

DRAFT Aboriginal Heritage Impact Assessment Berwick Health and Education Precinct Berwick, Victoria



Report Prepared for Metropolitan Planning Authority

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Executive Summary

This report presents the results of an Aboriginal heritage impact assessment of a proposed Health and Education Precinct situated at Berwick in Melbourne's southeast. The Metropolitan Planning Authority is currently preparing a Comprehensive Development Plan for this precinct and requires the impact assessment in order to enable them to plan the future urban structure of the precinct with greater certainty by identifying issues relating to Aboriginal heritage impacts early in the planning process.

The Comprehensive Development Plan is being prepared for an area bounded by the Princes Freeway to the south, and the Pakenham railway line and the existing Berwick town centre to the north. However, the study area for this assessment is limited to a section of the precinct owned by Monash University and located to the west of Clyde Road and the Chisholm TAFE land to the east of Clyde Road.

The report includes desktop assessment and field survey results, which have been prepared to a level compliant with the requirements for a standard assessment under the *Aboriginal Heritage Regulations* 2007. The desktop assessment concluded that it is reasonably possible that Aboriginal archaeological sites could be located within the study area and buried stone artefact scatters containing quartz, silcrete and quartzite artefacts are the most likely site type to be found. Although sites have been found in low-lying and elevated ground within the study area, larger and higher density-sites would be expected on elevated ground above the lower lying former swamp land. However, in the areas subject to previous substantial disturbance, sites are very likely to have been disturbed, dispersed or destroyed. In areas which have not been as substantially disturbed, buried low density artefact scatters of a similar nature to those already known to occur within the study area could be expected. Due to the apparent absence of native vegetation it is not expected that any culturally scarred trees would remain.

The field survey of the study area was undertaken by Bianca Di Fazio (Heritage Insight Pty Ltd), with Leigh Fletcher (BLSA) and Jacqui Wandin (WTLCCHC) on March 31, 2015, and no Aboriginal cultural heritage or historic sites were identified. The Boon Wurrung Foundation did not provide a representative on the day of the survey. The survey confirmed that the study area is substantially modified, and no specific landforms or areas were identified as being sensitive for Aboriginal cultural heritage. The survey was hampered by poor ground surface visibility so definitive interpretations about the presence or absence of Aboriginal heritage, even in surface contexts, is not possible.

Nevertheless, it can be concluded from the combination of desktop and field survey results that the entirety of the study area is of low sensitivity for Aboriginal cultural heritage (Map 8). The previous archaeological assessments within the study area have involved standard and complex assessment incorporating over 500m² of excavator transects, seven 1m² test pits and twenty-eight 50x50cm shovel probes and thirty-two 40cm x 40cm shovel probes. These investigations have intensively assessed a substantial portion of the western part of the activity area (on the west side of Clyde Road). These investigations resulted in the recovery of 17 artefacts which make up the three registered sites within the activity area (VAHR 7921-0682, VAHR 7921-0683 and VAHR 7921-1293). This is a very low density of cultural heritage material given the intensity and extent of the investigations. The current field survey has confirmed that the parts of the study area that have not been previously assessed in detail are located on the same landforms as those that have, and as such are likely to be of similarly low sensitivity. The survey has also confirmed that the study area has been subject to a range of disturbances. Despite the presence of the three previously recorded sites (VAHR 7921-0682, VAHR 7921-0683 and VAHR 7921-1293), the areas at and surrounding these are not considered to be more sensitive than other parts of the study area, as the immediately surrounding areas were assessed during the investigations that originally located the

sites (and also in subsequent investigations) and the extents of the sites were defined on the basis of these investigations.

Management of Aboriginal Cultural Heritage within the Berwick HEP

Cultural Heritage Management Plans

Under the *Aboriginal Heritage Act* 2006 and *Aboriginal Heritage Regulations* 2007, a Cultural Heritage Management Plan (CHMP) is a mandatory requirement for a proposed activity if:

- All or part of the activity area is an area of cultural heritage sensitivity (*Aboriginal Heritage Regulations* 2007, Division 1, 6(a)); and
- The proposed activity is a high impact activity (*Aboriginal Heritage Regulations* 2007, Division 1, 6(b)).

The Berwick HEP area contains large areas defined as areas of cultural heritage sensitivity under the *Regulations* (see Map 9). As a result, if any high impact activities are proposed within the Berwick HEP, a Cultural Heritage Management plan **must** be prepared. A list of High Impact Activities as defined in the *Aboriginal Heritage Regulations* 2007 is attached as Appendix A

However, given the high level of disturbance across the Berwick HEP and the extensive level of previous archaeological assessment including sub-surface testing, there is a possibility that depending on the location and nature of any specific activity there could be an exemption from CHMP made on the basis of significant ground disturbance as defined in the *Aboriginal Heritage Regulations* 2007, or that a CHMP could be completed at only desktop or standard assessment stage. However, this would need to be assessed at the time of the proposed activity, with reference to the nature of that activity.

Site Specific Recommendations

VAHR 7921-0683

In CHMP 10755 Stone and Defteros (2009: 37) made a recommendation for the protection of VAHR 7921-0683. The recommendation related to the site protection was:

An area 50 m long and 30 m wide should be set aside to preserve a representative sample of the raised landform containing 7921-0683 (VAHR). Figure 3 shows the proposed exclusion zone, which is located north of the proposed car park and includes the GPS centrepoint of the Aboriginal site (Figure 3).

As the area in the vicinity of VAHR 7921-0683 is currently undeveloped, the recommendation made by Stone and Defteros in CHMP 10755 should stand, and no works associated with the Berwick HEP should be conducted within the exclusion zone proposed by Stone and Defteros. A map of this exclusion zone, taken directly from CHMP 10755 is included as Appendix B.

VAHR 7921-0682

In CHMP 10755 Stone and Defteros (2009 35 - 37) stated that care should be taken to ensure that VAHR 7921-0682 would not be inadvertently harmed by activities proposed in that CHMP, and recommended

fencing a small area around the site during the proposed works. However, they also noted that none of the activities proposed in CHMP 10755 would directly impact on the site. Should this change under future development proposals for the Berwick HEP, any impacts to VAHR 7921-0682 should be dealt with by preparation of a Cultural Heritage Management Plan.

VAHR 7921-1293

The material remains (artefacts) from VAHR 7921-1293 were effectively salvaged during the preparation of CHMP 11530 (Chandler and Muhlen-Schulte 2011). Nevertheless, the site is an Aboriginal cultural heritage place, and as such the location remains an area of cultural heritage sensitivity and would therefore require a Cultural Heritage Management Plan in the event of any proposed impacts associated with the Berwick HEP in future.

It should also be noted that the artefacts recovered from VAHR 7921-1293 are currently stored at the offices of the cultural heritage advisor who prepared the plan. Under the compliance requirements outlined in CHMP 11530, there is provision for these artefacts to be repatriated. Although not clearly stated in the CHMP, it may be that the artefacts from VAHR 7921-1293 will be repatriated to a location within the Berwick HEP area in future.

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1.0 Introduction

This report presents the results of an Aboriginal heritage impact assessment of a proposed Health and Education Precinct situated at Berwick in Melbourne's southeast. The Metropolitan Planning Authority is currently preparing a Comprehensive Development Plan for this precinct and requires the impact assessment in order to enable them to plan the future urban structure of the precinct with greater certainty by identifying issues relating to Aboriginal heritage impacts early in the planning process.

The Comprehensive Development Plan is being prepared for an area bounded by the Princes Freeway to the south, and the Pakenham railway line and the existing Berwick town centre to the north. However, the study area for this assessment is limited to a section of the precinct owned by Monash University and located to the west of Clyde Road and the Chisholm TAFE land to the east of Clyde Road. The location of the study area is shown in Map 1.

The project brief outlined the following tasks to be undertaken:

- Identify the location of known Aboriginal Sites within the study area, including any environmental features such as waterways or landforms, which may have influenced past Aboriginal settlement, historical or cultural knowledge of Aboriginal places and information about the nature and types of archaeological sites likely to be present on different landforms. Areas or landforms which are likely to be of very high significance are to be identified and plotted on a map of the precinct;
- Review of any previous Aboriginal heritage assessments which are relevant to the study area, including by the City of Casey and private developers/ landowners;
- Undertake a field assessment (surface survey) of the precinct with local Aboriginal stakeholder/s as recommended by the Office of Aboriginal Affairs (OAAV) to determine the known and anticipated locations of Aboriginal features, sites and places and the nature and extent of their significance. Where found they should be identified, recorded and assessed to determine the category of value and significance using digital photography, differential GPS and GIS mapping to define the nature, significance and extent of the cultural heritage (including the production of site cards for OAAV);
- Collect and review oral history and Aboriginal cultural values relating to the precinct;
- Using the data and information gathered through the tasks specified above; produce an Aboriginal Heritage site prediction model for the precinct that identifies the location of known Aboriginal sites, environmental features which may have influenced past Aboriginal settlement, historical or cultural knowledge of Aboriginal places, and information about the nature and types of archaeological sites likely to be present on different landforms. Areas or landforms which are likely to be of very high significance are to be identified and plotted on a map of the precinct;
- Consult with relevant Aboriginal stakeholders and agencies to discuss the results of the assessment, field work and management options for Aboriginal cultural heritage within the precinct;
- Prepare a concise map(s) showing the surface survey areas and any Aboriginal places established in the survey areas, including estimates of effective survey coverage;
- Detail the exact methodology by which the Aboriginal cultural heritage presence in the precinct was assessed including details of field work (survey strategies and techniques) used to assess the precinct;

- Based on the results identified through the completion of the above tasks, develop detailed recommendations for actions to be taken in relation to Aboriginal cultural heritage within the precinct.

Section 2.0 of this report discusses consultation, while Section 3.0 discusses the environmental context of the study area, which is important in helping to assess past Aboriginal land use. Section 4.0 discusses ethnography and previous archaeological research in the region, while Section 5.0 briefly assesses historic land-use. In Section 6.0 both the environmental context and previous archaeological research are reviewed and the implications for the study area are discussed in terms of areas or landforms that may have high potential to contain Aboriginal archaeological sites within the study area. Section 7.0 outlines the methods and results of field survey; Section 8.0 outlines an Aboriginal heritage site prediction plan for the study area and provides a rationale for this; while Section 9.0 provides recommendations for future management of cultural heritage in the Berwick HEP.



