the lives of Aboriginal people in the activity area region and all across Victoria were greatly influenced by various government policies of Aboriginal "protection" and "management". The first of these was put in place in an attempt to lessen the impact of European settlement on the Aboriginal people. As a result of recommendations made by the Select Committee Inquiry into the condition of Aboriginal Peoples, the Port Phillip Aboriginal Protectorate was created. The Protectorate consisted of Chief Protector George Robinson and four Assistant Protectors whose task it was to not only physically protect the Aboriginal people of the district, but also to *"civilize them, to teach them agriculture, house-building and other white employments, to educate them to a settled European life style and to convert them to Christianity"*.[74] The protectorate lasted for only 10 years (1839-1849) and was generally deemed to be a failure.

By the early 1850s the Aboriginal population of the region had severely declined and following the abolition of the protectorate came a decade of what Christie has described as *"almost complete government neglect"* of the Aboriginal people of Victoria.[75]

The commencement of the reserve and mission system in 1863 saw the beginnings of greater government control and regulation of the lives of Aboriginal people. The passing of the 1869 Act for the Protection and Management of the Aboriginal Natives of Victoria provided the Central Board, then changed to the Board for the Protection of the Aborigines (BPA), with greater power over the lives of individuals, making the reserves or mission "prescribed places for Aboriginal people to live [and] set out the form of work contracts and certificates for which they were eligible".[76] The BPA could stipulate where people could live and decide whether and where they could work. Aboriginal people living within the Port Phillip district were gradually relocated to Coranderrk, which operated until the 1920s.

[74] *Christie 1979: 85, 89*

[75] *Christie 1979: 136*

[76] *Broome 2005: 131*

5.8 Environmental Context (Landforms & Geomorphology)

Archaeological assessment reports include information about the environmental context of study areas because of the important role environmental characteristics played in influencing the types of archaeological sites in any given area. Physical environments influence both the type and availability of natural resources and the types of cultural activities that were carried out in the past. Correspondingly, this also influences the types of archaeological sites that may be found.

A determination of the former environmental context is essential to develop accurate models of cultural activity, site distribution patterns and the archaeological potential of any given area. The environmental setting of the activity area is discussed below.

5.8.1 Landscape and Published Geological Mapping

The Wyndham Vale growth PSP 40 East is characterised by low slope gradients and a broad flat, gently undulating volcanic plain formed from sheetflow basalt parent material associated with the Newer Volcanics.

Geological and soil landscape mapping provides a useful insight into the expected conditions within the activity area, but due to the scale of the mapping (1:100,000) it is not a reliable predictor of conditions on the ground at any place. Ground truthing is usually required to confirm geological and soil types.

Published data produced by DSE interactive map shows the geology of the activity area comprises two geological types these are (Figure 5):

- Qno1 – Unnamed sheetflow basalt.

The Qno1 Newer Volcanic plains that dominate the west of Melbourne are usually associated with thin clay loam soil profiles overlaying heavy clay B horizon subsoils formed from decomposing basalt parent material. The landscape is also typically littered with basalt boulders and cobbles.

Shallow depressions in the sheetflow basalt plain may contain deeper lacustrine deposits or swamp gleys if they have been regularly waterlogged or if they once formed wetlands.

- Qd2 – Unnamed dune deposits.

Although the GeoVic mapping shows this area as Unnamed Dune, it is actually the Werribee Delta Alluvium. PSP 40 is located on the northern edge of the Werribee Delta Alluvium, which comprises sand and gravel sediments discharged by the Werribee River. The Werribee Delta Alluvium fills a palaeo-valley that was cut into the volcanic plain during times of low sea level. The soils comprise up to a few metres of sand and gravel alluvial deposits overlying older basalt parent material. The Werribee Delta Alluvium is underlain at depth by basalt parent material of the Newer Volcanics[77].

5.8.2 Drainage and Water Resources

Lollypop Creek, a mid-order drainage system, is located approximately 435m to the west of the activity area. The Werribee River, a large 5-order drainage line, is located 1.7km east of the activity area. A low order drainage line (a tributary of Lollypop Creek) is located on the south-western margin of the study area. Although there are numerous ephemeral wetlands in the area, none are indicated in PSP40.

5.8.3 Vegetation

Published information on vegetation and biodiversity is included on the Victorian Resources Online website (VRO). It provides a good indication of the prevailing vegetation patterns prior to European settlement and clearance of the land. For the purposes of showing the general patterns of vegetation across the study area, the VRO 1750 Vegetation Communities (EVC) Map relevant to the study area is shown on Figure 6.

The predicted 1750 EVCs within the activity area are:

[77] *http://new.dpi.vic.gov.au/earth-resources/exploration-and-mining/tools-and-resources/geovic*

- Plains Grassy Woodland
- Plains Grassland
- Floodplain Riparian Woodland

Analysis of current aerial photographs of the activity area confirms that, with the exception of pockets of native vegetation along the Werribee River and areas of intact native grasses, the original vegetation has been largely cleared off the land.

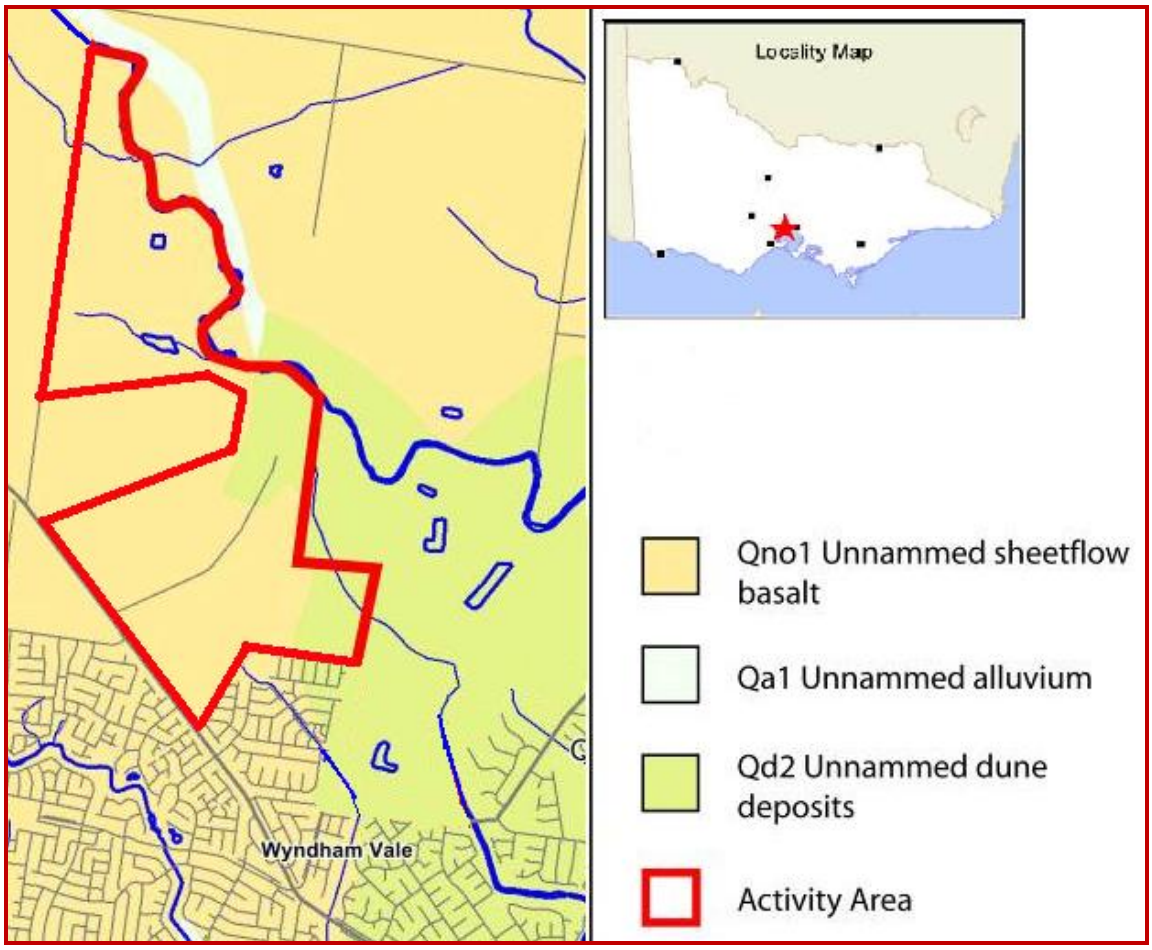


Figure 5. Geovic Geological Mapping. Dept of Primary Industries.

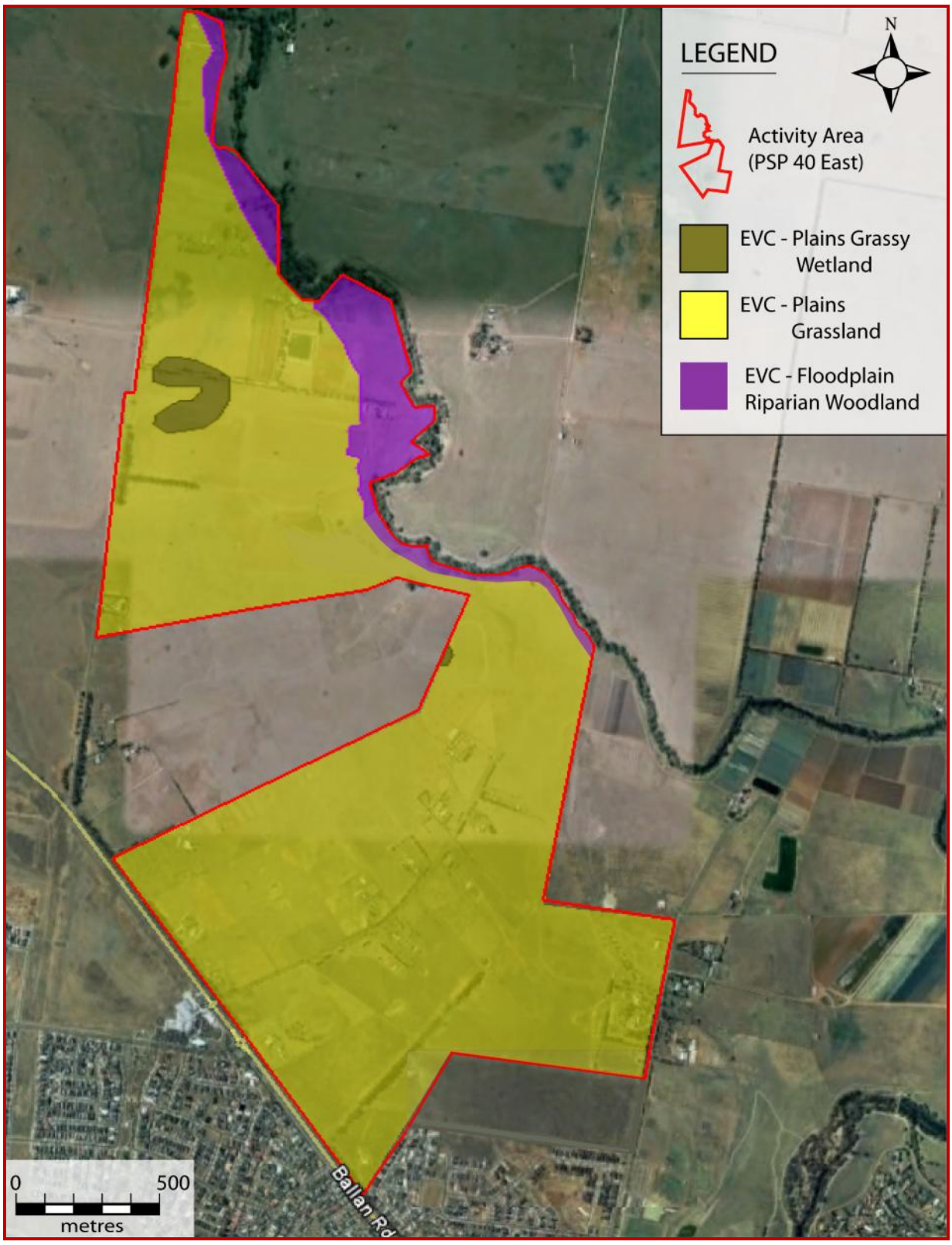


Figure 6. Department of Environment & Sustainability, Victorian Resources Online. 1750 Ecological Vegetation Communities (EVC's) identified within the activity area google earth.

5.8.4 Landforms within the activity area

According to Geological mapping by the Department of Sustainability & Environment (DSE), the study area is situated on a gently undulating volcanic plain. There are two low crest landforms within the northern section of PSP 40 East. Floodplain terraces are associated with the Werribee River. Two shallowly incised drainage channels (tributaries of the Werribee River) run east—west through the northern portion of PSP 40-East. These drainage channels contain quaternary alluvial deposits (Figure 7).

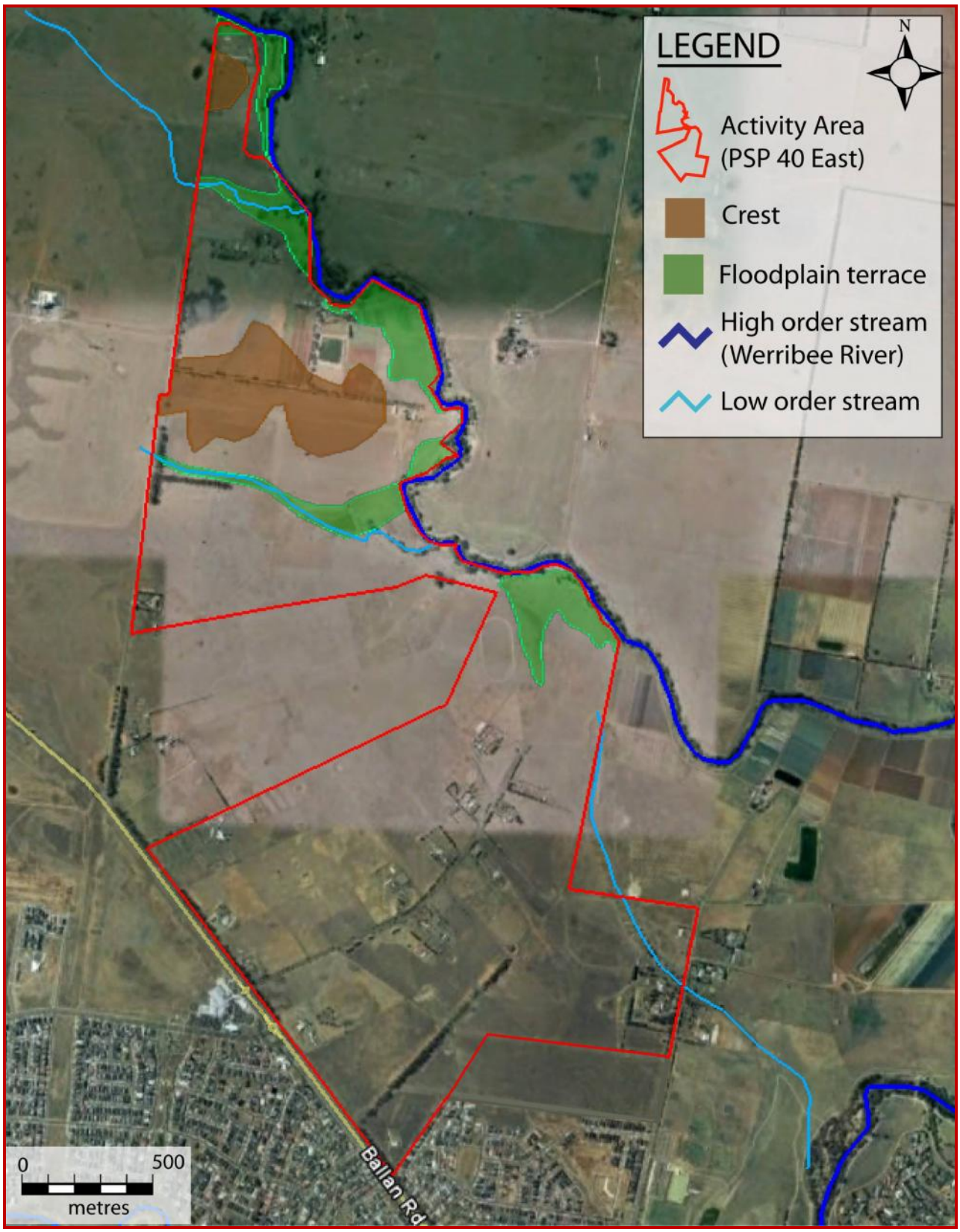


Figure 7. Landforms within the PSP 40 East activity area

5.9 Landuse History

5.9.1 Land Use History in the West Region

Andrew Long and Associates[78] completed a generalised land use history for the West Growth Areas. The following is a brief summary of the findings for the region:

Early settlement in the general Wyndham Vale area between 1850 to 1890 was largely by pastoralists, namely the Chirnside family who held a large sheep run in the area. By 1900 agriculturalism was beginning to spread throughout the Western region and by the 1940's dairy farming, market gardening, fruit growing and poultry farming had also been introduced across the region. Due to the dry climate of the western region crops were limited initially to cereals, however, once efficient irrigation systems were introduced other more luxury crops were introduced across the area[79].

5.9.2 Landuse disturbance history in the activity area

The primary land uses within the activity area were pastoral and agricultural with some cultivation. Throughout PSP 40 East several land disturbance activities have occurred. These disturbances have been confirmed by analysis of historical and high resolution current aerial photography (Figure 8).

Prior land-use disturbances identified during our analysis of current and historical aerial photographs are listed below and are shown on Figure 9.

- Repeated ploughing in areas of crop production;
- Clearing of native vegetation across the majority of the activity area;
- Construction of fences;
- Construction of houses and out buildings;

[78] *Andrew Long and Associates 2010 Volume 2 Section 10 (Draft PP49-58)*

[79] *Andrew Long and Associates 2010 Volume 2 Section 10 (Draft PP 72-85)*

- Construction of driveways and tracks providing access throughout the activity area;
- Excavation of Dams within the activity area; and
- Cultivation in the northern portion of the PSP.

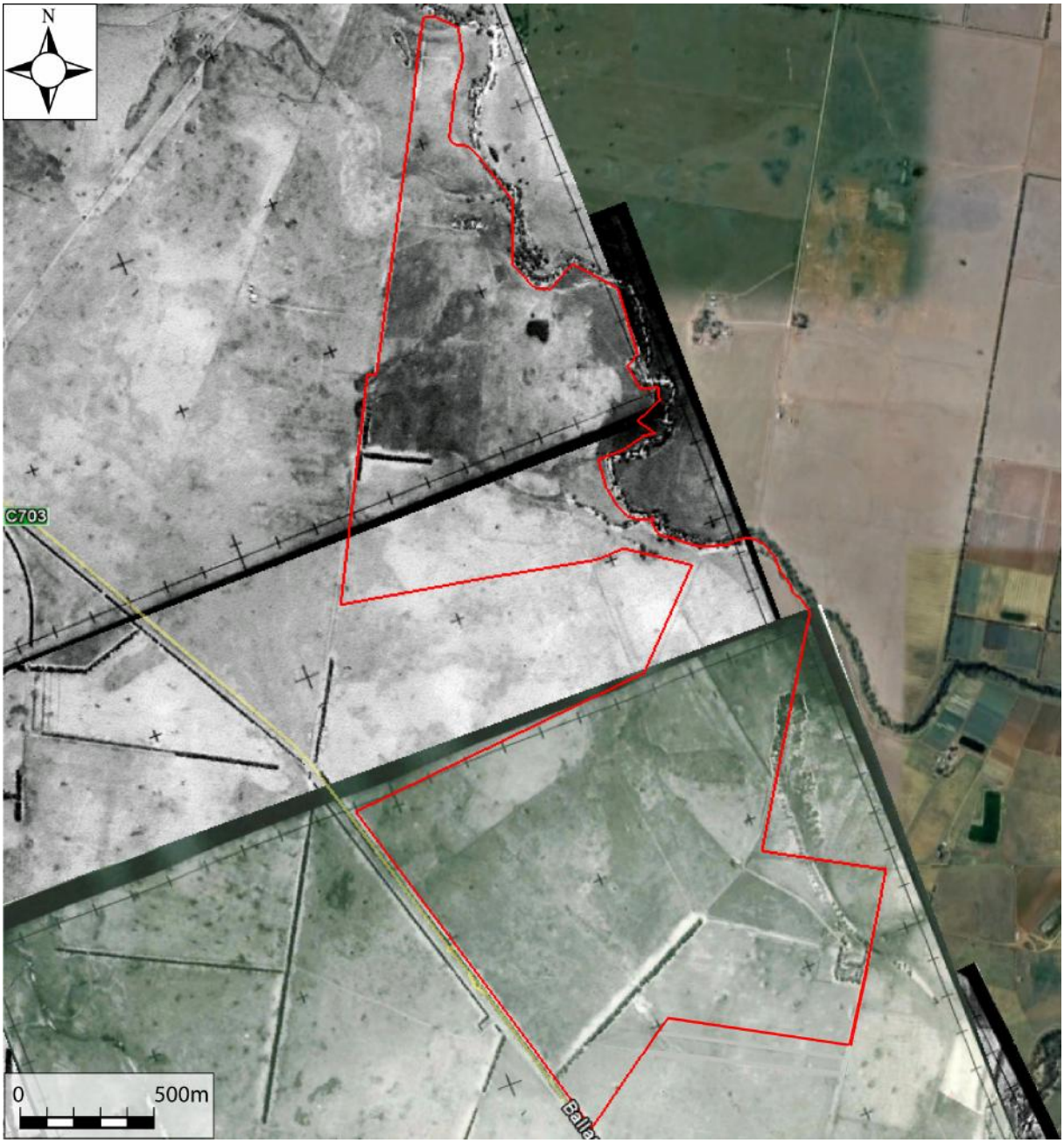


Figure 8. 1957 Historic Aerial of the PSP 40 East Activity Area (outlined in red)

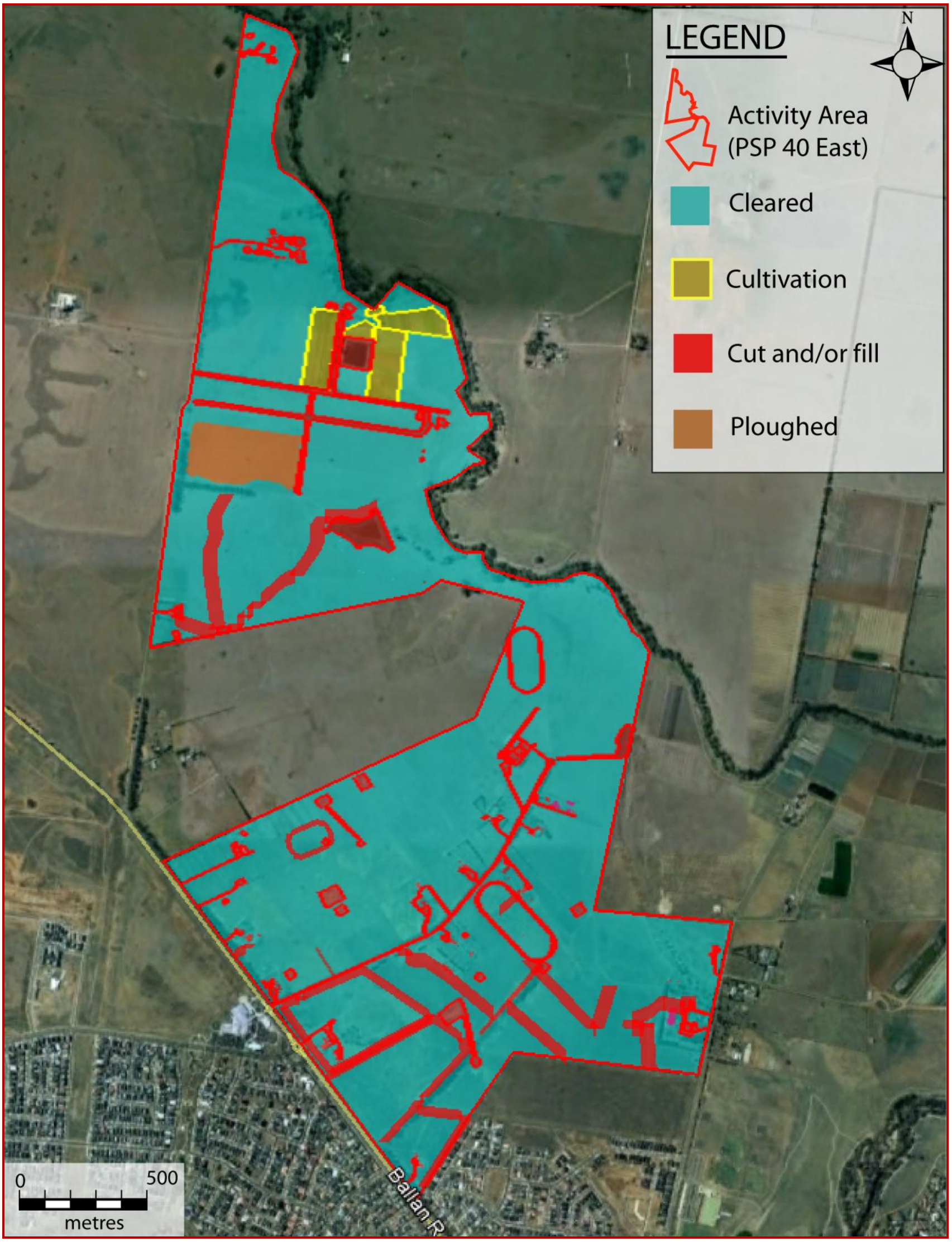


Figure 9. Disturbance within the PSP 40 Activity Area

5.10 Desktop Assessment Conclusions

The desktop assessment described in the preceding chapters of this CHMP has been used to identify prevailing Aboriginal site settlement patterns within the region and in the local area surrounding the activity area.

Analysis of historical aerial photographs, maps and plans and early accounts of Aboriginal settlement allowed us to identify original environmental characteristics of the area. This was useful in identifying areas of past ground disturbance that may have affected the integrity and significance of archaeological deposits. It also assisted in identifying portions of the activity area that would have been attractive places for Aboriginal occupation and use (i.e. due to close proximity of water and diverse resources).

The VAHR site distribution patterns and regional studies summarised above indicate the dominant site types within the Wyndham Vale PSP 40 East activity areas are likely to comprise artefact scatters, sub-surface stone artefact deposits, scarred trees and isolated artefact occurrences. There is also potential for quarry sites (at rock outcrops/escarpments, eruption points and on river gravel sources) and a low potential for burials (on aeolian and alluvial landforms with relatively deep soft soils). Currently all properties within PSP 40 East, with the exception of Parcel ID #93, require completion of a mandatory CHMP.

The distribution, density and size of known Aboriginal archaeological sites is largely dependent on environmental context, post-contact land use and erosion / site formation processes. There is likely to be a correlation between fresh water sources and Aboriginal archaeological deposits. Numerous studies have indicated a higher density and frequency of deposits exist in close proximity to water sources and the level of density and frequency increases with higher stream orders. There is likely to be a higher density and frequency of archaeological deposits in close proximity to former wetlands.

Stone sources are also likely to be associated with a higher density and frequency of archaeological deposits reflecting on-source primary reduction. Resource intersection zones, stream confluences and transitional vegetation may also be associated with a higher density and frequency of archaeological deposits. Other factors (as yet untested in the region) in archaeological potential may include slope gradient, aspect, landform and soil landscape type.

Past disturbance is also likely to have affected the potential for and integrity of archaeological deposits in any given area. Areas that have been permanently or regularly inundated (such as large swamps) may also have a lower level of potential because they were unsuitable for occupation and use.

5.11 Predictive Model

Drawing on the desktop research and previous archaeological survey work, we make the following predictions:

- Stone artefact deposits are likely to be found at varying densities across most landforms within the PSP 40 East;
- Higher density artefact scatters and sub-surface deposits may be found on crest landforms;
- Higher density artefact scatters and sub-surface deposits are likely to be found adjacent to creeks or wetlands. Artefact density and frequency is likely to increase with higher stream order (for creeks) and permanence (for wetlands);
- The density and complexity of artefact scatters and sub-surface deposits is likely to decrease with distance from water sources and wetlands;
- Higher density of artefact scatters and sub-surface deposits in close proximity to stone sources (either outcrops or river pebble sources);

- Stable aeolian and alluvial terrace landforms are likely to have deeper profiles and better preservation conditions. These landforms may contain greater archaeological integrity;
- Scarred trees may be present within areas containing mature remnant native trees of sufficient age and as isolated mature trees in agricultural settings;
- Rockshelters may be present in areas of outcropping rock escarpment, particularly along creek corridors. Areas of rock overhang sufficient in size to accommodate and shelter a person may have potential to contain occupation deposits;
- Isolated finds may be found anywhere across the landscape;
- Ceremonial places may be present in the landscape, but may not be archaeologically visible; and
- Stone arrangements may be found across the landscape.

Due to the large area covered by the Wyndham Vale PSPs, we used MapInfo GIS (Geographical Information System) to develop and map the predictions made regarding archaeological potential. The purpose of the predictive model was to:

- Provide the Growth Areas Authority, individual landowners within the PSP and the Aboriginal community with information about areas of Aboriginal archaeological sensitivity to feed into constraints and opportunities analysis,
- Help inform early PSP planning and design work, and
- Provide part of the desktop assessment component of CHMPs, and
- To assist in developing a methodology for complex assessments.

In developing the model, we drew on a number of environmental and disturbance variables that were used to identify areas of varying 'archaeological sensitivity'. For the purposes of the model, the term 'archaeological sensitivity' is defined as a combination of likely density, integrity and research value of archaeological deposits within any given area.

5.11.1 Factors Included in the Predictive Model

The following is a list of variables that contribute to archaeological potential within the Wyndham Vale PSP 40 East activity area. The variables are ranked in order of importance.

Proximity to water sources.

Proximity to water is one of the key determinants of archaeological potential. In general, sites are larger, more complex and more frequently found in close proximity to water sources. Levels of sensitivity are predicted to increase with higher order drainage lines and more permanent wetlands. Drainage and hydrology patterns have been significantly altered since European settlement in order to retain water in storage dams for agricultural purposes and drain waterlogged areas to open them up for grazing and cultivation. GIS-modelling combined with analysis of topographic maps, historical aerial photos have been used to determine the likely extent of former wetlands and areas prone to flooding.

The level of sensitivity is predicted to increase with higher order drainage lines and more permanent wetlands.

Alluvial Terraces.

These areas are considered highly sensitive because their proximity to higher-order water sources (ie. the Werribee River) increases the potential for higher density artefact scatters and sub-surface deposits (see above). More intact archaeological deposits are likely to survive within these alluvial soils due to their deeper profiles and better preservation. In particular, ethnographic and archaeological studies have indicated that Aboriginal burials are more likely to occur on these landforms.

Crest Landforms.

Previous investigations in the area have shown that crest landforms are often associated with a higher density and frequency of archaeological deposits – particularly when they are also located in close proximity to water sources. Crest landforms were delineated using aerial photography, topographic mapping and mapping carried out during the survey. The extent of the crest landforms (including eruption points) was mapped using Map Info GIS software.

Areas of cut and fill disturbance.

These areas are considered unlikely to contain Aboriginal archaeological deposits because topsoil units (ie. artefact bearing soil units) have been removed. These areas include roads, dams and the construction of building platforms for houses and sheds. They are considered to have nil archaeological sensitivity.

Areas of horticulture / market gardening.

These areas are considered to have a very low level of archaeological sensitivity because topsoil units have been heavily disturbed by deep ploughing, establishment of garden beds, re-grading and establishment of sub-ground watering systems. These areas may contain Aboriginal cultural deposits but they are likely to have a very low level of integrity and a very low level of scientific significance.

5.11.2 Factors Not Included in the Predictive Model.

The following variables were not included in the model, because the desktop assessment research and analysis of the local landscape indicated they are unlikely to be factors that affect local archaeological patterning within the subject land.

Previously recorded Aboriginal archaeological sites.

These places/sites have been shown on the sensitivity maps but have not been included as an influence on archaeological sensitivity in the model. This is because most of the sites are surface artefact scatters identified on erosional landforms, in areas of ground exposed by soil disturbance and within areas specifically investigated during previous archaeological studies. Therefore, the current local distribution of known sites is unlikely to accurately reflect the real distribution and nature of sub-surface archaeological deposits.

It is important to note that under the Aboriginal Heritage Act 2006 it is offence to disturb or destroy Aboriginal sites or objects except where a Permit to Harm has been approved by AAV and/or an approved CHMP allows for the disturbance. It is also important to note that areas within a 50m radius of known Aboriginal places are considered to be areas of cultural heritage sensitivity under the Aboriginal Heritage Regulations 2007 and may have implications for whether or not a CHMP is required for a proposed development activity.

Areas of ploughing.

Are considered to have a lower level of archaeological sensitivity because the top 20 – 30cm of topsoil has been disturbed by ploughing. These areas may contain Aboriginal cultural deposits but they are likely to have a lower level of integrity and a lower level of scientific significance. It is noted, however, that in deeper soils there is potential for more intact archaeological deposits to survive beneath the plough zone.

Areas of ploughing have not been included in the model because the PSP study areas have been cleared of original vegetation and virtually the entirety of the subject lands have been subject to some level of ploughing in the past. Therefore, because the ploughing has occurred right across the study areas, it does not have an influence on the model.

Stable aeolian landforms.

No stable Aeolian dune landforms were identified within the study areas during the desktop research. Although the GeoVic mapping describes the geomorphology along the Werribee River in PSP 40 East as consisting of an unnamed dune (Qd2), it is actually the Werribee Delta Alluvium.

Areas of remnant vegetation.

Areas of remnant vegetation are considered archaeologically sensitive because cultural deposits within these areas often have a high level of integrity as they have not been disturbed by past land-uses. These areas also have some potential to contain scarred trees. Areas of potential remnant vegetation were identified by analysing a series of historical aerial photographs of the activity dating back to 1949. No such areas were identified during our analysis.

Proximity to stone sources.

Aboriginal stone sources and geological mapping may provide an indication about where raw materials were gathered for making stone tools. Stone sources may occur across the local landscape in the form of boulders and weathered pieces outcropping on valley slopes and on volcanic plains, and gravels and pebbles washed downstream and deposited in alluvial terraces and on gravel bars.

Dominant raw material types in the region include silcrete, quartz, quartzite and chert, with other materials such as basalt, also present.

No specific stone sources or potential stone sources were identified during the desktop research.

Slope Gradient.

The local landscape within the study areas is flat to very gently undulating. There is no steep terrain within PSP 40 East, with the exception of steep escarpments overlooking the Werribee River. Therefore, slope gradient is unlikely to be a factor influencing archaeological potential.