Map 1: Location of the study area.



Map 2: Current conditions within the Study Area

2.0 Aboriginal Community Consultation

The study area does not fall within an area administered by a Registered Aboriginal Party under the *Aboriginal Heritage Act 2006*. However, the Boon Wurrung Foundation Ltd (BWFL), the Bunurong Land and Sea Association (BLSA) and the Wurundjeri Tribe Land and Compensation Cultural Heritage Council (WTLCCHC) are all currently applicants for Registered Aboriginal Party (RAP) status, and all are Traditional Owner groups with an interest in the cultural heritage of the Berwick area. Please note that the Boon Wurrung Foundation did not provide a representative at the time of the survey.

No formal response to consultation was received from these organisations beyond the provision of field representatives from the BLSA and the WTLCCHC, however discussion was undertaken in relation to the site with these representatives in the field. Both Mr Leigh Fletcher (BLSA) and Ms Jacqui Wandin (WTLCCHC) have considerable experience in the survey and assessment of landscapes and the cultural heritage significance of Aboriginal Places.

Neither Mr Fletcher nor Ms Wandin felt that the land associated with the Berwick HEP held any particular levels of significance and acknowledged that the small numbers of artefacts recovered from the extensive testing undertaken by previous studies in the area indicated that the landscape was not highly sensitive for cultural material.

3.0 Environmental Context

This section provides an overview of the environmental conditions prevalent in the study area. This is used to both describe the study area generally in terms of geology and landforms, and to provide some background with regard to environmental conditions prevalent in the past.

3.1 Landforms Geology and Soils

The study area is located within the East Victorian Dissected Uplands, which covers a large portion of Victoria, stretching east and northeast from Melbourne to the NSW border. The landform includes the Victorian Alps and primarily consists of sedimentary rocks such as sandstones and mudstones. Specific land system data related to the landform and soils within the study area can be found in Table 2.

Table 1: Summary of land system data encompassing the Activity Area

Land System Code - Land Systems of Victoria at 1: 250,000	Land System Summary Description	
1.1HsP8-1	Geomorphic Unit:	East Victorian Dissected Uplands
	Landform:	Hill (relative relief 90-300m)
	Lithology:	Sedimentary rocks i.e. sandstone, mudstone
	Soils:	Red earths. Low compaction. pH <5.5
	Pre-1750 EVCs:	EVC 688 Swampy Riparian Woodland/Swamp Scrub Mosaic; EVC 897 Plains Grassland/Plains Grassy Woodland Mosaic
	Climate (Temperate):	Mean maximum temperature 25.7°C (February) Mean minimum temperature 6.2°C (July) Mean annual temperature 14.5°C Mean annual rainfall 822.1mm Highest mean rainfall 86.1mm (September) Lowest mean rainfall 42.7mm (March) (Bureau of Meteorology 2015)
	Nearest Fresh Water Source:	Cardinia Creek

The study area is situated on four distinct geological units (Map 3). The first of these, the Murrundindi Supergroup is found along the southern half of the study area. This unit consists of Silurian and Devonian aged (443–358 million years ago) sedimentary marine mudstone and sandstone.

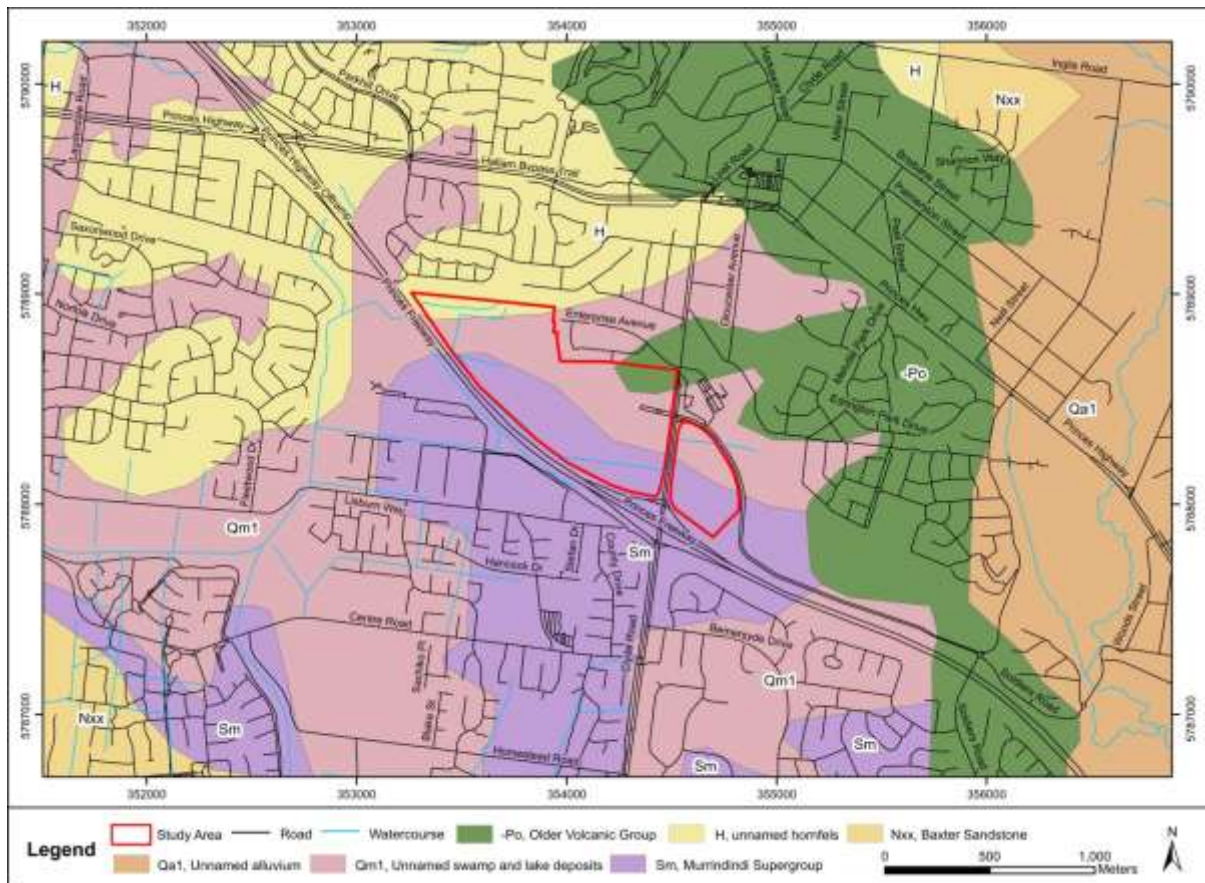
In the northwest corner of the study area a unit known as Unnamed Hornfels is present. As the name implies, this unit comprises Devonian aged (419–358 million years ago) hornfels, a generally fine-grained and exceptionally tough metamorphic rock.

Between these two units, through the centre and north half of the study area, is a unit known as Unnamed Swamp and Lake deposits. These are paludal lagoon and swamp deposits of silt and clay dating to the Quaternary (2.58 million years ago to the present).

In the north western part of the study area is a small area of a fourth geological unit referred to as the Older Volcanic Group. This contains Oligocene and Eocene (56–23 million years ago) aged extrusive tholeiitic and minor alkaline basalts.

Soils within the majority of the activity area have been described as comprising Hallam Loam (which coincides with the silurian geology) and the Narre Clay Loam (which coincides with the swamp deposits) (see Bell 2005; Stone and Defteros 2009). The Hallam Loam profile consists of surface grey or light grey loam to silty loam about 150mm deep. This overlies a brownish grey similarly textured subsoil often with iron concretions just above the subsoil clay which is brownish grey and yellow-brown medium to heavy clay, which occurs at about 400–500mm (Victorian Resources Online – ‘Hallam Loam’ accessed February 20, 2015). The Narre Clay Loam comprises brownish grey to dark greyish brown clay loams to 250mm, overlying brownish grey to greyish brown mottled sandy clay loams to light clays. Mottled grey and brown medium to heavy clays occur from about 400mm (Victorian Resources Online – ‘Narre Clay Loam’ accessed February 20, 2015). The Narre Clay is similar to the Narre Clay Loam but has a clay, rather than a clay loam surface soil.

Despite these different soil types within the study area, archaeological investigations (see below) have generally identified uniform soils with little variation between landforms, at least across the western part of the study area.



Map 3: Geology within the Study Area

3.3 Pre-contact Vegetation and Fauna

The study area falls within the Gippsland Plain bioregion (Victorian Resources Online - Bioregions of Victoria, Accessed February 16, 2015). The pre-1750 Ecological Vegetation Community (EVCs) present within the study area have been identified as EVC 688 (Swampy Riparian Woodland/Swamp Scrub Mosaic), which coincides with the swamp and lake geology discussed above, and EVC 897 (Plains Grassland/Plains Grassy Woodland Mosaic), in all other areas (Map 4) (Department of Primary Industries - Biodiversity Interactive Map, Accessed February 16, 2015).

As EVC 688 is a mosaic, there is no specific Bioregion Benchmark for Vegetation Quality Assessment description for it. However, the benchmark descriptions for its constituent EVCs are:

EVC 83 Swampy Riparian Woodland: Woodland to 15m tall generally occupying low energy streams of the foothills and plains. The lower strata are variously locally dominated by a range of large and medium shrub species on the stream levees in combination with large tussock grasses and sedges in the ground layer (Department of Sustainability and Environment - EVC Benchmarks, Accessed February 18, 2015).

EVC 53 Swamp Scrub: Closed scrub to 8m tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The EVC is dominated by Swamp Paperbark *Melaleuca ericifolia* (or sometimes Woolly Tea-tree *Leptospermum lanigerum*) which often forms a dense thicket, out-competing other species. Occasional emergent eucalypts may be present. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer (Department of Sustainability and Environment - EVC Benchmarks, Accessed February 18, 2015).