5.11.3 Predictive Sensitivity Mapping

MapInfo GIS software was used to model and map the predictions surrounding archaeological potential. This allowed us to produce maps that show areas of varying archaeological sensitivity graded from high to very low. The modeling and mapping is based on a probabilistic approach, where a combination of traits was used to determine the level of potential. The model traits for PSP 40 East are:

- Alluvial terrace landforms = Very High Sensitivity
- Within 200m of high-order stream = Very High Sensitivity
- Within 200m of mid-order stream = High Sensitivity
- Within 200m of lower-order stream or outer edge of swamp = Moderate Sensitivity
- Crests = Moderate Sensitivity;
- All other areas = low sensitivity
- Crest **and** within 200m of former water (including all stream types and swamp) = Increased Sensitivity by One Level;
- Cut and Fill Disturbance = Nil Sensitivity;
- Market Gardening / horticultural Disturbance = Very Low Sensitivity.

Figure 10 shows the results of the GIS predictive model. The figure shows areas of high potential (dark pink) grading to very low potential (white) to disturbed (grey).

It is important to note that the predictive sensitivity mapping is based on the results of desktop research. The accuracy of the modeling and mapping presented in this report should be quite robust, given the amount of archaeological investigation carried out over the last few years in the western growth areas that underpin the predictions made. Therefore, the sensitivity mapping could be used to inform high level PSP design work, particularly in regards to proposed configuration of open space networks, activity centres and key infrastructure such as main roads that need to be established early in the PSP planning and design process.

The predictive modeling and predictive sensitivity mapping should be refined after the standard assessment survey work, particularly to tighten-up identification of sensitive landforms and areas of prior disturbance. Additional surface sites found during the standard assessment survey would also need to be included in the mapping of known sites.

The predictive modeling and predictive sensitivity mapping should be tested during future complex assessments, preferably using systematic landform based test excavation specifically designed to test conclusions made in the predictive modeling and shown on the sensitivity mapping. The model and sensitivity mapping should then be refined (if necessary) and used as the basis for making design decisions at an individual CHMP / development project level in consultation with Aboriginal Affairs Victoria and Wadawurrung.

It also important to note that the predictive model and sensitivity mapping does not include predictions about cultural values to the Aboriginal community. Identification of cultural values and places cannot be predicted by a scientific model, they can only be identified during consultation with traditional owner knowledge holders – in this case, the Wadawurrung.

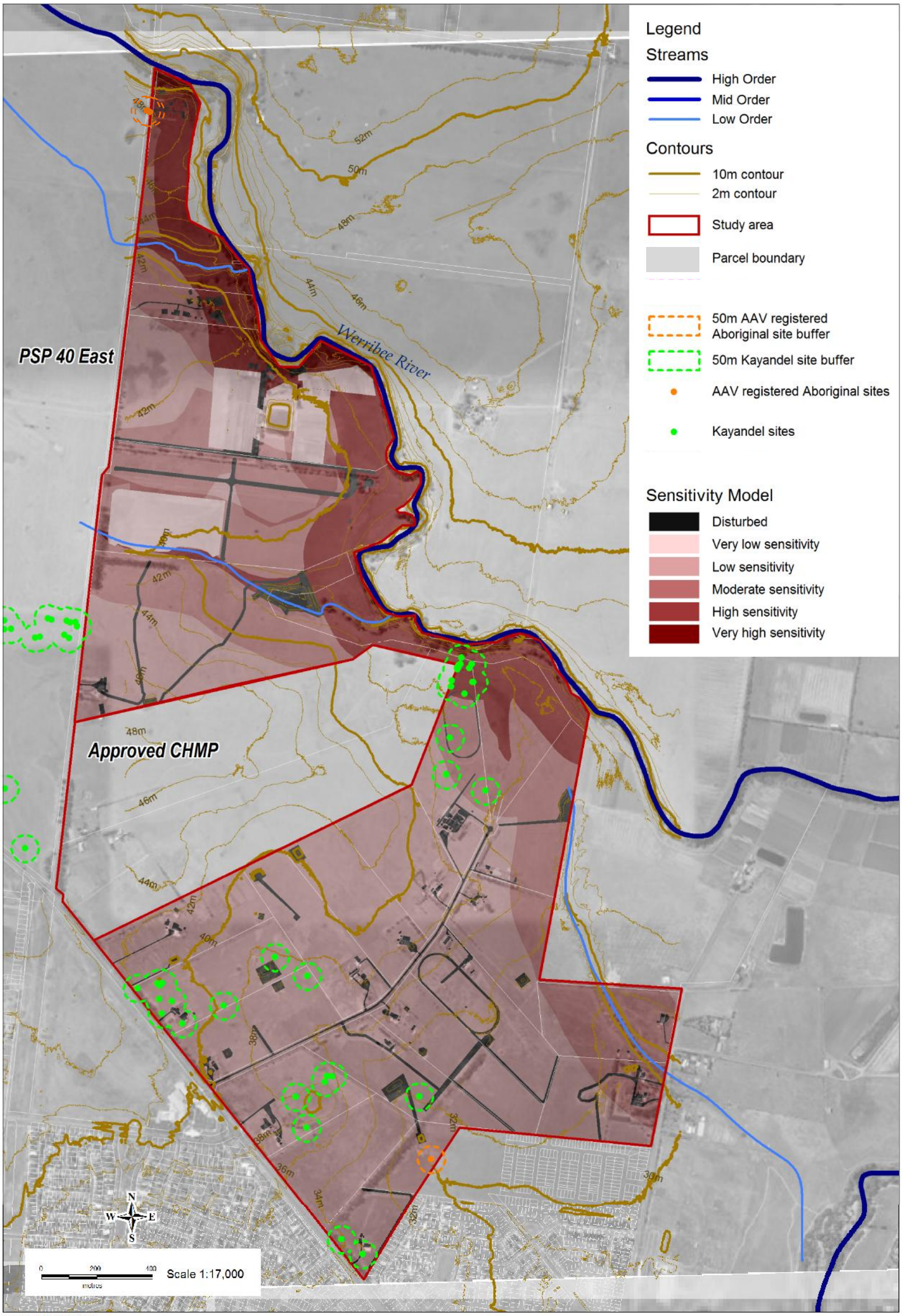


Figure 10. Predictive archaeological sensitivity model. Surface sites recorded by KAS are also included with 50m buffer.

6 STANDARD ASSESSMENT

6.1 Kayandel Archaeological Services Standard Assessment

6.1.1 Survey Details

The following sections describe the results of the archaeological survey carried out by Kayandel Archaeological Services (KAS) on behalf of the Growth Areas Authority (GAA) on the 26th to the 29th of July 2010. GAA provided copies of maps, plans and a draft CHMP assessment prepared by KAS to assist in developing the standard assessment component of this CHMP[80].

The survey of PSP 40 East activity area conducted by KAS had three aims:

- Inspect all properties in the activity area with ground surface visibility for Aboriginal archaeological sites;
- As a 'ground truthing' exercise to confirm the information collated during the desktop assessment; and
- Assess the overall potential for Aboriginal archaeology within the activity area.[81]

The results of the survey were intended to inform PSP 40 East planning and design, assist in development of a complex excavation methodology and to inform development of management recommendations for the activity area.

KAS and Wadawurrung members who participated in the survey work in July 2010 are shown overleaf on Table 9.

[80] *Syme et al 2010*

[81] *Syme et al 2010:19*

Table 9. Survey Participants.

Name	Organisation
Kathryn Drury	Kayandel Archaeological Services
Adrianne Michaels	Kayandel Archaeological Services
Albert Fagan	Wadawurrung
Brandon McRedmond	Wadawurrung
Jodie McRedmond	Wadawurrung

6.1.2 Survey Methodology

The methodology employed during the KAS Standard Assessment was pedestrian transects and opportunistic sampling. The KAS report indicates they undertook pedestrian transects spaced 5-10m apart in areas of medium to high visibility (i.e. in recently ploughed areas) and adopted an opportunistic approach in areas of low visibility (i.e. in areas where crops obscured the ground surface). Pedestrian transects were conducted in areas which contained surface artefacts (or suspected cultural heritage[82]) in an attempt to understand the nature and extent of the surface artefacts.

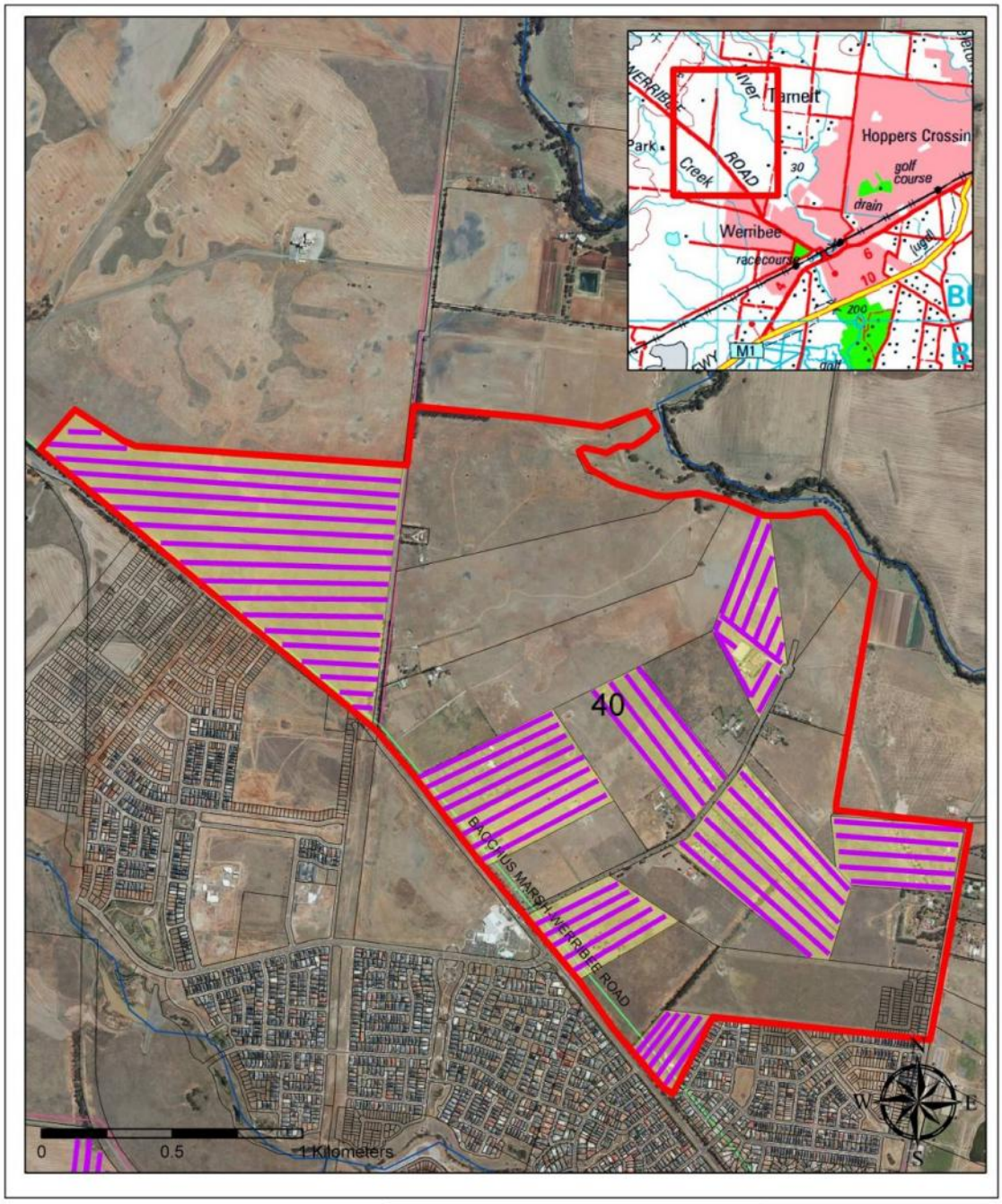
6.1.3 Survey Coverage

KAS surveyed a total of nine properties within the PSP 40 East activity area. Survey coverage of the activity area is shown below (Figure 11). KAS stated the following regarding their effective survey coverage of the activity area:

'During the survey, ground surface visibility was low in the majority of the activity area due to coverage of low growing thick weed and grass….One property is under crop (recently planted) giving high ground surface visibility'[83].

[82] *Syme et al 2010:20.*

[83] *Syme et al 2010:20*



Project: Growth Areas Authority CHMP	**Legend**
Proponent: Growth Areas Authority	PSP 40 Boundary
Map Description: Standard Assessment Survey Transects with Land Access.	Transect_Lines
Base Map Source: Cadastre/Aerial sourced from GAA	Land Access Granted as of 16th August 2010
Inset: SJ5505 1:250k Topographic Map	
Datum: MGA 94, Zone 55 **Created by:** AJB	
Date: 20/10/10	

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Figure 11. PSP 40 East Survey transects from Kayandel Archaeological Services Report. Source: Alfred Road Precinct Structure Plan CHMP by Kayendal Archaeological Services (Syme et al 2010), provided to AHMS by GAA.

6.1.4 General Observations.

The following observations of were made by KAS in their standard assessment of the PSP 40 East activity area:

'During the survey, ground surface visibility ranged from very low to medium dependant on the current state of use of each property within the activity area. Several properties had small portions of land under crop, while the majority is being used for the grazing of horses. Part of the activity area is covered by low grass, while the remainder is covered by long thick weed at least 30cm high resulting in no ground surface visibility'[84].

In summary, KAS identified the following disturbances within the activity area:

- Clearance of native vegetation;
- Horse grazing;
- Limited cultivation; and
- Ploughing and crop planting.

These impacts and additional disturbances have been previously identified and discussed in the desktop assessment this CHMP and shown on Figure 9. It is considered unlikely that archaeological material will be located within areas of cut and fill disturbance (shaded red on Figure 9) because these areas comprise substantially modified and/or highly disturbed ground resulting from cut and fill for construction of dams and buildings. This is likely to have resulted in removal of archaeological deposits from these parts of the activity area.

KAS identified four locations of "apparent artefact density" during their standard assessment, as well as low density artefact scatters and isolated artefacts.

[84] *Syme et al 2010:21*

KAS provided the following descriptions of the Aboriginal archaeological evidence identified during their standard assessment survey of the PSP 40 East activity area. The location of material identified by KAS is included in Figure 12.

6.1.5 Ballan Road AS1

This scatter is in the western portion of property number 101 (V 9464 F 468 L 15 LP 131455 Werribee Parish) in the north eastern portion of the Activity area. The standard assessment identified 10 surface artefacts with a range of raw material types (quartz, silcrete and quartzite). The site is situated on the southern banks of the Werribee River. Complex Assessment (ACHM in prep) completed in an adjoining property identified a large scatter adjoining this site. A notional site extent has been interpreted based upon the identified surface artefacts, along with locality specific relief features.[85]

Further details regarding the nature, extent and significance of this location will be identified during the Complex Assessment[86].

6.1.6 Ballan Road AS2

This scatter is centrally located within property 59 (PT L1 PS506355 WERRIBEE), which is situated on the northern alignment of Ballan Road to the east of Wollarah Road, in the central southern portion of the activity area. The area is reported to have been filled with the topsoil from a nearby project referred to as Presidents Avenue.

The site consists of 4 surface artefacts that were identified during the Standard Assessment. Further details regarding nature, extent and significance of this location will be identified during the Complex Assessment. It is likely that this

[85] *Syme et al 2010:21*

[86] *Syme at al 2010:22*

deposit will be identified as imported fill during the complex assessment. In this situation the archaeological significance of the site will be reduced[87].

6.1.7 Ballan Road AS3

This scatter is centrally located within property numbers 21 and 16 (L4&5 LP 125673 PSH WER), which are situated on the northern alignment of Ballan Road to the west of Wollarah Road. The area is reported to have been filled with topsoil from a nearby project referred to as Presidents Avenue.

The site consists of 7 surface artefacts that were identified during the Standard Assessment. Further details regarding the nature, extent and significance of the this location will be identified during the Complex Assessment. It is likely that this deposit will be identified as imported fill during the complex assessment. In this situation the archaeological significance of the site will be reduced[88].

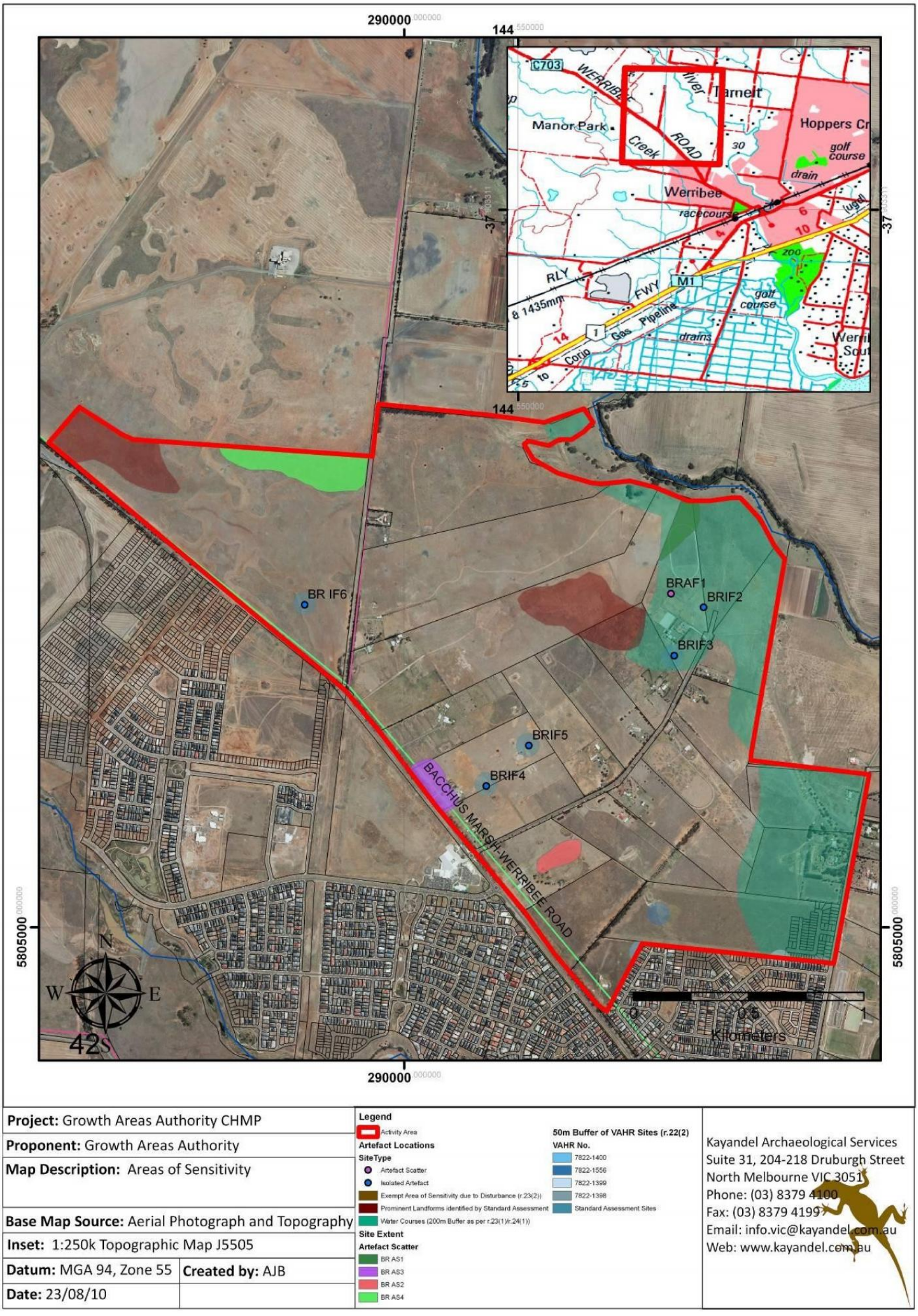
6.1.8 Ballan Road Isolated Finds

A total of six isolated artefacts were identified during the survey conducted by KAS (BRIF1 to BRIF6), five of which are within the present boundary of the PSP 40 East activity area (BRIF1 to BRIF5). The location of the isolated artefacts is shown on Figure 12.

6.1.9 VAHR 7822-3551 – KAS identified site registration

Although KAS proposed that the Aboriginal cultural heritage situated within the activity area be separated into three artefact scatters and 6 isolated stone artefact recordings, our review of the distribution of surface sites recorded (Figure 12 & shown on AHMS' predicted sensitivity model on Figure 21) by KAS indicates that they are fairly widely dispersed across the activity area as a low density scatter. Given the density and distribution of the stone artefacts across the activity area they have been registered as a Low Density Artefact Distribution - VAHR 7822-3351.

[87] Syme et al 2010:22
[88] Syme et al 201022



Project: Growth Areas Authority CHMP	
Proponent: Growth Areas Authority	
Map Description: Areas of Sensitivity	
Base Map Source: Aerial Photograph and Topography	
Inset: 1:250k Topographic Map J5505	
Datum: MGA 94, Zone 55	**Created by:** AJB
Date: 23/08/10	

Legend

Activity Area

Artefact Locations

SiteType

- Artefact Scatter
- Isolated Artefact
- Exempt Area of Sensitivity due to Disturbance (r.23(2))
- Prominent Landforms identified by Standard Assessment
- Water Courses (200m Buffer as per r.23(1)r.24(1))

Site Extent

Artefact Scatter

- BR AS1
- BR AS3
- BR AS2
- BR AS4

50m Buffer of VAHR Sites (r.22(2)

VAHR No.

- 7822-1400
- 7822-1556
- 7822-1399
- 7822-1398
- Standard Assessment Sites

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Figure 12. KAS Plan showing the extent of artefact scatters and isolated artefacts. Source: KAS 2010, Provided to AHMS by GAA.

6.1.10 Kayandel Complex Assessment

The material provided by GAA includes two draft plans (reproduced in Figure 13 and 14) that show a series of approximately 7 transects were excavated (most likely shovel test pits or probes) and 1 test trench (1m x 1m) in an area where subsurface deposits of Aboriginal archaeological evidence was identified. The draft plans indicate that artefacts were located on the northern boundary of property ID #101. No further details on the results of the text excavation were provided. No further complex assessment or test excavation is indicated on the draft plans.

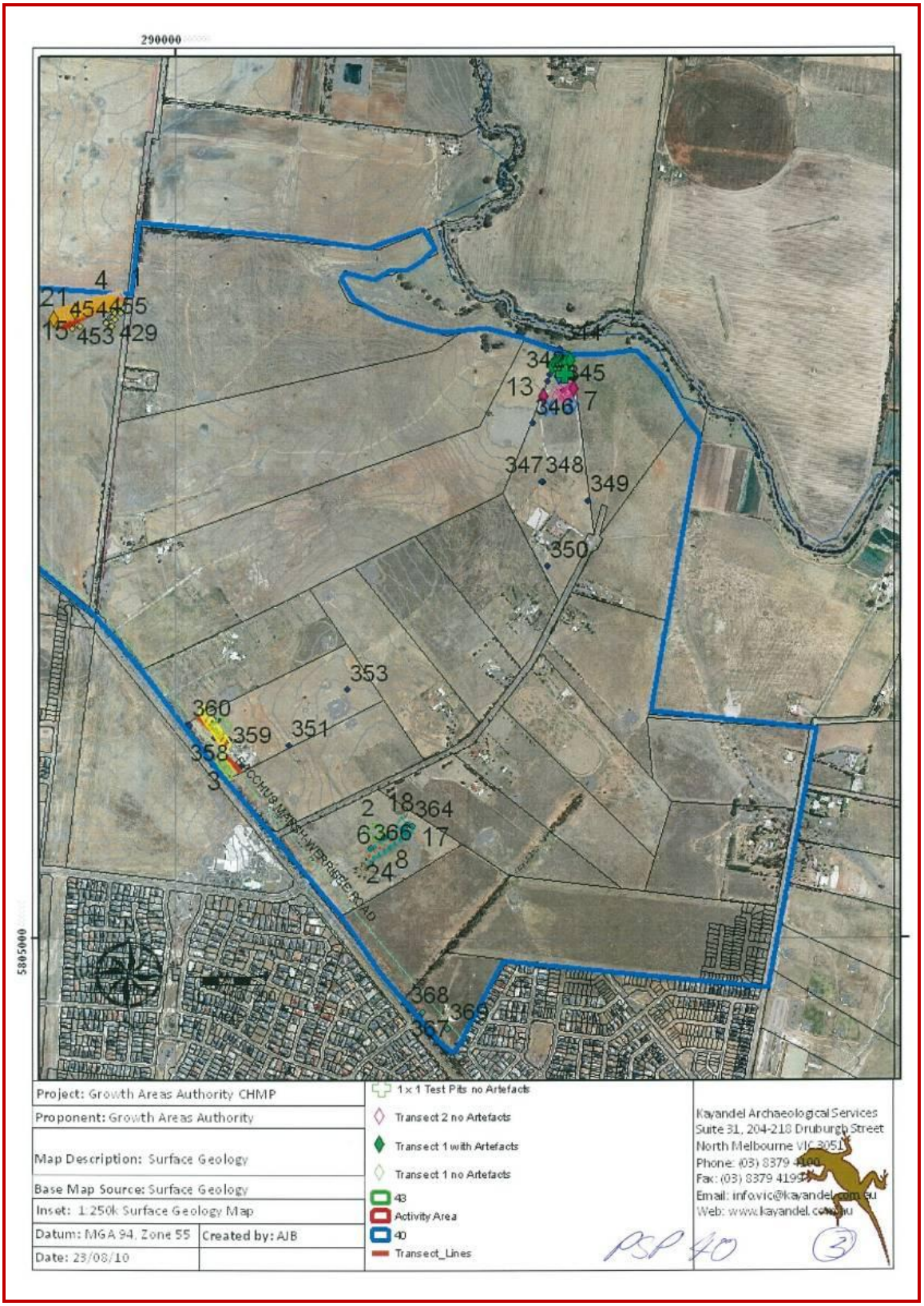

Figure 13. Draft plan provided to GAA showing layout of excavation transects.

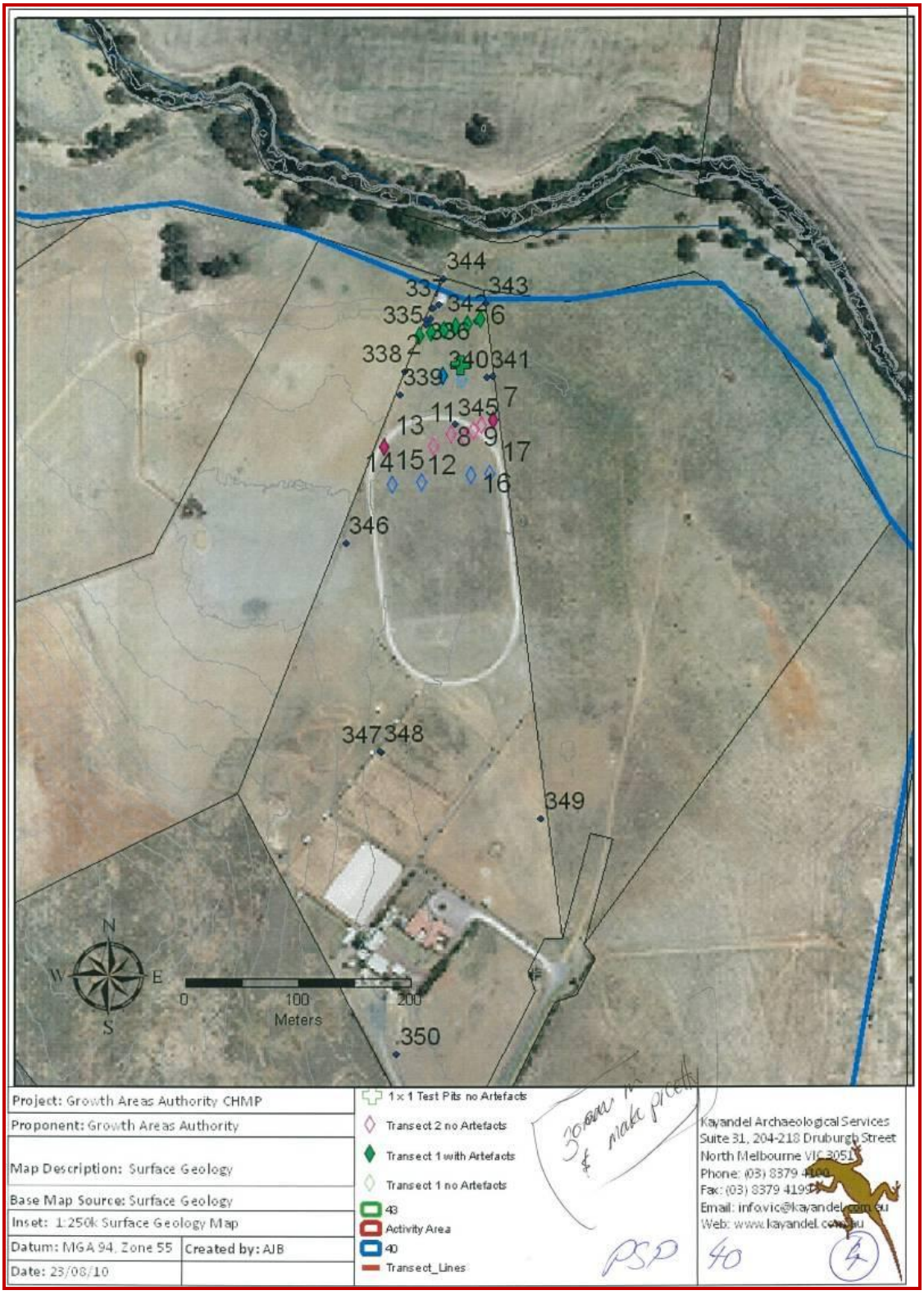

Figure 14. Draft plan provided to GAA showing close up of excavation transects and artefacts on property ID 101.

6.1.11 Conclusions

KAS made the following conclusions in their draft Standard assessment report:

One conclusion of the standard assessment, Aboriginal cultural heritage was identified within the activity area. Numerous isolated artefacts and two [sic] *extensive scatters were identified. The RAP informed KAS than an extensive scatter was located in June 2010 as part of an assessment undertaken for another CHMP on an adjacent property. The RAP has determined that the scatter identified in this CHMP is an extension of that previously identified on the adjacent property*[89].[90]

Effective survey coverage was significantly reduced by very low ground surface visibility across the majority of the activity area. Although disturbance from (likely repeated) ploughing has likely affected the archaeological integrity of the Low Density Artefact Distribution (VAHR 7822-3351) identified by KAS, the artefacts may have some potential to provide generalized information regarding assemblage characteristics in the local area. Subsurface investigation is required in order to assess the nature and extent of archaeological deposits (if any) and confirm levels of prior ground disturbance within the PSP 40 East activity area

[89] *Syme et al 2010:22*
[90] Three artefact scatters were identified by KAS during their standard and complex assessments.

6.2 AHMS Archaeological Survey

6.2.1 Survey Details

The following sections describe the results of an archaeological survey carried out by AHMS between 28th and 29th of September and on the 7th of October 2011. The survey was designed to cover land within PSP 40 East that was not included in the KAS survey and where landowners were willing to allow access for survey. The purpose was to incorporate all participating landholder's land within PSP 40 East into the Standard Assessment CHMP to assist GAA with precinct planning and to assist participating landowners and development proponents in completing CHMPs for future development of their land.

The principal aim of the survey was to identify exposed cultural material (i.e. surface sites) and to assess disturbance levels. The survey aimed to identify areas of archaeological potential, landforms, vegetation patterns, geomorphic units and areas of disturbance. The investigation was also used to assess the extent to which past land-uses may have affected natural soil profiles.

This information was used to assess the depth and potential integrity (intactness) of natural soil profiles across the study area and the likely impact of future construction. The results of the survey were used to help inform PSP planning and design, assist in development of a complex excavation methodology and to inform development of management recommendations for the activity area.

6.2.2 Survey Methodology

The archaeological survey was designed to balance a comprehensive and representative sample of landforms across the activity area and landowner requirements. The survey team included archaeologists Shannon Sutton & Adrian Burrow from AHMS. Representatives of the Registered Aboriginal Party, Wadawurrung, were present throughout the survey (the participants are listed in the Table 10 overleaf):

Table 10. Survey Participants.

Date	AHMS Representative	Wadawurrung Representative
28/09/11	Adrian Burrow, Shannon Sutton	Tammy Gilson, Blair Gilson
29/09/11	Adrian Burrow, Shannon Sutton	Kacie Mitchell, Mick Castriosis
07/10/11	Adrian Burrow, Shannon Sutton	Peter Castrisios, Tim Kennedy

The standard assessment involved a four stage approach:

Stage 1 – AHMS sought contact with all landowners who had agreed to be a part of the study to arrange a date for the archaeological survey to be conducted. AHMS also sought advice from each landowner on access issues and discussed requirements which some landowners had stipulated. Thirty-seven landowners who had agreed to be part of the study were contactable. This stage of work was used to define the scope of the standard assessment, including which parcels of land would be included in the investigation and therefore form a revised 'activity area'. A map showing the participating landholdings and standard assessment activity area (outlined and hatched in blue) is shown on Figure 15 and the property details are shown on **Table 11**.

Stage 2 - An analysis of topographic maps and aerial photographs of the applicable properties was undertaken prior to the survey to identify landforms across the activity area and to identify areas of ground surface exposure in the form of tracks, unsealed roads, dams, cuttings and areas of ground exposure. These areas were targeted during the survey because they provided an opportunity to identify surface artefact scatters and to investigate exposed soil profiles.

Stage 3 - Surveying was conducted on foot. The survey used the information obtained from analysis of aerial photographs and topographic maps (Stage 2), as well as the initial scoping work (Stage 3), to survey areas of ground surface

visibility (to identify surface artefact scatters) and mature/old growth trees (to identify scarred trees). Areas of erosion and ground exposure were examined for archaeological evidence such as stone artefacts, charcoal and shell. Ground surfaces and cuttings were also examined to determine the degree of soil disturbance, erosion and potential for archaeological deposits below current ground. Mature trees were examined for evidence of scarring, axe marks and/or old footholds.

Stage 4 – Surface artefact scatters found during the surveys were recorded in detail using a pro-forma developed for field recording. The location and extent of each surface site was recorded with Leica CS15 Differential GPS which provides sub 1 meter accuracy. Field notes were made and photographs taken to document landscape configuration, soil profiles, soil disturbance, ground visibility and vegetation types. During the survey we also sought to relocate previously registered Aboriginal places using a DGPS and the co-ordinates supplied for each place.

6.2.3 Survey Coverage

A total of 13 properties were surveyed by AHMS within the study area (Figure 15). Details of the accessible properties are provided in Table 11.

Survey coverage aimed to balance sampling of areas of ground surface exposure on these properties with detailed coverage of areas of high to very high sensitivity indicated in the predictive model developed during the desktop assessment. The survey also aimed to sample each of the landform types, providing coverage of crest, slope and floodplain landforms. Survey was comprehensive in the areas of highest predicted sensitivity along the margins of the Werribee River.

Effective coverage across the activity area are estimated at <5% due to poor ground surface visibility resulting from the presence of low to medium height pasture grasses.

Table 11. Survey coverage data.