Similarly, EVC 897 is also a mosaic of two EVCs, described as:

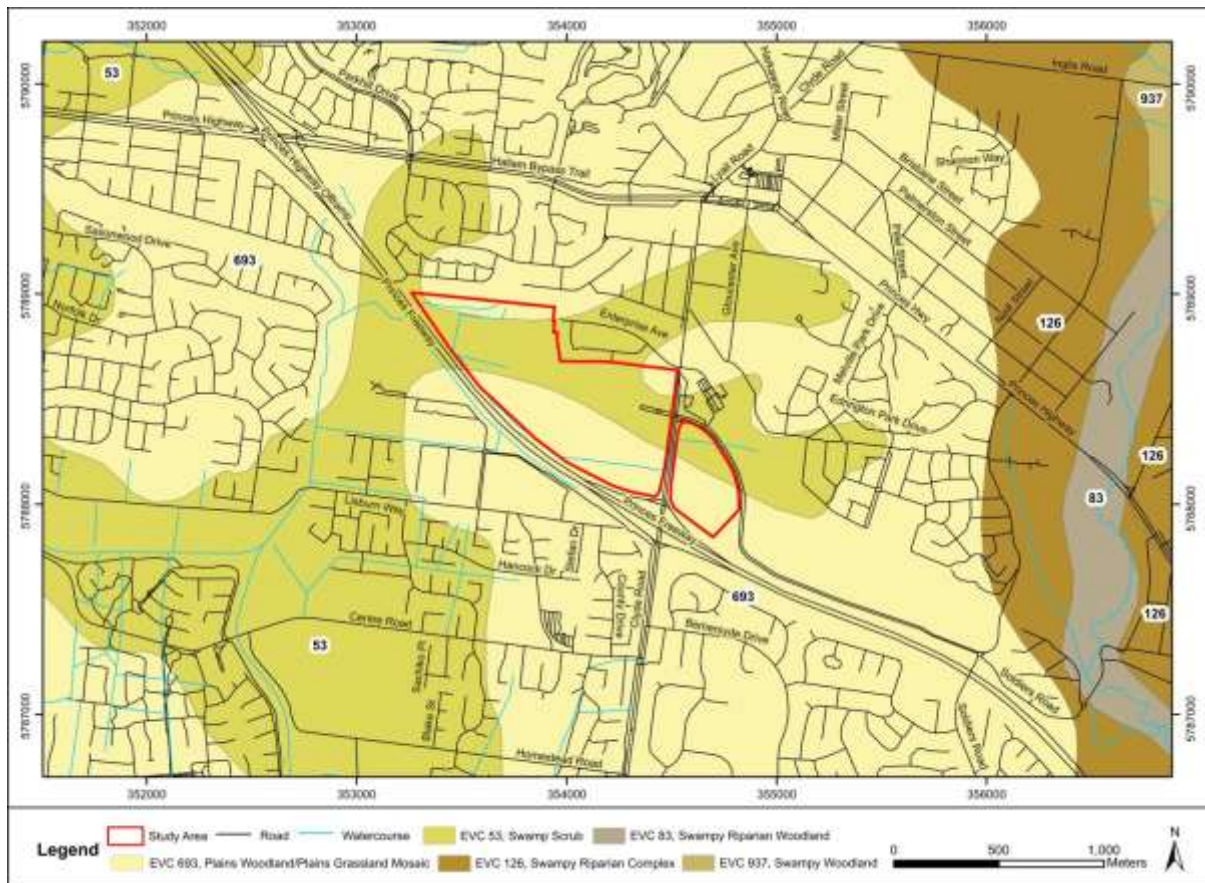
EVC 55 Plains Grassy woodland: An open, eucalypt woodland to 15m tall occurring on a number of geologies and soil types. Occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer (Department of Sustainability and Environment - EVC Benchmarks, Accessed February 18, 2015).

EVC 132_61 LaTrobe Valley Plains Grassland : Treeless vegetation dominated by largely grass and herb life forms. Shrubs and trees may be also occasionally present (Department of Sustainability and Environment - EVC Benchmarks, Accessed February 18, 2015).

Common species found in EVC 688 are *Acacia melanoxylon* (Blackwood), *Melaleuca ericifolia* (Swamp Paperbark), and *Leptospermum lanigerum* (Woolly Tea Tree), and a variety of sedges, reeds, and grasses including *Juncus procerus* (Tall Rush), and *Phragmites australis* (Common Reed). Common species found in

EVC 897 include *Allocasuarina littoralis* (Black Sheoak), *Themeda triandra* (Kangaroo Grass), and *Schoenus apogon* (Common Bog Sedge).

Plants were extensively exploited by Aboriginal people for food, medicine and fibres for weaving. Plant components utilised would have included berries, fungi, roots, tubers, bulbs, leaves, pith from fleshy plants, seeds and sap. Gum was also collected from wattle and stored in known locations for seasons when food was less abundant (Zola & Gott 1992).



Map 4: 1750s Ecological Vegetation Classes for the Study Area

Information on Fauna of the Activity Area

A number of animals would have been present within the Activity Area and the wider region and are likely to have been hunted by Aboriginal people. It is unlikely that there were any specific fauna used by Aboriginal people in the past concentrated within the Activity Area itself that were not equally as abundant within the surrounding areas.

Water Resources

Cardinia Creek lies approximately 1.5km east of the study area. In the past Cardinia Creek was one of four major watercourses east of Berwick that drained into the Koo Wee Rup Swamp. Two of the four watercourses, Cardinia Creek and Bunyip River, would have provided easy water access between the coast and inland regions via Koo Wee Rup Swamp (Smith 1991, p.5). Cardinia Creek is also thought to have

been one of a number of set travel routes for *Bunurong* people (Gaughwin & Sullivan 1984, p.92). There are also artificial and modified drainage lines within the study area which drain to the west into the Berwick Town Drain and then eventually into Port Phillip via the Hallam Main Drain and Eummemmering Creek.

Stone Resources

A variety of stone resources utilised for artefact manufacturing were available in the broader region containing the Activity Area. Basalt was present as surface exposures in the Berwick and Cranbourne regions as well as small deposits located in the hills above Pakenham, Nar Nar Goon and Garfield (Smith 1991, p.9). Quartz, granite, siltstone and mudstone are also available in the hill regions north of Berwick and Pakenham. The nearest silcrete and chert stone sources are located further south on the Mornington Peninsula (Smith 1991, p.9). Hornfels is also likely to have been available in the Berwick region.

4.0 Aboriginal History

This section of the report discusses historical evidence for Aboriginal people within the study area. It is included to discuss observations of Aboriginal culture at the time of early European settlement, which are useful to the development of a predictive model for Aboriginal site location. However, the accuracy of the written historical record is limited and generalised and in this case it should be used with caution. This section also provides a detailed review of select archaeological assessments that have been conducted within and around the study area, and a review of all of the registered Aboriginal heritage places within the study area and within a 2km radius of the study area. This information was obtained from the Victorian Aboriginal Heritage Register (VAHR), accessed through Aboriginal Cultural Heritage Register and Information Services (ACHRIS).

4.1 Historical and Ethno-historical accounts

Prior to European occupation, the central portion of what is now known as the state of Victoria was occupied by Aboriginal people who shared a common language and political, social, religious and economic affiliations. They identified themselves as *Kulin*, the label meaning ‘man’ in the dialect spoken in the Melbourne region (Blake 1991, p.31). The area of land occupied by the *Kulin* people extended as far north as present day Echuca, west as the Richardson River, Mt Avoca, Fiery Creek and Mt Emu Creek, south to the Victorian coastline and east to the Tarwin River and Wilsons Promontory (Blake 1991, p.30; Clark 1990).

Within the *Kulin*, a number of different but related dialects or *wurrung* (meaning lips, speech, mouth) were spoken. Generally speaking, different dialect groups among the *Kulin* were delineated by association with a specific area of country. Thus *Taungurong* was a *Kulin* dialect spoken north of the Great Dividing Range and west to the Campaspe River (Blake 1991, p.31). *Woinworung* was one of the *Kulin* dialects spoken in the Melbourne region, within the area drained by the Yarra River and its tributaries (Blake 1991, p.45). *Bunurong* was a dialect spoken along the coast from the Werribee River to Wilsons Promontory and in the country that took in rivers to the east of Melbourne, which drained from the highlands to the coast (Blake 1991, p.47).

Amongst the *Kulin*, political, social and economic relationships were shaped by affiliation with the main unit of social organisation (the clan) and affiliation with one of two groups linked with creation ancestors. A clan was usually formed from a number of related families (a lineal descent group), which claimed guardianship over a particular tract of land (Howitt 1904, p.41; Cotter 2001). *Kulin* clans supposedly traced descent through the male line (patrilineal descent), although this is disputed by some contemporary descendants of traditional owners.

The Activity Area lies within land which was occupied by clans speaking the *Bunurong* dialect of the *Kulin* language.

The *Kulin* were also divided into two groups (described as moieties¹ by western anthropologists) linked with creation ancestors. These groups were *Waa* (crow or Australian Raven) and *Bunjil* (Wedge-tailed Eagle) (Barwick 1984, p.105). Affiliation of an individual with either *Waa* or *Bunjil* was determined at birth by the group/moiety affiliation of the father and the father’s clan (Barwick 1984, p.105; Clark 1990).

¹ In anthropological terms, a ‘moiety’ is defined as one of two (or in some Australian Aboriginal societies more than two) unilateral descent groups into which a tribe or other large social group is divided

In traditional *Kulin* law, moiety and clan affiliation determined marriage. Individuals were required to marry outside their clan and to a person belonging to the opposite moiety. Thus an individual who belonged to the *Waa* descent group could only marry a person from another clan and from the *Bunjil* descent group. Marriages were often arranged at large ceremonies involving clans from a number of different geographical locations.

Marriage had an extremely important influence on social and economic relationships, and individuals could acquire considerable status and economic power through marriage ties, particularly by men who could afford to support more than one wife. Access to the land and resources of another clan was most often gained by a kin relationship formed by marriage (Barwick 1984, p.106), although geographical proximity of birth or descent could also form grounds for access. Marriage also imposed a mutual obligation of each clan to provide access to some or all of the resources of another, so that reciprocal sharing of resources was fundamental to land management (Barwick 1984, p.106).

Bunurong/Bun wurrung Clans

William Thomas stated that the *Bunurong* claimed “all the country south of the Yarra River, whose creeks and inlets fall into the sea from the Werribee River west to the Tarwin River, east of Cape Patterson” (Thomas papers Vol.7 17/1/1860 in Clark 1990, p.363). This would include the catchments of Cardinia Creek, Toomuc Creek and the Bunyip River (including the Tarago River).

The description given by *Bunurong* clans of the area covered by their own country, which was transcribed in a discussion between *Bunurong* descendants Nana Ida West, Auntie Lennah Newson, Sheldon Thomas and Sonia Murray, (reproduced in Murphy 2002, p.28), reveals that:

All the rivers, creeks and small streams that run into the two bays or Bass Strait east of the Werribee River are Bunurong land and waters...These rivers and mountains are living spiritual beings, they interact with all that is around them. There is no line separating the rivers from the mountains and living things move between them both without fighting. That is how my old people lived!

The *Bunurong* language group were comprised of six clans who occupied the coastal tract stretching east from the Werribee River and encompassing the Port Phillip and Western Port Bays and ceasing at the Tarwin River watershed (Howitt 1904, p.71; Clark 1990, p.366). It is also possible that the land around the study area was shared country with the neighbouring *Woiworing* (now known as the Wurundjeri), similar to that described by Barak as ‘half bad country’ (Barwick, 1984: 119).

Historical references to movement of *Bunurong* people through the area note that there were several set routes of movement, one of which was Cardinia Creek to the west (Smith 1991, p.14). Anecdotal local history reproduced by Roberts (1985, p.6) suggests that Aboriginal people moved down from the hills (to the north of Pakenham) during summer months, probably following paths along waterways such as Cardinia Creek and Toomuc Creek, finally entering Koo Wee Rup Swamp during the driest season to hunt eels and blackfish. Parts of the swamp were also burnt during the summer months to aid in hunting animals such as possums, wombats and wallabies (Roberts 1985, p.6). When the swamp was drained during the nineteenth and twentieth centuries, dense layers of burnt ti-tree were found in the upper layers of the swamp, testifying to this activity (Roberts 1985, p.6).

4.2 Previous Aboriginal Archaeological Assessments

Numerous archaeological assessments have been conducted in the Berwick region in the vicinity of the study area, including four field assessments that have included parts of the study area itself, and two

immediately bordering it. Regional assessments and the most relevant localised assessments are reviewed below.

Regional Assessments

Smith (1991) undertook an archaeological assessment of the Berwick-Pakenham corridor, which extends on either side of the Princes Highway between Dandenong and Bunyip, including Berwick. The corridor consisted of four landscape units: undulating hills, lowland plains, floodplains and Cranbourne Sands. She investigated eighteen areas within the growth corridor, comprising a total area of approximately 695ha.

Smith stated that most of the stone used for the manufacture of tools, appeared to have been imported from either the Mornington Peninsula, or geological formations such as the Haunted Hills gravels (north of the Princes Highway). In general, Smith found that the 'undulating hills' and 'lowland plains' contained relatively high proportions of stone artefact occurrences (scatters and isolated finds) with limited numbers of scarred trees. Stone artefact occurrences were located in the range of landforms present, except in floodplains located in the 'lowland plains' and 'floodplain' landscape units. Scarred trees were located on creek banks and floodplains.

The 'floodplains' landscape unit contained a high proportion of scarred trees and limited stone artefact occurrences, while the Cranbourne Sands did not contain any scarred trees, and small amounts of stone artefact occurrences. However, an analysis of site density determined that the Cranbourne Sands had the highest density of stone artefact occurrences with 833 sites calculated to occur per km², with significantly lower densities (25-143 sites per km²) calculated for the remaining landscape units. Scarred tree densities varied between zero for the Cranbourne Sands to 50 sites per km² for the floodplains landscape unit.

In general Smith stated that "the location of sites and site densities in the corridor appear to reflect the distribution and abundance of water and food resources, and, in the case of scarred tree sites, the distribution of material sources". Smith suggested that on the hills landform, most sites will be located within 50m of permanent creek lines, although isolated artefacts will also be found on hill slopes and hill tops. Site types were most likely to be surface artefact scatters and isolated artefacts, but could also include scarred trees. On the floodplains or 'lowland plains' – where the current study area is located – Smith suggested that archaeological sites would occur within 60m of creek lines and other water sources, especially Toomuc and Ararat Creeks. She also suggested that a high number of sites were likely to occur along Cardinia Creek, but that the majority of these will occur within 50m-150m from the existing creek channel. She suggested that site types on the floodplain were most likely to be surface artefact scatters and would most likely be dominated by quartz, chert or silcrete raw materials. As with the hills landform, Smith did not anticipate that scarred trees were likely to occur more than 50m from creek lines.

The general conclusions made by Smith for the Berwick-Pakenham Corridor were that, due to then poor surface visibility, it was considered that many more sites than those recorded by the site survey would occur. Furthermore, due to the degree of disturbance to the landscape within much of the corridor it was predicted that most of these sites would be disturbed to some extent.

Rhodes and Bell (2004) presented the results of an Aboriginal heritage study for the Urban Growth Corridor in the Shire of Cardinia. The corridor stretches between the east bank of Cardinia Creek in the west and Mt Ararat in the east. The purpose of the study was to develop a predictive model for Aboriginal site location within the study area that could be used to develop planning policy for determining Aboriginal cultural heritage requirements for planning applications within the Urban Growth Corridor.

In formulating the site prediction model Rhodes and Bell relied on soil mapping. However, owing to the limitations of soil mapping it was not possible to map different areas of potential archaeological sensitivity for the whole of the study corridor, but only for the area between Cardinia and Toomuc Creek.

Rhodes and Bell suggested that on deep alluvial sandy soils, Aboriginal archaeological sites are likely to be found on the surface, but may also occur at some considerable depth. On heavy clay soils, Aboriginal archaeological sites are more likely to be located close to the surface (300mm depth). No specific distance from major watercourses was identified at which sub-surface Aboriginal archaeological sites may be found. Aboriginal archaeological sites on both landforms have been found at distances greater than 1.5km from existing watercourses. A total of fifteen Aboriginal archaeological sites were recorded within the study area. Twelve of the Aboriginal archaeological sites located were situated on the floodplain, two in the hills formed on Silurian bedrock and one on a hill formed on granite at Greenhills.

The survey confirmed most of the site prediction model statements. Sites were recorded in shallow deposits in the hills while on the floodplain sites were identified in deeper alluvial deposits. Most of the raw materials for tool manufacture were imported and there were very few formal tools in the assemblage.

Localised Assessments within the Study Area

In 2003 Bell completed a desktop archaeological assessment of the Monash University Berwick Campus – almost all of the current study area west of Clyde Road. Bell concluded that the most likely areas for Aboriginal cultural heritage to be located on the property were on higher ground in the northern portion of the study area, and in areas surrounding a pocket of Narre Clay in the central portion of the study area as this clay indicates the presence of a former swamp or stream bed. Bell also noted that due to the clay soils within the study area, the potential for Aboriginal skeletal remains to be found in the study areas was low.

In 2005 Bell completed an archaeological survey and sub-surface testing program that followed on from the recommendations of her 2003 desktop report and covered the same land within the current study area west of Clyde Road. This program included excavation of seven long machine transects, totalling in excess of 500m, with a 900mm excavator bucket. Excavation was conducted on both the low lying plain in the south, east and west of the property, and on the flanks of a rise in the north-centre of the property. Despite testing on two separate landforms the test excavations revealed a fairly consistent soil profile of mid-brown loam over light grey silt over brown or orange clay which was located at depths between 400mm and 600mm. However, Bell argued that the surface loam layers (to depths of 200–350mm) were a disturbed unit, while one transect was devoid of the underlying grey silt. Bell pointed out that her transects 1–3 were located in areas which had been impacted by the adjacent development, transects 4, 5 and 7 were on the location of former airfield runways, while transect 6 was located in an area which had formerly been a market garden. The testing resulted in the location of two Aboriginal sites (VAHR 7921-0682 and 7921-0683). VAHR 7921-0682, located on the low-lying plain in the southern part of the property, contained two quartz artefacts found at depths of approximately 300mm, while 7921-0683 was found on the rise in the north centre of the property and contained eleven artefacts (quartz, quartzite and silcrete) found at depths between 100mm and 400mm. Bell concluded that the study area had seen some disturbance resulting from previous land use, but that the Aboriginal archaeological material would not be limited to the two site locations identified during her assessment. She argued that Aboriginal cultural material was likely to be found in both the low-lying plain and on the rise, but that artefact density was likely to be higher on the rise than on the plain. Overall, however, Bell suggested that artefact density would be relatively low.

Stone (2008) completed a CHMP for a parcel of land, entirely within current study area on the west side of Clyde Road for a proposed Select Entry School. The assessment included desktop and standard and complex assessments. At the conclusion of the standard assessment, Stone argued that the activity area did not contain any landforms that were likely to contain Aboriginal cultural heritage. Although the land was within the area assessed by Bell in 2003 and 2005, Stone suggested that the types of landforms demonstrated to contain Aboriginal heritage sites in the region (ridgelines, spurs and gentle slopes overlooking creeks and swamps) were not present within the activity area. By contrast the activity area was largely former swampland and the only landforms suitable for Aboriginal occupation had already been developed. Furthermore Stone noted that Bell's original interpretation that VAHR 7921-0682 was located on the low lying plain was incorrect, and that the site was in fact located on a slight rise above the former swampland. Stone concluded that although Aboriginal sites were found on raised landforms either side of the swampland in the immediate area, these landforms were all outside the activity area and would not be impacted. Stone also noted that the west side of the activity area (in the centre of the current study area) had been previously subjected to significant ground disturbance as a result of construction of a former airstrip and an existing gas pipeline.