ID	Parcel Number	Address	Survey area (ha)	Survey Team
90	1\Tp609103	Hobbs Road Wyndham Vale 3024	23.52	AHMS
6	1\Tp680909 & 2\Tp680909	180 Hobbs Road Wyndham Vale 3024	5.69	AHMS
5	1\Lp128235	162 Hobbs Road Wyndham Vale 3024	41.18	No Access
4	2\Lp128235	160 Hobbs Road Wyndham Vale 3024	40.52	No Access
26	2\Ps612751	70 Hobbs Road Wyndham Vale 3024	40.01	AHMS
27	1\Ps612751	70 Hobbs Road Wyndham Vale 3024	0.66	AHMS
21	4\Lp125673	504-530 Ballan Road Wyndham Vale 3024	12.2	KAS
16	5\Lp125673	468-502 Ballan Road Wyndham Vale 3024	12.14	KAS
50	11\Lp131455	Ballan Road Wyndham Vale 3024	12.14	AHMS
59	1\Ps506355	418 - 438 Ballan Road Wyndham Vale 3024	12.13	KAS
12	7\Lp125673	378-416 Ballan Road Wyndham Vale 3024	12.07	AHMS
11	1\Lp143937	340-376 Ballan Road Wyndham Vale 3024	5.69	KAS
100	12\Lp131455	Wollahra Rise Wyndham Vale 3024	12.13	AHMS
101	15\Lp131455	Wollahra Rise Wyndham Vale 3024	12.48	KAS
14	A\Ps633134	445-479 Mcgrath Road Wyndham Vale 3024	19.85	AHMS
97	14\Lp131455	Wollahra Rise Wyndham Vale 3024	12.13	AHMS
93	13\Lp131455	Wollahra Rise Wyndham Vale 3024	12.13	KAS
94	19\Lp131455	Wollahra Rise Wyndham Vale 3024	12.08	KAS
95	20\Lp131455	Wollahra Rise Wyndham Vale 3024	12.13	KAS
19	9\Lp126153	481-523 Mcgrath Road Wyndham Vale 3024	12.13	No Access
22	10\Lp126153	525-559 Mcgrath Road Wyndham Vale 3024	12.14	KAS
98	18\Lp131455	Wollahra Rise Wyndham Vale 3024	12.14	AHMS
96	17\Lp131455	Wollahra Rise Wyndham Vale 3024	12.39	AHMS
99	16\Lp131455	Wollahra Rise Wyndham Vale 3024	12.19	No Access
102	21\Lp131455	Wollahra Rise Wyndham Vale 3024	12.09	AHMS
N/A	Res 1\Lp131455	Wollahra Rise Wyndham Vale 3024	12.83	AHMS

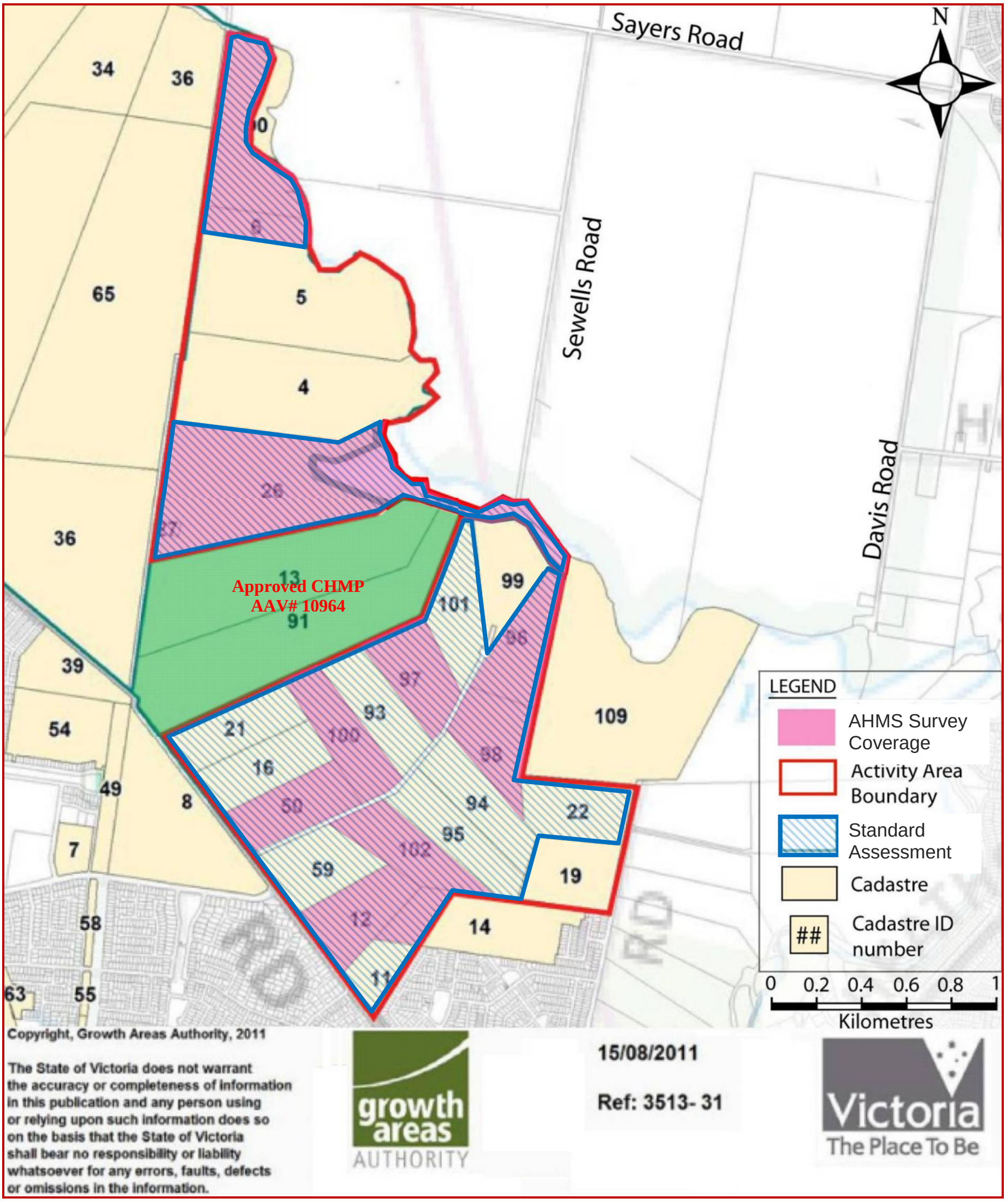

Figure 15. Areas surveyed during the AHMS Standard assessment of PSP 40 East.

6.2.4 General Observations

The activity area is dominated by a flat to gently undulating volcanic plain. Key landform features of the activity area are the Werribee River, its associated banks and adjacent terraces. Areas of rock outcropping were observed along these watercourses. Native vegetation was limited to small pockets along the Werribee River where several mature river gums were observed. One cultural scar was observed on one tree on the land owned and managed by Wyndham City Council (Figure 17).

The survey was used as an opportunity to improve our model of the extent and nature of past ground disturbance which had previously been assessed from historical and recent aerial images.

Disturbance within the activity area was extensive and caused by a whole range of factors. The following specific disturbances to the activity area were observed during the survey:

- Furrowing and ploughing for cultivation (wheat);
- Furrowing and ploughing for market gardening;
- Construction of dams & deposition of fill material around the dam;
- Construction of houses and out-buildings;
- Construction of formal gardens;
- Construction of sheds for farm activities;
- Construction of major and minor roads throughout the activity area;
- Construction of driveways and path network;
- Construction of farm tracks;

- Extensive removal of basalt floaters from paddocks;
- Stockpiling of basalt floaters in un-cropped areas;
- Installation of boundary fences; and
- Deposition of fill material along creek corridor.

These impacts have been previously discussed in the desktop assessment. It is considered unlikely that archaeological material will be located within areas of cut and fill disturbance (shaded red on Figure 9) because these areas comprise substantially modified and/or highly disturbed ground resulting from cut and fill for construction of dams and buildings. This is likely to have resulted in removal of archaeological deposits from these parts of the activity area.

6.2.5 Artefact Scatters

Four new Aboriginal Places were identified during the archaeological survey of the activity area. These locations of the Aboriginal places are shown on Figure 20.

Details of the Aboriginal places found during the survey are also presented in the tables below. Despite our attempt to relocate the three previously registered places within the activity area (VAHR#7822-1556, 7822-2918, 7822-2872), none of these were relocated. Factors such as very low ground surface visibility, difficulty accessing cropped areas and erosion along creek corridors influenced our ability to relocate these artefacts. Some of the previously recorded artefact scatters would have also been removed from the area during previous archaeological investigations.

VAHR 7822-3448 - Wyndham Vale Artefact Scatter 1 (WVAS1) – Property ID #90.

A low density surface scatter of approximately 11 artefacts was found on Property 90 (Figure 16). The site is likely to be a continuation of the previously recorded site VAHR 7822-2989-003, a low density artefact scatter which features on the same broad flat volcanic plains landform and extends from the north western boundary of the property ID #90 west through property ID #36 (outside of the current activity area). A full catalogue of VAHR 7822-3448 is presented in **Appendix 4**.

Table 12. Artefact from WVAS1.

Artefact ID	Raw Material	Type	Comments
1	Silcrete	Frag	Flake fragment
2	Silcrete	Flake	Complete flake
3	Silcrete	Frag	x 4 in concentration
4	Silcrete	Frag	Debitage
5	Silcrete	Flake	Complete flake
6	Quartz	Frag	Proximal fragment
7	Silcrete	Core	
8	Silcrete	Frag	Medial
9	Silcrete	Flake	Complete flake
10	Silcrete	Frag	Angular fragment
11	Quartz	Flake	Complete flake

Figure 16. Above - representative sample of artefacts from WVAS1. Below – Site location, a broad flat volcanic plain west of the Werribee River.

VAHR 7822-3419 - Wyndham Vale Scarred Tree 1 (WVST1) – Wyndham City Council Land.

The site consists of a suspected scarred tree located outside of the eastern boundary of property 26, on land owned and managed by Wyndham City Council. The scarred tree was located on a moderately steep eroding escarpment overlooking the Werribee River (Figure 17). A full catalogue of VAHR 7822-3448 is presented in **Appendix 4**.

Figure 17. Scarred tree (WVST1).

VAHR 7822-3418 - Wyndham Vale Artefact Scatter 2 (WVAS2) – Wyndham City Council Land.

A scatter of three silcrete stone artefacts identified on an eroding river terrace. The ground slopes away immediately to the north in the direction of a small drainage line. (Figure 18). A full catalogue of VAHR 7822-3448 is presented in **Appendix 4.**

Table 13. Artefacts from WVAS2

Artefact ID	Raw Material	Type	Comments
1	Silcrete	Flake	Distal broken left flake fragment
2	Silcrete	Flake	Primary flake, cortical platform.
3	Silcrete	Flake	Core

Figure 18. Above - Representative sample of artefacts from WVAS2. Below – Location of WVAS2 on eroding simple slope south east of the Werribee River and immediately south of a drainage corridor.

VAHR 7822-3417 - Wyndham Vale Isolated Artefact 1 (WVIA1) – Property ID #12.

The site consists of an isolated silcrete complete flake on an exposed volcanic loam topsoil immediately adjacent to a unsealed vehicular access track along the southern boundary of the property. The isolated find was located on volcanic plain landform. A full catalogue of VAHR 7822-3448 is presented in **Appendix 4.**

Figure 19. Above - Ventral and dorsal surface of WVIA1. Below - landscape shot of WVIA1 immediately adjacent to a dirt access track along the southern boundary of the property.

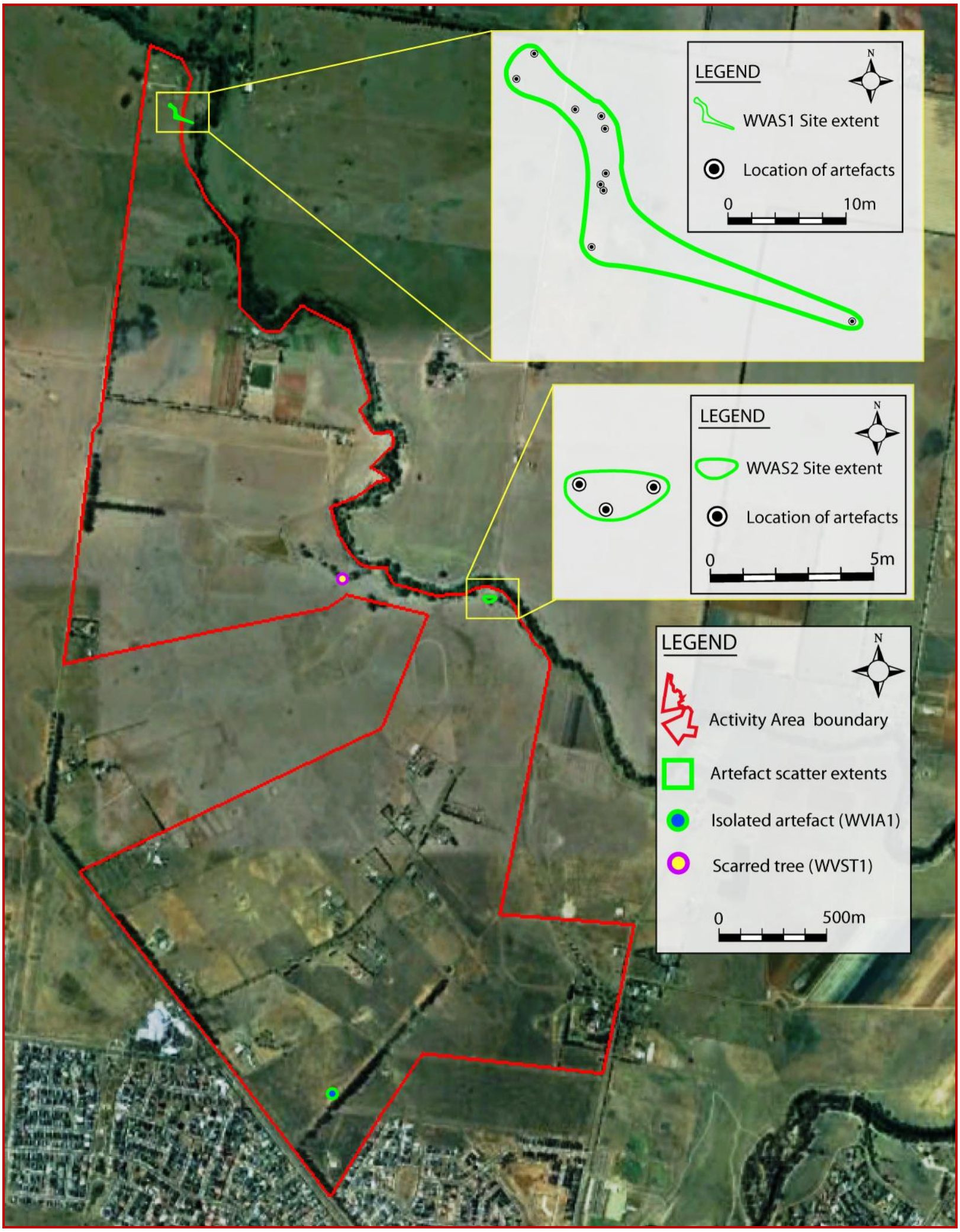

Figure 20. Location of sites and isolated artefacts identified during AHMS standard assessment.

6.2.6 Survey Conclusions

A total of two artefact scatters, one isolated stone artefact and one scarred tree were identified by AHMS during a survey of the activity area, including:

- 2 artefact scatters (VAHR 7822-3418 & VAHR 7822-3448);
- 1 isolated stone artefact (VAHR 7822-3417) and;
- 1 scarred tree (VAHR 7822-3419).

Three registered Aboriginal places (VAHR 7822-1556, VAHR 7822-2918 and VAHR 7822-2872), could not be relocated during the survey.

Effective survey coverage during both the KAS and the AHMS surveys was limited by low surface visibility (i.e. ground surface visibility was generally poor outside the creek corridors and existing access tracks) - therefore the surveys are unlikely to have identified the true extent of surface artefacts across the activity. There are also likely to be sub-surface stone artefact deposits buried below current ground surfaces, particularly within deeper aggrading soil profiles, such as those found on the Werribee River terraces.

Due to the general ineffectiveness of the survey work as a result of low ground surface visibility, only a limited number of conclusions regarding likely archaeological patterning were made drawing on the results of survey:

- Ground surface visibility in PSP 40 East was generally low and was therefore ineffective at determining the nature and density of potential surface Aboriginal cultural material;
- The surface survey was ineffective at detecting the presence, nature or density of sub-surface archaeological material. Sub-surface deposits may be buried below the modern ground surface with no surface evidence. Surface artefacts may also be re-worked by erosion or ground disturbances and therefore may not necessarily indicate the presence of sub-surface deposits;

- Intact archaeological deposits will only be present in areas that have not been significantly disturbed by European activities. Archaeological deposits within areas that are under cultivation are likely to be heavily disturbed;

- Relatively undisturbed portions of alluvial terrace, particularly adjacent to the Werribee River, have clear potential to contain deep high density archaeological deposits with archaeological research potential and some local and regional rarity;

- Areas of prior cut and fill disturbance are unlikely to contain Aboriginal cultural heritage, and therefore should be excluded from the scope of complex assessment. All other areas have some potential to contain Aboriginal cultural heritage and should be included in a programme of landform based test excavation as part of the complex assessment; and

- The results of the archaeological survey indicate that although there is potential for artefact scatters on all landforms across the activity area, although there is likely to be a higher density and frequency of sites in close proximity to creeks, particularly the higher order Werribee River.

- No Aboriginal archaeological evidence or sensitive landforms were identified in the area of the proposed Werribee River Bridge crossing on property ID #5. However, due to the constraints imposed by limited visibility throughout the activity area, test excavation should be undertaken to confirm disturbance levels and archaeological sensitivity in this area.

- The results of the surface survey supported the predictions made in the desktop assessment and the sensitivity model and mapping presented in the desktop assessment.