Stone and Defteros (2009) prepared a CHMP for a large parcel of land within the current study area, also on the west side of Clyde Road. The assessment for this CHMP included desktop, standard and complex phases of investigation. No Aboriginal archaeological material was identified during the standard assessments. The complex assessment involved excavation of six 1m² metre test pits and 28 50cm x 50cm shovel probes and these were focussed around sites VAHR 7921-0682 and VAHR 7921-0683, identified by Bell, as well as sampling more widely on the low lying plain. The results supported Bell's general interpretation of relatively consistent soil profile, but identified the slight variation in clay content between the subsurface sediments of the Hallam Loam on the elevated areas and the Narre Clay in the lower lying swampy land. They also identified an area as 'Modified soil' which differed from the natural stratigraphy over a large area on the east side of their Activity Area, which they concluded was the result of freeway and artificial drain construction. No Aboriginal archaeological material was identified during the testing. Stone and Defteros therefore concluded that the site VAHR 7921-0683 was likely to be the periphery of a site primarily located on the rise to the north of the study area which had subsequently been destroyed by the adjacent development, while the paucity of artefacts present in VAHR 7921-0682 was indicative of the lack of suitability of the lower lying landform for prior Aboriginal habitation.

Chandler and Muhlen-Schulte (2011) undertook an assessment as part of a CHMP for a proposed wetland area, again entirely within the current study area on the west side of Clyde Road. This assessment included desktop, standard and complex assessments. The complex assessment included excavation of one 1m² test pit, which established a stratigraphic profile of greyish brown silty clay over orange compact clay (at 450mm) and a grid of 32 40cm x 40cm shovel probes, which were excavated to a maximum depth of 460mm (with clay reached between 220 and 460mm). These results confirmed an apparent uniformity in the subsurface sediments, with no clear difference between Hallam Loam and Narre Clay, as suggested by Stone and Defteros (2009). The complex assessment resulted in the location of four Aboriginal artefacts (three silcrete and two quartzite) in two shovel probes approximately five metres apart in the south east of the activity area (along the southern boundary of the current study area). Radial shovel test pits were excavated around these but no other material was identified. This material was registered as site VAHR 7921-1293.

Localised Assessments immediately adjacent to the Study Area

Nicolson and Burch (2008) undertook an assessment of a property at 55 Kangan Drive, Berwick for a CHMP for a proposed rezoning and construction of a proposed business and commercial centre. This activity area immediately abuts the eastern side of the current study area on the east side of Clyde Road.

The CHMP assessment included desktop, standard and complex phases of investigation. The complex assessment included excavation of a 50cm x 50cm manual test pit and 33 shovel test pits. The controlled subsurface test pit revealed a profile consisting of loose brown loam over compact sandy clay and quartz sand over a very compact clay base at around 300mm. The shovel probes revealed that the loose loam generally contained blue metal and concrete inclusions, and exhibited evidence deposition of quartz sand up to 500mm deep. Nicolson and Burch concluded as a result that the topsoils in the activity area had been stripped and the area backfilled with quartz sand to aid drainage then topped with loose topsoil which contained the blue metal and concrete inclusions. The potential for Aboriginal archaeological sites to be found in the area was therefore considered to be extremely low.

Murphy and Dugay-Grist (2008) completed A CHMP at 2–30 Golf Links Road in Berwick, to the southwest of the current study area abutting the south side of the Princes Freeway. The activity area was located on a rise to the north east of a former swampland and was therefore considered to be of moderate to high potential for Aboriginal sites. However, manual and machine testing including two 1m² trenches and two 15m x 1.5m transects did not uncover any Aboriginal cultural heritage material. Murphy and Dugay-Grist concluded that the area was therefore not a focus of Aboriginal use in the past.

Light and Schell (2010) prepared a CHMP for the upgrade of Clyde Road between Anne Street and Kangan Drive in Berwick. The activity area included Clyde Road and part of Kangan Drive immediately abutting the current study area. The assessment involved complex assessment which included excavation of four 1m² test pits. No Aboriginal heritage was located within the activity area and Light and Schell concluded that the majority of the activity area had been impacted by developments such as road and utility construction, including stripping and filling of topsoils. They assessed the activity area as being of low potential for Aboriginal cultural heritage due to the absence of sensitive landforms and known archaeological sites, and the disturbances to the natural topsoils.



Map 5: Areas previously surveyed within the Study Area

Previously Recorded Aboriginal Archaeological Sites near the Study Area

The Victorian Aboriginal Heritage Register (VAHR), accessed through Aboriginal Cultural Heritage Register and Information Services (ACHRIS), was searched on February 17, 2015 as part of this assessment.

There are eighty-four (84) registered Aboriginal cultural heritage places, including 86 separate components, within a two kilometre radius of the study area. These are tabulated and discussed below.

Table 2: Summary of Registered Aboriginal Places within a two kilometre radius of the Study Area

Component Type	Frequency (No.)	Frequency (%)
Artefact Scatter	23	27
Object Collection	62	72
Scarred Tree	1	1
Total Components	86	
Total Registered Places	84	

It must be noted however that the 62 object collections pertain to collections of artefacts recovered from other sites which are not necessarily within the vicinity of the study area and therefore are not relevant to this study. In this case also the vast majority of the object collections are located in the offices of a cultural heritage advisor and originate from sites around the state. With these object collections taken out of consideration, it is clear that stone artefact scatters are by far the most common site type in the region making up 95% of the identified sites. These are scattered across the region, with a small cluster of sites adjacent to Cardinia Creek. The scarred tree is also located near Cardinia Creek.

Three of the registered Aboriginal cultural heritage places are located within the study area itself. These are summarised below:

VAHR Number	Site Contents	Depth of Deposits
7921-0682	2 quartz artefacts on plain in silty clay sediments	300–400mm
7921-0683	11 quartz, silcrete and quartzite artefacts in silty clay sediments on slopes of rise	100–400mm
7921-1293	4 silcrete and quartzite artefacts on plain in silty clay sediments	200–400mm

Registered Historical Places

A search of the Australian Heritage Database, Heritage Victoria's HERMES database and the City of Casey Planning Scheme shows that there are no registered historic places within the study area. The nearest registered historic places are two rusty gum myrtle trees located on Reserve Street in Berwick, approximately 200 metres northeast of the study area, listed on the City of Casey Heritage Overlay as HO24 and HO25.



Map 6: Location of previously recorded sites within the Study area.

5.0 Land Use History

Two of the earliest pastoral runs in the Berwick area were the Cardinia Creek run owned by Terrence O'Connor, and Captain Robert Gardiner's run, on which the Berwick township was established. Gardiner had arrived in 1837 and had originally come from Berwick-upon-Tweed in the United Kingdom, which influenced the naming of the township. The area was originally heavily forested and a timber industry quickly developed, and this land clearance and the impetus provided by the Victorian gold rush saw farming develop as the major industry in the area. Initially wheat and potatoes were grown but this soon gave way to dairying and cheese-making. Berwick's development was assisted by its position on the route to Gippsland, and coach services ran through the township from the 1860s, before the train line arrived in the 1870s. Berwick remained a predominantly rural locality until the post-war period when major industries began to move into the areas west of Berwick and the housing commission bought land for housing. In more recent decades the area has seen major urban residential development (Keating 2005: 70).

A 1932 topographic map of Berwick (Figure 1) shows the rural setting that prevailed in Berwick at this time. Aside from the street grid of the Berwick township, the surrounding area consists of large open blocks. The western part of the study area itself is clearly marked as timbered, and an ephemeral watercourse passes south then west through both portions of the study area.

A 1963 aerial photograph (Figure 2) shows that the activity area is cleared rural land, with apparently no developments on it other than a network of taxiways, roads and two runways associated with an airfield. By this time the majority of the study area had become what was known as Casey Airfield, which was built in 1938 and operated until the 1990s. The airfield was designed by Colonel Rupert Ryan and his sister, Lady Casey, wife of Lord Richard Casey who became Governor-General of Australia in the late 1960s, and who lived in Berwick (History of Berwick Website accessed February 19, 2015). There is a row of buildings or hangars along the east side of the airfield and a dam just to the northwest of these. An allotment on the northeast side of the airfield appears to be landscaped and contains planted trees. Those areas outside the airfield appear as grazing or agricultural land – with some evidence of furrowing indicative of ploughing in the southern and eastern parts of the study area. A drainage line or channel is visible running along the southern edge of the airfield and directly across the eastern part of the study area, suggesting that the ephemeral watercourse visible in this area on the 1932 topographic map has been channelised. There is a house just south of the eastern end of the activity area.

By 1970 (Figure 3) the airfield layout has changed, with a new runway running roughly east-west. The other runways, aprons and taxiways appear much more formalised, and the landscaped area east of the airfield also now contains established roads. Once again the remainder of the study area appears to be undeveloped agricultural land, with some more evidence of ploughed furrows along the southern portion of the study area. What appears to be a small structure is also present in the far west of the study area.

1989 aerial photography (Figure 4) shows the Princes Freeway has been constructed along the southern boundary of the study area and development of the adjacent land to the north is also well underway. The airfield is not very formalised and the northern section of it is largely given over to hangars, taxiways and aircraft parking areas. There are areas of exposed ground along the southern margins of the study area adjacent to the freeway suggesting that freeway construction may have had some impact in these areas. There is also a network of tracks in the area of the current Chisholm TAFE. Only the far western portion of the study area retains the appearance of undeveloped rural land.

2004 google earth imagery (Figure 5) shows that Kangan Drive has been constructed, as have the Chisholm TAFE buildings and some Monash University buildings. The alignment of the drain in the southern part of the western side of the study area has also been modified to include a small loop or bulge to the north. The former airfield runway alignments are still visible, and hangars and taxiways are still visible.

2014 aerial imagery (Figure 6) shows that additional buildings have been built at both the Monash and Chisholm campuses and buildings for the Nossal High School has been constructed. There also appears to be a large area of disturbance to the north of the Nossal school buildings. There are three large areas where the grass colour differs from the surrounds – along the southern edge of the study area in the far west, directly to the south of the Nossal High School buildings, and just south of the drain to the south of the Monash buildings. These may simply indicate grass slashing, but could also be related to some other forms of ground disturbance.