6.3 Cultural Values

During the survey, the Wathaurung representatives were consulted about key cultural and landscape values.

The aim of this consultation was to gain an initial indication of the cultural values which may be relevant to the landscape and to assist in developing a scope for more detailed cultural values assessment during complex assessments.

Cultural values are likely to be associated with but not limited to the following:

- Waterways and wetlands
- Areas of natural habitat (particularly areas of remnant vegetation)
- Habitat of specific plant or animal species that are / were important resources or had spiritual or totemic significance
- Known archaeological / cultural sites
- Old Trees
- Burial Places (including areas that have a higher potential to contain burials, such as soft alluvial soils on terrace landforms)
- Ceremonial sites
- Tracks and routes
- Stone sources
- Hills and high points within the volcanic landscape
- Rock outcrops, particularly outcropping rock along creek corridors
- Places of post contact and contemporary importance / history.

7 MANAGEMENT RECOMMENDATIONS

7.1 PSP Planning and Design

The results of the desktop and standard assessment were used to develop a predictive model of the archaeological sensitivity of the study area. The desktop identified three previously recorded Aboriginal places registered on the VAHR within the study area and the standard assessments undertaken by Kayandel Archaeological Services and AHMS identified previously unrecorded Aboriginal places within the activity area.

The predictive model and archaeological sensitivity map shown on Figure 21 is designed to inform GAA PSP design and planning work. The sensitivity map is also designed to provide landowners and development proponents with a guide to archaeological sensitivity within various parts of the study area to assist in gauging risk and making informed decisions about development design.

In general terms, the risk of impact on significant archaeological and Aboriginal cultural heritage values is likely to increase in accordance with sensitivity level. Therefore, areas that are in the very high sensitivity zone are likely to have the highest level of archaeological significance and as a result these areas are also likely to have the highest level of risk for development proponents. Likewise, areas of very low or disturbed sensitivity have a very low risk level.

We would recommend the following PSP design responses with reference to the sensitivity zones shown on **Figure 21**:

Cultural Values Recording: In addition to archaeological values, each complex assessment must include consultation with the Registered Aboriginal Party, Wadawurrung, to identify any cultural values which may be present within the Activity Area. The Wadawurrung must be invited to participate in any further survey or test excavation fieldwork

Higher Priority for Conservation (outlined yellow on Figure 20) and areas of Cultural Significance to the RAP (outlined in white on Figure 21): We recommend these areas, and any additional area identified during the course of Complex Assessments undertaken for PSP 40 East, have a higher priority for conservation. Where decisions about conservation or open space allocation are made by GAA or individual landowners / development proponents in consultation with the RAP, the higher priority areas should be considered as 'first priority' options for conservation. It may not be possible to include all of the higher priority land in conservation, however, where it is feasible it should be actively considered.

Options for conservation could include dedication of areas as Aboriginal conservation zones or retention of areas in their current form in open space, riparian, bio-link, set-backs and/or asset protection zones. Where possible, the landscape integrity and amenity of these areas should be retained, including appropriate set-backs where this is relevant. Appropriate and robust planning provisions should be established during the PSP design process for areas proposed to be included in conservation. Provisions for dedicated conservation areas should include specific measures that limit ground disturbance or erosion within the conservation areas into the future.

Further areas of cultural significance may be identified during Complex assessments undertaken for individual parcels within PSP 40 East.

VAHR 7822-3351 Artefact reburials - Following completion of individual complex assessments and the return of artefacts from VAHR 7822-3351 by KAS, the artefacts from VAHR 7822-3551 must be reburied. The location of reburial must be determined in consultation with Waddawurrung and the Sponsor

Site WVAS1 (Property ID#90): WVAS1 is a low density stone artefact scatter that represents a regionally common site type. The artefact scatter should be included in conservation or open space and measures should be adopted to protect the site prior to development and during development works. Management measures

should be established to ensure ongoing protection after development has been completed in the precinct.

Site WVAS2 (Wyndham City Council Land): WVAS2 is a low density stone artefact scatter of three artefacts. The site is a regionally and locally common site type observed on an erosional terrace adjacent to the Werribee River. WVAS2 should be included in conservation or open space and measures should be adopted to protect the site prior to development and during development works. Management measures should be established to ensure ongoing protection after development has been completed in the precinct.

Site WVIA1 (Property 12): WVIA1 is a single, isolated artefact observed in a disturbed context immediately adjacent to a dirt access track running east-west through property 12. This site is a locally common site, as there is potential for isolated finds everywhere across the landscape. WVIS1 should be salvaged by means of a surface collection by a suitably qualified archaeologist prior to development. Waddawurrung Representatives must be invited to participate in the salvage. VAHR forms must be updated to reflect that the site has been salvaged.

Site WVST-1 (Wyndham City Council Land): Scarred trees are an increasingly rare site type and usually have a high level of cultural value to the Aboriginal community. The scarred tree WVST-1 should be included in conservation or open space and measures should be adopted to protect the tree prior to development and during development works. Management measures should be established to ensure ongoing protection after development has been completed in the precinct.

Proposed Bridge Crossing (Property ID#5): No Aboriginal archaeological evidence or sensitive landforms were identified in the area of the proposed Werribee River Bridge crossing on property ID #5. However, due to the constraints imposed by limited visibility throughout the activity area, test excavation should be undertaken to confirm disturbance levels and archaeological sensitivity in this area. Although the predicted sensitivity model produced from the desktop &

standard assessment CHMP for the Tarneit PSP#91 (AAV# 11795) indicates that the area has high archaeological potential, the proposed bridge location east of the Werribee River is outside of the priority conservation and impact avoidance zones. Test excavation should be undertaken to determine levels of disturbance and archaeological sensitivity in the location of the proposed bridge crossing.

Very High Sensitivity: Retain as much as possible in open space, riparian, bio-link, set-backs and asset protection zones. The aim of PSP design should be to minimize future development impact on these areas (particularly the Very High sensitivity zone). This approach will protect areas with high potential for significant archaeological deposits and cultural values. The approach will also save time and money in reducing the scope of mitigation and salvage of sensitivity areas.

Moderate and High Sensitivity: Where there is an opportunity, development impact should be minimized where practicable. For instance, where there are opportunities to establish open space, these could be placed on areas of moderate sensitivity to protect Aboriginal heritage and reduce the scope of expensive and time consuming archaeological mitigation measures and salvage.

Low Sensitivity: No design and planning recommendations. These areas are essentially archaeologically 'neutral'.

Very Low and Disturbed Sensitivity: These areas could be the focus of development, particularly high impact features of a subdivision like a town centre, medium or high density residential, industrial or commercial.

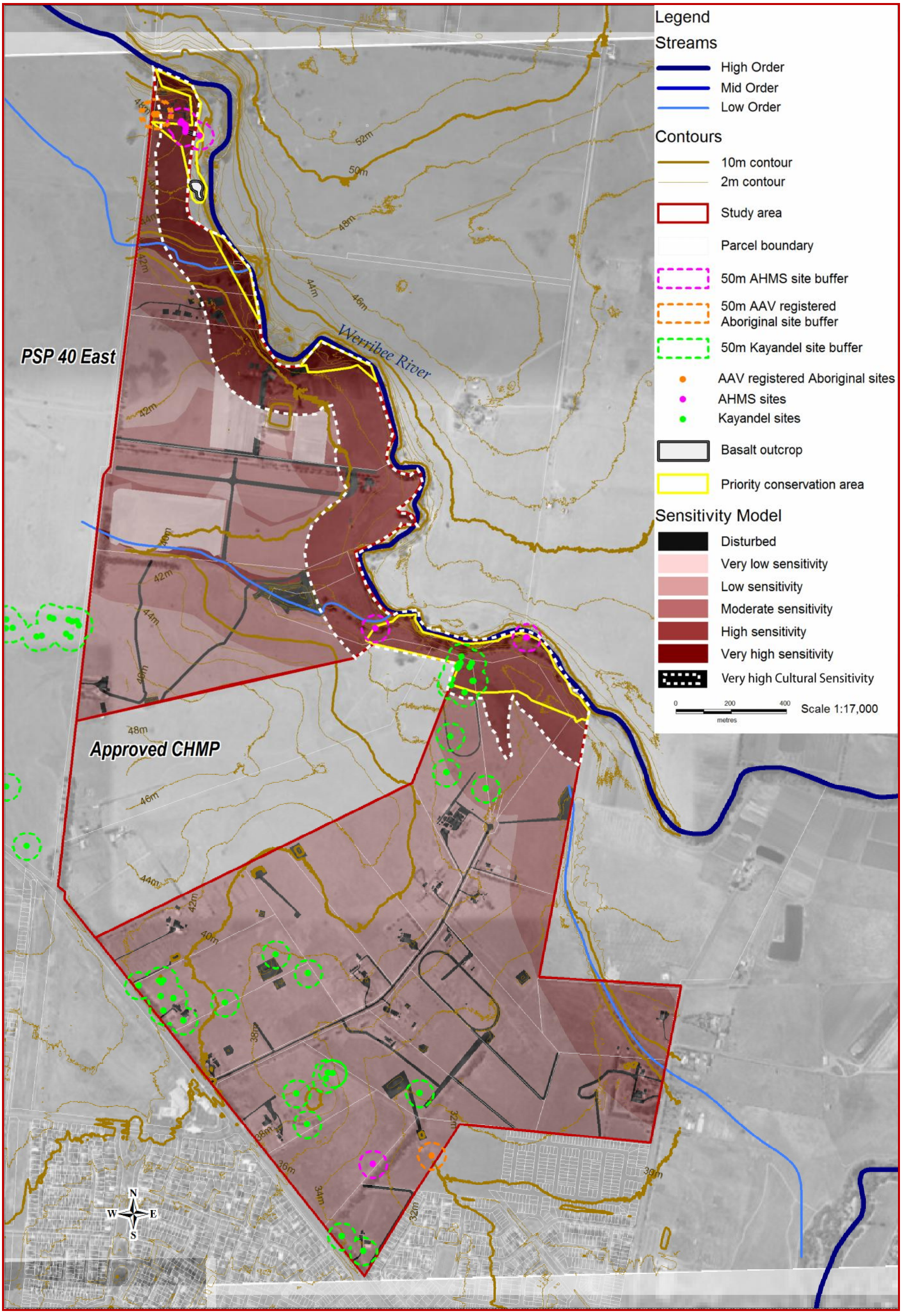

Figure 21. Archaeological sensitivity model showing approximatelocation of known sites, areas of sensitivity and higher priority for conservation areas.

7.2 Complex Assessments

Future development and sub-divisions within PSP 40 East would be considered 'high-impact' developments. The Precinct Structure Plan is also considered a 'sub-division' under Regulation 48 of the Aboriginal Heritage Regulations 2007.

Our analysis of the PSP area indicates every property allotment, with the possible exception of Property ID#93, is located within an area of cultural heritage sensitivity as defined by the Aboriginal Heritage Regulations 2007. This is because every property except ID#93 is either located within 200m of a named waterway (see Figure 22), or is located within 50m of a known Aboriginal place included on the VAHR register (see Figure 22) or recorded by KAS or AHMS during standard assessment (see Figure 21).

Therefore, all properties within PSP 40 East (with possible exception of Property ID#93) are likely to be required to prepare a cultural heritage management plan prior to commencement of approval of planning permits for development. The only exception to this would be if all of a proposed development activity area has been subject to significant ground disturbance in the past.

Significant ground disturbance is defined as disturbance of the topsoil or surface rock layer of the ground or a waterway by machinery in the course of grading, excavating, digging, dredging or deep ripping but does not include ploughing or other deep ripping in the Aboriginal Heritage Regulations 2007. In most cases, it is very difficult to demonstrate significant ground disturbance across the entirety of a typical residential sub-division project. Therefore developments are highly likely to require completion of a complex CHMP before a Planning Permit can be approved for those projects.

Where a CHMP will be required we recommend the use of a landform based approach to complex assessment (test excavation). The landform based approach aims to systematically test each landform within an activity area to establish the extent of cultural material present. This approach is recommended because it is a

very efficient and effective means of assessing the nature, extent and significance of Aboriginal cultural heritage across large landscapes. It also provides for a consistent approach across the PSP 40 East activity area and significant sampling efficiencies by using a common approach that can be utilized by all the landowners and proponents within the activity area.

The extent of testing and sample effort should be based on the level of sensitivity shown on the predictive sensitivity mapping shown on **Figure 21**. The following sampling density should be used

In general, we would recommend the following for the areas of varying archaeological sensitivity shown on **Figure 21**:

- **Areas where no development or ground disturbance is proposed** – No complex assessment will be required in areas where development and disturbance is not proposed. Inclusion of known sites identified by Kayandel and areas of higher sensitivity in conservation, open space, biolinks and/or riparian corridors will reduce the scope of Complex Assessment required and provide good outcomes in protecting significance Aboriginal heritage;

- **Areas of 'Disturbed' Sensitivity** –These areas are unlikely to contain Aboriginal cultural heritage. The *Aboriginal Heritage Regulations 2007* only require Complex Assessment in areas that are 'likely' to contain Aboriginal cultural heritage);

- **Areas of Very Low Sensitivity** – Limited test excavation should be undertaken to confirm the very high levels of prior ground disturbance predicted in the sensitivity model. The aim of this testing should be to simply establish the level of disturbance – this is because it is considered possible but unlikely that these areas will contain Aboriginal cultural heritage;

- **Areas of Low and Moderate Sensitivity** – Systematic landform testing should be undertaken in these areas to test and, if necessary, refine the predictive

model presented in this summary report. The sample per hectare should be lower in areas of low sensitivity because these areas are less likely to contain Aboriginal cultural heritage.

- **Areas of low archaeological sensitivity which contain surface/subsurface archaeological deposits** – Limited complex assessment is warranted in areas where known surface sites/subsurface sites are extant. The testing should aim to establish whether surface artefacts have a subsurface component and to further define the nature, extent and significance of subsurface deposits located by Kayandel Archaeological Services (KAS).

- **Areas of High and Very High Sensitivity** – Systematic landform testing should be undertaken in these areas to test and, if necessary, refine the predictive model presented in this summary report. The sample per hectare should be higher in areas of high to very high sensitivity because these areas are more likely to contain Aboriginal cultural heritage. Proposed development on terrace landforms is likely to require extensive and deep archaeological excavation due to the very high level of archaeological and cultural sensitivity associated with these landforms.

- **Areas of Very High Cultural Sensitivity** - Systematic landform testing should be undertaken in these areas to test and, if necessary, refine the predictive model presented in this summary report. The sample per hectare should be higher in areas of high to very high sensitivity because these areas are more likely to contain Aboriginal cultural heritage. Development should be mitigated or avoided in within the area of Very High Cultural Sensitivity.

Proposed test excavation sampling densities are outlined in Table 8 overleaf.

The test excavation sampling densities outlined below have not been endorsed by Wadawurrung but may be useful as a guide for developing future complex assessments for parcels within the PSP 40 East activity area. Test excavation methodologies must be determined in consultation with Wadawurrung.

Table 8 - Proposed sampling densities.

Sensitivity Level.	Testing Recommended (per 10 hectares).
Very Low	1 square metre to confirm disturbance level
Low	3 square metres
Moderate	8 square metres
High	10 square metres
Very High	12 square metres

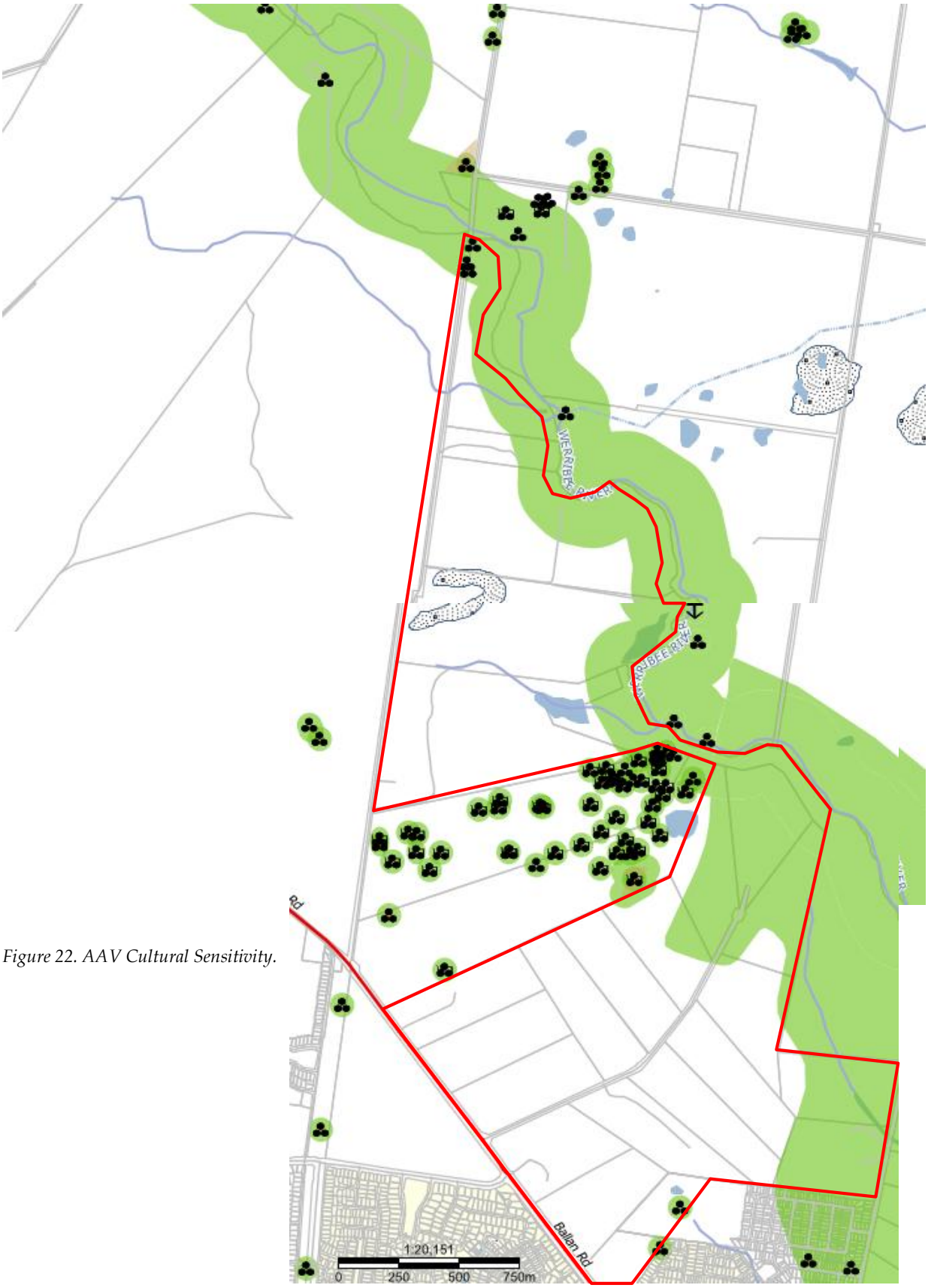

Figure 22. AAV Cultural Sensitivity.