Although not visible on any of the historical imagery discussed above, it is known that a 750mm gas pipeline is present running east-west through the western part of the study area. This was apparently constructed in the 1990s or early 2000s (Stone and Deferos 2009: 11). There are also unconfirmed reports (see Bell 2005: 5) that the far western part of the study area has been used as a market garden in the past.

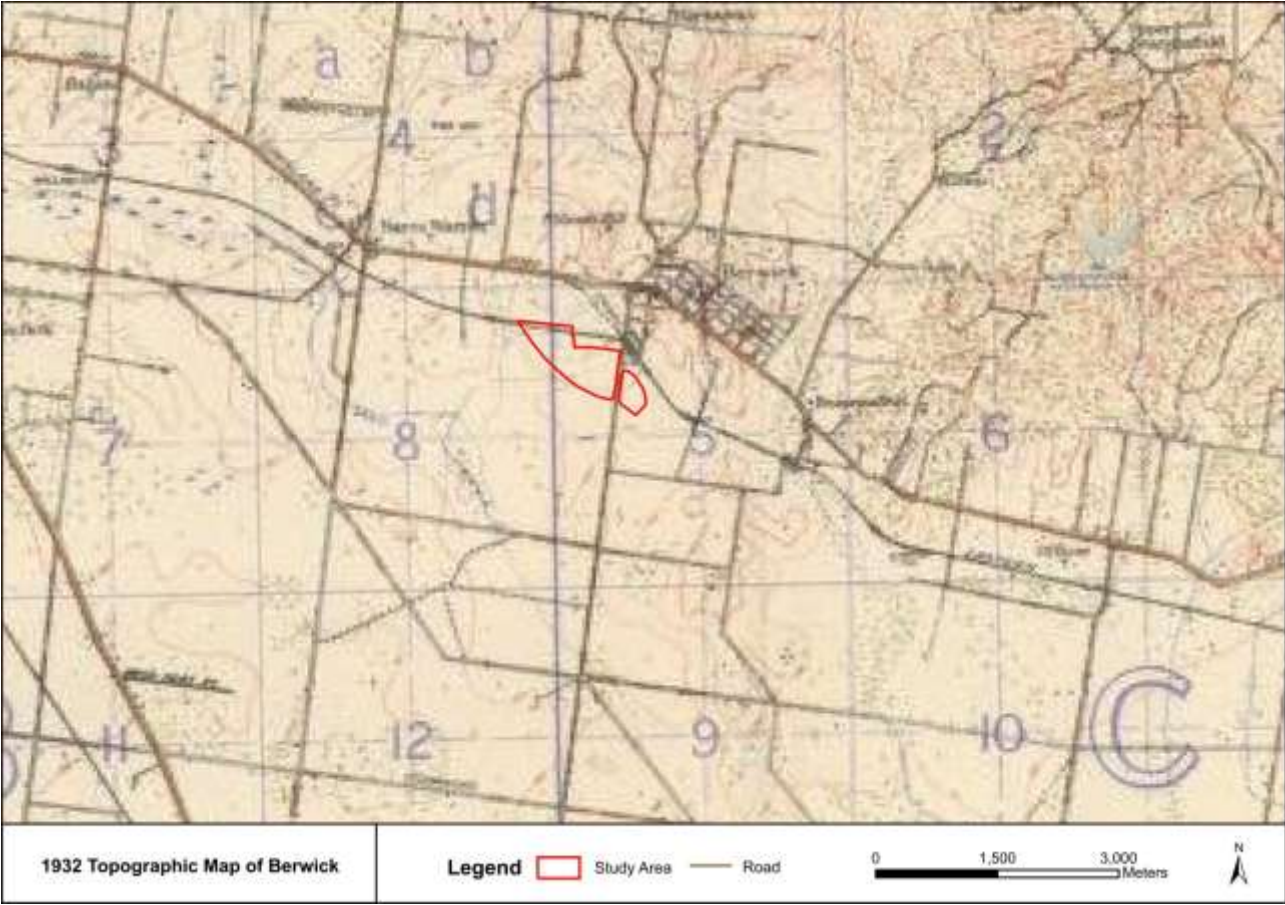


Figure 1: 1932 Topographic Map of Berwick (State Library of Victoria)

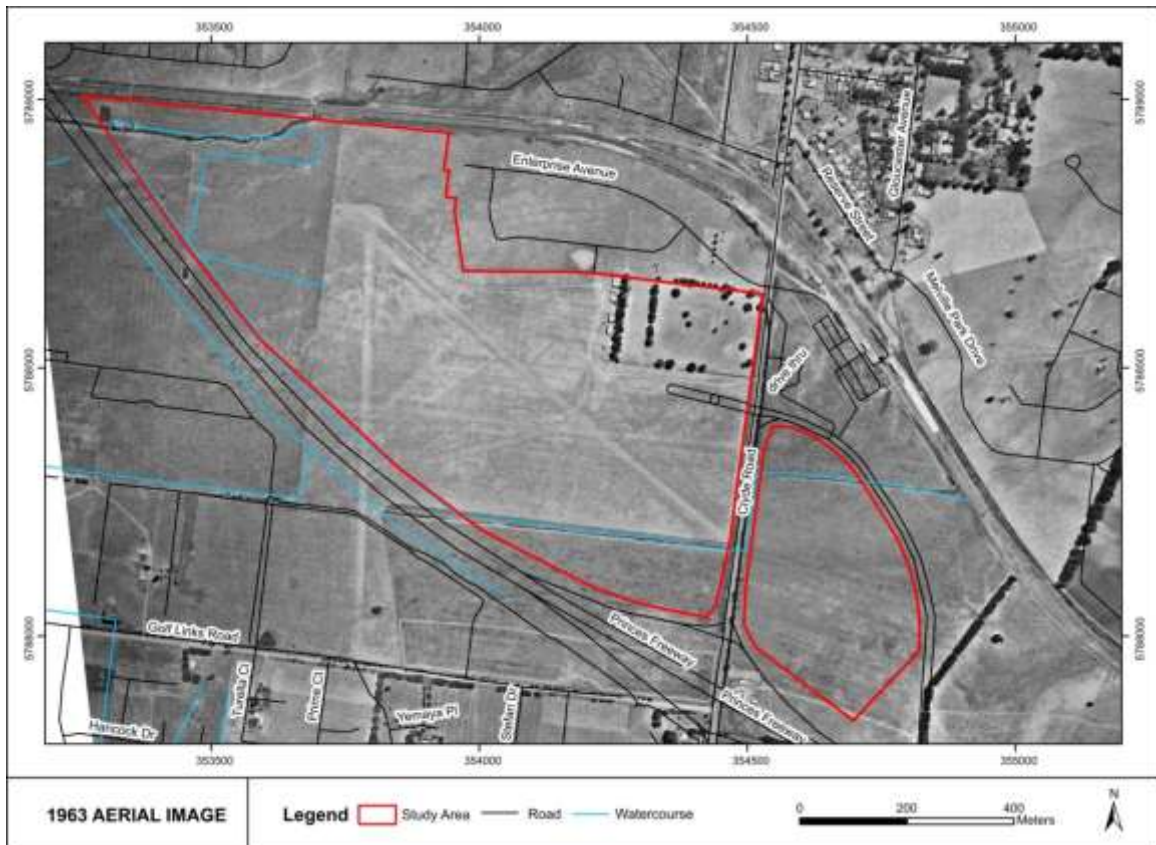


Figure 2: 1963 Aerial Photograph (DSE Laverton)

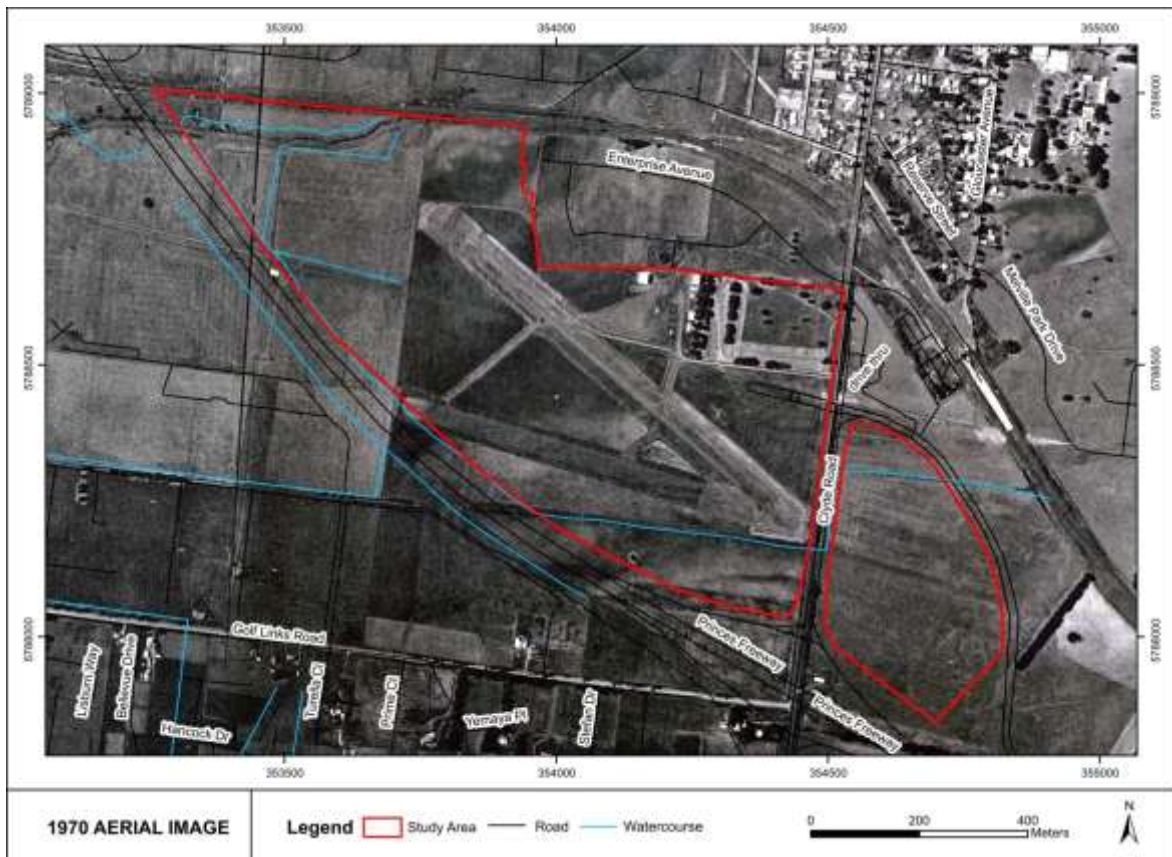


Figure 3: 1970 Aerial Photograph (DSE Laverton)