7.3 Management Requirements

The following recommendations set out the key legal requirements that will apply to PSP planning and development within the study area and activity area:

a. **Subdivision or development projects** (greater than 2 lots and/or two dwellings) will require completion of mandatory cultural heritage management plans (CHMPs) before Planning Permits can legally be approved for these projects[91]. As the Wadawurrung are the Registered Aboriginal Party for the activity area they will be the evaluating authority. In the event that Wadawurrung decline to evaluate the CHMP, AAV will be the evaluating authority. CHMPs must be prepared by a qualified Cultural Heritage Advisor and must be approved by Wadawurrung before they are in force.

   If individual development proponents believe their land has been subject to significant ground disturbance (either mechanical excavation disturbance and/or deep ripping) they could consider engaging a cultural heritage advisor to undertake an assessment and make a determination.

b. **Areas where no development or ground disturbance is proposed** – No complex assessment will be required in areas where development and disturbance is not proposed. Inclusion of known Aboriginal places and areas of higher sensitivity in conservation, open space, biolinks and/or riparian corridors will reduce the scope of Complex Assessment required and provide good outcomes in protecting significance Aboriginal heritage;

c. **Known Aboriginal Places** – Known Aboriginal places registered on the Victorian Aboriginal heritage register (VAHR) and places found during the standard assessment described in this report are protected by the Aboriginal Heritage Act 2006. It is an offence to disturb or destroy these places without first obtaining either a Permit to Harm or an approved CHMP.

[91] With the possible exception of Property ID#93, which currently may not be included in an area of cultural heritage sensitivity as defined by the Aboriginal heritage regulations 2007.

d. **Blanket Protection** – Irrespective of whether or not a CHMP is required for a particular development or activity, the Aboriginal Heritage Act 2006 provides blanket protection for Aboriginal cultural heritage. If any Aboriginal objects (artefacts), sites, places or skeletal remains are identified at any time before or during development works, they cannot be harmed until either a Permit to Harm or a CHMP that specifically permits harm to that place has been approved by Wadawurrung or AAV.

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Google Earth.

http://www.google.com/earth/index.html

NearMap.

https://www.nearmap.com/welcome-new

APPENDIX 1 - NOTICE OF INTENT

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 1800-762-003.

SECTION 1 – Sponsor information (mandatory)

Sponsor (*natural person or body corporate seeking to undertake the activity*):	Growth Areas Authority (GAA)
ABN/ACN:	77 803 352 468
Contact name:	Fiona McDougall
Postal Address:	Level 29, 35 Collins Street, Melbourne, Victoria 3000
Telephone Number	03 9651 9667 Fax number: 03 9651 9623
Mobile:	
Email Address:	Fiona.McDougall@gaa.vic.gov.au

Sponsor's agent (if relevant)

Company:	
Contact name:	
Postal Address:	
Telephone Number	Fax number:
Mobile:	
Email Address:	

SECTION 2 – Description of proposed activity and location

Project Name: PSP 40 East

List the relevant municipal district/s (ie, Local Council or Shire): Wyndham Shire,

Clearly identify the proposed **activity** for which the cultural heritage management plan is to be prepared (ie, mining, road construction, housing subdivision):

Precinct Structure Plan (PSP)

Clearly identify the **location** (such as listing cadastral information, attaching a copy of a title search, or indicating the street address):

PSP 40 East - south of the Werribee River down to Ballan Road (map attached)

Attach a map (to scale, with a north arrow and indicating the municipal district - if any) that clearly identifies the activity area and its boundaries in respect of which the cultural heritage management plan is to be prepared.

- Please ensure the map refers to existing roads and features, rather than proposed roads and features, and includes their names.
- Please ensure the map has the activity area outlined on it (this area should include all works relating to the proposed activity including location of temporary buildings, space for machinery, etc).
- The map should have a legend; at least three readily identifiable geographical locations (such as road intersections, parcel boundaries, or road/river crossings) and should state the map's projection.
- **Spatial data (ie a GIS file) containing the Activity Area will assist in the processing of your notification.** Please refer to "Lodging Spatial Data in the VAHR" on the AAV website for further information.

SECTION 3 – Cultural Heritage Advisor

If you would like a Cultural Heritage Advisor (a person who has the qualifications or experience [or both] required under s.189 of the Act) notified of the status of this Cultural Heritage Management Plan, please provide the following details for that person:

James Wheeler	AHMS	JWheeler@ahms.com.au
Name	*Company (if any)*	*Email address*

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

Start date 18 / 08 / 2011 *Finish date* 31 / 10 / 2011

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? Subdivision (r.46)

Is any part of the activity in an area of cultural heritage sensitivity, as listed in the regulations? **Yes** / **No** *(please circle)*

☐ Other reasons (Voluntary)

Within 200m of a waterway (r.23)

☐ An Environmental Effects Statement is required

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

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

This section is to be completed only where there is a registered Aboriginal party in relation to the management plan

Wathaurung Aboriginal Corporation (trading as Wadawurrung)

SECTION 7 – Signature of Sponsor

I certify that to the best of my knowledge and belief that the information supplied is correct and complete.

Signed: [signature] *Date:* 6/9/11

[Sponsor]

SECTION 8 – Notification checklist

☑ Ensure appropriate attachment/s are completed and attached to this notification (see section 2 of this form).

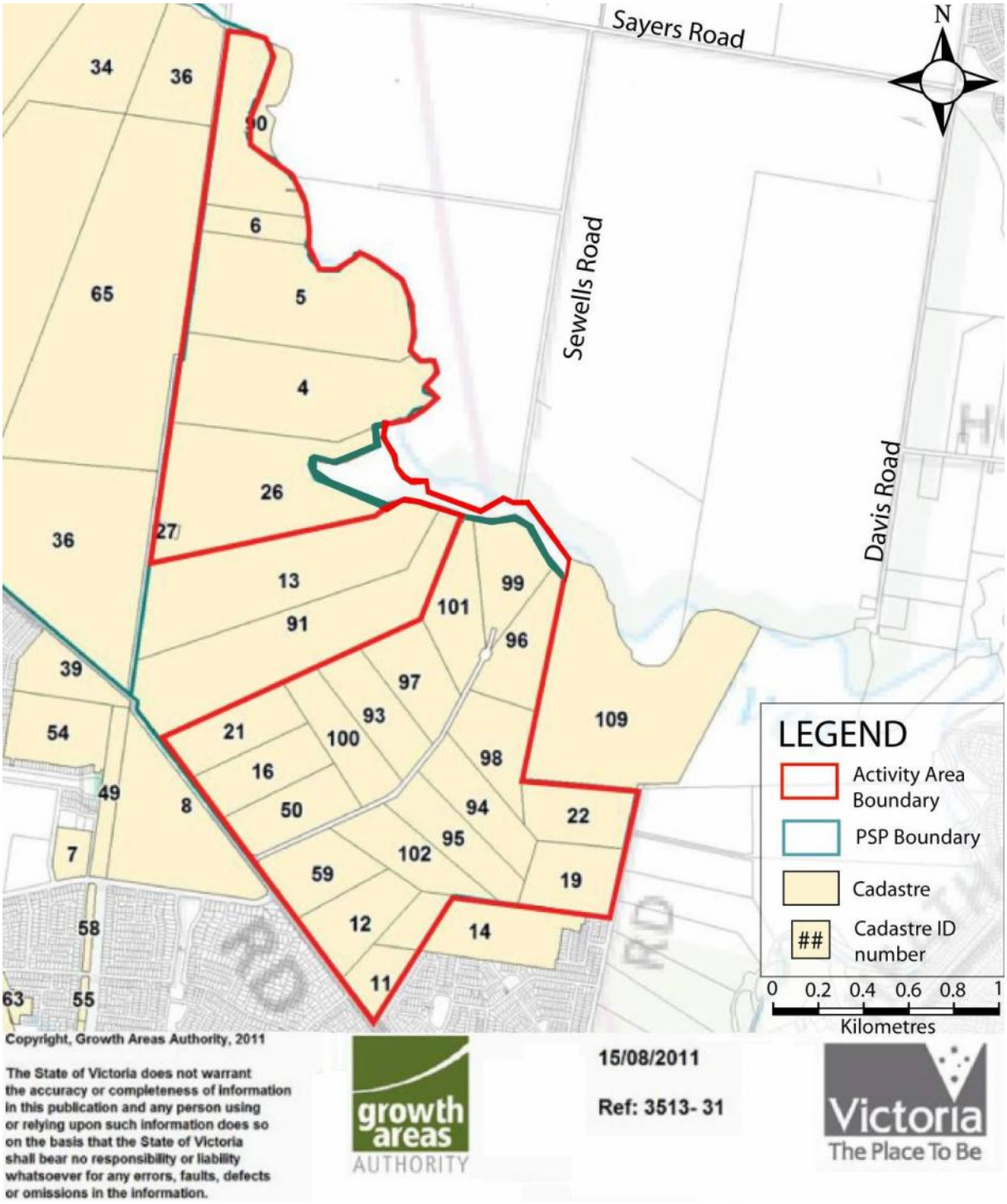
Please ensure this notice and all attached items are sent to the:

Deputy Director
Aboriginal Affairs Victoria
Department of Planning and Community Development
GPO Box 2392
MELBOURNE VIC 3001

OR ***Email: vahr@dpcd.vic.gov.au***

Notes:

- **Ensure that any relevant registered Aboriginal party/s is also notified. A copy of this notice 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 registered 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 may be used for this purpose.**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growth areas AUTHORITY
15/08/2011
Ref: 3513- 31
Victoria
The Place To Be

APPENDIX 2 – SCHEDULE TO PLANNING SCHEME (UGZ).

37.07 URBAN GROWTH ZONE

21/09/2009 VC60

Shown on the planning scheme map as **UGZ** with a number.

Purpose

To implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.

To manage the transition of non-urban land into urban land in accordance with a precinct structure plan.

To provide for a range of uses and the development of land in accordance with a precinct structure plan.

To contain urban use and development to areas identified for urban development in a precinct structure plan.

To provide for the continued non-urban use of the land until urban development in accordance with a precinct structure plan occurs.

To ensure that, before a precinct structure plan is applied, the use and development of land does not prejudice the future urban use and development of the land.

Application of provisions

Part A – No precinct structure plan applies

The provisions of clauses 37.07-1 to 37.07-8 apply if no precinct structure plan applies to the land.

Part B – Precinct structure plan applies

The provisions of clauses 37.07-9 to 37.07-16 apply if a precinct structure plan applies to the land.

Precinct structure plan provisions

A precinct structure plan applies to land when the precinct structure plan is incorporated in this scheme.

PART A - PROVISIONS FOR LAND WHERE NO PRECINCT STRUCTURE PLAN APPLIES

37.07-1 **Table of uses**

10/06/2008 VC48

Section 1 – Permit not required

USE	CONDITION
Agriculture (other than Animal keeping, Apiculture, Intensive animal husbandry, Rice growing and Timber production)	
Apiculture	Must meet the requirements of the Apiary Code of Practice, May 1997.
Bed and breakfast	No more than 6 persons may be accommodated away from their normal place of residence. At least 1 car parking space must be provided for each 2 persons able to be accommodated away from their normal place of residence.

Section 1 – Permit not required (continued)

USE	CONDITION
Carnival Circus	Must meet the requirements of A 'Good Neighbour' Code of Practice for a Circus or Carnival, October 1997.
Dependent person's unit	Must be the only dependent person's unit on the lot. Must meet the requirements of Clause 37.07-2.
Dwelling (other than Bed and breakfast)	Must be the only dwelling on the lot. The lot must be at least 40 hectares. Must meet the requirements of Clause 37.07-2.
Geothermal energy extraction	Must meet the requirements of Clause 52.08-4.
Home occupation Informal outdoor recreation Mineral exploration	
Mining	Must meet the requirements of Clause 52.08-2.
Minor utility installation Natural systems Railway Road	
Search for stone	Must not be costeaning or bulk sampling.
Telecommunications facility	Buildings and works must meet the requirements of Clause 52.19.
Tramway	

Section 2 – Permit required

USE	CONDITION
Animal boarding	
Animal keeping (other than Animal boarding)	Must be no more than 5 animals.
Car park	Must be used in conjunction with another use in Section 1 or 2.
Cemetery Community market Crematorium	
Dependent person's unit – if the Section 1 condition is not met	Must meet the requirements of Clause 37.07-2.
Display home	
Dwelling (other than Bed and breakfast) – if the Section 1 conditions are not met	Must be no more than two dwellings on the lot. Must meet the requirements of Clause 37.07-2.
Education centre Emergency services facility	

Section 2 – Permit required (continued)

USE	CONDITION
Freeway service centre	Must meet the requirements of Clause 52.30.
Freezing and cool storage	
Group accommodation	Must be used in conjunction with Agriculture, Outdoor recreation facility, Rural industry, or Winery. Must be no more than 6 dwellings.
Hospital Host farm Interpretation centre Leisure and recreation (other than Informal outdoor recreation and Motor racing track) Manufacturing sales Medical centre Mineral, stone, soil, or geothermal energy extraction (other than Mineral exploration, Geothermal energy extraction, Mining, and Search for stone) Nursing home	
Place of assembly (other than Carnival, Circus, and Place of worship)	Must not be used for more than 10 days in a calender year.
Place of worship Primary produce sales Real estate agency	
Residential hotel Restaurant	Must be used in conjunction with Agriculture, Outdoor recreation facility, Rural industry, or Winery.
Rice growing Rural industry Rural store	
Store (other than Freezing and cool storage and Rural store)	Must be in a building, not a dwelling, and used to store equipment, goods, or motor vehicles used in conjunction with the occupation of a resident of a dwelling on the lot.
Timber production	Must meet the requirements of Clause 52.18.
Utility installation (other than Minor utility installation and Telecommunications facility) Veterinary centre Wind energy facility Winery	

Section 3 - Prohibited

USE
Accommodation (other than Dependent person's unit, Dwelling, Group accommodation, Host farm, Nursing home, and Residential hotel)
Industry (other than Rural industry)
Intensive animal husbandry
Motor racing track
Office (other than Medical centre and Real estate agency)
Retail premises (other than Community market, Manufacturing sales, Primary produce sales and Restaurant)
Saleyard
Warehouse (other than Store)
Any other use not in Section 1 or 2

37.07-2 Use of land for a dwelling

10/06/2008
VC48

A lot used for a dwelling must meet the following requirements:

- Access to the dwelling must be provided via an all-weather road with dimensions adequate to accommodate emergency vehicles.
- The dwelling must be connected to a reticulated sewerage system or if not available, the waste water must be treated and retained on-site in accordance with the State Environment Protection Policy (Waters of Victoria) under the Environment Protection Act 1970.
- The dwelling must be connected to a reticulated potable water supply or have an alternative potable water supply with adequate storage for domestic use as well as for fire fighting purposes.
- The dwelling must be connected to a reticulated electricity supply or have an alternative energy source.

These requirements also apply to a dependent person's unit.

37.07-3 Subdivision of land

10/06/2008
VC48

A permit is required to subdivide land.

Each lot must be at least 40 hectares.

A permit may be granted to create smaller lots if any of the following apply:

- The subdivision is to create a lot for an existing dwelling. The subdivision must be a two lot subdivision. An agreement under section 173 of the Act must be entered into with the owner of each lot created which ensures that the land may not be further subdivided so as to create a smaller lot for an existing dwelling. The agreement must be registered on title.
- The subdivision is the re-subdivision of existing lots and the number of lots is not increased. An agreement under section 173 of the Act must be entered into with the owner of each lot created which ensures that the land may not be further subdivided so as to increase the number of lots. The agreement must be registered on title.
- The subdivision is by a public authority or utility service provider to create a lot for a utility installation.

37.07-4 Buildings and works

10/06/2008
VC48

A permit is required to construct or carry out any of the following:

- A building or works associated with a use in Section 2 of Clause 37.07-1. This does not apply to:
  - An alteration or extension to an existing dwelling provided the floor area of the alteration or extension is no more than 50 square metres.

- An alteration or extension to an existing building used for agriculture provided the floor area of the alteration or extension is no more than 100 square metres. The building must not be used to keep, board, breed or train animals.

- Earthworks which change the rate of flow or the discharge point of water across a property boundary.
- Earthworks which increase the discharge of saline water.
- A building which is within any of the following setbacks:
  - 100 metres from a Road Zone Category 1 or land in a Public Acquisition Overlay to be acquired for a road, Category 1.
  - 40 metres from a Road Zone Category 2 or land in a Public Acquisition Overlay to be acquired for a road, Category 2.
  - 20 metres from any other road.
  - 5 metres from any other boundary.
  - 100 metres from a dwelling not in the same ownership.
  - 100 metres from a waterway, wetlands or designated flood plain.

37.07-5 Referral of applications

10/06/2008
VC48

An application of the kind listed below must be referred in accordance with section 55 of the Act to the referral authority specified in Clause 66.03.

- An application to use or develop land for any of the following:
  - Display home
  - Education centre
  - Hospital
  - Medical centre
  - Nursing home
  - Place of worship
  - Real estate agency.
- An application to subdivide land to create a lot smaller than 40 hectares in area.

37.07-6 Environmental audit

10/06/2008
VC48

Before a nursing home, pre-school centre or primary school commences on potentially contaminated land, or before the construction or carrying out of buildings and works in association with a nursing home, pre-school centre or primary school commences on potentially contaminated land, either:

- A certificate of environmental audit must be issued for the land in accordance with Part IXD of the Environment Protection Act 1970, or
- An environmental auditor appointed under the Environment Protection Act 1970 must make a statement in accordance with Part IXD of that Act that the environmental conditions of the land are suitable for the sensitive use.

In this clause, "potentially contaminated land" means land used or known to have been used for industry, mining, or the storage of chemicals, gas, wastes or liquid fuel (if not ancillary to another use of the land).

37.07-7 Decision guidelines

10/06/2008
VC48

Before deciding on an application to use or subdivide land, construct a building or construct or carry out works, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- The effect on the future urban development and use of the land, and adjacent or nearby land, having regard to:
  - Any relevant Growth Area Framework Plan.
  - Any precinct structure plan being prepared for the area.

- Any comments or directions of the referral authority.

- Whether the proposal will prejudice the logical, efficient and orderly future urban development of the land, including the development of roads, public transport and other infrastructure.
- The capability of the land to accommodate the proposed use or development, including the disposal of effluent.
- How the use or development relates to sustainable land management.
- Whether the site is suitable for the use or development.
- The impact of the siting, design, height, bulk, colours and materials to be used on the natural environment, major roads, vistas and water features, future urban use of the land, and the measures to be undertaken to minimise any adverse impacts.
- The impact on the character and appearance of the area or features of architectural, historic or scientific significance or of natural scenic beauty or importance.
- The location and design of existing and proposed infrastructure including roads, public transport, walking and cycling networks, gas, water, drainage, telecommunications and sewerage facilities.
- Whether the use and development will require new or upgraded infrastructure, including traffic management measures.

37.07-8 Advertising signs

21/09/2009
VC60

Advertising sign requirements are at Clause 52.05. The zone is in Category 3.

Despite the provisions of Clause 52.05-9, a permit may be granted, for a period of not more than 5 years, to display an advertising sign that promotes the sale of land or dwellings.

PART B - PROVISIONS FOR LAND WHERE A PRECINCT STRUCTURE PLAN APPLIES

37.07-9 Use of land

10/06/2008
VC48

Any requirement in the Table of uses and any requirement specified in the schedule to this zone must be met.

Table of uses

Section 1 – Permit not required

USE	CONDITION
Any use in Section 1 of a zone applied by the schedule to this zone	Must comply with any condition opposite the use in Section 1 of the applied zone Must comply with any condition specified in the schedule to this zone
Any use specified in the schedule to this zone as a use for which a permit is not required	Must comply with any condition specified in the schedule to this zone

Section 2 – Permit required

USE	CONDITION
Any use in Section 2 of a zone applied by the schedule to this zone	Must comply with any condition opposite the use in Section 2 of the applied zone Must comply with any condition specified in the

USE	CONDITION
	schedule to this zone
Any use specified in the schedule to this zone as a use for which a permit is required	Must comply with any condition specified in the schedule to this zone
Any other use not in Section 1 or 3	

Section 3 - Prohibited

USE
Any use in Section 3 of a zone applied by the schedule to this zone
Any use specified in the schedule to this zone

37.07-10 Subdivision of land

10/06/2008
VC48

A permit is required to subdivide land. Any requirement in the schedule to this zone must be met.

A permit granted must:

- Be generally in accordance with the precinct structure plan applying to the land.
- Include any conditions or requirements specified in the schedule to this zone.

37.07-11 Buildings and works

10/06/2008
VC48

If the schedule to this zone specifies:

- That the provisions of a zone apply to the development of land, the provisions of the zone apply to land in the circumstances specified in the schedule.
- Provisions relating to the development of land, those provisions apply to land in the circumstances specified in the schedule.

If the schedule to this zone specifies that a permit is required to construct a building or construct or carry out works, a permit granted must:

- Be generally in accordance with the precinct structure plan applying to the land.
- Include any conditions or requirements specified in the schedule to this zone.

37.07-12 Application requirements

10/06/2008
VC48

An application to use or subdivide land, construct a building or construct or carry out works, must be accompanied by any information specified in the schedule to this zone.

37.07-13 Exemption from notice and review

10/06/2008
VC48

An application under clause 37.07-9 to 37.07-11 which is generally in accordance with the precinct structure plan applying to the land is exempt from the notice requirements of section 52(1)(a), (b) and (d), the decision requirements of section 64(1), (2) and (3) and the review rights of section 82(1) of the Act., unless the schedule to this zone specifies otherwise.

37.07-14 Decision guidelines

10/06/2008
VC48

Before deciding on an application to use or subdivide land, construct a building or construct or carry out works, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- Any relevant Growth Area Framework Plan.
- The precinct structure plan applying to the land, including the vision and objectives of the precinct structure plan.
- Any guidelines in the schedule to this zone.

37.07-15 Inconsistencies between specific and applied zone provisions

10/06/2008
VC48

If there is an inconsistency between the specific provisions specified in the schedule to this zone and the provisions of a zone applied by the schedule to this zone, the specific provisions prevail to the extent of any inconsistency.

37.07-16 Advertising signs

10/06/2008
VC48

Advertising sign requirements are at Clause 52.05. This zone is in the category specified in the schedule to this zone or, if no category is specified, Category 3.

Notes: *Refer to the* State Planning Policy Framework *and the* Local Planning Policy Framework, *including the* Municipal Strategic Statement, *for strategies and policies which may affect the use and development of land.*

Check whether an overlay also applies to the land.

Other requirements may also apply. These can be found at Particular Provisions.

APPENDIX 3 – GLOSSARY OF TECHNICAL TERMS

Aeolian	Wind generated geological processes. In an archaeological context it usually refers to wind blown deposits and sands.
Backed Artefact / Backing	A retouched tool (maybe a complete, distal, medial or proximal flake) that displays evidence of backing along one lateral margin. This backing may be initiated from the ventral surfaces or alternately may be an example of bidirectional backing initiated from both surfaces (Holdaway and Stern 2004:259). There are four main types of commonly recognised backed artefacts, which include 'Bondi Points; geometric microliths (or 'Backed Blades'), Juan Knives and Eloueras'.
Bipolar	A method of removing flakes from a core, by striking a core against an anvil (Holdaway and Stern 2004:11). This is often evidenced by crushing at the platform and/or at the termination of the flake; Bipolar flaking is also evidenced as crushing at the base (end opposite the platform) of a core.
Blade	A flake that is twice as long as its width.
Bulbar	Refers to a bulb of percussion produced during a conchoidal fracture
Chert	'a dense, extremely hard, microcrystalline or cryptocrystalline, siliceous sedimentary rock, consisting mainly of interlocking quartz crystals, sub-microscopic and sometimes containing opal (amorphous silica). It is typically white, black or grey, and has an even to flat fracture. Chert occurs mainly as nodular or concretionary aggregations in limestone and dolomite, and less frequently as layered deposits (banded chert). It may be an organic deposit (radiolarian chert), an inorganic precipitate (the primary deposit of colloidal silica), or a siliceous replacement of pre-existing rocks' (Lapidus 1990:102).

Conchoidal	Where a force strikes the surface of a core forming a circular or 'ring' crack that bends back towards the surface of the core, forming a partial bulb of percussion. The fracture frequently moves towards the exterior surface of the core, detaching a flake (Holdaway and Stern 2004:34).
Core	Andrefsky (1998:80-81) states a core can be understood as 'an objective piece that has had flakes removed from its surface'; Holdaway and Stern (2004:37; 5-8) provide further clarification 'artefacts that retain the negative flake scars of previous flake removals'.
Cortex	The outer layer of patination of rock is known as cortex. It is found on weathered stone (Holdaway & Stern 2004: 26-27). Cortex types (mostly rough, water worn or pebble) can indicate the source that stone material was obtained from.
Debitage	Small spalls and flakes produced during percussion, bipolar and pressure flaking.
Fine Grained Basalt	Basalt is a volcanic rock. See Volcanic below.
Flake	Depending on the completeness of the flake, a flake may have a number of common characteristics which may include: a platform, bulb of percussion, errailure (or bulbar) scar, point of force impact (PFI or umbo), dorsal ridge and ventral surface, fissures (or indentations), ripple marks (which radiate away from the point of force impact/umbo) and a termination. Not all of these features are typically found on every flake, however they are attributes likely to be present from conchoidal fracture.
egative Flake Scar	The negative indentation or scar left behind on a flake, core or tool when a flake is removed. The presence and abundance of negative flake scars can reveal information about the process of flaking. For example negative flake scars on a) cores can provide information on how intensely the core has been used, b) on the dorsal surface of a flake can indicate how intensely the core was flaked before this flakes was removed and/or that

	the core platform was cleaned off to start flaking again (platform rejuvenation), c) along the edge of a flake can indicate retouch/backing (Holdaway and Stern 2004:184).
Point	A term applied to certain formal types such as Bondi Points.
Platform	A striking platform or a platform is the surface from which a flake is struck from a Core (Holdaway and Stern 2004:5); flakes retain part of the platform on their proximal end.
Quartz	'crystalline silica, SiO2. It crystallizes in the trigonal system, commonly forming hexagonal prisms. For cryptocrystalline varieties of silica see Chalcedony. Colourless and transparent quartz, is found in good crystals, is known as rock crystal. Varieties that are colours due to the presence of impurities may be used as gemstones, amethyst, purple to blue-violet, rose quartz, pink; citrine, orange- brown; smoky quartz, pale yellow to deep brown' (Lapidus 1990:429).
Quartzite	'a metamorphic rock consisting primarily of quartz grains, formed by the recrystallization of sandstone by thermal or regional metamorphism; a metaquartzite and a sandstone composed of quartz grains cemented by silica; an orthoquartzite' (Lapidus 1990:430).
Retouch	Modification of a flake or core prior to use. Retouch is the 'removal of a series of small, contiguous flakes' from the edges of the artefact (Holdaway and Stern 2004:33). There are several different types of retouch which are identified as backing; stepped; scalar; invasive; notched and serrated retouch.
Reduction	By definition stone material is made smaller when it is struck to produce stone flakes and tools. This process is known as stone reduction. *'Modern stone artefact analyses use the reductive nature of stone artefact manufacture as the basis for reconstructing the*

	processes by which artefacts were made. By analysing the size and form of artefacts, archaeologists can obtain information about how stone was acquired from its source, the form in which the stone was transported to campsites, how it was worked, and the way stone artefacts were use until discarded' **(Holdaway and Stern 2004:3).**
Scarred Tree	**A tree that has been marked as a result of bark being removed by Aboriginal people for cultural reasons or for use in making shields, containers, canoes etc. Some trees may also have marks caused by making toe holds for climbing up trees.**
Scraper	**'A minimal definition of a scraper is that it is a flake with one or more margins of continuous retouch'. It also indicates the stage of reduction the flake has reached (see Holdaway and Stern 2004:227).**
Silcrete	**'a hard surface deposit composed of sand and gravel cemented by opal, chert and quartz, formed by chemical weathering and water evaporation in semi-arid climate. Extensive deposits of silcrete are found in S. Africa and Australia. Silcrete is a siliceous duricrust' (Lapidus 1990:472).**
Termination	**There are a number of different flake terminations (or ends of a flake) which are possible through flaking stone material. The main types of flake terminations include step, hinge, feather and plunging. Flake terminations can provide information about how the flake was removed.**
Tool	**A tool is an artefact which shows evidence of modification (i.e. by retouch) or without modification (i.e. show signs of usewear) (Holdaway and Stern 2004:33; 39).**
Tuff	**'pyroclastic rock composed mainly of volcanic ash (fragments <2mm in diameter). Tuffs may be classified as crystal tuff if they contain a large proportion of crystal fragments, vitric tuff composed mainly of glass and pumice fragments and lithic tuff, containing mainly rock fragments. A consolidated mixture of**

	lapilli and ash is a lapilli tuff' (Lapidus 1990:519-520).
Usewear	'Evidence of distinctive patterns of wear [which is] sometimes found on the edges of artefacts that were believed to have been used for specific purposes' (Holdaway and Stern 2004:41). Several types of usewear can be observed. Holdaway and Stern (2004:41; 167) identify 'chattering' and 'edge damage' as one form of usewear.
Volcanic	'All extrusive rocks and associated high-level intrusive ones. The group is entirely magmatic and dominantly basic. Igneous lithic material generally dark in colour and may be glassy (like obsidian) or very fine-grained or glassy igneous rock produced by volcanic action at or near the Earth's surface, either extruded as lava (e.g. basalt) or expelled explosively' (Lapidus 1990:535).

APPENDIX 4 - GAZETEER

Name	VAHR#	GDA 94	Artefacts
Wyndham Vale artefact scatter 1 (WVAS1)	7822-3448	E290214 N5808759	11 stone artefacts
Wyndham Vale scarred tree 1 (WVST1)	7822 - 3419	E290901 N5806967	1 x scarred tree
Wyndham Vale artefact scatter 2 (WVAS2)	7822-3418	E291449 N5806934	3 x stone artefacts
Wyndham Vale isolated artefact 1 (WVIA1)	7822-3417	E290892 N5805028	Isolated stone artefact

VAHR 7822-3484 LDAD Recording

Site type	Easting	Northing	Material	Contents
Isolated Artefact	291242	5806827	Quartz	Ang.Frag.
Isolated Artefact	290780	5804766	Quartz	Ang.Frag.
Isolated Artefact	290857	5804713	Quartz	Ang.Frag.
Isolated Artefact	289823	5806992	Quartz	Ang.Frag.
Isolated Artefact	289829	5806977	Quartz	Ang.Frag.
Isolated Artefact	289829	5806979	Quartz	Ang.Frag.
Isolated Artefact	289695	5806940	Quartz	Ang.Frag.
Isolated Artefact	289591	5806968	Quartz	Ang.Frag.
Isolated Artefact	289202	5806937	Quartz	Ang.Frag.
Isolated Artefact	291198	5806823	Quartz	Ang.Frag.
Isolated Artefact	291256	5806777	Quartz	Ang.Frag.
Isolated Artefact	291242	5806827	Quartz	Ang.Frag.
Isolated Artefact	290125	5806635	Quartzite	Ang.Frag.
Isolated Artefact	289677	5806936	Quartzite	Ang.Frag.
Isolated Artefact	290136	5805692	Trachyte	Ang.Frag.
Isolated Artefact	290541	5805786	Silcrete	Blade
Isolated Artefact	289567	5806999	Silcrete	Blade
Isolated Artefact	291172	5806576	Quartz	Core
Isolated Artefact	290119	5807691	Quartz	Core
Isolated Artefact	289724	5807006	Quartz	Core
Isolated Artefact	289414	5807047	Quartz	Core
Isolated Artefact	289566	5806967	Quartz	Core
Isolated Artefact	289783	5806947	Quartz	Core
Isolated Artefact	291175	5806761	Quartz	Core
Isolated Artefact	291250	5806842	Quartzite	Core
Isolated Artefact	291158	5806443	Quartzite	Core

Site type	Easting	Northing	Material	Contents
Isolated Artefact	290722	5805335	Quartzite	Core
Isolated Artefact	291213	5806864	Silcrete	Core
Isolated Artefact	290128	5805683	Silcrete	Core
Isolated Artefact	290135	5805582	Silcrete	Core
Isolated Artefact	291197	5806827	Silcrete	Core
Isolated Artefact	290729	5805358	Other	Flake
Isolated Artefact	291300	5806385	Quartz	Flake
Isolated Artefact	290658	5805718	Quartz	Flake
Isolated Artefact	290616	5805283	Quartz	Flake
Isolated Artefact	290655	5805171	Quartz	Flake
Isolated Artefact	289259	5807045	Quartz	Flake
Isolated Artefact	289628	5806940	Quartz	Flake
Isolated Artefact	291203	5806837	Quartz	Flake
Isolated Artefact	291204	5806838	Quartz	Flake
Isolated Artefact	291202	5806829	Quartz	Flake
Isolated Artefact	290119	5805691	Quartzite	Flake
Isolated Artefact	290171	5805627	Quartzite	Flake
Isolated Artefact	289805	5806991	Quartzite	Flake
Isolated Artefact	289568	5806393	Quartzite	Flake
Isolated Artefact	291250	5806842	Silcrete	Flake
Isolated Artefact	291224	5806735	Silcrete	Flake
Isolated Artefact	290357	5805611	Silcrete	Flake
Isolated Artefact	290046	5805674	Silcrete	Flake
Isolated Artefact	288742	5804094	Silcrete	Flake
Isolated Artefact	291200	5806825	Silcrete	Flake
Isolated Artefact	290357	5805611	Silcrete	Flake
Isolated Artefact	289792	5806997	Silcrete	Flake
Isolated Artefact	289737	5807001	Silcrete	Flake
Isolated Artefact	289641	5806178	Silcrete	Flake
Isolated Artefact	290747	5805356	Glass	Flake