Figure 4: 1989 Aerial Photograph (DSE Laverton)



Figure 5: 2004 Aerial Imagery (Google Earth)



Figure 6: 2014 Aerial Imagery (Google Earth)

6.0 Review of Desktop Information and Implications for the Study Area

This section provides an assessment of the implications of the information provided in Sections 3.0, 4.0 and 5.0 for the study area, and particularly what they mean for the likely sensitivity of certain landforms and areas within study area. The following statements can be made about the study area:

- The study area primarily contains a mix of low lying former swampland containing paludal deposits and rises with underlying sedimentary geology. The soils of both are characterised by clay loams to depths of 400mm – 500mm, over clay. The study area is largely cleared of native vegetation but these landforms were formerly covered by swamp scrub/swamp woodland and grassland/grassy woodland vegetation respectively.
- Regional archaeological assessments suggest that the study area would be of moderate to high sensitivity for Aboriginal archaeological sites due to the presence of the former swampland and drainage lines, particularly within the western part of the study area. These regional assessments also suggest that due to the clay deposits found within the study area, buried archaeological deposits would be expected at comparatively shallow depths (300mm approximately). The regional distribution of known Aboriginal heritage places suggests that stone artefact scatters are the most likely site type to be found.
- However, land within the study area has been the subject of four previous archaeological field assessments, all of which have included subsurface testing. As a result, large portions of the western part of the study area have been tested for the presence of archaeological sites. These archaeological assessments have resulted in the identification a relatively low density of Aboriginal archaeological material, and considerable areas of disturbance resulting from previous land-use.
- There are three registered Aboriginal cultural heritage places within the study area: VAHR 7921-0682, VAHR 7921-0683, and VAHR 7921-1293. These are all low-density sub-surface stone artefact scatters containing artefacts manufactured from quartz, silcrete, and quartzite, all of which were found at depths between 100 and 400mm. The sites occur in both the sedimentary and swamp geological units and on both flat plains and elevated rises. However, the densest of the sites was located on elevated ground in the northern part of the study area.
- The land-use history indicates that the study area has moved through several phases of use – from agricultural land, to use as an airfield, through to its more recent use for school and university campuses. It is clear that these uses have resulted in a range of disturbances including:
 - Modification and channelisation of drainage lines;
 - Construction of runways, taxiways and associated airfield infrastructure;
 - Construction of school and university buildings including services, drainage, parking and roads.

In addition, it is known that a 750mm gas pipeline runs roughly east-west through the western portion of the activity area. The comparatively recent construction of the adjacent development to the north, the Princes Freeway and Kangan Drive are also likely to have impacted on the periphery of the study area. Most, if not all, of these disturbances would fall within the definition of ‘Significant Ground Disturbance’ as defined by the *Aboriginal Heritage Regulations 2007*, and they jointly cover a large part of the western side of the study area. However, despite hearsay evidence of the previous use of parts of the activity area for market gardening, the land use history suggests that parts of the far western and eastern portions of the study area have only ever been used for agricultural purposes and are therefore less likely to have been significantly disturbed.

Bearing these factors in mind it is reasonably possible that Aboriginal archaeological sites could be located within the study area and buried stone artefact scatters containing quartz, silcrete and quartzite artefacts are the most likely site type to be found. Although sites have been found in low-lying and elevated ground within the study area, larger and higher density-sites would be expected on elevated ground above the lower lying former swamp land. However, in the areas subject to previous substantial disturbance, sites are very likely to have been disturbed, dispersed or destroyed. In areas which have not been as substantially disturbed, buried low density artefact scatters of a similar nature to those already known to occur within the study area could be expected. Due to the apparent absence of native vegetation it is not expected that any culturally scarred trees would remain.

7.0 Field Survey

7.1 Field Survey Methods

A field survey of the study area was undertaken This may locate evidence of surface sites but will not necessarily find buried archaeological deposits. The methodology for the field survey was informed by the desktop assessment, and surface survey was employed in order to:

- Identify any surface evidence of cultural heritage sites; and
- Identify areas of potential sensitivity for sub-surface deposits of Aboriginal cultural material.

The method of inspection involved the field team walking 2-5 metres apart across all parts of the study area. Due to the ground surface visibility, fences and structures and other obstacles however, the survey employed a judgement sample survey, which sought to identify and closely inspect areas of exposure, such as under trees and around disturbed areas such as dams and driveways.

Areas in which there was bare ground surface exposure were inspected closely. The general percentage (%) of ground surface visibility was recorded throughout the study area. All evidence of prior ground disturbance was also recorded. All mature trees within the Activity Area were examined for the presence of scars. The study area was also examined for the presence of caves, cave entrances or rock shelters.

If any surface archaeological sites were located during the assessment, the following would be undertaken:

- Completion of a standard recording form;
- Photography of the general location of the surface site and cultural material; and
- Drawing a plan of the site in relation to landmarks within the study area and recording the location of the cultural material with a differential GPS.

A discussion of the results of the survey took place on-site with the field representatives.

7.2 Field Survey Results

The field survey of the study area was undertaken by Bianca DiFazio (Heritage Insight Pty Ltd), with Leigh Fletcher (BLSA) and Jacqui Wandin (WTLCCHC) on March 31, 2015. Representatives of BWFL were invited to participate via a standard request but no representative of BWFL was available on the day. Survey accessibility was excellent across the study area, and the majority of the study area was inspected by the field team (Map 7). Prior to the field survey, the owners of the land within the study area (Monash University and Chisholm Institute) had provided written consent for the participants to access their properties.



Map 7: Areas surveyed

Ground Surface Visibility and Survey Coverage

Ground surface visibility was uniformly poor across the areas surveyed (See Plates 1 – 3), with pasture grass obscuring the ground surface in virtually all areas assessed. For the majority of these areas ground surface visibility was clearly nil. Some very small patches of higher visibility were identified along a small number of fencelines.

Aside from poor surface visibility there were no other constraints on the survey of the Activity Area.

Landforms and Disturbance

Notwithstanding the information presented in the desktop component of this investigation, the land within the survey area was flat to gently undulating, with no distinct separate landform features such as hills, ridges or valleys.

Numerous surface disturbances were noted across the survey area, including;

- Levelling for the creation of playing fields and tennis courts (Plates 5 and 6);
- A constructed drain located in the central section of the study area (Plate 7);
- Service alignments, marked by signage and access pits (Plate 8)
- Spoil mounds, generally incorporated into the landscaping of the area (Plates 9 and 10)

Much of the study area appeared as open agricultural or grazing land (see Plates 1-3), with alternative vegetation limited to a few areas such as along the easement at the southern boundary of the study area (Plate 11), where the majority of the trees were planted exotics.

Aboriginal Cultural Heritage

No Aboriginal cultural heritage was identified during the field survey. There were no caves, cave entrances or rock shelters identified within the Activity Area. In addition, due to the homogeneity of the landform within the survey area, no specific areas of Aboriginal cultural heritage sensitivity were identified.

The results of the field survey were discussed with the field representatives of BLSA and W/ILCCHC at the conclusion of the survey. Neither Mr Fletcher nor Ms Wandin felt that the land associated with the Berwick HEP held any particular levels of significance and acknowledged that the small numbers of artefacts recovered from the extensive testing undertaken by previous studies in the area indicated that the landscape was not highly sensitive for cultural material.

Historic Sites

No historic sites or areas of potential for historic sites were identified during the field survey.



Plate 1: Western section of the study area showing poor surface visibility



Plate 2: Eastern section of the study area showing poor surface visibility



Plate 3: Central part of the study area showing poor surface visibility



Plate 4: Easement on the southern boundary of the central section of the study area showing small areas of excellent surface visibility



Plate 5: Eastern section of the study area showing benching and levelling associated with a football pitch



Plate 6: Levelled land associated with tennis courts in the central section of the study area



Plate 7: Excavated drain in the central section of the study area



Plate 8: View over western section of the study area showing service alignment in the foreground



Plate 9: Large artificial mound in eastern section of the study area



Plate 10: Large artificial mound in eastern section of the study area



Plate 11: Small area of vegetation in easement on the southern boundary of the eastern section of the study area

8.0 Aboriginal Heritage Site Prediction Plan

The survey confirmed that the study area is substantially modified, and no specific landforms or areas were identified as being sensitive for Aboriginal cultural heritage. The survey was hampered by poor ground surface visibility so definitive interpretations about the presence or absence of Aboriginal heritage, even in surface contexts, is not possible.

Nevertheless, it can be concluded from the combination of desktop and field survey results that the entirety of the study area is of low sensitivity for Aboriginal cultural heritage (Map 8). The previous archaeological assessments within the study area have involved standard and complex assessment incorporating over 500m² of excavator transects; seven 1m² test pits; 28 50cm x 50cm shovel probes; and 32 40cm x 40cm shovel probes. These investigations have intensively assessed a substantial portion of the western part of the activity area (on the west side of Clyde Road). These investigations resulted in the recovery of 17 artefacts which make up the three registered sites within the activity area (VAHR 7921-0682, VAHR 7921-0683 and VAHR 7921-1293). This is a very low density of cultural heritage material given the intensity and extent of the investigations. The current field survey has confirmed that the parts of the study area that have not been previously assessed in detail are located on the same landforms as those that have, and as such are likely to be of similarly low sensitivity. The survey has also confirmed that the study area has been subject to a range of disturbances. Despite the presence of the three previously recorded sites (VAHR 7921-0682, VAHR 7921-0683 and VAHR 7921-1293), the areas at and surrounding these are not considered to be more sensitive than other parts of the study area, as the immediately surrounding areas were assessed during the investigations that originally located the sites (and also in subsequent investigations) and the extents of the sites were defined on the basis of these investigations.

In conclusion, the whole of the study area can be considered to be of low sensitivity for Aboriginal cultural heritage, and the statements made at the conclusion of the desktop assessment can be reiterated: in parts of the study area subject to previous substantial disturbance, any archaeological sites are very likely to have been disturbed, dispersed or destroyed. In areas which have not been as substantially disturbed, buried low density artefact scatters of a similar nature to those already known to occur within the study area could be expected. It is not expected that any culturally scarred trees remain.



Map 8: Aboriginal Heritage Site Prediction Plan

9.0 Management of Aboriginal Cultural Heritage within the Berwick HEP

9.1 Cultural Heritage Management Plans

Under the *Aboriginal Heritage Act* 2006 and *Aboriginal Heritage Regulations* 2007, a Cultural Heritage Management Plan (CHMP) is a mandatory requirement for a proposed activity if:

- All or part of the activity area is an area of cultural heritage sensitivity (*Aboriginal Heritage Regulations* 2007, Division 1, 6(a)); and
- The proposed activity is a high impact activity (*Aboriginal Heritage Regulations* 2007, Division 1, 6(b)).

The Berwick HEP area contains large areas defined as areas of cultural heritage sensitivity under the *Regulations* (see Map 9). As a result, if any high impact activities are proposed within the Berwick HEP, a cultural heritage management plan must be prepared. A list of High Impact Activities as defined in the *Aboriginal Heritage Regulations* 2007 is attached as Appendix A to this report.

However, given the high level of disturbance across the Berwick HEP and the extensive level of previous archaeological assessment including sub-surface testing, there is a possibility that depending on the location and nature of any specific activity there could be an exemption from CHMP made on the basis of significant ground disturbance as defined in the *Aboriginal Heritage Regulations* 2007, or that a CHMP could be completed at desktop or standard assessment stage. However, this would need to be assessed at the time of the proposed activity.

9.2 Specific Recommendations in relation to Registered Aboriginal Places within the Berwick HEP

VAHR 7921-0683

In CHMP 10755 Stone and Defteros (2009: 37) made a recommendation for the protection of VAHR 7921-0683. The recommendation related to the site protection was:

An area 50m long and 30m wide should be set aside to preserve a representative sample of the raised landform containing 7921-0683 (VAHR). Figure 3 shows the proposed exclusion zone, which is located north of the proposed car park and includes the GPS centrepoint of the Aboriginal site (Figure 3).

As the area in the vicinity of VAHR 7921-0683 is currently undeveloped, the recommendation made by Stone and Defteros in CHMP 10755 should stand, and no works associated with the Berwick HEP should be conducted within the exclusion zone proposed by Stone and Defteros. A map of this exclusion zone, taken directly from CHMP 10755 is included as Appendix B.

VAHR 7921-0682

In CHMP 10755 Stone and Defteros (2009: 35-37) stated that care should be taken to ensure that VAHR 7921-0682 would not be inadvertently harmed by activities proposed in that CHMP, and recommended fencing a small area around the site during the proposed works. However, they also noted that none of the activities proposed in CHMP 10755 would directly impact on the site. Should this change under proposals for the Berwick HEP, any impacts to VAHR 7921-0682 should be dealt with by preparation of a Cultural Heritage Management Plan.

VAHR 7921-1293

The material remains (artefacts) from VAHR 7921-1293 were effectively salvaged during the preparation of CHMP 11530 (Chandler and Muhlen-Schulte 2011). Nevertheless, the site is an Aboriginal cultural heritage place, and as such the location remains an area of cultural heritage sensitivity and would therefore require a Cultural Heritage Management Plan in the event of any proposed impacts associated with the Berwick HEP in future.

It should also be noted that the artefacts recovered from VAHR 7921-1293 are currently stored at the offices of the cultural heritage advisor who prepared the plan. Under the compliance requirements outlined in CHMP 11530, there is provision for these artefacts to be repatriated. Although not clearly stated in the CHMP, it may be that the artefacts from VAHR 7921-1293 will be repatriated to a location within the Berwick HEP area in future.



Map 9: Defined Areas of Cultural Heritage Sensitivity within the Berwick HEP

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Appendix A – High Impact Activities defined in the *Aboriginal Heritage Regulations 2007*

Buildings and works for specified uses

- (i) aquaculture;
- (ii) a camping and caravan park;
- (iii) a car park;
- (iv) a cemetery;
- (v) a child care centre;
- (vi) a corrective institution;
- (vii) a crematorium;
- (viii) an education centre;
- (ix) an emergency services facility;
- (x) a freeway service centre;
- (xi) a hospital;
- (xii) an industry;
- (xiii) intensive animal husbandry;
- (xiv) a major sports and recreation facility;
- (xv) a minor sports and recreation facility;
- (xvi) a motor racing track;
- (xvii) an office;
- (xviii) a place of assembly;
- (xix) a pleasure boat facility;
- (xx) a research centre;
- (xxi) a retail premises;
- (xxii) a retirement village;
- (xxiii) a service station;
- (xxiv) a transport terminal;
- (xxv) a utility installation, other than a telecommunications facility, if—
 - (A) the works are a linear project that is the construction of an overhead power line with a length exceeding one kilometre or for which more than 10 power poles are erected; or
 - (B) the works are a linear project that is the construction of a pipeline with a length exceeding 500 metres; or
 - (C) the works are a linear project with a length exceeding 100 metres (other than the construction of an overhead power line or a pipeline with a pipe diameter not exceeding 150 millimetres); or
 - (D) the works affect an area exceeding 25 square metres.
- (xxvi) a veterinary centre;
- (xxvii) a warehouse;
- (xxviii) land used to generate electricity, including a wind energy facility.

Constructing specified items of infrastructure

- (a) an airfield;
- (b) a bicycle track with a length exceeding 100 metres;

- (c) a helipad;
- (d) rail infrastructure, other than—
 - (i) a railway track with a length of less than 100 metres; or
 - (ii) a railway track siding with a length of less than 100 metres; or
 - (iii) a cutting with a length of less than 100 metres; or
 - (iv) a tunnel with a length of less than 100 metres; or
 - (v) a bridge with a span of less than 100 metres; or
 - (vi) a platform with a length of less than 100 metres; or
 - (vii) a service road with a length of less than 100 metres;
- (e) a road with a length exceeding 100 metres;
- (f) a walking track with a length exceeding 100 metres;
- (g) a telecommunications line consisting of an underground cable or duct with a length exceeding 500 metres.

Dwellings

- (1) The construction of three or more dwellings on a lot or allotment is a high impact activity.
- (2) The carrying out of works for three or more dwellings on a lot or allotment is a high impact activity.

Subdivision of land

- (1) The subdivision of land into three or more lots is a high impact activity if—
 - (a) the planning scheme that applies to the activity area in which the land to be subdivided is located provides that at least three of the lots may be used for a dwelling or may be used for a dwelling subject to the grant of a permit; and
 - (b) the area of each of at least three of the lots is less than eight hectares.
- (2) The subdivision of land into two or more lots in an industrial zone is a high impact activity.

Alpine resorts

- (1) The construction of a building or the construction or carrying out of works in an alpine resort is a high impact activity if the construction of the building or the construction or carrying out of the works would result in significant ground disturbance.

Activities requiring earth resource authorisations

An activity is a high impact activity if it is an activity—

- (a) for which an earth resource authorisation is required before the activity may be carried out

Extraction or removal of stone

- (1) The extraction or removal of stone (other than sand or sandstone) that does not require an earth resource authorisation is a high impact activity if—
 - (a) the primary purpose of the extraction or removal is—
 - (i) the sale or commercial use of the stone; or
 - (ii) the use of the stone in construction, building, road or manufacturing works; and
 - (b) the land from which the stone is extracted or removed is more than 2000 square metres; and
 - (c) the extraction or removal would result in significant ground disturbance.

Extraction or removal of sand or sandstone

- (1) The extraction or removal of sand or sandstone (other than extraction or removal that requires an earth resource authorisation) is a high impact activity if the extraction or removal would result in significant ground disturbance.

Searching for stone

- (1) A search for stone is a high impact activity if it would result in significant ground disturbance.

Extraction or removal of loose stone on agricultural land on the Victorian Volcanic Plain

- (1) The extraction or removal of loose stone from the surface of land used for agriculture on the Victorian Volcanic Plain is a high impact activity if the extraction or removal—
 - (a) is for the primary purpose of land improvement, including pasture enhancement; and
 - (b) would result in significant ground disturbance.
- (1A) The crushing of loose stone on the surface of land used for agriculture on the Victorian Volcanic Plain is a high impact activity if the crushing is—
 - (a) by machinery; and
 - (b) for the primary purpose of land improvement, including pasture enhancement.
- (2) Subregulations (1) and (1A) do not apply if the land is used for crop raising or has been used for crop raising.

Timber production

- (1) The use of an area of land greater than 40 hectares in size for timber production is a high impact activity if—
 - (a) a permit is required under a planning scheme to use the land for timber production; and
 - (b) the use of the land for timber production would result in significant ground disturbance.
- (2) The construction of a building associated with timber production is a high impact activity if—
 - (a) a permit is required under a planning scheme to construct the building; and
 - (b) the construction of the building would result in significant ground disturbance.

Dams

The construction or alteration of a private dam, other than on a waterway, is a high impact activity if a licence is required under section 67(1A) of the **Water Act 1989** for the construction or alteration of the private dam.

Use of land

- (1) The use of land for a purpose specified in regulation 43(1) is a high impact activity if a statutory authorisation is required to use the land for that purpose.
- (2) The use of land for an extractive industry is a high impact activity if a statutory authorisation is required to use the land for the extractive industry.
- (3) The use of a lot or allotment for three or more dwellings is a high impact activity if a statutory authorisation is required to use the lot or allotment for three or more dwellings.

Appendix B – Map of proposed Exclusion Zone for VAHR 7921-0683 from CHMP 10755 (Stone and Defteros 2009).

